04-09-1382 P

Request for Letter of Map Revision

TUSCANY MASTER PLANNED COMMUNITY
C-1 Channel
Between Lake Mead Drive and Las Vegas Wash

Clark County
City of Henderson, Nevada

VOLUME 1 of 2

Prepared for:

COMMERCE ASSOCIATES, L.L.C.
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Prepared by:

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PBS&J

July 2, 2004

7/2/04

CITY OF HENDERSON
240 Water Street
P. O. Box 95050
Henderson, NV 89009

July 2, 2004

RFCD
2004 JUL 12 AM 9:56

Mr. Max Yuan
Hazard Study Branch
Federal Insurance and Mitigation Administration
500 C Street, SW
Washington, DC 20472

RE: Request for Letter of Map Revision
C-1 Channel, City of Henderson, Clark County, NV

Dear Mr. Yuan:

The enclosed request is for a Letter of Map Revision based on construction of a portion of the Clark County Regional Flood Control District Master Plan facility C-1 Channel, City of Henderson, Clark County, Nevada. PBS&J has prepared the LOMR under contract with Commerce Associates, L.L.C. The C-1 Channel facility is included on the Clark County Regional Flood Control District's Master Plan. As such it will be owned and operated by the City of Henderson, with District funds. Each year the City of Henderson along with other District member entities develop a maintenance work program. These facilities are included in the maintenance work program for long term inspection and maintenance.

Please accept this study to support this request for a Letter of Map Revision. PBS&J has delivered the study documents directly to Pernille Buch-Pedersen at Michael Baker Jr. If you should need further information, please call.

Sincerely,

Curt Chandler, P.E.
Land Development Manager

c: Pernille Buch-Pedersen, Michael Baker, Jr., w/enclosure
Kevin Eubanks, Clark County Regional Flood Control District
Janie Nehipali, City of Henderson

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Tuscany C-1 Channel Improvement Plans (Phase I)
Tuscany C-1 Channel Improvement Plans (Phase II)

1.0 INTRODUCTION

Commerce and Associates, L.L.C. has retained PBS&J to evaluate current drainage conditions for the Tuscany Master Planned Community (TMPC) for the purpose of removing an existing Zone A floodzone that crosses a majority of the site (see Figure 1-Vicinity Map & Figure 3A).

The proposed TMPC is a mixed density residential golf course community encompassing approximately 350 acres situated in the southeast part of the Las Vegas Valley. Current site conditions include a completed golf course and rough graded parcels. Note that no homes have been constructed in or outside the floodzone within the TMPC. Also, a portion of the C-1 Channel (Phase I & II) has been constructed along the eastern side of the TPMC site. The completed portion of the channel consists of approximately 7,500 feet of concrete rectangular channel and two baffled apron energy dissipation structures. The terminal end of the C-1 Channel (Phase III) has been rough graded and ultimately will consist of a rip rap lined trapezoidal channel. The C-1 Channel discharges to the Las Vegas Wash located approximately 1,500 feet north of the subject site. Additional details on the completed portion of the C-1 Channel can be found in the approved design plans located in Appendix F (Volume 2).

2.0 PURPOSE AND SITE DESCRIPTION

2.1 PURPOSE

The purpose of this Letter of Map Revision (LOMR) is to address physical changes to a portion of the C-1 Watershed between Lake Mead Drive and the Las Vegas Wash. Also, this LOMR will address a newly created tributary (herein referred to as 4-Kids) to the C-1 Channel that historically drained directly to the Las Vegas Wash. The downstream portion of the C-1 watershed has undergone substantial development in recent years that has resulted in the construction of numerous flood control facilities. Development of the project site and upstream communities continues today and as a result much of the historic characteristics that defined the floodplain are no longer current. The historic flood source to the project site has been substantially reduced based on urbanization and the implementation of flood control facilities. This LOMR request will analyze a portion of the C-1 Watershed and the 4-Kids tributary to demonstrate that the current conditions no longer warrant some of the flood zone delineations as shown on the current effective FIRM Panel 2605 dated September 27, 2002, revised to reflect LOMR dated November 6, 2003. Please refer to Figure 1 Area/Vicinity Map for an overall view of the project area. Also refer to Figure 2 CCRFCD Flood Control Facilities Map that shows existing and proposed facilities within and adjacent to the project area.

2.2 LOCATION

The subject site (Tuscany Master Planned Community) is located within Sections 29, 32 and 33, Township 21 South, Range 63 East and Sections 4 and 5, Township 22 South, Range 63 East, Mount Diablo Base & Meridian, City of Henderson, Clark County, Nevada. However, note that the total drainage area tributary to the C-1 Channel adjacent to the site used in this analysis encompasses a much broader area than described above.

2.3 TOPOGRAPHY

Historic topography in and around the subject site was alluvial characterized by a network of braided washes. The overall slope across the site is approximately 2.5% from Lake Mead Drive to the Las Vegas Wash. Under historic conditions a single deeply incised natural wash drained the majority of the C-1 Watershed directly to the Las Vegas Wash; however, under current conditions a significant portion of this wash has been improved including the reach analyzed in this LOMR. The Las Vegas Wash, as previously mentioned, is approximately 1,500 feet north of the subject site. The Las Vegas Wash is the principal drainage feature of the Las Vegas Valley responsible for draining the majority of the valley to Lake Mead.

2.4 EXISTING FLOOD CONTROL FACILITIES

The 2002 Master Plan Update (MPU) serves as a planning tool for the implementation of existing and proposed flood control facilities for the Las Vegas Valley. The MPU shows the alignment of the C-1 Channel in relation to the subject site (see Figure 2). Also, refer to Figure 2A that provides detailed information on each existing or proposed facility.

2.5 FEMA FLOODZONE INFORMATION

Figure 3 is a reproduction of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Clark County, Nevada, Community Panel No. 320036C2605E, revised to reflect the LOMR dated November 6, 2003. Figure 3 shows the Zone A floodzone traversing the site from south to north. Also refer to Figure 3A that shows the DFIRM floodzone delineations for the subject site.

It should be noted that the Zone A floodzone located at the northwest corner of the subject site will not be addressed in this report (see Figure 5). The origin of the floodzone is uncertain but appears to be the result of a backwater affect from the confluence of the historic C-1 Wash with the Las Vegas Wash. This floodzone will be addressed in a future LOMR submittal.

2.6 SURVEY

Ground survey was conducted by PBS&J for the following three areas to assist in the analysis:

1. (2) 12'x10' box culverts within the C-1 Channel beneath Lake Mead Drive including several hundred feet upstream and downstream. This survey information was used to prepare HEC-RAS cross-sections and confirm channel and RCB geometry.

2. 4-Kids Channel and upstream natural wash including the box culverts at the upstream (12'x4') and downstream (10'x5') end of the 4-Kids Channel. This survey information was used to prepare normal depth calculations of the natural wash upstream of the 4-Kids Channel and normal depth capacity calculations of the 4-Kids Channel.

3. Unlined portion of the terminal end of the C-1 Channel (Phase III). This survey information was used to prepare HEC-RAS cross-sections for the unlined portion of the C-1 Channel.

The electronic survey data files have been included in the Data CD located in Appendix E.

3.0 HYDROLOGY

3.1 COMPUTER MODELING

The hydrologic model utilized to calculate runoff is the HEC-1 Flood Hydrograph Package, Version 4.1, developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. The methodology and calculations used to determine the hydrologic parameters in the HEC-1 modeling are included in Appendix C. The local parameters for computing runoff have been developed in accordance with the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual.

3.2 HYDROLOGIC REFERENCE

The HEC-1 model submitted in this LOMR combines the hydrology from several sources to form one complete model used to establish the peak 100-year flow in the C-1 Channel. Note that the hydrology established for the onsite TMPC portion is based on future conditions (assuming the site is fully developed) and represent the most conservative result. This assumption was also made for the area immediately northeast of the TMPC (school/park site) that drains to the C-1 Channel. The flow generated by the onsite TMPC accounts for less than 4% of the total flow reaching the C-1 channel adjacent to the site. The majority of the flow used in the hydraulic modeling of the C-1 Channel is from the Carter Burgess reference model upstream of the project site. It should also be noted that the flows shown on the C-1 Channel design plans will not match the hydrology submitted for this LOMR. The C-1 Channel was originally designed to accommodate the MPU flow. The hydrology established for the MPU assumes full build out of the watershed and thus the flow shown on the C-1 Channel design plans are higher.

The following HEC-1 models have been referenced:

1. Carter & Burgess HEC-1 for the C-1 Watershed per approved FEMA Case No.03-09-0270P for the watershed south of Lake Mead Drive tributary to the C-1 Channel.

2. G.C. Wallace HEC-1 from the Technical Drainage Study for Lake Mead Commons Offsite Improvements for the area south of Lake Mead and east of the C-1 Channel. This reference watershed drains to the 4-Kids Channel.

3. Pentacore HEC-1 model from the Technical Drainage Study for Provenance, Mohawk Drive and Sunset Road for the area between Lake Mead Drive and the Tuscany project site.

4. PBS&J HEC-1 model from the *Update to the Technical Drainage Study for Tuscany Loop Road for the onsite hydrology tributary to the C-1 Channel.*

Please refer to Appendix C for the included hydrologic reference material and basin maps discussed in this section.

3.3 WATERSHED BOUNDARY & DESCRIPTION

The total offsite drainage area tributary to the C-1 Channel adjacent to the subject site is approximately 43 square miles and is largely undeveloped in the current condition. Approximately 35% of the watershed is urbanized with mixed density residential and commercial developments. The upstream watershed boundaries are formed by several mountain ranges consisting of steep rugged terrain. These areas are characterized by slopes to 75%, foothills with slopes of 15 to 50%, and alluvial fans with slopes of 1.5 to 5%. The project site is located on an historic fan (prior to urbanization). As previously discussed, the historic potential for flood flows reaching the project site has been diminished with the completion of numerous flood control facilities. These facilities include channels, storm drains and detention basins that are located at key locations within the C-1 Watershed to mitigate flood hazards.

Note that basin C3A1A from the Carter Burgess HEC-1 model overlaps the majority of basins E and F from the G.C. Wallace HEC-1 model. These basins are located immediately east of the C-1 Channel and south of Lake Mead Drive. PBS&J does not propose to revise any of the hydrologic basins from either report, since the overall effect of the overlap is negligible and the result is more conservative.

4.0 HYDRAULICS

4.1 NORMAL DEPTH CALCULATIONS

FlowMaster, version 6.1 was used for normal depth analysis of channel and/or natural wash cross-sections.

4.2 HEC-RAS MODELING

Hydraulic modeling of the C-1 Channel was performed in conformance with the local standards as specified in the Hydrologic Criteria and Drainage Design Manual using the HEC-RAS program, version 3.1.1. The U.S. Army Corps of Engineers' River Analysis System (HEC-RAS) allows the user to perform steady and unsteady flow river hydraulic calculations. A single HEC-RAS model was prepared for this project for the portion of the C-1 Channel between Lake Mead Drive and the Las Vegas Wash. Note that two different sets of channel stationing are used in the HEC-RAS model. The first set of stationing is for the unlined wash between Lake Mead Drive and the first baffled apron drop structure (0+00 to 28+00). The second set of stationing is based off the design plans from the first drop structure to the confluence with the Las Vegas Wash (10+00 to 94+00). The HEC-RAS river stationing has been adjusted to accommodate the various plan stationing. A more detailed discussion of the HEC-RAS model can be found in Section 5.2 of this report.

5.0 RESULTS

Presented below are the results of the analysis for the areas affected by the flood zones within the project boundary.

5.1 4-KIDS CHANNEL

As previously discussed in Section 2.1 of this report, the 4-Kids Channel drains to the C-1 Channel via an 8'x5' RCB. Historically, the watershed tributary to the 4-Kids Channel drained directly to the Las Vegas Wash via a natural wash.

The 4-Kids channel is approximately 1,300 feet of partially improved channel conveying 597 cfs to the C-1 Channel. The 4-Kids Channel is rectangular with stone walls and a 25' bottom width. The bottom of the channel is unlined. The flow tributary to the 4-Kids Channel originates from the watershed upstream of Lake Mead Drive per the G.C. Wallace study discussed in Section 3. Also, a basin downstream of Lake Mead Drive contributes flow to the channel as shown on Figure C-1 in Appendix C. These tributary areas consist predominantly of undeveloped land with some commercial and residential developments.

The natural wash area between the 4-Kids Channel and Lake Mead Drive has been analyzed with normal depth cross-sections (A through E, see Figure 6) using Flowmaster to establish the normal flow depth and width. The 4-Kids Channel has been analyzed with cross-sections F through I to show the flow is contained in the channel. Note that some of the cross-sections show supercritical flow for both the natural wash and the channel. In order to more accurately map the floodplain the critical depth elevation for the supercritical Flowmaster calculation was used as the governing parameter to produce a critical depth top width. The top width at critical depth was then used to map the floodplain at those sections. The results of the normal depth analysis can be found in Appendix D and demonstrate that the floodzone can be narrowed to that shown on Figure 6A. The final analysis for the 4-Kids Channel is the two culvert capacity calculations. As shown on Figure 6, a 12'x4' RCB is located at the upstream end of the channel (immediately downstream of cross-section E). Also, a 10'x5' culvert is located at the downstream end of the channel (immediately downstream of cross-section I). Please refer to Appendix D for the Flowmaster normal depth capacity calculations that show the culverts have adequate capacity to convey the 597 cfs. The 10'x5' culvert at the downstream end of the 4-Kids Channel only extends beneath Olsen Street then transitions to an 8'x5' RCB (see Figure 6). The capacity for the 8'x5' RCB has been checked with a normal depth section that shows the culvert has adequate capacity to convey 597 cfs (see Appendix D for the calculations and culvert profile).

Although the historic principal flooding source has been contained to the 4-Kids

channel, the floodzone north of the downstream limit of study (as shown on Figure 6A) has not been proposed to be removed. PBS&J believes the drainage from the Calico Ridge Residential Community may still pose a flood threat in the current condition and therefore will be addressed in a future submittal.

5.2 C-1 CHANNEL

A HEC-RAS model has been prepared with the use of the design reports in conjunction with PBS&J survey data. Note that the original intent was to incorporate the approved HEC-RAS model from Carter Burgess (FEMA Case No.03-09-270P) into the model for this report. However, due to topographical and culvert geometry discrepancies for the crossing beneath Lake Mead Drive it was decided to create a stand alone model using PBS&J survey data. The HEC-RAS model starts approximately 150 feet upstream of the culvert crossing beneath Lake Mead Drive and includes the following four components as described below:

1. **Component A:** Approximate 600 foot section of the C-1 Channel (150' upstream and 150' downstream of Lake Mead Drive) based on PBS&J ground survey as shown on Figure 7 (HEC-RAS cross-section 1 through 8).

2. **Component B:** Approximate 2,700 foot reach of the C-1 channel downstream of Lake Mead Drive to the existing drop structure based on 1' topography as shown on Figure 7 (HEC-RAS cross-sections -2 through -28.5).

3. **Component C:** Approximate 6,700 foot reach of the C-1 Channel (Phase I & II) based on the design plans (HEC-RAS cross-section -999.5 through -7,500).

4. **Component D:** Approximate 1,600 foot reach of the C-1 Channel (Phase III) consisting of the rough graded trapezoidal terminal section as shown on Figure 8 (HEC-RAS cross-sections -7527.7 through -9162.3).

Please refer to Appendix D for the detailed HEC-RAS output for the C-1 Channel. The results of the model show that the 100-year flow is contained within the C-1 Channel at all sections.

6.0 CONCLUSION

We believe that based on the data and supporting calculations contained within this Letter of Map Revision application, the flood zone revisions for the C-1 Channel and the 4-Kids tributary are warranted. Please refer to **Figures 3 and 4, FEMA Flood Zone Map and Annotated FEMA Flood Zone Map**. Figure 5A and 6A show the proposed revisions to the current effective flood zone delineations.

7.0 REFERENCES

Criteria Manual — *Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual.* Prepared for: Clark County Regional Flood Control District. Adopted August 12, 1999.

FlowMaster — FlowMaster Version 6.1, Haestad Methods, Inc. 1999.

HEC-1 — HEC-1 Flood Hydrograph Package Version 4.1. U.S. Army Corps of Engineers, Hydrologic Engineering Center, June 1998.

HEC-RAS — U.S. Army Corps of Engineers' River Analysis System (HEC-RAS) Version 3.1.1, Hydrologic Engineering Center, May 2003.

MPU 02 — *CCRFCD Master Plan Update of the Las Vegas Valley 2002.* Prepared for Clark County Regional Flood Control District. Prepared by PBS&J, 2002.

SCS — *Soil Survey of Las Vegas Valley Area Nevada 1985.* United States Department of Agriculture, Soil Conservation Service.

CBI — *C-1 Channel System Flood Insurance Restudy.* Prepared by Carter & Burgess, Inc dated December 2002.

GCW — *Technical Drainage Study for Lake Mead Commons Offsite Improvements.* Prepared by G.C. Wallace dated August 2001.

PENT — *Technical Drainage Study for Provenance, Mohawk Drive and Sunset Road.* Prepared by Pentacore dated March 16, 2001.

PBSJ — *Update to the Technical Drainage Study for Tuscany Loop Road.* Prepared by PBS&J dated February 1, 2002.

APPENDIX A

FEMA MT-2 Forms

MT-2 FORM 1

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
320003	City of Henderson	NV	32003C	2605E	11/06/03

2. Flooding Source: C-1 Watershed/Channel

3. Project Name/Identifier: Request for Letter of Map Revision for Tuscany Master Planned Community

4. FEMA zone designations affected: A (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: $4,200

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/frm_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: Brian Loffman, CFM	Company: PBS&J	
Mailing Address: 2270 Corporate Circle Suite 100 Henderson, NV 89074	Daytime Telephone No.: (702) 263-7275	Fax No.: (702) 263-7200
	E-Mail Address: bloffman@pbsj.com	
Signature of Requester (required):		Date: July 2, 2004

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: Curt Chandler, P.E., Land Development Manager		Telephone No.: (702) ~~455-4808~~ 267-3020
Community Name: City of Henderson Public Works	Community Official's Signature (required):	Date: July 2, 2004

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: Mathew S. Baird	License No.: NV 13684	Expiration Date: 12/31/04
Company Name: PBS&J	Telephone No.: (702) 263-7275	Fax No.: (702) 263-7200
Signature:		Date: July 2, 2004

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/culvert, addition/revision of levee/floodwall, addition/revision of [illegible]
☐ 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

PROFESSIONAL ENGINEER-STATE OF NEVADA
MATTHEW S. BAIRD
Exp. 12/31/04
CIVIL
No. [illegible]
7/2/04

Statement of Explanation for following sections:

1. MT-2 Form 1 Page 1 of 2 Section B

In addition to a concrete channel, culverts and bridge structures the C-1 system has two baffled apron drop structures to dissipate energy within the C-1 Channel adjacent to the project site.

MT-2 FORM 2

C-1 Channel

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: C-1 Watershed/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)
S. of Las Vegas Wash	42.47	N/A	6255 cfs

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

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [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.shtm.

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

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	S. of Confluence of C-1 & Las Vegas Wash	-9162.3	n/a	n/a
Upstream Limit	150' U/S of 2 12'x10' RCB @ Lake Mead Dr	8	n/a	n/a

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/frm_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: na	Floodway File Name: na
Corrected Effective Model*	Natural File Name: na	Floodway File Name: na
Existing or Pre-Project Conditions Model	Natural File Name: See Attached	Floodway File Name: na
Revised or Post-Project Conditions Model	Natural File Name: na	Floodway File Name: na
Other - (attach description)	Natural File Name: na	Floodway File Name: na

*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.

Statement of Explanation for following sections:

1. Mt-2 Form 2 Page 1 of 2 Section A 5
2. Mt-2 Form 3 Page 2 of 10 Section B 4 for C-1 Channel (A-E)
3. Mt-2 Form 3 Page 2 of 10 Section C 4

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the 2 12'X10' RCB and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

4. Mt-2 Form 2 Page 2 of 2 Section B

HEC-RAS file name: C-1 Channel Final.prj

MT-2 FORM 2

4-Kids Tributary

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: C-1 Watershed/4-Kids Tributary
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)
E.of Olsen Nof Lake Mead	1.15	N/A	597 cfs

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

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [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.shtm.

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

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	East of Osen St @ (x-section I)	I	n/a	n/a
Upstream Limit	East of Olsen St @ (x-section A)	A	n/a	n/a

2. Hydraulic Method Used

Hydraulic Analysis FlowMaster [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/frm_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: na	Floodway File Name: na
Corrected Effective Model*	Natural File Name: na	Floodway File Name: na
Existing or Pre-Project Conditions Model	Natural File Name: na	Floodway File Name: na
Revised or Post-Project Conditions Model	Natural File Name: na	Floodway File Name: na
Other - (attach description)	Natural File Name: na	Floodway File Name: na

*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.

Statement of Explanation for following sections:

1. Mt-2 Form 2 Page 1 of 2 Section A 5

Explanation: Sediment transport was not considered due to the steepness of channel and the associated high flow velocities. Any sediment entering the system would be transported to the C-1 Channel and then into the Las Vegas Wash.

2. Mt-2 Form 2 Page 1 of 2 Section B for Four-Kids Channel

FlowMaster was used for normal depth capacity calculations for cross-sections A through I.

MT-2 FORM 3

Riverine Structures Form

C-1 Channel

C-1 Channel @ Crossing w/ Lake Mead Drive

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: C-1 Channel

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

Location of Structure: Approximately 150' upstream and 150' downstream of Lake Mead Drive

Downstream Limit/Cross Section: 1

Upstream Limit/Cross Section: 8

2. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

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: C-1 Watershed/Channel

Name of Structure: C-1 Channel based on as-built survey and field inspection

1. Accessory Structures

The channelization includes (check one):

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

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 (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:

Name of Structure:

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); *and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is* a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

(2) 12' x 10' RCB's beneath Lake Mead Drive

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam ..... complete Section D
Levee/Floodwall ..... complete Section E
Sediment Transport ..... complete Section F (if required)

Description Of Structure

1. Name of Structure: (2) 12'x10' RCB's

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

Location of Structure: Beneath Lake Mead Drive at the intersection with the C-1 Channel

Downstream Limit/Cross Section: 5

Upstream Limit/Cross Section: 6

2. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe): Concrete Lined Channel
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

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 (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: C-1 Watershed/Channel

Name of Structure: 2: 12'x10' RCB's based on as-built survey

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

	Stillwater Elevation Behind the Dam	
FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. *Riprap Design Parameters (check one):* ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (*include copies of the design analysis*):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	*Critical Safety Factor*	*Criteria (Min.)*
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: *Extend table on an added sheet as needed and reference*)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
    ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
    ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the 2 12'X10' RCB and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

C-1 Channel D/S of First Baffled Apron

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
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Flooding Source: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: C-1 Channel**

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

   Location of Structure: Section of C-1 Channel between the two existing drop structures.

   Downstream Limit/Cross Section: -999.5

   Upstream Limit/Cross Section: -7250

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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: C-1 Watershed/Channel

Name of Structure: C-1 Channel

1. Accessory Structures

The channelization includes (check one):

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

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 (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:

Name of Structure:

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

- ☐ monolithic cast-in place reinforced concrete
- ☐ reinforced concrete masonry block
- ☐ sheet piling
- ☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (*include copies of the design analysis*):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	*Critical Safety Factor*	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
    ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
    ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

Statement of Explanation for following sections:

1. Mt-2 Form 3 Page 2 of 10 Section B 3 for C-1 Channel

Explanation: Hydraulic Jump is formed due to flow striking the energy dissipators at supercritical velocity when there is a sudden change of steepness and material. The Froude number of the incoming flow ranges from 1.7 to 2.5 causing a weak hydraulic jump, as the velocity throughout is fairly uniform. This hydraulic jump won't affect the stability of the channel but would help in dissipating excess energy of the flowing water and thereby preventing possible erosion of the unlined channel downstream.

Baffled Apron Drop Structure No. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam ..... complete Section D
Levee/Floodwall ..... complete Section E
Sediment Transport..... complete Section F (if required)

Description Of Structure

1. Name of Structure: Drop Structure No.1 within the C-1 Channel

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

Location of Structure: Downstream of unlined C-1 Channel

Downstream Limit/Cross Section: -999.5

Upstream Limit/Cross Section: -1046

2. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

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: C-1 Watershed/Channel

Name of Structure: C-1 Channel

1. Accessory Structures

The channelization includes (check one):

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

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 (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:

Name of Structure:

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☒ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

8'x4' RCB Connected to C-1 Channel @ STA 13+75

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: 8'x4' RCB**

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

   Location of Structure: C-1 Channel at approximately Station 13+75

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

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

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 (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: C-1 Watershed/Channel

Name of Structure: 8'x4' RCB

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

- ☐ monolithic cast-in place reinforced concrete
- ☐ reinforced concrete masonry block
- ☐ sheet piling
- ☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☒ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

Bridge

FEDERAL EMERGENCY MANAGEMENT AGENCY

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Flooding Source: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: C-1 Channel**

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

   Location of Structure: Within C-1 Channel

   Downstream Limit/Cross Section: -2424.4

   Upstream Limit/Cross Section: -2347.4

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe): Concrete Lined Channel
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

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 (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: C-1 Watershed/Channel

Name of Structure: C-1 Channel Bridge

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☒ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

- ☒ monolithic cast-in place reinforced concrete
- ☒ reinforced concrete masonry block
- ☐ sheet piling
- ☒ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	*Criteria (Min.)*
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. *The river flow duration curve is enclosed:* ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

8'x4' RCB Connected to C-1 Channel @ STA 58+00

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: 8'x4' RCB

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

Location of Structure: C-1 Channel at approximately Station 58+00

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

2. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

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

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 (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: C-1 Watershed/Channel

Name of Structure: 8'x4' RCB

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:

2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:

3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:

4. A layout detail for the embankment protection measures. Sheet Numbers:

5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☒ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. *Embankment material is protected by (describe what kind):*

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	*Critical Safety Factor*	*Criteria (Min.)*
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

Baffled Apron Drop Structure No. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: Drop Structure No. 2 within C-1 Channel**

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

   Location of Structure: Terminal end of improved section of the C-1 Channel

   Downstream Limit/Cross Section: -7297.7

   Upstream Limit/Cross Section: -7250

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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: C-1 Watershed/Channel

Name of Structure: C-1 Channel

1. Accessory Structures

The channelization includes (check one):

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

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 (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:

Name of Structure:

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

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. *Does the project involve revised hydrology?* ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. *Riprap Design Parameters (check one):* ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0
(Reference: USACE EM-1110-2-1913 Table 6-1)			

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ *Surcharge-Slope @* , ☐ *surface* psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. *Foundation scour protection* ☐ *is,* ☐ *is not provided. If provided, attach explanation and supporting documentation:*

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

Explanation: Sediment transport was not considered due to the steepness of C-1 channel and the associated high flow velocities. Any sediment entering the system would be transported to the outlet and then into the Las Vegas Wash.

4-Kids Tributary

4-Kids Channel

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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Flooding Source: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: 4-Kids Channel**

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

   Location of Structure: North of Lake Mead Dr., East of Olsen Street

   Downstream Limit/Cross Section: I

   Upstream Limit/Cross Section: E

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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: C-1 Watershed/Channel

Name of Structure: 4-Kids Channel based on as-built survey and field inspection

1. Accessory Structures

The channelization includes (check one):

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

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 597 (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:

Name of Structure:

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):
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)
- ☐ Shape (culverts only)
- ☐ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☐ Skew Angle
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection
- ☐ Low Chord Elevations – Upstream and Downstream
- ☐ Top of Road Elevations – Upstream and Downstream
- ☐ Structure Invert Elevations – Upstream and Downstream
- ☐ Stream Invert Elevations – Upstream and Downstream
- ☐ Cross-Section Locations

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☒ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☒	earthen embankment, dike, berm, etc.	Station	to
☒	structural floodwall	Station	to
☐	Other (describe):	Station	to

c. Structural Type (check one):

- ☒ monolithic cast-in place reinforced concrete
- ☒ reinforced concrete masonry block
- ☐ sheet piling
- ☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☒ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	*Critical Safety Factor*	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

1. Mt-2 Form 2 Page 1 of 2 Section A 5

Explanation: Sediment transport was not considered due to the steepness of channel and the associated high flow velocities. Any sediment entering the system would be transported to the C-1 Channel and then into the Las Vegas Wash.

2. Mt-2 Form 2 Page 1 of 2 Section B for Four-Kids Channel

FlowMaster was used for normal depth capacity calculations for cross-sections A through I.

12'x10' RCB at U/S End of 4-Kids Channel

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: 4-Kids Channel**

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

   Location of Structure: Uptream end of the 4-Kids Channel @ cross-section E

   Downstream Limit/Cross Section: F

   Upstream Limit/Cross Section: E

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

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

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 (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: C-1 Channel/Watershed

Name of Structure: 12' x 10' RCB at U/S end of 4-Kids Channel based on as-built survey & field inspection

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): Inlet Control Nomograph
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)
- ☒ Shape (culverts only)
- ☒ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☐ Skew Angle
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection
- ☐ Low Chord Elevations – Upstream and Downstream
- ☐ Top of Road Elevations – Upstream and Downstream
- ☐ Structure Invert Elevations – Upstream and Downstream
- ☐ Stream Invert Elevations – Upstream and Downstream
- ☐ Cross-Section Locations

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.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☒ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

	Stillwater Elevation Behind the Dam	
FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

- ☐ monolithic cast-in place reinforced concrete
- ☐ reinforced concrete masonry block
- ☐ sheet piling
- ☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

1. Mt-2 Form 2 Page 1 of 2 Section A 5

Explanation: Sediment transport was not considered due to the steepness of channel and the associated high flow velocities. Any sediment entering the system would be transported to the C-1 Channel and then into the Las Vegas Wash.

2. Mt-2 Form 2 Page 1 of 2 Section B for Four-Kids Channel

FlowMaster was used for normal depth capacity calculations.

10'x5' & 8'x5' RCB's @ D/S End of 4-Kids Channel

FEDERAL EMERGENCY MANAGEMENT AGENCY

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Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 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: C-1 Watershed/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
Dam .....complete Section D
Levee/Floodwall .....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. **Name of Structure: 4-Kids Channel (10x5 & 8x5 RCB's)**

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

   Location of Structure: Downstream end of the 4-Kids Channel @ cross-section I

   Downstream Limit/Cross Section: C-1 Channel

   Upstream Limit/Cross Section: I

2. **Name of Structure:**

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

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

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:

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

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

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 (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: C-1 Channel/Watershed

Name of Structure: 10'x5' & 8'x5' RCB's

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): Inlet Control Nomograph
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)
- ☒ Shape (culverts only)
- ☒ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☐ Skew Angle
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection
- ☐ Low Chord Elevations – Upstream and Downstream
- ☐ Top of Road Elevations – Upstream and Downstream
- ☐ Structure Invert Elevations – Upstream and Downstream
- ☐ Stream Invert Elevations – Upstream and Downstream
- ☐ Cross-Section Locations

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.

D. DAM

Flooding Source:

Name of Structure:

1. *This request is for (check one):* ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:

2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:

3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:

4. A layout detail for the embankment protection measures. Sheet Numbers:

5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	*Criteria (Min)*		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. 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.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations? ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations? ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Statement of Explanation for following sections:

1. Mt-2 Form 2 Page 1 of 2 Section A 5

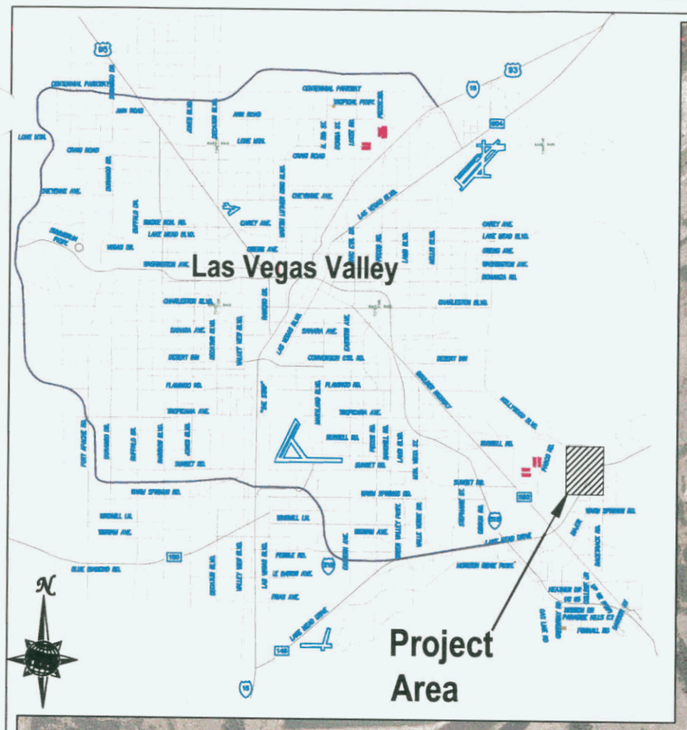
Explanation: Sediment transport was not considered due to the steepness of channel and the associated high flow velocities. Any sediment entering the system would be transported to the C-1 Channel and then into the Las Vegas Wash.

2. Mt-2 Form 2 Page 1 of 2 Section B for Four-Kids Channel

FlowMaster was used for normal depth capacity calculations.

APPENDIX B

Figures



Las Vegas Wash

C-1 Channel / Las Vegas Wash Confluence

Existing Baffled Apron

Tuscany Master Planned Community

Existing Concrete Channel

Existing 4-Kids Channel

Calico Ridge

Olsen St

Existing Baffled Apron

Lake Mead Drive

Pabco Road

Athens Avenue

Racetrack Road

Unnamed Wash

C-1 Channel

N

GRAPHIC SCALE

1000 0 500 1000 2000 4000

(IN FEET)

1 inch =1000 ft.

FIGURE 1: VICINITY MAP

C-1 Channel LOMR

C-1 Channel Alignment

PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
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Fax: 702-263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

FIGURE 1

REGIONAL FLOOD CONTROL DISTRICT

2002 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Culvert
- Bridge
- Pipeline
- Lined Channel
- Unlined Channel
- Dike
- Natural Wash
- ID-Mile Separator

N W E S

0 1,000 2,000 3,000 4,000 5,000 Feet

SCALE: 1 inch = 3000 feet

STUDY AREA

VEGAS VALLEY DR

E RUSSELL RD

E SUNSET RD

BOULDER HWY

BROADBENT BLVD

PABCO RD

E LAKE MEAD BLVD

ATHENS AV

LAKE LAS VEGAS PKWY

GRAND MEDITERRA BLVD

MONTELAGO BLVD

GOLDA AVE

E LAKE MEAD DR

I-215

FLOOD CONTROL FACILITIES
FIGURE F-18

PBS&J

C.C. WALLACE, INC.

FIGURE 2

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
C1CH		C-1 CHANNEL						
0000	P2	Conc Chnl 75'W 10'D with Rip Rap 5:1 SS	2100	7324	CP61*	C1SDN4	11.92	0.40
0040	P2	Conc Chnl 40'W 10'D 0:1 SS	4200	7324	CP61*	C1SDN4	11.92	1.00
0125	P2	Conc Chnl 40'W 10'D 0:1 SS	2100	7324	CP61*	C1SDN4	11.92	1.00
0159	E	Energy Dissipator		7324	CP61*	C1SDN4	11.92	0.00
0161	E	Earth Chnl 30'-60'W 7'-20'D with Gabion 2:1 SS	2750	7324	CP61*	C1SDN4	11.92	2.00
0161	P0	Conc Chnl 40'W 8'D 0:1 SS	7325	2750	CP61*	C1SDN4	11.92	2.00
0213	E	Energy Dissipator		7324	CP61*	C1SDN4	11.92	0.00
0215	E	2: 12' X 9' RCBC @ Lake Mead Dr	270	7324	CP61*	C1SDN4	11.92	3.20
0220	E	Conc Chnl 15'W 9'D 1:1 SS: West Floodwall	2560	7324	CP61*	C1SDN4	11.92	2.30
C1FK		C-1 CHANNEL - FOUR KIDS						
0000	P2	10' X 5' RCB	770	935	CP72B	C1SDN3	1.00	2.50
0014	E	Earth Chnl 21'W 4'-5'D with Rock 0:1 SS	1280	935	CP72B	C1SDN3	1.00	1.80
0039	E	12' X 4' RCBC @ Eagle Rock Rd	70	935	CP72B	C1SDN3	1.00	2.70
0040	P1	Conc Chnl 10'W 4.5'D 2:1 SS	1750	935	CP72B	C1SDN3	1.00	2.70
0073	E	4: 6' X 3' RCBC @ Lake Mead Dr	160	721	CP72A	C1SDN3	0.78	2.00
0076	P1	Conc Chnl 10'W 5'D 0:1 SS	1400	721	CP72A	C1SDN3	0.78	3.00
C1LM		C-1 CHANNEL - LAKE MEAD						
0000	P1	Conc Chnl 10'W 6'D 2:1 SS	2525	1385	CP71	C1SDN3	1.96	0.90
DCWA		DUCK CREEK WASH						
0000	E	Natural Wash	2700	10146	CLDC020	DUCKPITT	50.83	0.90
0168	E	Dip Section @ Broadbent	80	10139	CLDC020	DUCKPITT	50.83	0.45
0168	P2	4: 28' X 8' RCBC	140	10139	CLDC020	DUCKPITT	50.83	0.45
0169	P2	Conc Chnl 118'W 8.4'D 0:1 SS	500	10139	CLDC020	DUCKPITT	50.83	0.45
0182	P2	Conc Chnl 70'W 9'D 2:1 SS	3000	10078	CLDC010	DUCKPITT	50.38	0.45
LLMW		LAKE LAS VEGAS - MAGIC WAY						
0000	E	5: 8' X 5' RCBC	150	1932	CP80	C1SDN3	3.52	1.00
0003	P0	Conc Chnl 10'W 6'D 2:1 SS	6670	1932	CP80	C1SDN3	3.52	3.50
0129	E	6: 8' X 3' RCBC	160	1842	CP79	C1SDN3	3.04	1.00
0132	P0	Conc Chnl 15'W 5'D 2:1 SS	3720	1564	CP77	C1SDN3	2.30	3.10
0203	E	Conc Chnl 35'W 5'-6'D 0.5:1 SS	3000	1515	C1-85	C1SDN3	2.06	3.10
LV01		LAS VEGAS WASH - BRANCH 01 (TROPICANA AVE CHANNEL)						
0000	E	Earth Chnl 4'W 4'D 1:1 SS	3400	2238	CLLV160	TROPCHNL	3.61	0.35
0000	P1	Conc Chnl 14'W 9'D 1:1 SS	2238	3400	CLLV160	TROPCHNL	3.61	0.35
LV02		LAS VEGAS WASH - BRANCH 02 (MONSON CHANNEL)						
0000	E	Earth Chnl 20'W 6'D 1.5:1 SS	6600	2641	CM7	FLAM3SC	4.57	0.32
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	6600	2641	CM7	FLAM3SC	4.57	0.32
LVMD		LAS VEGAS WASH - MIDDLE						
0000	E	SNWA Gradient Control Weir SNWA# = W 3.0	60	22191	CLLV410	LVWSC3	200.00	0.00
0002	P0	SNWA Bank Protection SNWA# = BP 3.0	830	22191	CLLV410	LVWSC3	200.00	0.00
0004	E	Las Vegas Wash Floodway	34000	22191	CLLV410	LVWSC3	200.00	0.00
0010	P0	SNWA Gradient Control Weir SNWA# = W 3.3	430	22191	CLLV410	LVWSC3	200.00	0.00
0014	P0	SNWA Bank Protection SNWA# = BP 3.3	940	22191	CLLV410	LVWSC3	200.00	0.00
0015	P0	SNWA Bank Protection SNWA# = BP 3.3	730	22191	CLLV410	LVWSC3	200.00	0.00
0025	P0	SNWA Gradient Control Weir SNWA# = W 3.5	610	22191	CLLV410	LVWSC3	200.00	0.00
0029	P0	SNWA Bank Protection SNWA# = BP 3.5	1250	22191	CLLV410	LVWSC3	200.00	0.00
0030	P0	SNWA Bank Protection SNWA# = BP 3.7	1030	22191	CLLV410	LVWSC3	200.00	0.00
0049	P0	SNWA Bank Protection SNWA# = BP 3.7	710	22191	CLLV410	LVWSC3	200.00	0.00
0050	P0	SNWA Bank Protection SNWA# = BP 3.7	770	22191	CLLV410	LVWSC3	200.00	0.00
0070	P0	SNWA Gradient Control Weir SNWA# = W 3.9	390	22191	CLLV410	LVWSC3	200.00	0.00
0074	E	SNWA Bank Protection SNWA# = BP 3.9	740	22191	CLLV410	LVWSC3	200.00	0.00
0075	E	SNWA Bank Protection SNWA# = BP 3.9	520	22191	CLLV410	LVWSC3	200.00	0.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVMD		LAS VEGAS WASH - MIDDLE -- continued						
0080	P0	SNWA Gradient Control Weir SNWA# = W 4.2	470	22191	CLLV410	LVWSC3	200.00	0.00
0084	P0	SNWA Bank Protection SNWA# = BP 4.2	610	22191	CLLV410	LVWSC3	200.00	0.00
0085	P0	SNWA Bank Protection SNWA# = BP 4.2	1220	22191	CLLV410	LVWSC3	200.00	0.00
0090	P0	SNWA Gradient Control Weir SNWA# = W 4.5	370	22191	CLLV410	LVWSC3	200.00	0.00
0100	P0	SNWA Bank Protection SNWA# = BP 4.5	400	22191	CLLV410	LVWSC3	200.00	0.00
0105	P0	SNWA Gradient Control Weir SNWA# = W 4.7	510	22191	CLLV410	LVWSC3	200.00	0.00
0110	P0	SNWA Bank Protection SNWA# = BP 4.7	750	22191	CLLV410	LVWSC3	200.00	0.00
0120	P0	SNWA Bank Protection SNWA# = BP 4.7	680	22191	CLLV410	LVWSC3	200.00	0.00
0121	P0	SNWA Bank Protection SNWA# = BP 4.7	360	22191	CLLV410	LVWSC3	200.00	0.00
0130	P0	SNWA Gradient Control Weir SNWA# = W 5.1	310	22191	CLLV410	LVWSC3	200.00	0.00
0140	P0	SNWA Bank Protection SNWA# = BP 5.1	910	22191	CLLV410	LVWSC3	200.00	0.00
0158	P0	SNWA Bank Protection SNWA# = BP 5.1	50	22191	CLLV410	LVWSC3	200.00	0.00
0160	P0	SNWA Bank Protection SNWA# = BP 5.1	90	22191	CLLV410	LVWSC3	200.00	0.00
0161	P0	SNWA Bank Protection SNWA# = BP 5.1	480	22191	CLLV410	LVWSC3	200.00	0.00
0162	P0	SNWA Bank Protection SNWA# = BP 5.1	50	22191	CLLV410	LVWSC3	200.00	0.00
0164	P0	SNWA Bank Protection SNWA# = BP 5.1	680	22191	CLLV410	LVWSC3	200.00	0.00
0168	E	SNWA Gradient Control Weir SNWA# = W 5.4	790	22191	CLLV410	LVWSC3	200.00	0.00
0169	P0	SNWA Bank Protection SNWA# = BP 5.4	820	22191	CLLV410	LVWSC3	200.00	0.00
0171	P0	SNWA Bank Protection SNWA# = BP 5.4	910	22191	CLLV410	LVWSC3	200.00	0.00
0176	P0	SNWA Bank Protection SNWA# = BP 5.4	440	22191	CLLV410	LVWSC3	200.00	0.00
0184	P0	SNWA Bank Protection SNWA# = BP 5.4	940	22191	CLLV410	LVWSC3	200.00	0.00
0189	P0	SNWA Bank Protection SNWA# = BP 5.4	470	22191	CLLV410	LVWSC3	200.00	0.00
0200	P0	SNWA Bank Protection SNWA# = BP 5.4	290	22191	CLLV410	LVWSC3	200.00	0.00
0205	E	SNWA Gradient Control Weir SNWA# = W 5.8	670	21563	CPBR170	LVWSC6	200.00	0.00
0211	E	SNWA Bank Protection SNWA# = BP 5.8	390	21563	CPBR170	LVWSC6	200.00	0.00
0219	E	SNWA Bank Protection SNWA# = BP 5.8	210	21563	CPBR170	LVWSC6	200.00	0.00
0221	E	SNWA Bank Protection SNWA# = BP 5.8	360	21563	CPBR170	LVWSC6	200.00	0.00
0229	E	SNWA Bank Protection SNWA# = BP 5.8	110	21563	CPBR170	LVWSC6	200.00	0.00
0230	E	SNWA Bank Protection SNWA# = BP 5.8	610	21563	CPBR170	LVWSC6	200.00	0.00
0231	E	SNWA Bank Protection SNWA# = BP 5.8	590	21563	CPBR170	LVWSC6	200.00	0.00
0236	E	SNWA Bank Protection SNWA# = BP 5.8	810	21563	CPBR170	LVWSC6	200.00	0.00
0240	E	SNWA Bank Protection SNWA# = BP 5.8	20	21563	CPBR170	LVWSC6	200.00	0.00
0241	E	SNWA Bank Protection SNWA# = BP 5.8	240	21563	CPBR170	LVWSC6	200.00	0.00
0242	E	SNWA Bank Protection SNWA# = BP 5.8	90	21563	CPBR170	LVWSC6	200.00	0.00
0246	E	SNWA Bank Protection SNWA# = BP 5.8	20	21563	CPBR170	LVWSC6	200.00	0.00
0248	E	SNWA Bank Protection SNWA# = BP 5.8	100	21563	CPBR170	LVWSC6	200.00	0.00
0252	E	SNWA Bank Protection SNWA# = BP 5.8	20	21563	CPBR170	LVWSC6	200.00	0.00
0254	E	SNWA Bank Protection SNWA# = BP 5.8	80	21563	CPBR170	LVWSC6	200.00	0.00
0258	E	SNWA Bank Protection SNWA# = BP 5.8	20	21563	CPBR170	LVWSC6	200.00	0.00
0262	E	SNWA Bank Protection SNWA# = BP 5.8	80	21563	CPBR170	LVWSC6	200.00	0.00
0264	E	SNWA Bank Protection SNWA# = BP 5.8	20	21563	CPBR170	LVWSC6	200.00	0.00
0268	E	SNWA Bank Protection SNWA# = BP 5.8	330	21563	CPBR170	LVWSC6	200.00	0.00
0271	E	SNWA Bank Protection SNWA# = BP 5.8	220	21563	CPBR170	LVWSC6	200.00	0.00
0298	E	SNWA Gradient Control Weir SNWA# = W 6.7	780	21563	CPBR170	LVWSC6	200.00	0.00
0300	P0	SNWA Bank Protection SNWA# = BP 6.7	270	21563	CPBR170	LVWSC6	200.00	0.00
0301	P0	SNWA Bank Protection SNWA# = BP 6.7	220	21563	CPBR170	LVWSC6	200.00	0.00
0302	E	SNWA Gradient Control Weir SNWA# = W 6.7	560	21563	CPBR170	LVWSC6	200.00	0.00
0304	P0	SNWA Bank Protection SNWA# = BP 6.7	200	21563	CPBR170	LVWSC6	200.00	0.00
0310	P0	SNWA Bank Protection SNWA# = BP 6.7	820	21563	CPBR170	LVWSC6	200.00	0.00
0311	P0	SNWA Bank Protection SNWA# = BP 6.7	780	21563	CPBR170	LVWSC6	200.00	0.00
0345	P0	SNWA Gradient Control Weir SNWA# = W 7.1	290	21563	CPBR170	LVWSC6	200.00	0.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVMD		LAS VEGAS WASH - MIDDLE -- continued						
0350	P0	SNWA Bank Protection SNWA# = BP 7.1	540	21563	CPBR170	LVWSC6	200.00	0.00
0395	P0	SNWA Gradient Control Weir SNWA# = W 7.3	290	21563	CPBR170	LVWSC6	200.00	0.00
0400	P0	SNWA Bank Protection SNWA# = BP 7.3	670	21563	CPBR170	LVWSC6	200.00	0.00
0401	P0	SNWA Bank Protection SNWA# = BP 7.3	270	21563	CPBR170	LVWSC6	200.00	0.00
0412	P0	SNWA Bank Protection SNWA# = BP 7.3	790	21563	CPBR170	LVWSC6	200.00	0.00
0422	P0	SNWA Gradient Control Weir SNWA# = W 7.7	1570	21563	CPBR170	LVWSC6	200.00	0.00
0426	P0	SNWA Bank Protection SNWA# = BP 7.7	820	21563	CPBR170	LVWSC6	200.00	0.00
0451	P0	SNWA Bank Protection SNWA# = BP 7.7	650	18714	CRWSL	LVWSC2	200.00	0.00
0471	P0	SNWA Bank Protection SNWA# = BP 7.7	540	18714	CRWSL	LVWSC2	200.00	0.00
0478	P0	SNWA Gradient Control Weir SNWA# = W 8.2	170	18714	CRWSL	LVWSC2	200.00	0.00
0480	P0	SNWA Bank Protection SNWA# = BP 8.2	750	18714	CRWSL	LVWSC2	200.00	0.00
0481	P0	SNWA Bank Protection SNWA# = BP 8.2	320	18714	CRWSL	LVWSC2	200.00	0.00
0495	P0	SNWA Gradient Control Weir SNWA# = W 8.5	150	18714	CRWSL	LVWSC2	200.00	0.00
0500	P0	SNWA Bank Protection SNWA# = BP 8.5	610	18714	CRWSL	LVWSC2	200.00	0.00
0511	P0	SNWA Bank Protection SNWA# = BP 8.5	440	18714	CRWSL	LVWSC2	200.00	0.00
0514	P0	SNWA Bank Protection SNWA# = BP 8.5	370	18714	CRWSL	LVWSC2	200.00	0.00
0518	P0	SNWA Gradient Control Weir SNWA# = W 8.8	170	18714	CRWSL	LVWSC2	200.00	0.00
0521	P0	SNWA Bank Protection SNWA# = BP 8.8	550	18714	CRWSL	LVWSC2	200.00	0.00
0524	P0	SNWA Bank Protection SNWA# = BP 8.8	340	18714	CRWSL	LVWSC2	200.00	0.00
0536	P0	SNWA Gradient Control Weir SNWA# = W 9.0	330	18714	CRWSL	LVWSC2	200.00	0.00
0540	P0	SNWA Bank Protection SNWA# = BP 8.8	400	18714	CRWSL	LVWSC2	200.00	0.00
0543	P0	SNWA Bank Protection SNWA# = BP 8.8	370	18714	CRWSL	LVWSC2	200.00	0.00
0551	P0	SNWA Gradient Control Weir SNWA# = W 9.2	250	18714	CRWSL	LVWSC2	200.00	0.00
0552	P0	SNWA Gradient Control Weir SNWA# = W 9.2	380	18714	CRWSL	LVWSC2	200.00	0.00
0560	E	SNWA Bank Protection SNWA# = BP 9.3	1210	18714	CRWSL	LVWSC2	200.00	0.00
0563	E	SNWA Bank Protection SNWA# = BP 9.3	340	18714	CRWSL	LVWSC2	200.00	0.00
0568	E	SNWA Gradient Control Weir SNWA# = W 9.3	90	18714	CRWSL	LVWSC2	200.00	0.00
0582	E	SNWA Bank Protection SNWA# = BP 9.3	20	18714	CRWSL	LVWSC2	200.00	0.00
0586	E	SNWA Bank Protection SNWA# = BP 9.3	190	18714	CRWSL	LVWSC2	200.00	0.00
0591	E	SNWA Gradient Control Weir SNWA# = W 9.5	150	18714	CRWSL	LVWSC2	200.00	0.00
0598	P0	SNWA Bank Protection SNWA# = BP 9.5	360	18714	CRWSL	LVWSC2	200.00	0.00
0600	P0	SNWA Gradient Control Weir SNWA# = W 9.6	130	18714	CRWSL	LVWSC2	200.00	0.00
0601	P0	SNWA Gradient Control Weir SNWA# = W 9.6	250	18714	CRWSL	LVWSC2	200.00	0.00
0602	P0	SNWA Gradient Control Weir SNWA# = W 9.6	250	18714	CRWSL	LVWSC2	200.00	0.00
0603	P0	SNWA Gradient Control Weir SNWA# = W 9.6	170	18714	CRWSL	LVWSC2	200.00	0.00
PTBR		PITTMAN WASH - BURNS						
0000	P1	Conc Chnl 40'W 7.5'D 2:1 SS	1750	5456	CPBR170	PIT3SC	6.37	0.68
0029	E	Rip Rap Chnl 35'W 9'D 2:1 SS	2850	5448	CPBR160	PIT3SC	5.85	0.68
0029	P1	Rip Rap Chnl 60'W 9'D 3:1 SS	5448	2850	CPBR160	PIT3SC	5.85	0.68
0090	E	2: 24' X 8.5' RCAC @ Weisner Way	5448	2850	CPBR160	PIT3SC	5.85	0.90
0091	E	Conc Chnl 25'W 9'D 2:1 SS	2570	5448	CPBR160	PIT3SC	5.85	1.10
0140	E	Conc Chnl 25'W 9'D 2:1 SS	1110	5254	CPBR150	PIT3SC	5.54	0.50
0160	E	Conc Chnl 10'W 8'D 2:1 SS	210	2881	CPBR090	PIT3SC	3.19	1.00
0163	E	Conc Chnl 20'W 8'D 0:1 SS	250	2881	CPBR090	PIT3SC	3.19	1.00
0164	P1	Add 4: 16' X 4' RCBC @ Boulder Hwy	330	2881	CPBR090	PIT3SC	3.19	1.50
0165	E	2: 6' X 4' RCBC @ Boulder Hwy	330	2881	CPBR090	PIT3SC	3.19	1.50
PTGB		PITTMAN WASH - GIBSON						
0058	P1	Conc Chnl 15'W 5.5'D 2:1 SS	1560	1532	CPBR080	PIT3SC	1.76	1.50
PTPA		PITTMAN PABCO						
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	12430	2251	CPLW120	PIT3SC	4.69	0.30
PTVW		PITTMAN WASH - VAN WAGENEN						
0000	P1	Conc Chnl 25'W 6'D 2:1 SS	1460	2848	CPBR090	PIT3	3.19	1.50
0025	E	12' X 8' RCB	1650	1160	CPBR030	PIT3SC	1.07	1.00

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.

**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.

REGIONAL FLOOD CONTROL DISTRICT

2002 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE FACILITY INVENTORY FIGURE F-18

LEGEND

Street Name Designator AA BB
- Parent Stream Name
- Stream Name

ID / River Mile 00 00
- Distance above confluence
- With parent stream
- Miles in tenths

Existing Facility ..... E
Proposed or Modified Facility ..... P
Contingency Level
- Category B P0
- Master Plan P1
- Preliminary Design P2
- Design P3

Bottom Width ..... W
Depth ..... D
Side Slope, H:V ..... SS

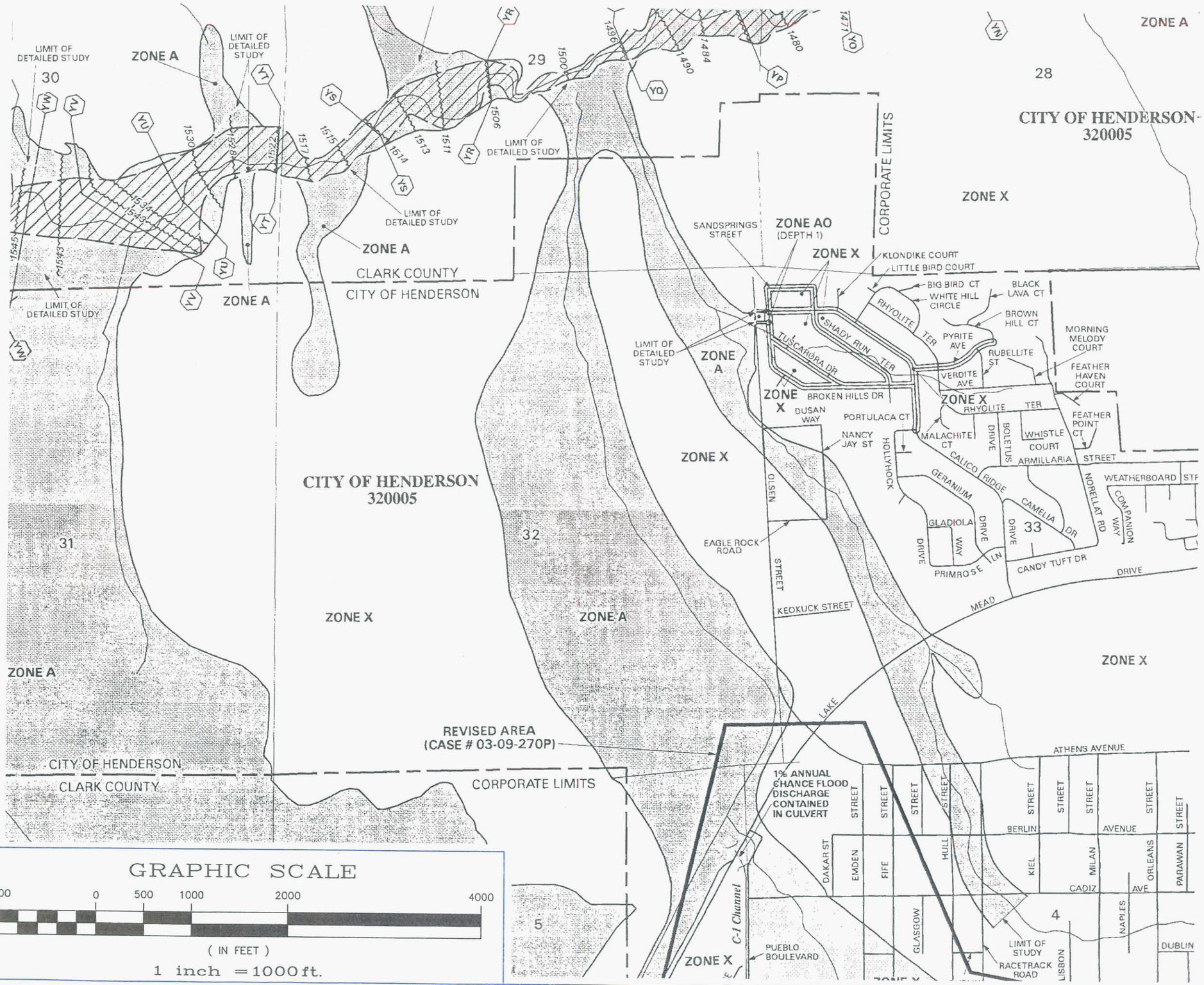
Construction Features

Cast in Place Concrete Pipe ..... CIPCP	Reinforced Concrete Box ..... RCB
Corrugated Metal Arch Pipe Culvert ..... CMAP	Reinforced Concrete Box Culvert ..... RCBC
Corrugated Metal Pipe Culvert ..... CMP	Reinforced Concrete Pipe ..... RCP
High Density Polyethylene ..... HDPE	Reinforced Concrete Pipe Culvert ..... RCPC
Helical Elliptical Reinforced Concrete Pipe ..... HERCP	Storm Sewer Pipe ..... SSP
Reinforced Concrete Arch Pipe ..... RCAC	

PBS&J

G.C. WALLACE, INC.

FIGURE 2A



GRAPHIC SCALE

1000 0 500 1000 2000 4000

(IN FEET)

1 inch = 1000 ft.

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2605E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2605 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2605	E
HENDERSON, CITY OF	320005	2605	E

REVISED TO REFLECT LOMR DATED NOV 06 2003

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2605E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

N

FIGURE 3
FEMA FLOOD ZONE MAP

PBSJ
2270 Corporate Circle
Suite 100
Henderson, NV 89074
Phone: 702-263-7275
Fax: 702-263-7200
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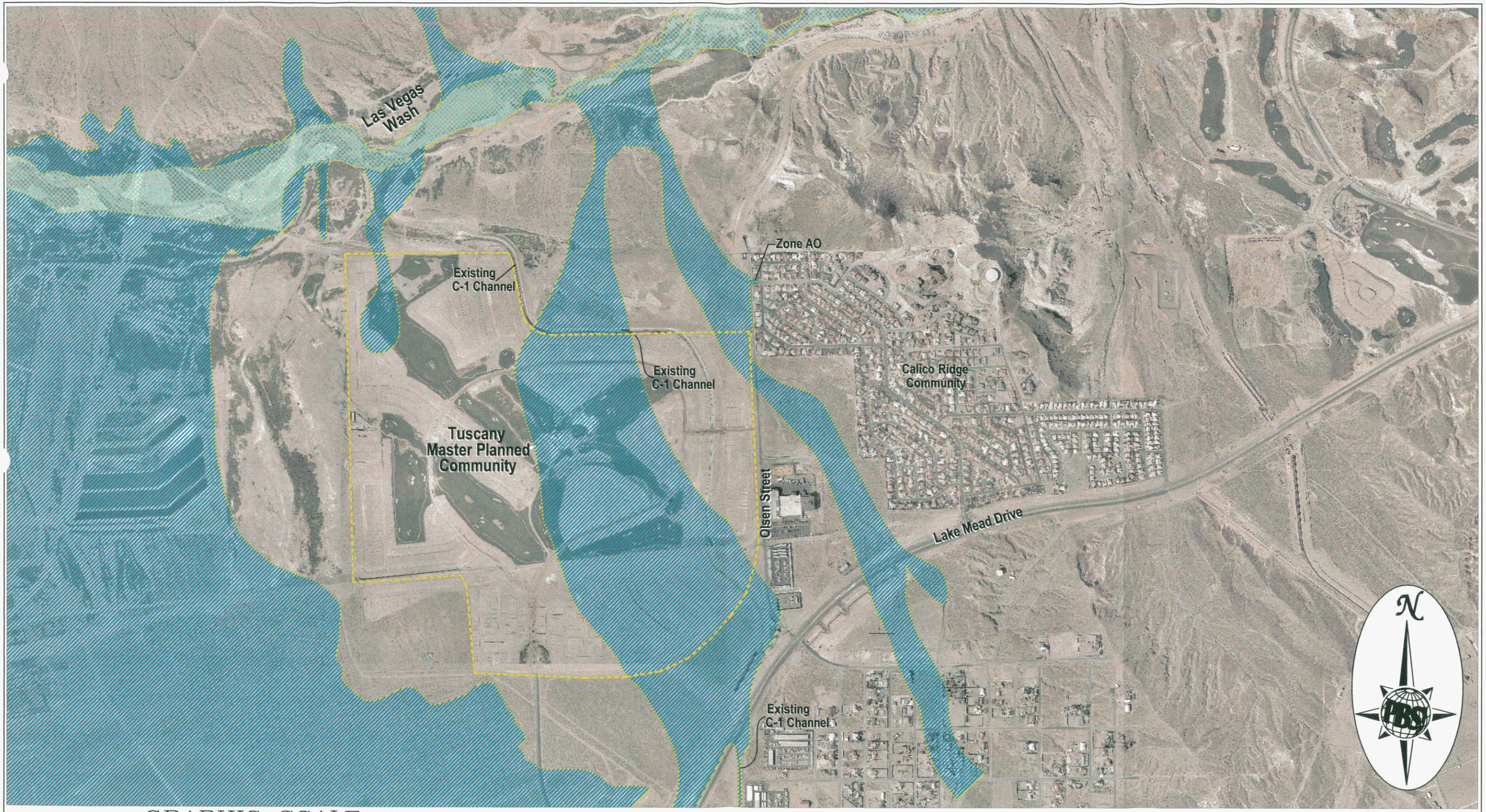

GRAPHIC SCALE

1200 0 600 1200 2400 4800

(IN FEET)

1 inch =1200 ft.

FIGURE 3A: DFIRM Flood Zone Map

Zone A Flood Zone

Zone AE Floodway

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FIGURE 3A

Proposed Floodzone Delineation

Area to be Removed

PANEL 2605E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2605 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2605	E
HENDERSON, CITY OF	320005	2605	E

REVISED TO REFLECT LOMR DATED NOV 06 2003

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2605E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

N

FIGURE 4
ANNOTATED FEMA FLOOD ZONE MAP

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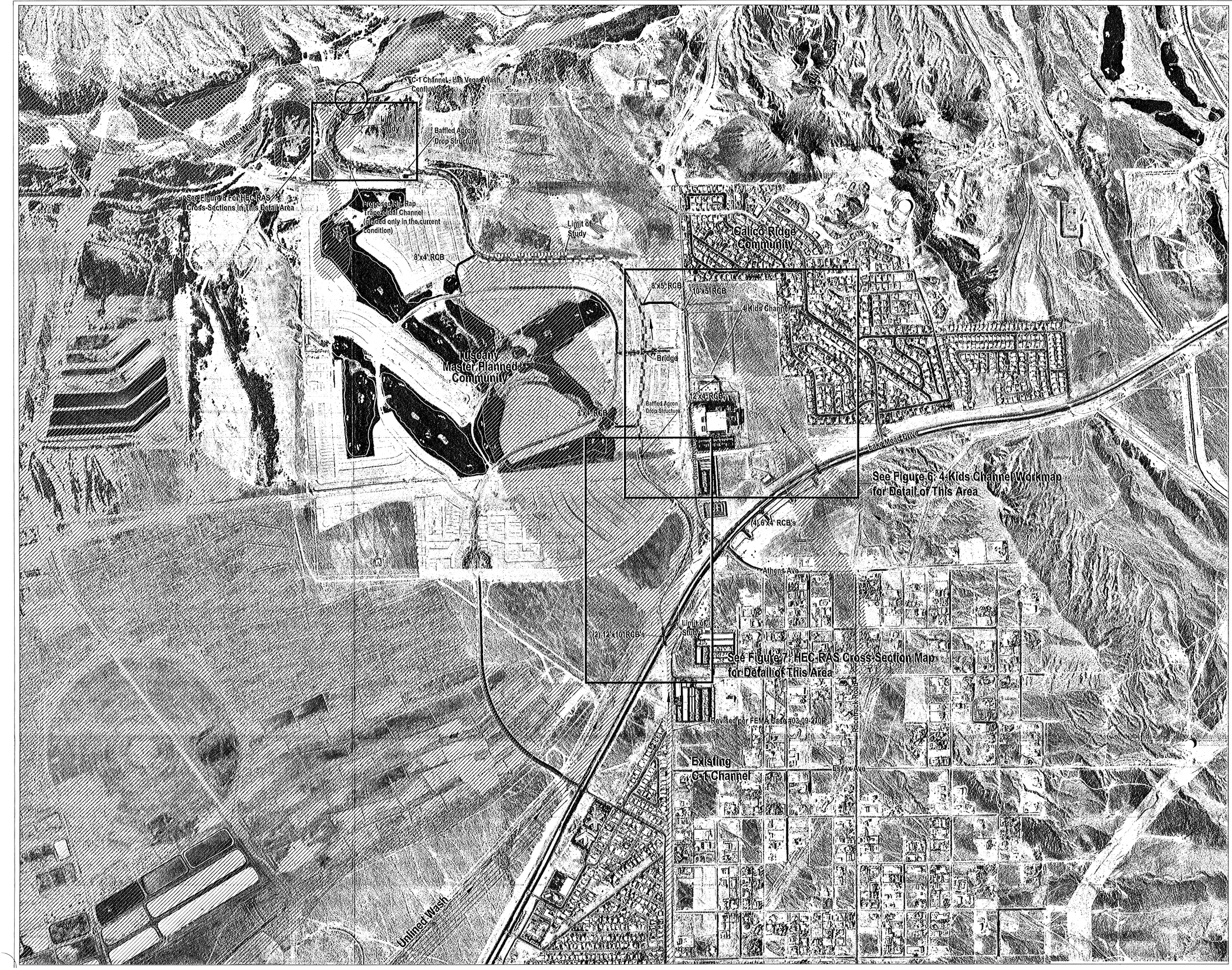

Legend

- Cross-Section Location (A)
- Existing Storm Drain Facility
- Flow Direction Arrow
- TMPC Site Boundary
- 21+00 — HEC-RAS Stationing

Zone A Flood Zone

Zone AE Floodway

Note

Aerial photo as of April 2004

The hydraulic analysis and associated flood zone delineations completed for this LOMR are based on the channel design plans provided in Appendix F and supplemental field survey completed by PBS&J.

I hereby certify that the information used in this LOMR substantially conforms with current conditions.

Matthew S. Baird, NV 13684

N

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)
1 inch = 600ft.

C-1 Channel Letter of Map Revision

FIGURE 5: Overall C-1 Channel Work Map

Project No. 511197.00 July 2004

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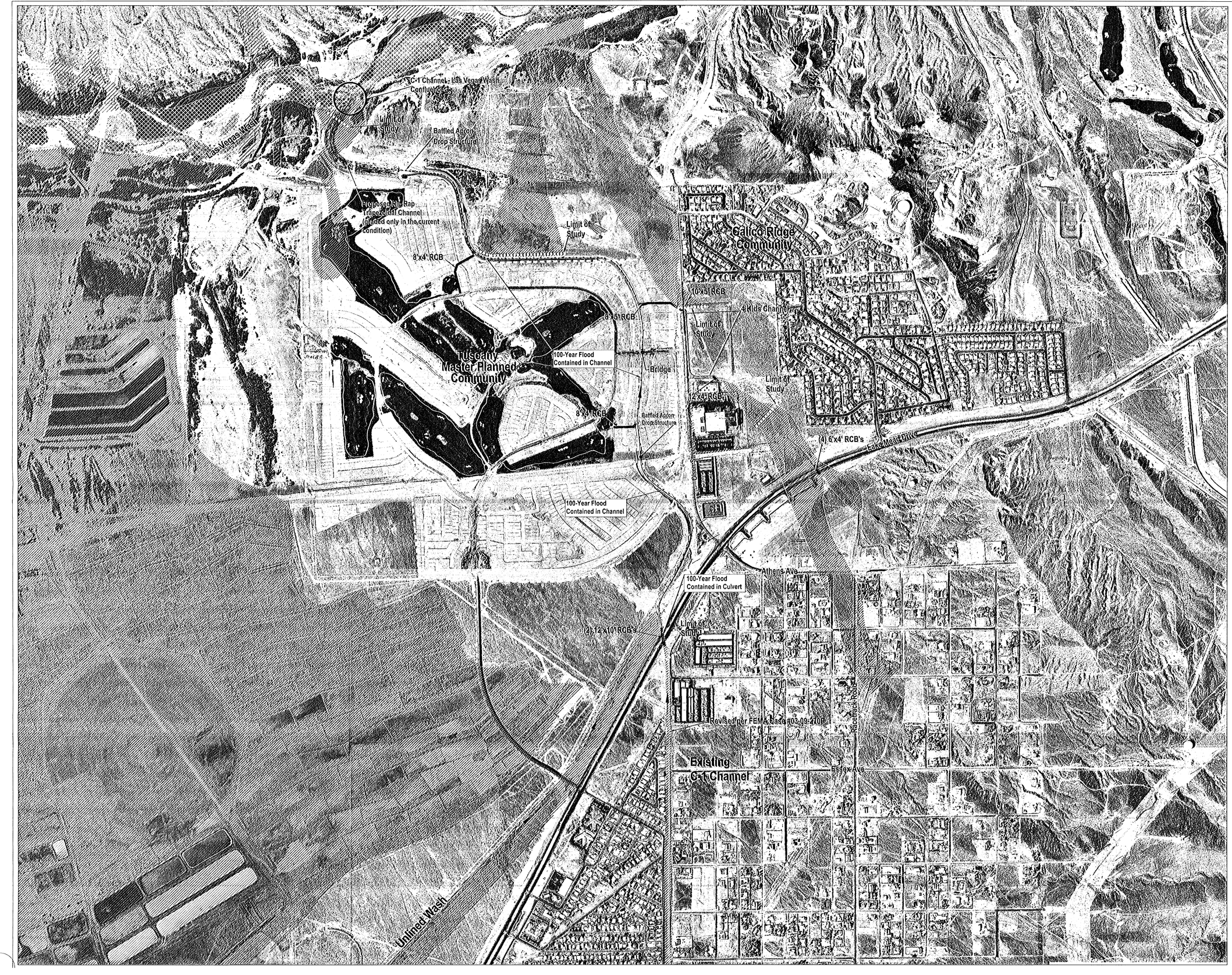
FIGURE 5



Legend

- Existing Storm Drain Facility
- Flow Direction Arrow
- TMPC Site Boundary

Zone A Flood Zone
Zone AE Floodway

Note

Aerial photo as of April 2004.

The hydraulic analysis and associated flood zone delineations completed for this LOMR are based on PBS&J survey data, channel design plans provided in Appendix F and supplemental field investigations completed by PBS&J.
I hereby certify that the information used in this LOMR substantially conforms with current conditions.

Matthew S. Baird, NV 13684

N

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)
1 inch = 600ft.

C-1 Channel Letter of Map Revision

FIGURE 5A: Overall Proposed Floodzone Delineation Work Map

Project No. 511197.00 July 2004

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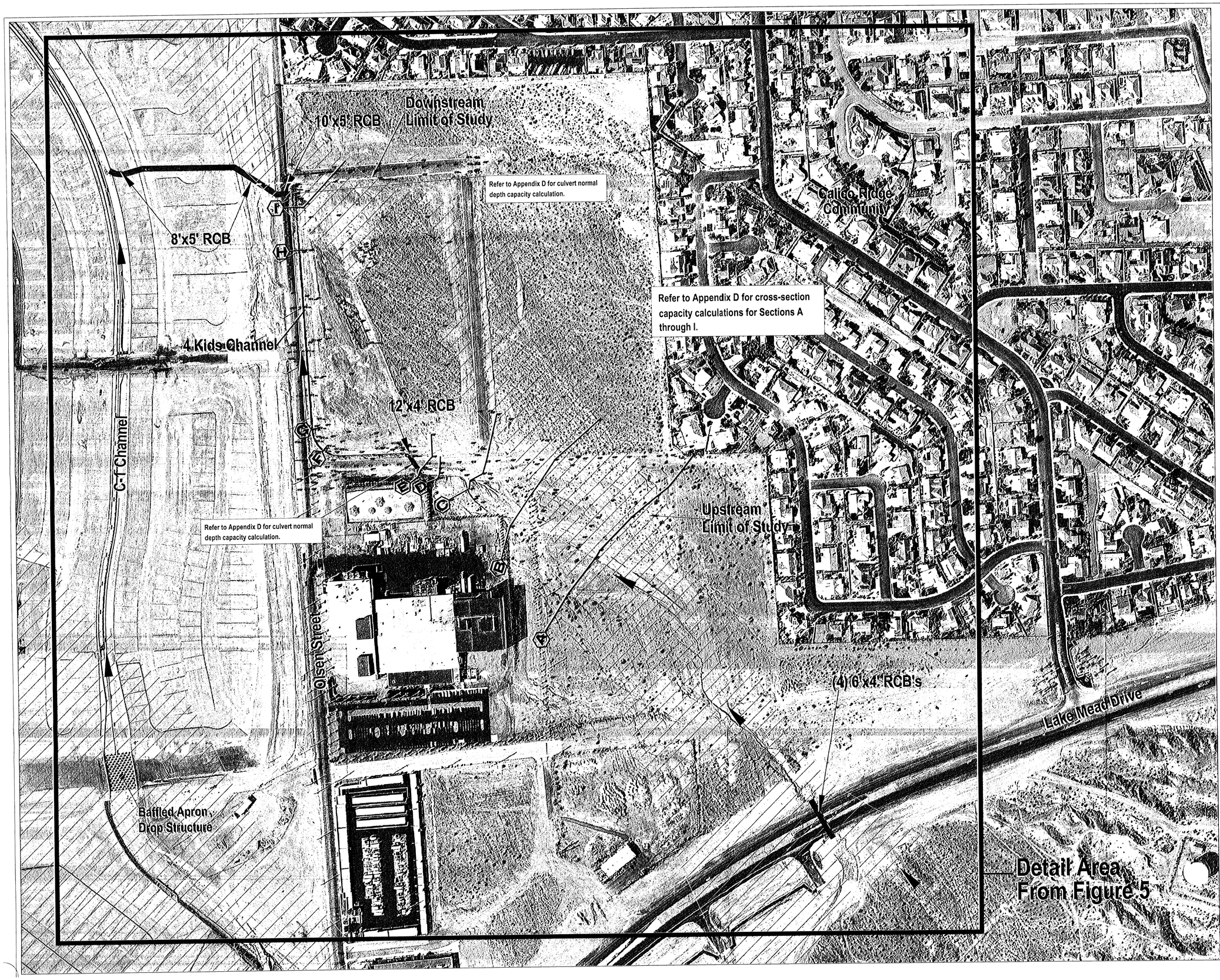
FIGURE 5A



Legend

- Cross-Section Location
- Existing Storm Drain Facility
- Flow Direction Arrow

Note

Aerial photo as of April 2004.
Ground Survey Performed by PBS&J on May 18, 2004

The hydraulic analysis and associated flood zone delineations completed for this LOMR are based on field survey completed by PBS&J as shown on this map.

I hereby certify that the information used in this LOMR substantially conforms with current conditions.

Matthew S. Baird, NV 13684

Zone A Floodzone

N

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150ft.

C-1 Channel Letter of Map Revision

FIGURE 6: 4-Kids Work Map

Project No. 511197.00 July 2004

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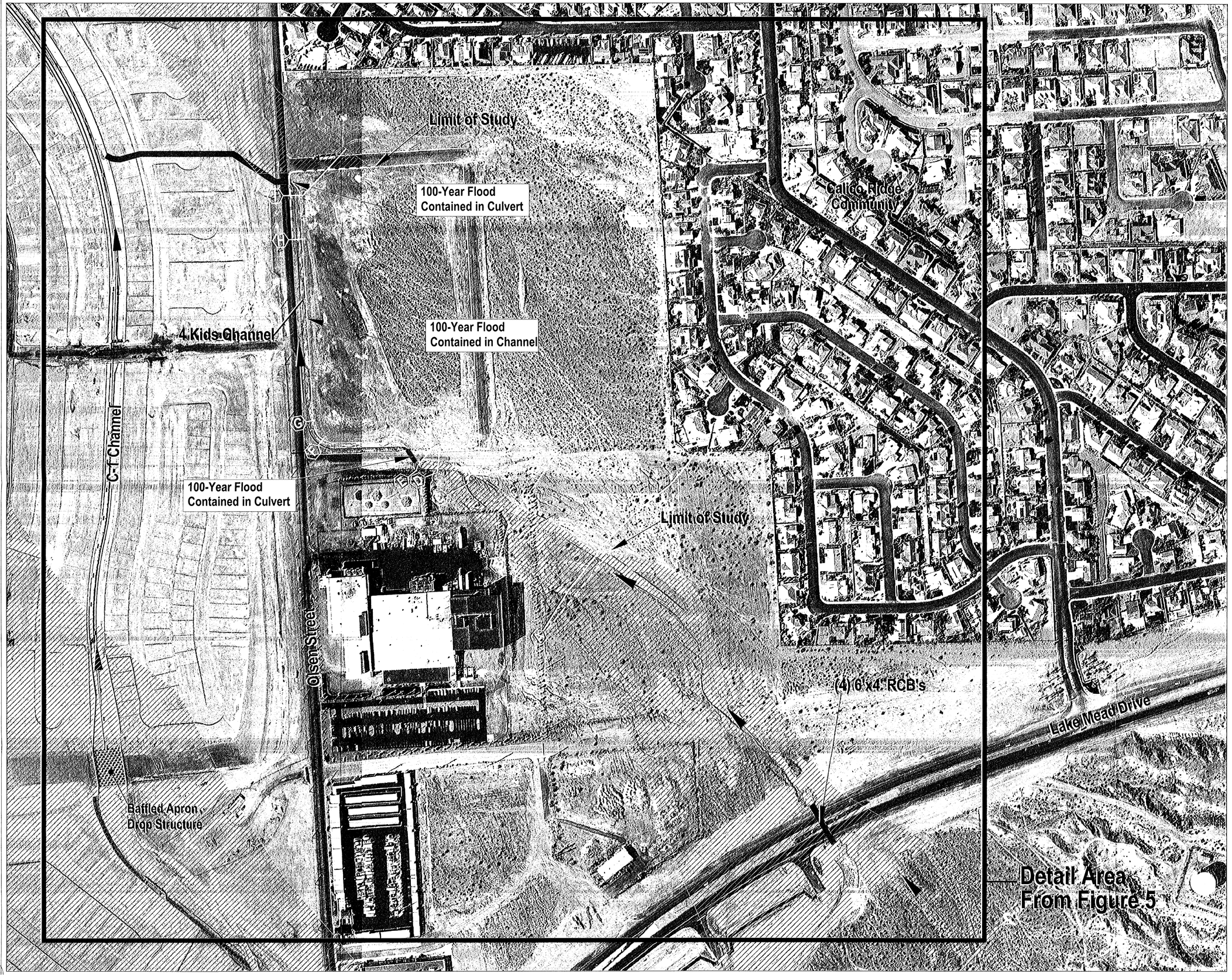
FIGURE 6



Legend

Existing Storm Drain Facility

Flow Direction Arrow

Note

Aerial photo as of April 2004.
Ground Survey Conducted by PBS&J on May 18, 2004

The hydraulic analysis and associated flood zone delineations completed for this LOMR are based on field survey completed by PBS&J as shown on this map.

I hereby certify that the information used in this LOMR substantially conforms with current conditions.

Matthew S. Baird, NV 13684

Zone A Floodzone

N

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150ft.

C-1 Channel Letter of Map Revision

FIGURE 6A: Proposed Floodzone Delineation Map

Project No. 511197.00 July 2004

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FIGURE 6A

Legend

Cross-Section Location

Existing Storm Drain Facility

Flow Direction Arrow

Note

Aerial photo as of April 2004.

Ground Survey Conducted by PBS&J on May 18, 2004

Cross-Sections 1 Through 8 are based on PBS&J Ground Survey as Shown in the Detail Area

Remaining HEC-RAS Cross-Sections are Based on the Stations Shown on the Channel Alignment

Zone A Floodzone

The hydraulic analysis and associated flood zone delineations completed for this LOMR are based on topographic information shown on this map and supplemental field survey completed by PBS&J.

I hereby certify that the information used in this LOMR substantially conforms with current conditions.

Matthew S. Baird, NV 13684

N

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150ft.

C-1 Channel Letter of Map Revision

FIGURE 7: HEC-RAS Cross-Section Location Map

Project No. 511197.00 July 2004

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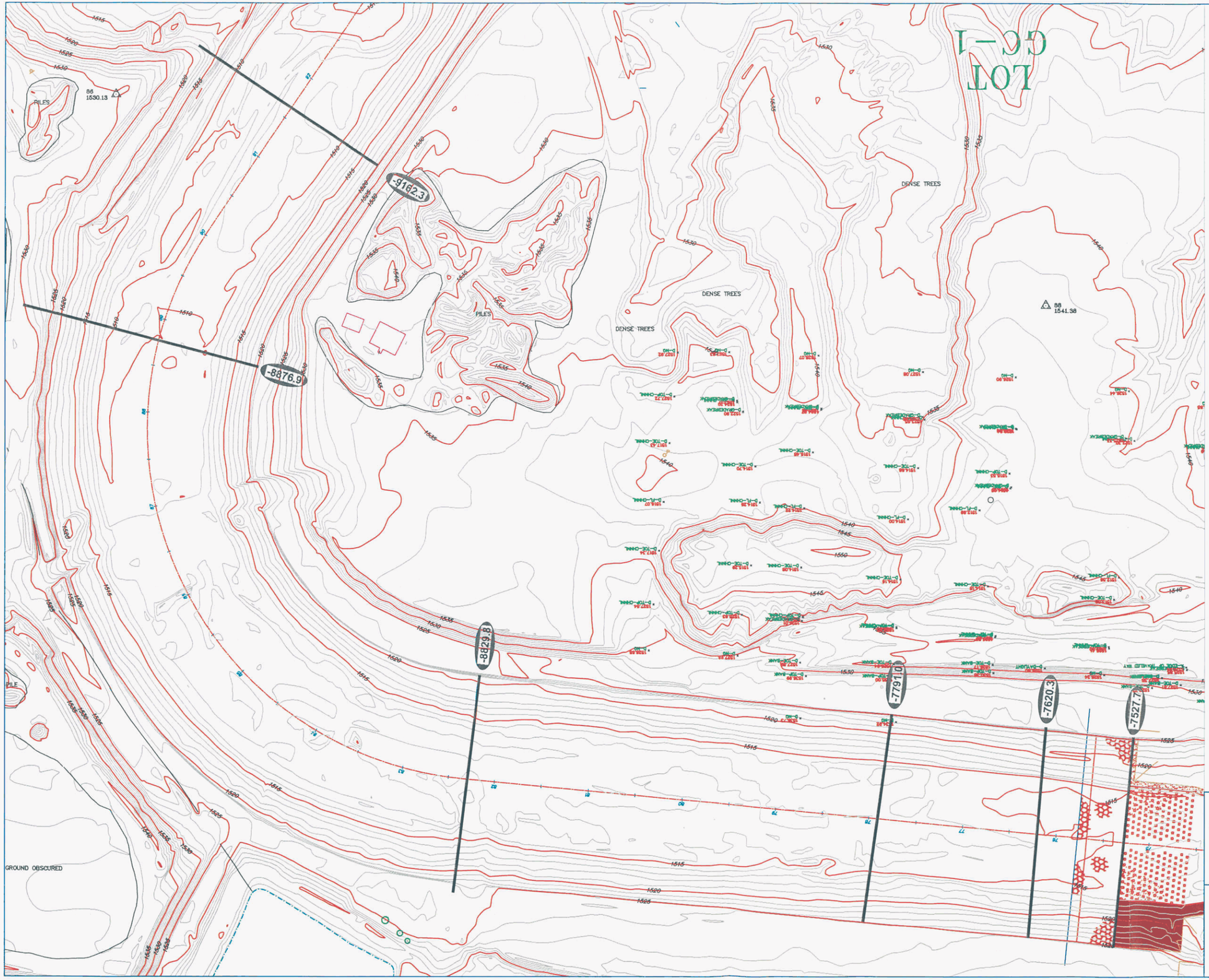
FIGURE 7



LEGEND :

-7791.0 — HEC-RAS Cross-Sections

NOTE :

Cross-Sections are based on PBS&J Ground Survey

N

SCALE : 1 inch : 100 feet

PLAN & SURVEY POINTS

FIGURE - 8

PBS&J
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Suite 100
Henderson, Nevada 89074
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ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

APPENDIX C
Hydrology

HEC-1 Model

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*          VERSION 4.1              *
*                                   *
*  RUN DATE   30JUN04  TIME  13:48:58   *
*                                   *
*************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

   1          ID        File: C1-LOMR.DAT
   2          ID
   3          ID   Post, Buckley, Schuh & Jernigan, Inc.
   4          ID
   5          ID      C1 CHANNEL COMBINED HYDROLOGY
   6          ID      DESIGN STORM = 100-YEAR 6-HR STORM
   7          ID      STORM DISTRIBUTION = SDN #5ID
   8          ID   *********************************
   9          ID   *********************************
  10          ID   *                               *
  11          ID   *            C1-LOMR            *
  12          ID   *                               *
  13          ID   *                               *
  14          ID   *           JUNE 2004           *
  15          ID   *                               *
  16          ID   *                               *
  17          ID   *                               *
  18          ID   *                               *
  19          ID   *                               *
  20          ID   *                               *
  21          ID   *           COMBINED            *
  22          ID   *       OFFSITE & ONSITE        *
  23          ID   *           HYDROLOGY           *
  24          ID   *********************************
  25          ID   *********************************
  26          ID
  27          ID
              *DIAGRAM
              *
              *
              * ***************************************************
              * C-1 WATERSHED FIS RESTUDY
              * PREPARED BY: CARTER BURGESS AND SOUTHWEST FLUVIAL SYSTEMS
              * ***************************************************
              *  JR CARDS CONTAINED DARFS BASED ON THE FOLLOWING VALUES:
              *
              *                      AREA      DARF
              *                      SQ.MI.
              *
              *                      0 -  5    0.950
              *                      5 - 12    0.880
              *                     12 - 16    0.832
              *                     16 - 20    0.804
              *                     20 - 30    0.765
              *                     30 - 40    0.725
              *
  28          IT       3       0       0     450
  29          IN       5       0       0
  30          IO       5
  31          JR    PREC   0.950   0.880   0.832   0.804    .765    .725
```

1 HEC-1 INPUT PAGE 2

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

  32          KK     C1H
  33          BA   4.007
  34          PB    3.15
  35          PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
  36          PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
  37          PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
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 38          PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
 39          PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
 40          PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
 41          PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
 42          PC    .997    .999   1.00
 43          LS       0      85
 44          UD    0.14
             *
             *
             *  THE BLACK MTN DETENTION BASIN STAGE/DISCHARGE AND STAGE/STORAGE RELATIONSHIPS
             *  WERE CHECKED AGAINST THE LATEST RECORD DRAWINGS AND PREDESIGN REPORTS.
             *  THE FOLLOWING INPUT  WAS DIGITIZED FROM RECORD DRAWINGS AS THE HEC-1 INPUT
             *  WAS NOT AVAILABLE. THE RECORD DRAWINGS DIFFERED SLIGHTLY FROM THE
             *  PRE-DESIGN REPORT.
             *
             *
             *

 45          KK     DB1
 46          KM   FACILITY = BLACK MOUNTAIN DETENTION BASIN
 47          KM   FACILITY # = C1CH 0967
 48          KM   STORAGE VOLUME = 400 AC-FT (100-YR PK STAGE  = 2593 WSE)
 49          KM   OUTLET = 36" ORIFICE PLATE ON A 54" RCP
 50          KO       3
 51          RS       1    STOR      -1
 52          SV       0    1.19    4.55   10.32   22.58   38.69   54.90   73.42   92.55  113.51
 53          SV  135.16  158.22  183.23   208.1  234.67  262.55  292.02  325.32
 54          SE    2556    2558    2560    2562    2564    2566    2568    2570    2572    2574
 55          SE    2576    2578    2580    2582    2584    2586    2588    2590
 56          SQ       0    1.28   27.31   57.88   77.52   95.42  108.73   120.5  131.87  141.78
 57          SQ  150.74  159.67  168.97   176.6  183.71  190.74  197.77  204.93
 58          SE    2556    2558    2560    2562    2564    2566    2568    2570    2572    2574
 59          SE    2576    2578    2580    2582    2584    2586    2588    2590
             *

 60          KK    RDB1
 61          KM   ROUTE DB1 TO    C1HB1
 62          KM   FACILITY = MISSION HILLS INTERCEPTOR
 63          KM   FACILITY # C1CH 1012
 64          KM   TYPE OF FACILITY = RCB
 65          RD    5600   0.028   0.015            DEEP       8      50
             *
```



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

 66          KK   C1HB1
 67          KM   PART OF 2001 MPU C1-2
 68          BA   .4497
 69          PB    3.17
 70          LS       0      82
 71          UD    0.51
             *

 72          KK     CP2
 73          KM   COMBINE RCP1 AND C1HB1
 74          HC       2
             *

 75          KK    RCP2
 76          KM   ROUTE CP2 TO C1G3A
 77          KM   FACILITY = MISSION HILLS INTERCEPTOR
 78          KM   FACILITY # C1CH 0930
 79          KM   TYPE OF FACILITY = RCB
 80          RD    1000   0.028   0.015            DEEP       8      50
             *

 81          KK   C1G3A
 82          KM   2001 MPU C1-3
 83          BA   .2726
 84          PB    3.19
 85          LS       0      85
 86          UD    0.17
             *

 87          KK     CP3
 88          KM   COMBINE RCP2 AND C1G3A
 89          HC       2
             *

 90          KK    RCP3
 91          KM   ROUTE CP3 TO C1G3B
 92          KM   FACILITY = MISSION HILLS INTERCEPTOR
 93          KM   FACILITY # 0905
 94          KM   TYPE OF FACILITY = RCB
 95          RD    2900   0.028   0.015            DEEP       8      50
             *

 96          KK   C1G3B
 97          KM   2001 MPU C1-5
 98          BA   .7328
 99          PB    3.21
100          LS       0      84
101          UD    0.11
             *
```



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

```
102          KK     CP4
103          KM   COMBINE RCP3 AND C1G3B
104          HC       2
             *

105          KK    RCP4
106          KM   ROUTE CP4 TO C1G3C
107          KM   MISSION HILLS INTERCEPTOR
108          KM   FACILITY # 0871
109          KM   TYPE OF FACILTY = RCB
110          RD    1300   0.025   0.015       0    DEEP      12    50
             *

111          KK   C1G3C
112          KM   2001 MPU C1-6
113          BA   1.048
114          PB    3.24
115          LS       0      85
116          UD    0.18
             *

117          KK     CP5
118          KM   COMBINE RCP4 AND C1G3C
119          KM   MISSION HILLS DETENTION BASIN
120          HC       2
             *

121          KK   C1G3D
122          KM   2001 MPU C1-7
123          BA   .8376
124          PB    3.28
125          LS       0      86
126          UD    0.15
             *

127          KK    CP6A
128          KM   COMBINE CP5 AND C1G3D
129          KM   MISSION HILLS DETENTION BASIN
130          HC       2
             *

131          KK   C5ICB
132          KM   PART OF 2001 C-8
133          BA   .7334
134          PB    3.37
135          LS       0      79
136          UD    0.15
             *
```



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

137          KK   C5ICB
138          KM   ROUTE C5ICB TO MISSION HILLS DETENTION BASIN
139          KM   FACILITY # = C1CH 0882
140          KM   TYPE OF FACILITY = ROCK LEVEE
141          RD    2350   0.024   0.040       0    TRAP      50       2
             *

142          KK   C5I2A
143          KM   PART OF 2001 MPU C1-9
144          BA   1.400
145          PB    3.33
146          LS       0      80
147          UD    0.14
             *

148          KK    CP6B
149          KM   COMBINE RC5ICB AND C5I2A
150          HC       2
             *

151          KK     CP6
152          KM   COMBINE CP6A AND CP6B
153          KM   @ MISSION HILLS DETENTION BASIN
154          HC       2
             *
             *
             *  THE MISSION HILLS DETENTION BASIN STAGE/DISCHARGE AND STAGE/VOLUME RELATIONS
             *  WERE CHECKED AGAINST THE LATEST RECORD DRAWINGS AND PREDESIGN REPORTS.
             *  THE FOLLOWING INPUT REFLECTS RECORD DRAWING INFORMATION
             *

155          KK     DB2
156          KM   FACILITY = MISSION HILLS DETENTION BASIN
157          KM   FACILITY # C1CH 0854
158          KM   STORAGE VOLUME = 402 ACRE-FEET (100-YR WSE)
159          KM   OUTLET = 84" RCP
160          KO       3
161          RS       1    STOR      -1
162          SV       0    2.55   15.85   40.23   72.34   107.2   185.2   273.0   371.6   480.1
163          SV   598.5   630.2
164          SE    2323    2326    2328    2330    2332    2334    2338    2342    2346    2350
165          SE    2354    2355
166          SQ       0   56.78   108.7   142.9   170.4   193.9   234.1   268.4   298.7   326.1
167          SQ   351.6   357.6
```

```
 168          SE    2323    2326    2328    2330    2332    2334    2338    2342    2346    2350
 169          SE    2354    2355
              *

 170          KK    RDB2
 171          KM    ROUTE DB2 TO C1G2D
 172          KM    FACILITY = MISSION HILLS DETENTION BASIN
 173          KM    FACILITY # = 0757
 174          KM    TYPE OF FACILITY = RCP
 175          RD     6100   0.025   0.013       0    CIRC     7.0
              *
```



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

 176          KK   C1G2C
 177          KM   PART OF 2001 MPU C1-13
 178          BA   .2925
 179          PB    3.23
 180          LS       0      76
 181          UD    0.27
              *

 182          KK   C1G2D
 183          KM   PART OF 2001 MPU C1-21
 184          BA   .2244
 185          PB    3.27
 186          LS       0      73
 187          UD     .22
              *

 188          KK    CP7A
 189          KM   COMBINE RDB2, C1G2C, AND C1G2D
 190          KM   NDOT DETENTION BASIN @ US95
 191          HC       3
              *

 192          KK  C1G2B1
 193          KM   PART OF 2001 MPU C1-10
 194          BA   .5231
 195          PB    3.17
 196          LS       0      74
 197          UD     .42
              *

 198          KK   RG2B1
 199          KM   ROUTE C1G2B1 TO C1G2B2
 200          KM   NO FACILITY - OVERLAND FLOW
 201          RD    4400    .028    .030       0    TRAP     200
              *

 202          KK  C1G2B2
 203          KM   PART OF 2001 MPU C1-12
 204          BA   .3097
 205          PB    3.20
 206          LS       0      77
 207          UD     .27
              *

 208          KK    CP7B
 209          KM   COMBINE C1G2B1, C1G2B2
 210          KM   COLLEGE AT US95
 211          HC       2
              *
```



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

 212          KK   C1G2A
 213          KM   PART OF 2001 MPU C1-11
 214          BA   .3468
 215          PB    3.17
 216          LS       0      79
 217          UD    0.22
              *

 218          KK  RC1G2A
 219          KM   ROUTE C1G2A TO CP7C
 220          KM   NDOT FACILITY @US95
 221          RD    3800    .018    .030       0    TRAP     100
              *

 222          KK    CP7C
 223          KM   COMBINE CP7B AND C1G2A
 224          KM   COLLEGE AT US95
 225          HC       2
              *

 226          KK     CP7
 227          KM   COMBINE CP7B AND CP7C
 228          KM   NDOT FACILITY AT US95
 229          HC       2
              *
              *  NDOT DETENTION BASIN INPUT IS TAKEN FROM PREDESIGN REPORT AND DRAWINGS
              *  THIS DETENTION BASIN IS BROKEN INTO TWO DETENTION PONDS, NAMELY POND A AND
              *  POND B, ON THE UPPER AND LOWER SIDE OF THE INTERCHANGE, RESPECTIVELY. THE
              *  100-YR PEAK IS ATTENUATED THROUGH THE BASIN BY ROUTING OF THE HYDROGRAPH,
```

```
*  FIRST THROUGH POND A AND SECOND THROUGH POND B. A DOUBLE 10X10  RCB CONNECTS
*  THE TWO PONDS UNDER I-515,INV EL = 2230 (INLET) AND 2221 (OUTLET) WHEREAS
*  A TRIPPLE RCB WAS DESIGNED AT THE OUTLET WITH INVERT EL = 2219.68, BUT IS NOT
*  CONSTRUCTED TO DATE. THE FOLLOWING STAGE/STORAGE AND STAGE/DISCHARGE RELATION
*  WERE TAKEN FROM THE NDOT PREDESIGN REPORT.
*
*
```

```
230  KK   CP7DB
231  KM   FACILITY = NDOT DETENTION BASIN
232  KM   FACILITY # C1CH 0658
233  KM   POND A
234  KM   STORAGE VOLUME = 94 AC-FT AT WSE= 2248
235  KM   OUTLET = DOUBLE 10 X 10 RCB
236  KO       3
237  RS       1    STOR      -1
238  SV       0    .125    .660   1.852   3.904   6.967  11.156  16.146  21.506  27.208
239  SV  33.219  39.589  46.369  53.528  61.032  68.877  77.056  85.507  94.163 102.957
240  SE    2230    2231    2232    2233    2234    2235    2236    2237    2238    2239
241  SE    2240    2241    2242    2243    2244    2245    2246    2247    2248    2249
242  SQ       0    70.2   180.1   317.4   479.1   659.2   854.5  1068.1  1290.9  1525.9
243  SQ  1776.1  2038.6  2256.8  2384.2  2511.7    2700  2887.0  3060.9  3225.7  3515.4
244  SE    2230    2231    2232    2233    2234    2235    2236    2237    2238    2239
245  SE    2240    2241    2242    2243    2244    2245    2246    2247    2248    2249
     *
```



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

```
246  KK   CP7DB
247  KM   FACILITY = NDOT DETENTION BASIN
248  KM   FACILITY # C1CH 0658
249  KM   POND B
250  KM   STORAGE VOLUME = 94 AC-FT AT WSE= 2232
251  KO       3
252  RS       1    STOR      -1
253  SV       0    .677   5.419  13.616  21.947  30.416  39.025  47.764  56.622  65.611
254  SV   74.74  84.018  93.457 103.051 112.794
255  SE    2220    2221    2222    2223    2224    2225    2226    2227    2228    2229
256  SE    2230    2231    2232    2233    2234
257  SQ       0    13.2    37.2   152.0   340.3   578.1   849.7  1155.1  1488.1  1845.5
258  SQ  2224.9  2481.1  2700.8  3035.5  3463.4
259  SE    2220    2221    2222    2223    2224    2225    2226    2227    2228    2229
260  SE    2230    2231    2232    2233    2234
     *

261  KK    RCP7
262  KM   ROUTE CP7 TO CP8A
263  KM   PARTIALLY IMPROVED CHANNEL
264  KM   FACILITY # C1CH 0613, 0641, AND 0674
265  RD    3960    .025    .030       0    TRAP      20
     *

266  KK    C1NA
267  KM    2001 MPU C1-14
268  BA   .4139
269  PB    3.18
270  LS       0      84
271  UD    0.03
     *

272  KK   RC1NA
273  KM   ROUTE C1NA TO CP8A
274  KM   FACILITY = PARTIALLY IMPROVED CHANNEL
275  KM   FACILITY # C1CH 0613, 0641, AND 0674
276  RD    1980    .025    .030       0    TRAP      20
     *

277  KK    CP8
278  KM   COMBINE C1NA AND CP8A
279  HC       2
     *

280  KK   RCP8
281  KM   ROUTE CP8 TO C1HA
282  KM   C1 AND PUEBLO
283  RD    2500    .025    .030       0    TRAP      20
*  BEGIN POGGEMEYER DESIGN GROUP INPUT FROM 1998 LETTER OF MAP REVISION
*  FOR THE EQUESTRIAN DETENTION BASIN, CASE NO 99-09-623P. SOME SUBBASINS
*  IN THIS MODEL HAVE BEEN MODIFIED TO REFLECT POST 1998 DEVELOPMENT.
*  THE FOLLOWING TABLE CORRELATES 1998 LOMR SUBBASIN LABELS WITH LABELS IN
*  THIS MODEL.
*  ************************************************************************
*  *                                                                      *
*  *                    EQUIVALENT 1998 LOMR SUBBASIN LABELS              *
*  *                                                                      *
*  *                    1998 LOMR              THIS MODEL                 *
*  *                      C5FD                   C5FD                    *
*  *                      C5FA                   C5FA                    *
*  *                      C5FB                   C5FB                    *
*  *                      C5FC                   C5FC                    *
*  *                      C5EA                   C5EA                    *
*  *                      C5EC                   C5EC                    *
*  *                      C5EB                   C5EB                    *
*  *                      C5ED                   C5ED                    *
*  *                      C5DA                   C5DA                    *
```

```
*  *                    C5DB                    C5DB                    *
*  *                    C5CAa                   N/A                     *
*  *                    C5CAb                   N/A                     *
*  *                    C5CB                    C5CB                    *
*  *                    C5DC                    N/A                     *
*  *                    OFF-2A                  N/A                     *
*  *                    OFF-2B                  N/A                     *
*  *                    OFF-2C                  C1HD                    *
*  *                    OFF-3                   C1HE                    *
*  *                    OFF-4                   C1HF                    *
*  *                    OFF-6                   N/A                     *
*  *                    OFF-8                   C5I1D                   *
*  *                    OFF-9                   C5I1E                   *
*  *                    OFF-10                  C5GD                    *
*  *                    OFF-11                  N/A                     *
*  *                    OFF-12                  C5I1C                   *
*  *                    OFF-13                  N/A                     *
*  *                    OFF-14                  C5GA                    *
*  *                    OFF-15                  C5GB                    *
*  *                    OFF-16                  C5GC                    *
*  *                    OFF-21                  N/A                     *
*  *                    OFF-23                  N/A                     *
*  *                    OFF-24                  N/A                     *
*  *                                                                    *
*  **********************************************************************
*
```

1 HEC-1 INPUT PAGE 9

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

 284      KK    C5GC
 285      KM   1998 LOMR OFF-16
 286      BA   .1107
 287      PB    3.43
 288      LS       0      84
 289      UD    0.04
          *

 290      KK   RC5GC
 291      KM   ROUTE C5GC TO C5GB
 292      RD    1000    .020    .030           TRAP     100
          *

 293      KK    C5GB
 294      KM   1998 LOMR OFF-15
 295      BA   .3249
 296      PB    3.43
 297      LS       0      83
 298      UD     .16
          *

 299      KK    CP9
 300      KM   COMBINE C5GB AND C5GC
 301      HC       2
          *

 302      KK   RCP9
 303      KM   ROUTE CP9 TO C5GA
 304      RD    2640    .035    .030           TRAP      40
          *

 305      KK    C5GA
 306      KM   1998 LOMR OFF-14
 307      BA   .2723
 308      PB    3.39
 309      LS       0      66
 310      UD     .30
          *

 311      KK    CP10
 312      KM    COMBINE RCP9 AND C5GA
 313      HC       2
          *

 314      KK   RCP10
 315      KM    ROUTE CP10 TO C5I1E
 316      RD    2200    .033    .030           TRAP     100
          *
```

1 HEC-1 INPUT PAGE 10

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

 317      KK   RCP10
 318      KM    ROUTE CP10 TO C5I1E
 319      RD    2200    .030    .030           TRAP     100
          *

 320      KK    C5GD
 321      KM   1998 LOMR OFF-10
 322      BA   .4447
 323      PB    3.46
 324      LS       0      67
 325      UD    0.46
          *

 326      KK  DIVER1
 327      KM   DIVERT FLOWS CONVEYED INTO CULVERT "A" STA 296+24, ACROSS BOULDER HIGHWAY
```

```
328          DT  DIVER1
329          DI       0      37     126     260     502
330          DQ       0      10      20      30      40
             *

331          KK   RC5GD
332          KM   ROUTE C5GD TO C5I1E
333          RD    2200    .030    .030           TRAP     100
             *

334          KK   C5I1E
335          KM   1998 LOMR OFF-9
336          BA   .1634
337          PB    3.45
338          LS       0      79
339          UD     .05
             *

340          KK    CP11
341          KM   COMBINE RCP10, C5I1E, AND RC5GD
342          HC       3
             *

343          KK   RCP11
344          KM   ROUTE  CP11 TO C1HF
345          RD    1600     .04    .030           TRAP     100
             *

346          KK    C1HF
347          KM   1998 LOMR OFF-4
348          BA   .1008
349          PB    3.45
350          LS       0      78
351          UD    0.27
             *
```



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

352          KK    CP12
353          KM   COMBINE RCP11 AND C1HF
354          HC       2
             *

355          KK   RCP12
356          KM   ROUTE CP12 TO C1HE
357          RD    1800    .013    .030           TRAP     200
             *

358          KK   C5I1B
359          KM   MODIFIED 1998 LOMR SUBBASIN OFF-13
360          BA   .5185
361          PB    3.43
362          LS       0      71
363          UD    0.08
             *

364          KK  RC5I1B
365          KM   ROUTE C5I1B TO C5I1D
366          RD    1100    .018    .030           TRAP     100
             *

367          KK   C5I1D
368          KM   1998 LOMR OFF-8
369          BA   .1158
370          PB    3.43
371          LS       0      77
372          UD     .15
             *

373          KK    CP13
374          KM   COMBINE RC5I1B TO C5I1D
375          HC       2
             *

376          KK   RCP13
377          KM   ROUTE CP13 TO C1HE
378          RD    2100    .021    .030           TRAP     100
             *

379          KK    C1HE
380          KM   1998 LOMR OFF-3
381          BA   .1467
382          PB    3.29
383          LS       0      72
384          UD     .14
             *
```



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

385          KK    CP14
386          KM   COMBINE RCP12, RCP13, AND C1HE
387          HC       3
             *

388          KK  DIVER2
```

```
389          KM   DIVERT CULVERT AND BOULDER HIGHWAY OVERFLOWS INTO MAGIC WAY 844+00, 843+52,
390          KM   AND 840+46, TO SUBBASIN C5CC
391          DT  DIVER2
392          DI       0    1255    2000
393          DQ       0     116     900
             *

394          KK   RCP14
395          KM   ROUTE CP14 TO C1HD
396          RD    800    .010    .030           TRAP     100
             *

397          KK    C1HD
398          KM   1998 LOMR OFF-2C
399          BA   .0716
400          PB    3.29
401          LS       0      77
402          UD    0.15
             *

403          KK    CP15
404          KM   COMBINE RCP14 AND C1HD
405          HC       2
             *

406          KK   RCP15
407          KM   ROUTE CP15 TO C1HCB
408          RD    1700    .010    .030           TRAP     100
             *

409          KK  DIVER3
410          KM   DIVERT CULVERT FLOWS INTO SUBBASIN C5CC, STA 832+02, 825+52, AND 834+82
411          DT  DIVER3
412          DI       0    1171    2000
413          DQ       0     217     900
             *

414          KK    C5I1
415          KM   1998 LOMR OFF-11
416          BA   .2432
417          PB    3.43
418          LS       0      76
419          UD     .17
             *
```

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

420          KK   C5I1C
421          KM   1998 LOMR OFF-12
422          BA  0.0643
423          PB    3.43
424          LS       0      80
425          UD     .23
             *

426          KK  RC5I1C
427          KM   ROUTE C5I1C TO C5I1
428          RD    700    .014    .030           TRAP     100
             *

429          KK    CP16
430          KM   COMBINE RC5I1C AND C5I1
431          HC       2
             *

432          KK   RCP16
433          KM   ROUTE CP16 TO C1G1B
434          RD    1200    .018    .030           TRAP      50
             *

435          KK   C1G1B
436          KM   1998 LOMR OFF-6 IS PART OF THIS SUBBASIN
437          PB    3.21
438          BA   .1428
439          LS       0      87
440          UD     .18
             *

441          KK    CP17
442          KM   COMBINE RCP16 AND C1G1B
443          HC       2
             *

444          KK   RCP17
445          KM   ROUTE CP17 TO C1HCB
446          RD    1700    .010    .030           TRAP     100
             *

447          KK   C1HCB
448          KM   MODIFIED 1998 LOMR OFF-2B
449          BA   .1818
450          PB    3.29
451          LS       0      78
452          UD    0.06
             *
```

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

 453          KK  CP18A
 454          KM   COMBINE RCP17,AND C1HCB
 455          HC       2
              *

 456          KK    CP18
 457          KM   COMBINE RCP15 AND CP18A
 458          HC       2
              *

 459          KK  DIVER4
 460          KM   DIVERT CULVERT FLOWS AND BOULDER OVERFLOWS INTO SUBBASIN C5CC
 461          KM   STA 816+22 AND 819+84, BOULDER HIGHWAY
 462          DT  DIVER4
 463          DI       0    1234    2000
 464          DQ       0     111    1000
              *

 465          KK   RCP18
 466          KM   ROUTE CP18 TO C1HB
 467          RD    1100    .007    .030            TRAP     100
              *

 468          KK   C1G1A
 469          KM   2001 MPU C1-15
 470          BA   .2243
 471          PB    3.20
 472          LS       0      84
 473          UD    0.22
              *

 474          KK  RC1G1A
 475          KM   ROUTE TO C1HB
 476          KM   OVERLAND FLOW
 477          RD    2600    .025    .030            TRAP     200
              *

 478          KK    C1HB
 479          KM   MODIFIED 1998 LOMR OFF-2A
 480          BA   .1472
 481          PB    3.21
 482          LS       0      85
 483          UD    0.03
              *

 484          KK   CP19A
 485          KM   COMBINE C1HB, RC1G1A
 486          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 15

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

 487          KK    CP19
 488          KM   COMBINE CP19A AND RCP18
 489          HC       2
              *

 490          KK  DIVER5
 491          KM   DIVERT CULVERT FLOWS INTO SUBBASIN C4A1C, STA 807+37
 492          DT  DIVER5
 493          DI       0     798    2000
 494          DQ       0      70     970
              *

 495          KK   RCP19
 496          KM   ROUTE CP19 TO BOULDER HIGHWAY AND PUEBLO
 497          RD    2300    .013    .030            TRAP     100
              *

 498          KK    C1HA
 499          KM   SUBBASIN C1HA
 500          KM   2001 MPU C1-24
 501          BA   .0735
 502          PB    3.13
 503          LS       0      66
 504          UD     .21
              *

 505          KK   CP20A
 506          KM   COMBINE C1HA AND RCP19
 507          HC       2
              *

 508          KK    CP20
 509          KM   COMBINE CP20A AND RCP8
 510          HC       2
              *

 511          KK   RCP20
 512          KM   ROUTE CP20 TO C1B
 513          KM   FACILITY  = C-1 CHANNEL
 514          KM   FACILITY # C1CH 0528
 515          KM   TYPE OF FACILTIY  = CONCRETE CHANNEL
 516          RD    1700    .027    .015            TRAP      25       1
```

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                *
          517   KK     C1D
          518   KM   2001 MPU C1-26
          519   BA   .4005
          520   PB    3.14
          521   LS       0      78
          522   UD     .21
                *
1                                        HEC-1 INPUT                                                    PAGE 16

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

          523   KK    RC1D
          524   KM   ROUTE C1D TO C1C
          525   KM   UNION PACIFIC RAILROAD
          526   RD    1600    .014    .030       0    TRAP       0      50
                *
          527   KK     C1C
          528   KM   2001 MPU C1-27
          529   BA   .2307
          530   PB    3.08
          531   LS       0      80
          532   UD     .19
                *
          533   KK    CP21
          534   KM   COMBINE RC1D AND C1C
          535   HC       2
                *
          536   KK   RCP21
          537   KM   ROUTE CP21 TO C1B
          538   RD    4600    .010    .015       0    TRAP       0      30
                *
          539   KK     C1B
          540   KM   2001 MPU C1-28
          541   BA   .3773
          542   PB    3.11
          543   LS       0      86
          544   UD     .21
                *
          545   KK   C4A1D
          546   KM   2001 MPU C1-25
          547   BA   0.062
          548   PB    3.11
          549   LS       0      78
          550   UD     .19
                *
          551   KK  RC4A1D
          552   KM   ROUTE C4A1D TO C1B
          553   RD     700    .020    .015            TRAP      25       1
                *
          554   KK    CP22
          555   KM   COMBINE RCP19,RCP20, C1B, AND RC4A1D
          556   HC       4
                *
1                                        HEC-1 INPUT                                                    PAGE 17

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

          557   KK   RCP22
          558   KM   ROUTE CP21 TO C1A
          559   KM   FACILITY = C-1 CHANNEL
          560   KM   FACILTIY # = C1CH 0455, 0502
          561   KM   TYPE OF FACILTIY = CONCRETE CHANNEL
          562   RD    3200    .021    .015            TRAP      25       1
                *
          563   KK     C1A
          564   KM   2001 MPU C1-29
          565   BA   .1456
          566   PB    2.99
          567   LS       0      84
          568   UD     .22
                *
          569   KK    CP23
          570   KM   COMBINE CP22 AND C1A
          571   HC       2
                *
          572   KK   RCP23
          573   KM   ROUTE CP23 TO C4A1B
          574   KM   FACILITY = C-1 CHANNEL
          575   KM   FACILITY # = C1CH 0455
          576   KM   TYPE OF FACILITY  = CONCRETE CHANNEL
          577   RD    1250    .025    .025            TRAP     25.       1
                *
          578   KK    C5CC
          579   KM   1998 LOMR OFF-21
```

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580          PB    3.29
581          BA   .3346
582          LS       0       79
583          UD    0.28
             *

584          KK     RET4
585          KM    RETRIEVE FLOWS FROM C1HCB
586          DR   DIVER4
             *

587          KK    RDIV4
588          KM    ROUTE DIVERSION 4 TO CP24A
589          KM    TYPE OF FACILTIY = OVERLAND FLOW TO EQUESTRIAN
590          RD     1100    .027    .030            TRAP     100       1
             *

591          KK    RDIV4
592          KM    ROUTE DIVERSION 4 TO CP24A
593          KM    TYPE OF FACILTIY = STREET FLOW IN EQUESTRIAN
594          RD     1700    .009    .016            TRAP      80       1
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

595          KK    CP24A
596          KM    COMBINE C5CC AND RDIV4
597          HC       2
             *

598          KK     RET3
599          KM    RETRIEVE DIVERSION 3 FROM C1HD
600          DR   DIVER3
             *

601          KK    RDIV3
602          KM    ROUTE DIVERSION 3 TO CP24A
603          KM    TYPE OF FACILTIY = OVERLAND FLOW TO EQUESTRIAN
604          RD     2000    .023    .030            TRAP     100       1
             *

605          KK    RDIV3
606          KM    ROUTE DIVERSION 3 TO CP24A
607          KM    TYPE OF FACILTIY = STREET FLOW IN EQUESTRIAN
608          RD     1100    .009    .016            TRAP      80       1
             *

609          KK    CP24B
610          KM    COMBINE CP24A AND RDIV4
611          HC       2
             *

612          KK     RET2
613          KM    RETRIEVE DIVERSION 2 FROM C1HE
614          DR   DIVER2
             *

615          KK    RDIV2
616          KM    ROUTE DIVERSION 2 TO CP24A
617          KM    TYPE OF FACILTIY = OVERLAND FLOW TO EQUESTRIAN
618          RD     2500    .024    .030            TRAP     100       1
             *

619          KK    RDIV2
620          KM    ROUTE DIVERSION 2 TO CP24A
621          KM    TYPE OF FACILTIY = STREET FLOW IN EQUESTRIAN
622          RD      600    .009    .016            TRAP      80       1
             *

623          KK    CP24C
624          KM    COMBINE CP24B AND RDIV2
625          HC       2
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

626          KK     C5CA
627          KM    PART OF 1998 LOMR C5CAb
628          KM    2001 MPU C1-30
629          BA   .2974
630          PB    3.41
631          LS       0       70
632          UD    0.22
             *

633          KK    RC5CA
634          KM    ROUTE C5CA TO C5CF
635          KM    APPALOOSA RD
636          RD     2000    .019    .016       0    TRAP       0      50
             *

637          KK     C5CF
638          KM    PART OF 1998 LOMR C5CA6
639          KM    2001 MPU C1-31
640          BA   .3233
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```
641          PB    3.25
642          LS       0      68
643          UD    0.07
             *

644          KK    CP25
645          KM    COMBINE RC5CA AND C5CF
646          KM    APPALOOSA ROAD AND PALOMINO DRIVE
647          HC       2
             *

648          KK    RCP25
649          KM    ROUTE CP25 TO C5CE
650          KM    APPALOOSA ROAD
651          RD    2640    .020    .016            TRAP      50       0
             *

652          KK    C5CE
653          KM    PART OF 1998 LOMR C5CAb
654          BA    .3244
655          PB    3.29
656          LS       0      68
657          UD     .08
             *

658          KK    CP26
659          KM    COMBINE RCP25 AND C5CE
660          KM    APPALOOSA ROAD AND EQUESTRIAN
661          HC       2
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

662          KK    RCP26
663          KM    ROUTE CP26 TO C5CD
664          KM    EQUESTRIAN DRIVE
665          RD    1200    .016    .016            TRAP      50       0
             *

666          KK    C5CD
667          KM    PART OF 1998 LOMR C5CAa AND C5CAb
668          BA    .2668
669          PB    3.31
670          LS       0      73
671          UD     .34
             *

672          KK    RET1
673          KM    RETREIVE DIVERSION 1 FROM C5GD
674          DR   DIVER1
             *

675          KK    RDIV1
676          KM    ROUTE DIVERSION 1 TO CP27
677          KM    TYPE OF FACILTIY = OVERLAND FLOW TO EX CONC CHANNEL
678          RD    2600    .019    .030            TRAP     100       1
             *

679          KK    RDIV1
680          KM    ROUTE DIVERSION 1 TO CP27
681          KM    TYPE OF FACILTIY = CONCRETE CHANNEL
682          RD    1300    .014    .015            TRAP      20       1
             *

683          KK    RDIV1
684          KM    ROUTE DIVERSION 1 TO CP27
685          KM    TYPE OF FACILTIY = STREET TO EQUESTRIAN
686          RD    2000    .014    .016            TRAP      60       1
             *

687          KK    CP27
688          KM    COMBINE RCP26, C5CD, AND RDIV1
689          HC       3
             *

690          KK    RCP27
691          KM    ROUTE CP27 TO CP24C
692          RD    1450    .017    .017            TRAP     100
             *

693          KK    CP24D
694          KM    COMBINE CP24C AND RCP27
695          HC       2
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

696          KK    C5CB
697          KM    MODIFIED 1998 LOMR C5CB
698          KM    2001 MPU C1-47A
699          BA    .1409
700          PB    3.26
701          LS       0      81
702          UD     .30
             *
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```
703          KK   CP24E
704          KM   COMBINE CP24D AND C5CB
705          HC       2
             *

706          KK    C5FD
707          KM   1998 LOMR C5FD
708          BA   .1706
709          PB    3.43
710          LS       0       83
711          UD     .07
             *

712          KK   RC5FD
713          KM   ROUTE C5FD TO C5FB
714          RD    2500     .02     .040        0    TRAP       50        2
             *

715          KK    C5FA
716          KM   1998 LOMR C5FA
717          BA   .5071
718          PB    3.43
719          LS       0       87
720          UD     .02
             *

721          KK   RC5FA
722          KM   ROUTE C5FA TO C5FB
723          RD    4600    .065     .040        0    TRAP      100        1
             *

724          KK    C5FB
725          KM   1998 LOMR C5FB
726          BA   .2592
727          PB    3.43
728          LS       0       69
729          UD     .17
             *

730          KK    CP28
731          KM   COMBINE RC5FD, RC5FA, AND C5FB
732          HC       3
             *
```



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

733          KK   RCP28
734          KM   ROUTE CP28 TO  C5FC
735          KM   FACILITY = C-1 CHANNEL - EQUESTRIAN LEVEE
736          KM   FACILITY # = C1EQ 0297
737          KM   TYPE OF FACILITY = ROCK LEVEE
738          RD    2000   0.019    .040        0    TRAP       50        3
             *

739          KK    C5FC
740          KM   1998 LOMR C5FC
741          KM   2001 MPU C1-37
742          BA   .2222
743          PB    3.43
744          LS       0       73
745          UD    0.16
             *

746          KK    CP29
747          KM   COMBINE RCP28 AND C5FC
748          HC       2
             *

749          KK   RCP29
750          KM   ROUTE CP29 TO C5EA
751          KM   FACILITY = C-1 CHANNEL - EQUESTRIAN LEVEE
752          KM   FACILITY # = C1EQ 0297
753          KM   TYPE OF FACILITY = ROCK LEVEE
754          RD    1900   0.018    .040        0    TRAP      100        3
             *

755          KK    C5EA
756          KM   1998 LOMR C5EA
757          KM   2001 MPU C1-38
758          BA   .4873
759          PB    3.43
760          LS       0       82
761          UD    0.12
             *

762          KK    CP30
763          KM   COMBINE RCP29 AND C5EA
764          HC       2
             *

765          KK   RCP30
766          KM   ROUTE CP30 TO C5EC
767          KM   FACILITY = C-1 CHANNEL - EQUESTRIAN LEVEE
768          KM   FACILITY # = C1EQ 0297
769          KM   TYPE OF FACILITY = ROCK LEVEE
770          RD    1600   0.017    .040        0    TRAP      100        3
```

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                *
1                                        HEC-1 INPUT                                                    PAGE 23

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

           771      KK    C5EB
           772      KM    1998 LOMR C5EB
           773      BA   .5469
           774      PB    3.43
           775      LS       0      88
           776      UD     .21
                    *

           777      KK   RC5EB
           778      KM   ROUTE C5EB  TO C5EC
           779      RD    3500   0.040    .040       0    TRAP      50       3
                    *

           780      KK    C5EC
           781      KM    1998 LOMR C5EC
           782      BA   .2214
           783      PB    3.43
           784      LS       0      71
           785      UD     .14
                    *

           786      KK    CP31
           787      KM   COMBINE RC5EB, C5EC, AND RCP30
           788      HC       3
                    *

           789      KK   RCP31
           790      KM   ROUTE CP31 TO C5ED
           791      KM   FACILITY = C-1 CHANNEL - EQUESTRIAN LEVEE
           792      KM   FACILITY # = C1EQ 0297
           793      KM   TYPE OF FACILITY = ROCK LEVEE
           794      RD    2500   0.020    .040       0    TRAP      35       3
                    *

           795      KK    C5ED
           796      KM   1998 LOMR C5ED
           797      KM   2001 MPU C1-41
           798      BA   .1578
           799      PB    3.41
           800      LS       0      79
           801      UD    0.17
                    *

           802      KK    CP32
           803      KM   COMBINE RCP31 AND C5ED
           804      HC       2
                    *

           805      KK   RCP32
           806      KM   ROUTE CP32 TO C5DA
           807      KM   FACILITY = C-1 CHANNEL - EQUESTRIAN LEVEE
           808      KM   FACILITY # = C1EQ 0349
           809      KM   TYPE OF FACILITY = ROCK LEVEE
           810      RD    1000   0.020    .040       0    TRAP      35       3
                    *
1                                        HEC-1 INPUT                                                    PAGE 24

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

           811      KK    C5DA
           812      KM   1998 LOMR C5DA
           813      KM   2001 MPU C1-42
           814      BA   1.063
           815      PB    3.42
           816      LS       0      86
           817      UD    0.05
                    *

           818      KK    C5DB
           819      KM   1998 LOMR C5DB
           820      KM   2001 MPU C1-43
           821      BA   .5321
           822      PB    3.40
           823      LS       0      88
           824      UD    0.07
                    *

           825      KK    CP33
           826      KM   COMBINE RCP32, C5DA, C5DB
           827      HC       3
                    *

           828      KK   RCP33
           829      KM   ROUTE CP33 TO C5CB
           830      KM   FACILITY = C-1 CHANNEL - EQUESTRIAN CHANNEL
           831      KM   FACILITY # = C1EQ 0297
           832      KM   TYPE OF FACILITY = CONCRETE TRAP CHANNEL
           833      RD    5000   0.027    .013       0    TRAP      20       1
                    *

           834      KK    CP24
           835      KM   COMBINE RCP33 AND CP24E
```

```
836          HC       2
             *

837          KK   RCP24
838          KM   ROUTE CP24 TO CP34
839          KM   FACILITY = MAGIC WAY
840          KM   TYPE OF FACILITY = STEET
841          RD    3000   0.010    .016       0    TRAP      20       1
             *

842          KK    C5DC
843          KM   MODIFIED 1998 LOMR SUBBASIN C5DC
844          PB    3.31
845          BA   .3264
846          LS       0       83
847          UD     .02
             *
```



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

848          KK   RC5DC
849          KM   ROUTE C5DC TO C4BD
850          RD    6600     .024    .040       0    TRAP     100
             *
             *

851          KK    C4BD
852          KM   MODIFIED 1998 LOMR SUBBASIN C5DC
853          KM   2001 MPU C1-47
854          BA   .5243
855          PB    3.23
856          LS       0       82
857          UD    0.42
             *

858          KK   CP34A
859          KM   COMBINE RC4BF, C4BD, AND C5DC
860          HC       2
             *

861          KK   CP34B
862          KM   COMBINE  RCP24  AND CP34A
863          KM   EQUESTRIAN DETENTION BASIN
864          HC       2
             *
             *  THE EQUESTRIAN DETENTION BASIN STAGE/DISCHARGE AND STAGE/VOLUME RELATIONSHIPS
             *  WERE CHECKED AGAINST THE LATEST RECORD DRAWINGS AND PREDESIGN REPORTS.
             *  THE FOLLOWING INPUT REFLECTS RECORD DRAWING INFORMATION
             *

865          KK     DB4
866          KM   FACILITY = EQUESTRIAN DETENTION BASIN
867          KM   FACILITY # = C1EQ 0159
868          KM   STORAGE VOLUME = 409 AC-FT,(100-YR PEAK STAGE AT EL = 2069, W/O FREEBOARD)
869          KM   OUTLET = 48" RCP
870          KO       3
871          RS       1    STOR       0
872          SV       0       2      13      31      61      97     118     140     171     200
873          SV     229     261     290     315     344     379     409     437     470     504
874          SE    2048    2050    2052    2054    2056    2058    2059    2060    2061    2062
875          SE    2063    2064    2065    2066    2067    2068    2069    2070    2071    2072
876          SQ       0      37      80     117     142     163     173     182     191     198
877          SQ     206     213     221     228     235     242     248    2755    7761   14467
878          SS    2069     900     3.0     1.5
             *
             *
             *              *****END OF 1998 LOMR INPUT******
             *
             *
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

879          KK    C4BF
880          KM   PART OF 1998 LOMR SUBBASIN C5DC
881          PB    3.21
882          BA   .2776
883          LS       0       81
884          UD     .06
             *

885          KK   RC4BF
886          KM   ROUTE C4BF TO C4BC
887          RD    3100     .020    .033       0    TRAP   100.0
             *

888          KK    C4BC
889          KM   SUBBASIN C4BC
890          PB    3.15
891          BA   .2402
892          LS       0       82
893          UD     .19
             *

894          KK    CP34
```

```
895          KM   COMBINE RC4BF, C4BC, AND CP34B
896          HC       3
             *

897          KK   RCP34
898          KM   ROUTE CP34 TO C4A1C ALONG EQUESTRIAN OUTFALL
899          KM   FACILITY = C-1 CHANNEL - EQUESTRIAN DETENTION BASIN OUTFALL
900          KM   FACILITY # C1EQ 0078, 0112, 0139
901          RD    3600    .018    .030       0    TRAP     100
             *

902          KK   C4A1C
903          KM   2001 MPU C1-49
904          BA   .5200
905          PB    3.07
906          LS       0      82
907          UD     .25
             *

908          KK    RET5
909          KM   RETRIEVE DIVERSION 5
910          DR  DIVER5
             *

911          KK   RDIV5
912          KM   ROUTE DIV5 ALONG RACE TRACK ROAD TO NEWPORT
913          KM   FACILITY = STREET
914          RD    5000    .024    .016       0    TRAP     100
             *
```



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

915          KK   CP35A
916          KM   COMBINE RDIV5, RCP34, AND C4AIC
917          KM   RACETRACK AND NEWPORT
918          HC       3
             *

919          KK    C4A1
920          KM    2001 MPU C1-50
921          BA   .3493
922          PB    3.07
923          LS       0      79
924          UD     .32
             *

925          KK    CP35
926          KM   COMBINE CP35A AND C4A1
927          HC       2
             *

928          KK  RCP35
929          KM   ROUTE TO C4A1B
930          KM   OVERLAND FLOW
931          KM   C-1 CHANNEL AT BURKHOLDER
932          RD    3500     .02    .030            TRAP     100       3
             *

933          KK    C4BE
934          KM   NOT A PART OF THE 1998 LOMR
935          PB    3.17
936          BA   .2206
937          LS       0      85
938          UD    0.26
             *

939          KK   RC4BE
940          KM   ROUTE C4BE TO C4BB
941          RD    3400    .036    .030            TRAP     100
             *

942          KK    C4BB
943          BA   .3477
944          PB    3.09
945          LS       0      87
946          UD    0.29
             *

947          KK    CP36
948          KM   COMBINE RC4BE AND C4BB
949          HC       2
             *
```



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

950          KK   RCP36
951          KM   ROUTE CP36 TO C4A2B
952          KM   ROUTE TO BURKHOLDER AND RACETRACK
953          RD    2640   0.033   0.016       0    TRAP       0      50
             *

954          KK   C4A2B
955          KM   2001 MPU C1-52
956          BA   .2491
957          PB    3.03
```

```
 958          LS       0      75
 959          UD    0.10
              *

 960          KK    CP37
 961          KM    COMBINE RC4BB AND C4A2B
 962          KM    RACETRACK ROAD @ BURKHOLDER BOULEVARD
 963          HC       2
              *

 964          KK    RCP37
 965          KM    ROUTE CP37 TO C4A1B  ALONG BURKHOLDER
 966          RD     2700   0.033   0.016       0    TRAP       0      50
              *

 967          KK    CP38A
 968          KM    COMBINE CP35 AND RCP37 AT BURKHOLDER AND PUEBLO
 969          HC       2
              *

 970          KK    C4A1B
 971          KM    2001 MPU C1-53
 972          BA    .2492
 973          PB     2.98
 974          LS       0      72
 975          UD     .20
              *

 976          KK    CP38
 977          KM    COMBINE RCP22, CP38A, AND C4A1B @ BURKHOLDER AND PUEBLO
 978          HC       3
              *

 979          KK    RCP38
 980          KM    ROUTE CP38 TO CP45
 981          RD     2200   0.021   0.015       0    TRAP      10      02
              *

 982          KK     C4CB
 983          KM     2001 MPU C1-54
 984          BA    5.408
 985          PB     3.43
 986          LS       0      85
 987          UD     0.06
              *
              *
              *
              *  THE EAST C-1 DETENTION BASIN STAGE/STORAGE AND STAGE/DISCHARGE RELATIONSHIPS
              *  WERE CHECKED AGAINST THE LATEST RECORD DRAWINGS AND PREDESIGN REPORTS.
              *  THE FOLLOWING INPUT  WAS DIGITIZED FROM RECORD DRAWINGS AS THE HEC-1 INPUT
              *  WAS NOT AVAILABLE. THE RECORD DRAWINGS DIFFERED SLIGHTLY FROM THE
              *  PREDESIGN INPUT.
              *
              *
              *
```



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

 988          KK      DB5
 989          KM    FACILITY = EAST C-1 DETENTION BASIN
 990          KM    FACILITY # = C1IT 0492
 991          KM    STORAGE VOLUME = 400 AC-FT (100-YR PK STAGE WSE = 2485.3)
 992          KM    OUTLET = 48" RCP
 993          KO       3
 994          RS       1     STOR      -1
 995          SV     1.2      3.3     12.1     28.0     49.0     79.8    115.0    166.1    232.2    320.1
 996          SV   418.8    534.5    605.5    681.1    765.1    846.8    943.4   1044.8   1261.8   1426.1
 997          SE  2446.0   2450.0   2454.0   2458.0   2462.0   2466.0   2470.0   2474.0   2478.0   2482.0
 998          SE  2486.0   2490.0   2492.0   2494.0   2496.0   2498.0   2500.0     2502   2506.0   2510.0
 999          SQ     0.5     22.9     36.1     45.7     53.6     60.4     66.5     72.3     77.5     82.4
1000          SQ    87.0     91.2     93.5     95.6     97.6     99.5    101.4    103.4    107.2    110.7
1001          SE  2446.0   2450.0   2454.0   2458.0   2462.0   2466.0   2470.0   2474.0   2478.0   2482.0
1002          SE  2486.0   2490.0   2492.0   2494.0   2496.0   2498.0   2500.0     2502   2506.0   2510.0
              *

1003          KK     RDB5
1004          KM    ROUTE DB5 TO C4CA
1005          KM    FACILITY = EAST C-1 DETENTION BASIN LEVEE
1006          KM    FACILITY # = C1DK 0226
1007          KM    TYPE OF FACILTIY = SOIL CEMENT LEVEE
1008          RD     5300    .034    .025       0    TRAP      50       2
              *

1009          KK     C4CA
1010          KM     PART OF 2001 MPU C1-55
1011          BA    .1964
1012          PB     3.43
1013          LS       0      85
1014          UD     0.27
              *

1015          KK    C3B3E
1016          KM    PART OF 2001 MPU C1-55
1017          BA    .2225
1018          PB     3.43
1019          LS       0      90
1020          UD     .16
```

```
                *
1021            KK    CP39
1022            KM    COMBINE C4CA, C3B3E, AND RDB5
1023            HC       3
                *
1024            KK    RCP39
1025            KM    ROUTE CP39 TO C3B3D
1026            RD     2650     .023     .025        0     TRAP       50        2
                *
1                                        HEC-1 INPUT                                                    PAGE 30

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

1027            KK    C3B3D
1028            KM    PART OF 2001 MPU C1-55
1029            PB     3.43
1030            BA    .2554
1031            LS       0       89
1032            UD      .14
                *
1033            KK    CP40
1034            KM    COMBINE RCP39 AND C3B3D
1035            HC       2
                *
1036            KK    RCP40
1037            KM    ROUTE TO CP42
1038            RD     1400      .05     .025             TRAP       50        3
                *
1039            KK    C3B3C
1040            KM    PART OF 2001 MPU C1-65
1041            BA    1.238
1042            PB     3.50
1043            LS       0       88
1044            UD     0.07
                *
1045            KK   RC3B3C
1046            KM    ROUTE C3B3C TO C3B3B
1047            RD     2300     .024     .030             TRAP      100        3
                *
1048            KK    C3B3B
1049            KM    PART OF 2001 MPU C1-65
1050            BA    .3220
1051            PB     3.43
1052            LS       0       87
1053            UD     0.17
                *
1054            KK    CP41
1055            KM    COMBINE C3B3C AND C3B3B
1056            HC       2
                *
1057            KK    RCP41
1058            KM    ROUTE TO C3B3A
1059            RD     6300      .05     .030             TRAP      100        3
                *
1                                        HEC-1 INPUT                                                    PAGE 31

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

1060            KK    C3B3A
1061            BA    .5107
1062            PB     3.43
1063            LS       0       85
1064            UD     0.10
                *
1065            KK    CP42
1066            KM    COMBINE RCP41, RCP40, AND C3B3A
1067            HC       3
                *
1068            KK    RCP42
1069            KM    ROUTE CP42 TO CP43 @ MAGIC WAY AND DRAKE CHANNEL
1070            KM    OVERLAND FLOW THROUGH C4BA2
1071            RD     5300     .015     .030             TRAP      100        3
                *
1072            KK    C4BA2
1073            KM    PART OF 2001 MPU C1-46
1074            BA    .1351
1075            PB     3.43
1076            LS       0       74
1077            UD      .16
                *
1078            KK    CP43A
1079            KM    COMBINE C4BA2 AND RCP42
1080            HC       2
                *
```

```
1081          KK   RCP43
1082          KM   ROUTE CP43 TO C4A2A ALONG DRAKE CHANNEL
1083          KM   FACILTIY = C-1 CHANNEL - DRAKE CHANNEL
1084          KM   FACILTY # - C1DC 0051
1085          KM   TYPE OF FACILITY = EARTHEN W\ GABION DROPS
1086          RD   2640     .029    .030            TRAP      20       2
              *

1087          KK   C4BA3
1088          KM   PART OF 2001 MPU C1-46
1089          BA   .4069
1090          PB    3.43
1091          LS      0      78
1092          UD    .41
              *

1093          KK  RC4BA3
1094          KM   ROUTE C4BA3 TO C4A2A
1095          RD    2900    .031    .030            TRAP     200
              *
1                                    HEC-1 INPUT                                    PAGE 32

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

1096          KK   C4A2A
1097          KM   2001 MPU C1-57
1098          BA   .2607
1099          PB    3.05
1100          LS      0      77
1101          UD    .04
              *

1102          KK    CP44
1103          KM   COMBINE C4A2A, RCP43, AND RC4BA3
1104          KM   DRAKE AND RACETRACK
1105          HC       3
              *

1106          KK   RCP44
1107          KM   ROUTE CP44 TO C4A1A
1108          KM   FACILITY = C-1 CHANNEL -DRAKE CHANNEL
1109          KM   TYPE OF FACILITY = CONCRETE CHANNEL
1110          RD    2640    .021    .015            TRAP      10       2
              *

1111          KK   C4A1A
1112          KM   2001 MPU C1-58
1113          BA   .2544
1114          PB    2.92
1115          LS      0      79
1116          UD    .66
              *

1117          KK    CP45
1118          KM   COMBINE RCP44, RCP38, AND C4A1A
1119          KM   CONFLUENCE OF C1 CHANNEL AND DRAKE CHANNEL
1120          HC       3
              *

1121          KK   RCP45
1122          KM   ROUTE CP45 TO C3B1C
1123          KM   FACILITY = C-1 CHANNEL
1124          KM   FACILITY # = C1CH 0321
1125          KM   TYPE OF FACILITY = CONCRETE CHANNEL
1126          RD    2640    .025    .015            TRAP      15       1
              *

1127          KK   C3A2B
1128          KM   PART OF 2001 MPU C1-65
1129          BA   .5139
1130          PB    3.23
1131          LS      0      86
1132          UD    .13
              *
1                                    HEC-1 INPUT                                    PAGE 33

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

1133          KK  RC3A2B
1134          KM   ROUTE C3A2B TO CP46
1135          KM   FACILITY = OVERLAND FLOW
1136          RD    4100    .030    .030            TRAP     100       1
              *

1137          KK   C4BA1
1138          KM   PART OF 2001 MPU C1-62
1139          BA   .4758
1140          PB    2.99
1141          LS      0      74
1142          UD    .21
              *

1143          KK    CP46
1144          KM   COMBINE RC3A2B AND C4BA1
1145          HC       2
              *
```

```
1146          KK   RCP46
1147          KM   ROUTE CP46  TO C3B1D
1148          KM   OVERLAND FLOW TO RACETRACK
1149          RD    2640     .03     .03            TRAP     100       3
              *

1150          KK   C3B1D
1151          KM   2001 MPU C1-60
1152          BA   .2455
1153          PB    2.93
1154          LS       0       73
1155          UD     .05
              *

1156          KK    CP47
1157          KM   COMBINE RC4BA1 AND C3B1D
1158          KM   RACETRACK AND WARM SPRINGS
1159          HC       2
              *

1160          KK   RCP47
1161          KM   ROUTE CP47 TO C3B1C
1162          KM   WARM SPRINGS ROAD AND PUEBLO
1163          RD    2640    .025    .016            TRAP       0       50
              *

1164          KK   C3B1C
1165          KM   2001 MPU C1-61
1166          BA   .2434
1167          PB    2.87
1168          LS       0       84
1169          UD     .04
              *
```



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

1170          KK    CP48
1171          KM   COMBINE RCP45, C3B1C, AND RCP46
1172          HC       3
              *

1173          KK   RCP48
1174          KM   ROUTE CP47 TO C3B1A
1175          KM   FACILITY = C-1 CHANNEL
1176          KM   FACILITY # C1CH 0284, 0340
1177          KM   TYPE OF FACILITY = CONCRETE CHANNEL
1178          RD    2640    .025    .015            TRAP      15       1
              *

1179          KK   C3B1B
1180          KM   PART OF 2001 MPU C1-67
1181          BA   .2094
1182          PB    2.92
1183          LS       0       76
1184          UD     .20
              *

1185          KK  RC3B1B
1186          KM   ROUTE C3B1B TO C3B1A
1187          KM   ITHACA AVENUE AND PUEBLO
1188          RD    2640    .025    .016            TRAP       0       50
              *

1189          KK   C3B1A
1190          KM   2001 MPU C1-63
1191          PB    2.85
1192          BA   .2435
1193          LS       0       78
1194          UD     .21
              *

1195          KK    CP49
1196          KM   COMBINE C3B1A, RC3B1B, AND RCP48
1197          HC       3
              *

1198          KK   RCP49
1199          KM   ROUTE CP49 TO C3A1A
1200          KM   FACILITY = C-1 CHANNEL
1201          KM   FACILITY # C1CH 0220, 0269
1202          KM   TYPE OF FACILITY = CONCRETE CHANNEL
1203          RD    3960    .025    .015            TRAP      15       1
              *

1204          KK   C3A2A
1205          KM   PART OF 2001 MPU C1-66
1206          BA   .4708
1207          PB    3.23
1208          LS       0       88
1209          UD     .09
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
1210          KK  RC3A2A
1211          KM   ROUTE C3A2A TO C3A1B
1212          KM   OVERLAND FLOW
1213          RD    7900     .03    .030            TRAP       0     100       3
              *

1214          KK   C3A1B
1215          KM   PART OF 2001 MPU C1-66
1216          BA   1.018
1217          PB    3.23
1218          LS       0      81
1219          UD     .08
              *

1220          KK    CP50
1221          KM   COMBINE C3A1B,RC3A2A, AND CP49
1222          HC       2
              *

1223          KK   RCP50
1224          KM   ROUTE CP50 TO C3A1A
1225          KM   ITHACA
1226          RD    2600    .019    .016            TRAP      50
              *

1227          KK   C3A1A
1228          KM   PART OF 2001 MPU C1-64
1229          BA   .3744
1230          PB    2.84
1231          LS       0      81
1232          UD     .07
              *

1233          KK    CP51
1234          KM   COMBINE C3A1A,RCP50,AND RCP49 - C-1 CHANNEL AND LAKE MEAD DRIVE
1235          HC       3
              *
              * *******END OF CARTER BURGESS MODEL********
              *
*** FREE ***
              *

1236          KK A-BASIN
1237          KM   FROM 1998 STUDY, AREA REMEASURED AND HYDROLOGY REDONE
1238          BA    0.34
1239          LS       0      88
1240          UD    0.36
              *
              * *******MPU HYDROLOGY BEGINS********
              *
```



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

1241          KK   C1-68
1242          BA   0.356
1243          PB    2.86
1244          LS       0    85.1
1245          UD   0.302
              *

1246          KK  RC1-68
1247          KM   ROUTE C1-68 TO C1-72
1248          KM   FACILITY = C-1 CHANNEL - LAKE MEAD
1249          KM   FACILITY # = C1LM 0184 TO C1LM 0144
1250          KM   LINING = CONCRETE
1251          RD    2980   0.009    .015       0    TRAP      10       2
              *

1252          KK   C1-72
1253          BA   0.451
1254          PB    2.83
1255          LS       0    82.0
1256          UD   0.251
              *

1257          KK    CP67
1258          KM   COMBINE RC1-68 AND C1-72
1259          KM   WARM SPRINGS ROAD @ LAKE MEAD DRIVE
1260          HC       2
              *

1261          KK   C1-70
1262          BA   0.344
1263          PB    2.93
1264          LS       0    86.6
1265          UD   0.397
              *

1266          KK  RC1-70
1267          KM   ROUTE C1-70 TO C1-71
1268          KM   PALO VERDE DRIVE
1269          RD    2300   0.020    .016       0    TRAP       0      50
              *

1270          KK   C1-71
1271          BA   0.290
1272          PB    2.87
```

```
1273          LS       0    80.7
1274          UD   0.368
              *

1275          KK    CP68
1276          KM   COMBINE RC1-70 AND C1-71
1277          KM   PALO VERDE DRIVE @ WARM SPRINGS
1278          HC       2
              *
```



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

1279          KK   RCP68
1280          KM   ROUTE CP68 TO C1-72
1281          KM   WARM SPRINGS ROAD
1282          RD    2300   0.023    .016       0    TRAP       0      50
              *

1283          KK    CP69
1284          KM   COMBINE CP67 AND RCP68
1285          KM   WARM SPRINGS ROAD @ LAKE MEAD DRIVE
1286          HC       2
              *

1287          KK   RCP69
1288          KM   ROUTE CP69 TO C1-73
1289          KM   FACILITY = C-1 CHANNEL - LAKE MEAD
1290          KM   FACILITY # = C1LM 0125 TO C1LM 0083
1291          KM   LINING = CONCRETE
1292          RD    3115   0.009    .015       0    TRAP      10       2
              *

1293          KK   C1-73
1294          BA   0.325
1295          PB    2.83
1296          LS       0    84.8
1297          UD   0.327
              *

1298          KK    CP70
1299          KM   COMBINE RCP69 AND C1-73
1300          HC       2
              *

1301          KK   RCP70
1302          KM   ROUTE CP70 TO C1-74
1303          KM   FACILITY = C-1 CHANNEL - LAKE MEAD
1304          KM   FACILITY # = C1LM 0083 TO C1LM 0000
1305          KM   LINING = CONCRETE
1306          RD    4370   0.009    .015       0    TRAP      10       2
              *

1307          KK   C1-74
1308          BA   0.195
1309          PB    2.83
1310          LS       0    87.1
1311          UD   0.145
              *

1312          KK    CP71
1313          KM   COMBINE RCP70 AND C1-74
1314          HC       2
              *
              * *******MPU HYDROLOGY ENDS********
              *
```



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

1315          KK C-1TOT0
1316          KM   C1 CHANNNEL @ LAKE MEAD
1317          HC       3
              *

1318          KKRC1TOT01
1319          KM   ROUTE CP51 TO C-1TOT1
1320          RD    2100    .023    .035       0    TRAP      25
              *
              * ************************************************
              * TRIBUTARY TO C1-TOT1
              * ************************************************
              *

1321          KK     ON5
1322          KM   REFERENCE BASIN TAKEN FROM STANTEC, 2001
1323          BA  0.0352
1324          LS       0      88
1325          UD    0.11
              *

1326          KK  ATHEN2
1327          KM   PORTION OF ATHENS AVENUE THAT DRAINS INTO THE C-1 CHANNEL
1328          BA  0.0036
1329          LS       0      98
1330          UD   0.099
              *
```

```
1331          KK C1-TOT1
1332          KM   COMBINE FLOW FROM ON5 AND ATHEN2
1333          KM   FLOW DRAINS INTO C-1 CHANNEL
1334          HC       3
              *

1335          KKRC1TOT12
1336          KM   ROUTE C1-TOT1 TO C1-TOT2
1337          RK    1143   0.010   0.035       0    TRAP      40
              *
              * ***************************************************
              * TRIBUTARY TO C-LOOP1
              * FLOW SPLITS
              * ***************************************************
              *

1338          KK18OND-16
1339          KM   ONSITE DEVELOPED BASIN 18OND-16
1340          BA  0.0022
1341          LS       0      87
1342          UD   0.112
              *
1                                        HEC-1 INPUT                                        PAGE 39

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


1343          KK    PK-3
1344          KM   ONSITE DEVELOPED BASIN PK-3 (PARK BTWN PARCEL 18 & 19)
1345          BA  0.0020
1346          LS       0      79
1347          UD   0.098
              *

1348          KK 19OND-5
1349          KM   ONSITE  DEV BASIN 19OND-5
1350          BA  0.0051
1351          LS       0      87
1352          UD   0.110
              *

1353          KKC-19OND5
1354          KM   COMBINE 19OND-5,PK-3 AND 18OND-16
1355          HC       3
              *

1356          KK D19OND5
1357          KM   FLOW SPLIT AT C-19OND5 (IN PARCEL 19)
1358          DT D19OND4
1359          DI       0      15
1360          DQ       0       4
              *

1361          KK19OND-18
1362          KM   ONSITE  DEV BASIN 19OND-18
1363          BA  0.0036
1364          LS       0      87
1365          UD   0.107
              *

1366          KK19OND-17
1367          KM   ONSITE  DEV BASIN 19OND-17
1368          BA  0.0066
1369          LS       0      87
1370          UD   0.107
              *

1371          KK 19OND-1
1372          KM   ONSITE  DEV BASIN 19OND-1
1373          BA  0.0037
1374          LS       0      87
1375          UD   0.081
              *

1376          KKC-19OND1
1377          KM   COMBINE 19OND-1,19OND-17,19OND-18 AND D19OND5
1378          HC       4
              *
1                                        HEC-1 INPUT                                        PAGE 40

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


1379          KK19OND-15
1380          KM   ONSITE  DEV BASIN 19OND-15
1381          BA  0.0025
1382          LS       0      87
1383          UD   0.098
              *

1384          KK 19OND-2
1385          KM   ONSITE  DEV BASIN 19OND-2
1386          BA  0.0041
1387          LS       0      87
1388          UD   0.086
              *

1389          KK 19OND-3
```

```
1390          KM   ONSITE  DEV BASIN 19OND-3
1391          BA  0.0030
1392          LS       0      87
1393          UD   0.088
              *

1394          KKC-19OND15
1395          KM   COMBINE 19OND-2,19OND-3,19OND-15
1396          KM   DISCHARGES INTO OLIVIA PKWY (BASIN LOOP-1)
1397          HC       3
              *

1398          KKDUMMYC-19
1399          KM   DUMMY COMBINATION POINT - TO MINIMIZE HYDROGRAPH STACK
1400          KM   COMBINE C-19OND1 AND C-19OND15
1401          KM   FLOW DISCHARGED FROM PARCEL 19 INTO BASIN LOOP-1 (OLIVIA PKWY)
1402          HC       2
              *

1403          KK   LOOP1
1404          KM   OLIVIA PKWY
1405          BA  0.0039
1406          LS       0      98
1407          UD   0.047
              *

1408          KK C-LOOP1
1409          KM   COMBINE DUMMYC-19 AND LOOP-1
1410          HC       2
              *

1411          KK  DLOOP1
1412          KM   FLOW SPLIT AT C-LOOP1
1413          DT  DLOOP5
1414          DI       0      54
1415          DQ       0      19
              *
              * ***************************************************
              * FLOW IN C1 CHANNEL @ C-1TOT2
              * ***************************************************
              *
```

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

1416          KKRTC-LOOP1
1417          KM   ROUTE LOOP-1 THRU LOOP-2
1418          KM   (FLOW AT C-LOOP1 MINUS FLOW SPLIT)
1419          RK     830   0.047   0.016       0    TRAP     134       1
              *

1420          KK  LOOP-2
1421          KM   OLIVIA PKWY
1422          BA  0.0031
1423          LS       0      98
1424          UD   0.050
              *

1425          KK    SC-2
1426          KM   SALES CENTER DEVELOPED BASIN 1 (SALES CENTER)
1427          BA 0.00156
1428          LS       0      98
1429          UD   0.057
              *

1430          KK C-LOOP2
1431          KM   COMBINE LOOP-2, RTC-LOOP1 AND SC-2
1432          KM   ALL FLOW @ C-LOOP-2 IS COLLECTED IN DROP INLETS
1433          KM   15' TYPE C W/ 5 GRATES ON BOTH SIDES OF STREET
1434          HC       3
              *

1435          KK   UPB-1
1436          KM   FLOW FROM UPPERBASIN 1
1437          BA  0.0117
1438          LS       0      84
1439          UD   0.119
              *

1440          KKRETD19OND4
1441          KM   RETREIVE FLOW FROM PARCEL 19
1442          DR D19OND4
              *

1443          KKPARCEL18
1444          KM   COMBINED RUNOFF THROUGH PARCEL 18
1445          BA  0.0621
1446          LS       0      90
1447          UD   0.564
              *

1448          KKDUMMYGC-1
1449          KM   FOR ROUTING PURPOSE ONLY
1450          KM   COMBINE C-LOOP2, UPB-1 AND PARCEL 18
1451          HC       4
              *
```

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

1452      KKRTDUMMYGC-1
1453      KM   ROUTE DUMMYGC-1 THRU GOLFCOURSE GC-1
1454      RK    1650   0.005   0.030       0    TRAP      20       3
          *
1455      KK    GC-1
1456      KM   GOLFCOURSE 1
1457      BA  0.0230
1458      LS       0      84
1459      UD   0.199
          *
1460      KK   CGC-1
1461      KM   COMBINE FLOWS IN GOLF COURSE
1462      KM   COMBINE RTDUMMYGC-1 & GC-1
1463      HC       2
          *
1464      KK12OND-13
1465      KM   ONSITE DEVELOPED BASIN 12OND-13
1466      BA  0.0036
1467      LS       0      90
1468      UD   0.088
          *
1469      KK C-1TOT2
1470      KM   COMBINE FLOWS IN C1 CHANNEL
1471      HC       3
          *
1472      KKRC1TOT23
1473      KM   ROUTE C-1TOT2 THRU C1 TO SILVER CASCADES C-1TOT3
1474      RK    1006   0.010   0.015       0    TRAP      40
          *
          * ****************************************************
          * TOTAL FLOW FROM C-P11 AND 12 OND-2
          * FLOW IS COLLECTED IN STORM DRAIN LOCATED IN VIA ALATOIRE
          * DISCHARGES INTO THE C-1 CHANNEL
          * ****************************************************
          *
1475      KK   UPB-2
1476      KM   RUNOFF FROM UPPER BASIN 2
1477      BA  0.0048
1478      LS       0      88
1479      UD   0.086
          *
1480      KK 11OND-1
1481      KM   ONSITE DEVELOPED BASIN 11OND-1(PARCEL 11)
1482      BA  0.0125
1483      LS       0      80
1484      UD   0.155
          *
```



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

1485      KK 11OND-2
1486      KM   ONSITE DEVELOPED BASIN 11OND-2(PARCEL 11)
1487      BA  0.0125
1488      LS       0      80
1489      UD   0.155
          *
1490      KK    ST-3
1491      KM   RUNOFF FROM STREET BASIN 3
1492      BA  0.0013
1493      LS       0      98
1494      UD   0.051
          *
1495      KK   C-P11
1496      KM   TOTAL FROM PARCEL 11 AND STREET BASIN
1497      KM   DISCHARGED INTO C-1 CHANNEL
1498      HC       4
          *
1499      KK 12OND-2
1500      KM   ONSITE DEVELOPED BASIN 12OND-2(PARCEL 12)
1501      BA  0.0133
1502      LS       0      87
1503      UD   0.120
          *
1504      KKC-12OND2
1505      KM   TOTAL FLOW FROM C-P11 AND 12 OND-2
1506      KM   FLOW IS COLLECTED IN STORM DRAIN LOCATED IN VIA ALATOIRE
1507      KM   DISCHARGES INTO THE C-1 CHANNEL
1508      KM   21' TYPE C W/7 GRATES ( EACH SIDE OF STREET)
1509      HC       2
          *
1510      KK C-1TOT3
1511      KM   TOTAL FLOW IN C-1 CHANNEL @ C-12OND2
```

```
1512          KM   COMBINE RC1TOT23 AND C-12OND2
1513          HC       2
              *

1514          KKRC1TOT34
1515          KM   ROUTE C-1TOT3 TO 4 KIDS C-1TOT4
1516          RK     664   0.010   0.015       0    TRAP       40
              *
              * ***************************************************
              * START OF G.C.WALLACE 2001(B)
              * FLOW TO THE 4KIDS CHANNEL
              * ***************************************************
              *
```



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

1517          KK       J
1518          KM   REFERENCE FROM G.C. WALLACE(B)
1519          BA   .0512
1520          LS       0      86
1521          UD   0.162
              *

1522          KK       K
1523          KM   REFERENCE FROM G.C. WALLACE(B)
1524          BA   .0529
1525          LS       0      88
1526          UD   0.135
              *

1527          KK       H
1528          KM   REFERENCE FROM G.C. WALLACE(B)
1529          BA   .0788
1530          LS       0      89
1531          UD   0.207
              *

1532          KK       I
1533          KM   REFERENCE FROM G.C. WALLACE(B)
1534          BA   .0096
1535          LS       0      88
1536          UD    .103
              *

1537          KK      C1
1538          KM   REFERENCE FROM G.C. WALLACE(B)
1539          KM   COMBINE SUBBASINS J, K, H, AND I
1540          HC       4
              *

1541          KK       F
1542          KM   REFERENCE FROM G.C. WALLACE(B)
1543          BA   .1043
1544          LS       0      75
1545          UD    .274
              *

1546          KK       G
1547          KM   REFERENCE FROM G.C. WALLACE(B)
1548          BA   .0032
1549          LS       0      98
1550          UD    .116
              *

1551          KK       E
1552          KM   REFERENCE FROM G.C. WALLACE(B)
1553          BA   .1013
1554          LS       0      70
1555          UD    .276
              *
```



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

1556          KK      C2
1557          KM   REFERENCE FROM G.C. WALLACE(B)
1558          KM   COMBINE SUBBASINS F, G AND E
1559          HC       3
              *

1560          KK     RC2
1561          KM   ROUTE C2 THROUGH LAKE MEAD CHANNEL AND CULVERTS
1562          KM   REFERENCE FROM G.C. WALLACE(B)
1563          RD    1650    .005    .025            TRAP       30       3
              *

1564          KK      PR
1565          KM   REFERENCE FROM G.C. WALLACE(B)
1566          BA   .0236
1567          LS       0      51
1568          UD    .172
              *

1569          KK      PC
1570          KM   REFERENCE FROM G.C. WALLACE(B)
1571          BA   .0492
```

```
1572          LS       0      89
1573          UD    .100
              *

1574          KK  C2SITE
1575          KM   REFERENCE FROM G.C. WALLACE(B)
1576          KM   COMBINE SUBBASINS AND C2
1577          HC       3
              *

1578          KK      P2
1579          KM   REFERENCE FROM G.C. WALLACE(B)
1580          BA   .0119
1581          LS       0      98
1582          UD    .171
              *

1583          KK  SIT&P2
1584          KM   COMBINE THE SUBBASINS AND C2 WITH P2 (LAKE MEAD DRIVE)
1585          KM   REFERENCE FROM G.C. WALLACE(B)
1586          HC       2
              *

1587          KK       A
1588          KM   REFERENCE FROM G.C. WALLACE(B)
1589          BA   .1058
1590          LS       0      77
1591          UD    .096
              *
```



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

1592          KK       B
1593          KM   REFERENCE FROM G.C. WALLACE(B)
1594          BA   .2281
1595          LS       0      72
1596          UD    .184
              *

1597          KK DUMMYAB
1598          KM   ROUTING PURPOSES TO AVOID
1599          KM   TOO MANY HYDROGRAPHS
1600          HC       2
              *

1601          KK       C
1602          KM   REFERENCE FROM G.C. WALLACE(B)
1603          BA   .0962
1604          LS       0      67
1605          UD    .239
              *

1606          KK      C3
1607          KM   REFERENCE FROM G.C. WALLACE(B)
1608          KM   COMBINE SUBBASINS A, B, AND C
1609          HC       2
              *

1610          KK     RC3
1611          KM   ROUTE C3 THROUGH SUBBASIN D
1612          KM   REFERENCE FROM G.C. WALLACE(B)
1613          RD    1430   .0315    .016            TRAP       1      50
              *

1614          KK       D
1615          KM   REFERENCE FROM G.C. WALLACE(B)
1616          BA   .0772
1617          LS       0      76
1618          UD   0.168
              *

1619          KK      C4
1620          KM   REFERENCE FROM G.C. WALLACE(B)
1621          KM   COMBINE C3 AND SUBBASINS D, H AND I
1622          HC       2
              *

1623          KK     RC4
1624          KM   REFERENCE FROM G.C. WALLACE(B)
1625          KM   ROUTE C4 THROUGH SUBBASIN P1
1626          RD     800    .018    .016            TRAP      40       1
              *
```



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

1627          KK      P1
1628          KM   ATHENS AVENUE
1629          KM   REFERENCE FROM G.C. WALLACE(B)
1630          BA   .0074
1631          LS       0      98
1632          UD    .104
              *

1633          KK   C4&P1
1634          KM   REFERENCE FROM G.C. WALLACE(B)
```

```
1635          KM   COMBINE C4 AND P1
1636          HC       2
              *

1637          KK   RCRP1
1638          KM   REFERENCE FROM G.C. WALLACE(B)
1639          KM   ROUTE THROUGH FUTURE DEVELOPMENT SITE
1640          RD    2500     .01    .013            CIRC       5
              *

1641          KK      C5
1642          KM   REFERENCE FROM G.C. WALLACE(B)
1643          KM   COMBINE ALL
1644          HC       3
              *
              *   ***END OF G.C. WALLACE 2001(B)***
              *

1645          KK  OFFD-7
1646          KM   OFFSITE BASIN OFFD-7
1647          KM   FLOW AREA NORTH OF LAKE MEAD DRIVE TO THE 4 KIDS CHANNEL
1648          BA  0.1530
1649          LS       0       90
1650          UD   0.153
              *

1651          KK     C-9
1652          KM   COMBINE C5 AND BASIN OFFD-7
1653          HC       2
              *

1654          KK C-1TOT4
1655          KM   COMBINE FLOWS IN C-1 CHANNEL
1656          KM   COMBINE RC1TOT34 AND C-9
1657          HC       2
              *

1658          KKRC1TOT45
1659          KM   ROUTE C-1TOT4 TO C-1TOT5
1660          RK    2580   0.010   0.015       0    TRAP      40
              * ****************************************************
              * TRIBUTARY TO C-6COND2 (DI LOCATION)
              * DI @ THIS LOC. COLLECT FLOW & DISCHARGES TO GC-4
              * ****************************************************
              *
```

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

1661          KK 17OND-1
1662          KM   ONSITE DEVELOPED BASIN 17OND-1
1663          BA  0.0100
1664          LS       0       87
1665          UD   0.141
              *

1666          KKRT17OND1
1667          KM   ROUTE 17OND-1 THRU 12OND-1
1668          RK     600   0.007   0.016       0    TRAP    62.5       1
              *

1669          KK 12OND-1
1670          KM   ONSITE DEVELOPED BASIN 12OND-1
1671          BA  0.0038
1672          LS       0       87
1673          UD   0.114
              *

1674          KKC-12OND1
1675          KM   COMBINE 17OND-1 AND 12OND-1
1676          HC       2
              *

1677          KKRTC-12OND1
1678          KM   ROUTE 6COND1 THRU 6COND-2
1679          RK    1000   0.021   0.016       0    TRAP    62.5       1
              *

1680          KK 6COND-1
1681          KM   ONSITE DEVELOPED BASIN 1COND-1
1682          BA  0.0033
1683          LS       0       87
1684          UD  0.1000
              *

1685          KKRT6COND1
1686          KM   ROUTE 6COND-1 THRU 6COND-2
1687          RK     500   0.022   0.016       0    TRAP    62.5       1
              *

1688          KK 6COND-2
1689          KM   ONSITE DEVELOPED BASIN 6COND-2
1690          BA  0.0033
1691          LS       0       87
1692          UD   0.099
              *

1693          KKC-6COND2
```

```
1694          KM   COMBINE RTC-12OND1,RT6COND1 AND 6COND-2
1695          HC        3
              *
1                                        HEC-1 INPUT                                        PAGE 49

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


1696          KKDC-6COND2
1697          KM   ALL FLOW @ C-6COND2 IS COLLECTED IN DROP INLETS
1698          KM   12' TYPE C W/ 4 GRATES ON BOTH SIDES OF STREET
1699          KM   FLOW  DISCHARGES INTO GOLF COURSE BASIN GC-4 (NEAR HOLE 8 GREEN)
1700          DT    DGC4
1701          DI        0       50
1702          DQ        0       50
              *
              * ***************************************************
              * TRIBUTARY TO C-14OND3 (DI LOCATION)
              * DI @ THIS LOCATION  COLLECT THE FLOW & DISCHARGES TO
              * 8'X4' RCB WHICH DISCHARGES TO C-1 CHANNEL
              * ***************************************************
              *

1703          KK 14OND-1
1704          KM   ONSITE  DEV BASIN 14OND-1
1705          BA  0.0045
1706          LS        0       87
1707          UD   0.098
              *

1708          KK 14OND-2
1709          KM   ONSITE  DEV BASIN 14OND-2
1710          BA  0.0045
1711          LS        0       87
1712          UD   0.118
              *

1713          KKDUMMYC-14
1714          KM   DUMMY COMBINATION POINT - FOR ROUTING PURPOSES ONLY
1715          KM   COMBINE 14OND-1 AND 14OND-2
1716          HC        3
              *

1717          KKRTDUMMYC-14
1718          KM   ROUTE DUMMYC-14 (14OND-1 AND 14OND-2) THRU 14OND-3
1719          RK      900   0.016   0.016        0    TRAP    70.5        1
              *

1720          KK 14OND-3
1721          KM   ONSITE  DEV BASIN 14OND-3 (PORTION OF PARCEL 14 & 6)
1722          BA  0.0117
1723          LS        0       87
1724          UD   0.108
              *

1725          KK 14OND-4
1726          KM   ONSITE  DEV BASIN 14OND-4
1727          BA  0.0081
1728          LS        0       87
1729          UD   0.104
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1730          KKC-14OND3
1731          KM   COMBINE RTDUMMYC-14, 14OND-3 AND 14OND-4
1732          KM   TRIBUTARY TO C-14OND3 (DI LOCATION)
1733          KM   DI @ THIS LOCATION  COLLECT THE FLOW & DISCHARGES TO
1734          KM   8'X4' RCB WHICH DISCHARGES TO C-1 CHANNEL
1735          HC        3
              *
              * ***************************************************
              * TRIBUTARY TO C-LOOP3 (DI LOCATION)
              * DI @ THIS LOCATION  COLLECT THE FLOW & DISCHARGES TO
              * 8'X4' RCB WHICH DISCHARGES TO C-1 CHANNEL
              * ***************************************************
              *

1736          KK 24OND-2
1737          KM   ONSITE  DEV BASIN 24OND-2
1738          BA 0.01484
1739          LS        0       87
1740          UD   0.144
              *

1741          KKRT24OND2
1742          KM   ROUTE 24OND-2 THRU LOOP-3
1743          RK     1000    .013   0.016        0    TRAP    62.5        1
              *

1744          KK 13OND-1
1745          KM   ONSITE  DEV BASIN (PORTION 13)
1746          BA  0.0022
1747          LS        0       87
1748          UD   0.050
              *
```

```
1749          KK  LOOP-3
1750          KM   OLIVIA PKWY
1751          BA  0.0028
1752          LS       0      98
1753          UD   0.123
              *

1754          KK C-LOOP3
1755          KM   COMBINE RT24OND2, 13OND-1 AND LOOP-3
1756          KM   TRIBUTARY TO C-LOOP3 (DI LOCATION)
1757          KM   DI @ THIS LOCATION  COLLECT THE FLOW & DISCHARGES TO
1758          KM   8'X4' RCB WHICH DISCHARGES TO C-1 CHANNEL
1759          HC       3
              *
              * ************************************************
              * FLOW COMBINED @ CGC-5 ENTRANCE TO 8'X4' RCB
              * DISCHARGES INTO C-1 CHANNEL
              * ************************************************
              *
```



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

1760          KK  OFFD-1
1761          KM   PORTION OF CLUBHOUSE ACCESS RD (CLUBHOUSE)
1762          KM   FROM REFERENCED STUDY
1763          BA  0.0019
1764          LS       0      76
1765          UD   0.119
              *

1766          KK    RT-1
1767          KM   ROUTE OFFD-1 THRU OFFD-2 (CLUBHOUSE)
1768          KM   FROM REFERENCED STUDY
1769          RK     630   0.019   0.022       0    TRAP      10      15
              *

1770          KK  OFFD-2
1771          KM   PORTION OF CLUB HOUSE ACCESS RD. (CLUBHOUSE)
1772          KM   FROM REFERENCED STUDY
1773          BA  0.0018
1774          LS       0      76
1775          UD   0.136
              *

1776          KK  COMB-1
1777          KM   COMBINE RT-1 AND OFFD-2 (CLUBHOUSE)
1778          KM   FROM REFERENCED STUDY
1779          HC       2
              *

1780          KK    RT-2
1781          KM   ROUTE COMB-1 THRU ONDEV-1(CLUBHOUSE)
1782          KM   FROM REFERENCED STUDY
1783          RK     350   0.005   0.016       0    TRAP      10      15
              *

1784          KK ONDEV-1
1785          KM   ONSITE DEVELOPED CLUBHOUSE BASIN (CLUBHOUSE)
1786          KM   FROM REFERENCED STUDY
1787          BA  0.0023
1788          LS       0      98
1789          UD   0.065
              *

1790          KK    D.I.
1791          KM   TOTAL FLOW FROM CLUBHOUSE BASIN (CLUBHOUSE)
1792          KM   DISCHARGED INTO GOLF COURSE BASIN GC-5 VIA STORM DRAIN
1793          KM   FROM REFERENCED STUDY
1794          HC       2
              *
```



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

1795          KK  RTCLUB
1796          KM   ROUTE CLUBHOUSE FLOW THRU GC-5
1797          RK     800   0.025   0.030       0    TRAP     100       3
              *

1798          KK  RETGC4
1799          KM   RETREIVE FLOW DIVERTED FROM LOOP RD.
1800          KM   COLLECTED VIA DI'S @ C-6OND2
1801          DR    DGC4
              *

1802          KK  RTDGC4
1803          KM   ROUTE  RETGC4 THRU BASIN GC-4
1804          RK    1300   0.015   0.030       0    TRAP     100       3
              *

1805          KK    GC-4
1806          KM   ONSITE DEVELOPED BASIN GC-4 (GOLF COURSE)
1807          BA  0.0178
1808          LS       0      80
1809          UD   0.129
              *
```

```
1810          KK   RTGC4
1811          KM   ROUTE GC-4  THRU GC-5
1812          RK    1150   0.026   0.030       0    TRAP     100       3
              *

1813          KK    GC-5
1814          KM   ONSITE DEVELOPED BASIN GC-5 (GOLF COURSE)
1815          BA  0.0336
1816          LS       0      80
1817          UD   0.076
              *

1818          KK   C-GC5
1819          KM   TOTAL FLOW COMBINED @ ENTRANCE TO 8'X4' RCB
1820          KM   DISCHARGED INTO C-1 CHANNEL
1821          HC       4
              *
              * ***************************************************
              * COMBINED PORTION OF PARCEL 6,9 & 10
              * ***************************************************
              *

1822          KK P6.9.10
1823          KM   COMBINED PORTION OF PARCEL 6,9&10
1824          BA  0.0504
1825          LS       0      90
1826          UD   0.331
              *
```



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

1827          KKDUMMY8X4
1828          KM   FOR ROUTING PURPOSES
1829          HC       4
              *
              * ***************************************************
              * SUBBASINS FROM SCHOOLPARK
              * ***************************************************
              *

1830          KK  ATHEN1
1831          KM   ATHENS AVENUE BASIN THAT DRAINS TO THE NORTH
1832          BA  0.0070
1833          BF       0
1834          LS       0      98
1835          UD   0.124
              *

1836          KK  OFFD-3
1837          KM   OFFSITE BASIN OFFD-3 (SUNSET RD)
1838          BA  0.0039
1839          LS       0      98
1840          UD   0.063
              *

1841          KK    C-1A
1842          KM   COMBINE OFFD-3 AND ATHEN1
1843          KM   FLOW IN ATHENS AVENUE ENTERING SOUTH EDGE
1844          KM   OF SCHOOL AND PARK SITE
1845          HC       2
              *

1846          KK   OND-4
1847          KM   ONSITE DEV BASIN OND-4
1848          BA  0.0023
1849          LS       0      83
1850          UD    0.05
              *

1851          KK    RT-4
1852          KM   ROUTE OND-4 THUR OND-1
1853          RK     900   0.006   0.016       0    TRAP      48       0
              *

1854          KK   OND-3
1855          KM   ONSITE DEV BASIN OND-3
1856          BA  0.0048
1857          LS       0      49
1858          UD   0.105
              *
```



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

1859          KK   OND-1
1860          KM   ONSITE DEV BASIN OND-1
1861          BA  0.0019
1862          LS       0      98
1863          UD   0.103
              *

1864          KK     C-3
1865          KM   COMBINED OND-3, RT-4 & OND-1
1866          HC       3
              *
```

```
1867          KK    RT-5
1868          KM   ROUTE C-3 THUR OND-2
1869          RK     900   0.005   0.016       0    TRAP      48       0
              *

1870          KK   OND-6
1871          KM   ONSITE DEV BASIN OND-6
1872          BA  0.0034
1873          LS       0      39
1874          UD   0.116
              *

1875          KK   OND-5
1876          KM   ONSITE DEV BASIN OND-5
1877          BA  0.0055
1878          LS       0      68
1879          UD   0.107
              *

1880          KK    RT-6
1881          KM   ROUTE OND-5 THRU OND-2
1882          RK     800   0.005   0.016       0    TRAP      48       0
              *

1883          KK DUMMY56
1884          KM   ROUTING PURPOSES
1885          HC       2
              *

1886          KK   OND-7
1887          KM   ONSITE DEV BASIN OND-7
1888          BA  0.0033
1889          LS       0      88
1890          UD   0.050
              *

1891          KK   OND-2
1892          KM   ONSITE DEV BASIN OND-2
1893          BA  0.0022
1894          LS       0      98
1895          UD   0.108
              *
```



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

1896          KK     C-4
1897          KM   COMBINED LAST 4
1898          HC       4
              *

1899          KK   OND-8
1900          KM   ONSITE DEV BASIN OND-8
1901          BA  0.0016
1902          LS       0      68
1903          UD    0.05
              *

1904          KK    RT-7
1905          KM   ROUTE OND-8 THRU OND-9
1906          RK     400   0.025   0.016       0    TRAP      48       0
              *

1907          KK  OND-10
1908          KM   ONSITE DEV BASIN OND-10
1909          BA  0.0048
1910          LS       0      68
1911          UD   0.081
              *

1912          KK    RT-8
1913          KM   ROUTE OND-10 THRU OND-9
1914          RK     400   0.025   0.016       0    TRAP      48       0
              *

1915          KK   OND-9
1916          KM   ONSITE DEV BASIN OND-9
1917          BA  0.0038
1918          LS       0      98
1919          UD    0.05
              *

1920          KK     C-5
1921          KM   COMBINED OND-9, RT-7 RETTOC-6 &  RT-8
1922          HC       3
              *

1923          KK     C-6
1924          KM   COMBINED ALL ONSITE FLOWS
1925          HC       3
              *

1926          KK C-1TOT5
1927          KM   COMBINE FLOWS IN C-1 CHANNEL
1928          KM   @ 8'X4' RCB
1929          HC       3
              *
```

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

1930      KKRC1TOT56
1931      KM   ROUTE FLOW FROM C-1TOT5 TO C-1TOT6
1932      RK    1030   0.010   0.015       0    TRAP      40
          *
          * *************************

1933      KK  PARCEL6A
1934      KM   COMBINED FLOW FROM PARCEL 6A
1935      BA    .055
1936      LS       0      91
1937      UD   0.101
          *

1938      KK C-1TOT6
1939      KM   COMBINE FLOW IN C-1 CHANNEL
1940      HC       2
          *

1941      KKRC1TOT76
1942      KM   ROUTE FLOW FROM C-1TOT6 TO C-1TOT7
1943      RD    1170   0.010   0.015       0    TRAP       4
          *
          *
          * ************************************************
          *  ALL FLOW CONVEYED IN 10'X4' RCB
          *  DISCHARGED INTO GOLF COURSE BASIN GC-9
          * ************************************************
          *

1944      KKRETDLOOP5
1945      KM   RETRIEVE FLOW SPLIT FROM @ C-LOOP1
1946      DR  DLOOP5
          *

1947      KK    SC-1
1948      KM   SALES CENTER DEVELOPED BASIN
1949      BA 0.00109
1950      LS       0      98
1951      UD   0.050
          *

1952      KK  LOOP-5
1953      KM   OLIVIA PKWY
1954      BA  0.0009
1955      LS       0      98
1956      UD   0.056
          *

1957      KKDUMMYC-LOOP5
1958      KM   COMBINE LOOP-5,SC-1 AND RETDLOOP5 (FLOW SPLIT)
1959      KM   DUMMY COMBINATION POINT FOR ROUTING PURPOSES ONLY
1960      HC       3
          *
```



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

1961      KKRTDUMMYC-LOOP5
1962      KM   ROUTE DUMMYC-LOOP5 THRU 23OND-7
1963      RK     410    .040   0.016       0    TRAP    70.5       1
          *

1964      KK 23OND-7
1965      KM   ONSITE  DEV BASIN 23OND-7
1966      BA 0.00422
1967      LS       0      87
1968      UD   0.062
          *

1969      KKC-23OND7
1970      KM   COMBINE RTDUMMYC-LOOP5 AND 23OND-7
1971      HC       2
          *

1972      KK    RTC-23OND7
1973      KM   ROUTE C-23OND7 THRU 23OND-8
1974      RK     950    .018   0.016       0    TRAP    70.5       1
          *

1975      KK 23OND-8
1976      KM   ONSITE  DEV BASIN 23OND-8
1977      BA 0.01328
1978      LS       0      87
1979      UD   0.095
          *

1980      KKC-23OND8
1981      KM   COMBINE RTC-23OND7 AND 23OND-8
1982      HC       2
          *

1983      KKRTC-23OND8
1984      KM   ROUTE C-23OND8 THRU LOOP-4
```

```
1985          RK     800   0.047   0.016       0    TRAP     62.5       1
              *

1986          KK  LOOP-4
1987          KM   OLIVIA PKWY
1988          BA  0.0020
1989          LS       0      98
1990          UD   0.053
              *

1991          KKC-LOOP4A
1992          KM   COMBINE RTC-23OND8 AND LOOP-4
1993          HC       2
              *
```



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

1994          KKDC-LOOP4A
1995          KM   DIVERT 28 CFS @ C-LOOP4A VIA DROP INLETS
1996          KM   10' TYPE C W/3 GRATES ON BOTH SIDES OF STREET
1997          KM   FLOW DISCHARGES ONTO CHANNEL BETWEEN LOOP RD AND PARCEL 5
1998          DT    DGC8
1999          DI       0      50     100
2000          DQ       0      28      28
              *

2001          KK 24OND-1
2002          KM   ONSITE DEVELOPED BASIN 24OND-1
2003          BA 0.01484
2004          LS       0      87
2005          UD   0.127
              *

2006          KKC-LOOP4B
2007          KM   COMBINE RTC-23OND8, LOOP-4 AND 24OND-1
2008          KM   MINUS DIVERTED FLOW @ C-LOOP4A
2009          HC       2
              *

2010          KKRETDC-LOOP4A
2011          KM   RETRIEVE 20-CFS DI'S @ C-LOOP4A
2012          DR    DGC8
              *

2013          KKDEVOFBA1
2014          KM   PORTION OF BASIN MAIN (MAINTENANCE BUILDING)
2015          KM   FROM REFERENCED STUDY
2016          BA  0.0010
2017          LS       0      61
2018          UD   0.025
              *

2019          KKDEVONBA1
2020          KM   PORTION OF BASIN MAIN (MAINTENANCE BUILDING)
2021          KM   FROM REFERENCED STUDY
2022          BA 0.00011
2023          LS       0      98
2024          UD   0.036
              *

2025          KKDEVONBA2
2026          KM   PORTION OF BASIN MAIN (MAINTENANCE BUILDING)
2027          BA .000232
2028          LS       0      98
2029          UD   0.059
              *
```



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

2030          KKDEVONBA3
2031          KM   PORTION OF BASIN MAIN (MAINTENANCE BUILDING)
2032          KM   FROM REFERENCED STUDY
2033          BA  0.0013
2034          LS       0      98
2035          UD   0.039
              *

2036          KK    COM1
2037          KM   COMBINED FLOW DISCHARGED FROM BASIN MAIN (MAINTENANCE BUILDING)
2038          KM   FROM REFERENCED STUDY
2039          KM   FLOW DISCHARGED INTO GC-8
2040          HC       4
              *

2041          KK  RTMAIN
2042          KM   ROUTE MAINTENANCE BLDG FLOW THRU GC-8 ( MAINTENANCE BLDG)
2043          RK     600   0.011   0.030       0    TRAP      100       3
              *

2044          KK    GC-7
2045          KM   ONSITE DEVELOPED BASIN GC-7 (GOLF COURSE)
2046          BA  0.0345
2047          LS       0      80
2048          UD   0.128
              *
```

```
2049          KK    GC-8
2050          KM   ONSITE DEVELOPED BASIN GC-8 (GOLF COURSE)
2051          BA  0.0280
2052          LS        0      80
2053          UD   0.127
              *

2054          KK   C-GC8
2055          KM   COMBINE ALL FLOW CONVEYED ROADSIDE CHANNEL
2056          KM   BETWEEN LOOP ROAD AND PARCEL 5
2057          KM   DISCHARGED INTO 10'X4' RCB
2058          HC        5
              *

2059          KK  5OND-1
2060          KM   ONSITE DEVELOPED BASIN 5OND-1 (PORTION OF PARCEL 5)
2061          KM   COLLECTED VIA DROP INLETS & DISCHARGED INTO 10'X4' RCB
2062          KM   9' TYPE C W/ 3 GRATES (BOTH SIDES)
2063          KM   10' X 4' RCB DAYLIGHTS INTO GOLF COURSE BASIN GC-9
2064          BA  0.0063
2065          LS        0      92
2066          UD   0.082
              *
```



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

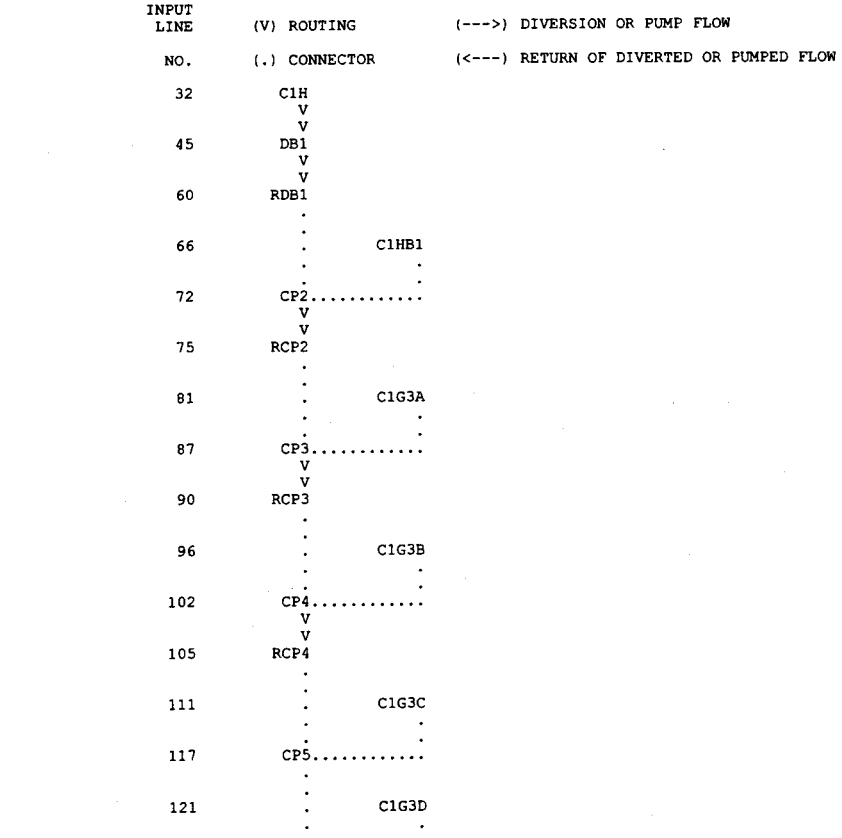

2067          KK   C-GC9
2068          KM   COMBINE BASIN 5OND-1 AND C-GC8
2069          KM   ALL FLOW CONVEYED IN 10'X4' RCB
2070          KM   DISCHARGED INTO GOLF COURSE BASIN GC-9
2071          HC        2
              *

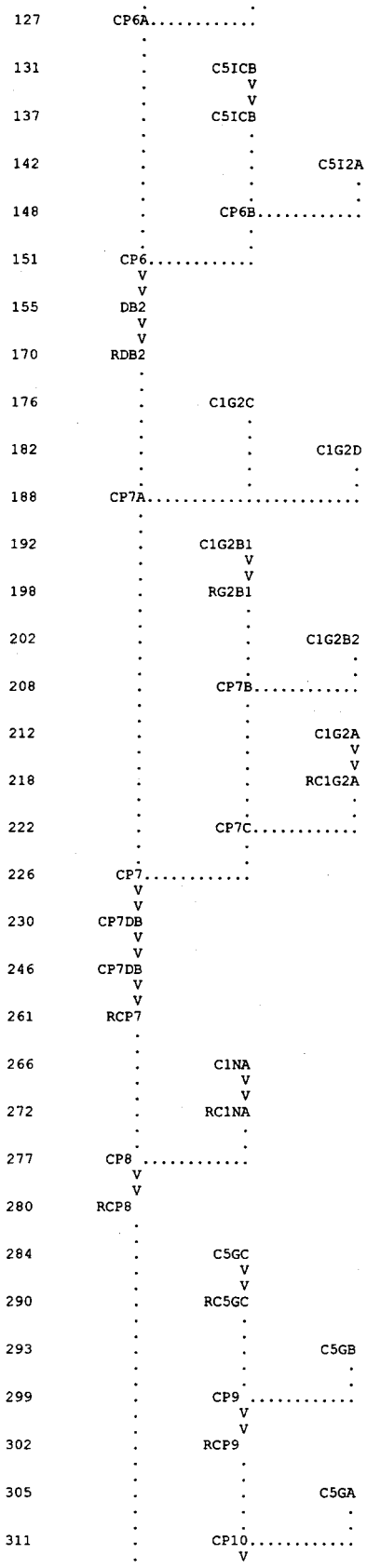
2072          KK    P5GC
2073          KM   PORTION OF PARCEL 5 AND GOLFCOURSE
2074          BA  0.0893
2075          LS        0      87
2076          UD     0.2
              *

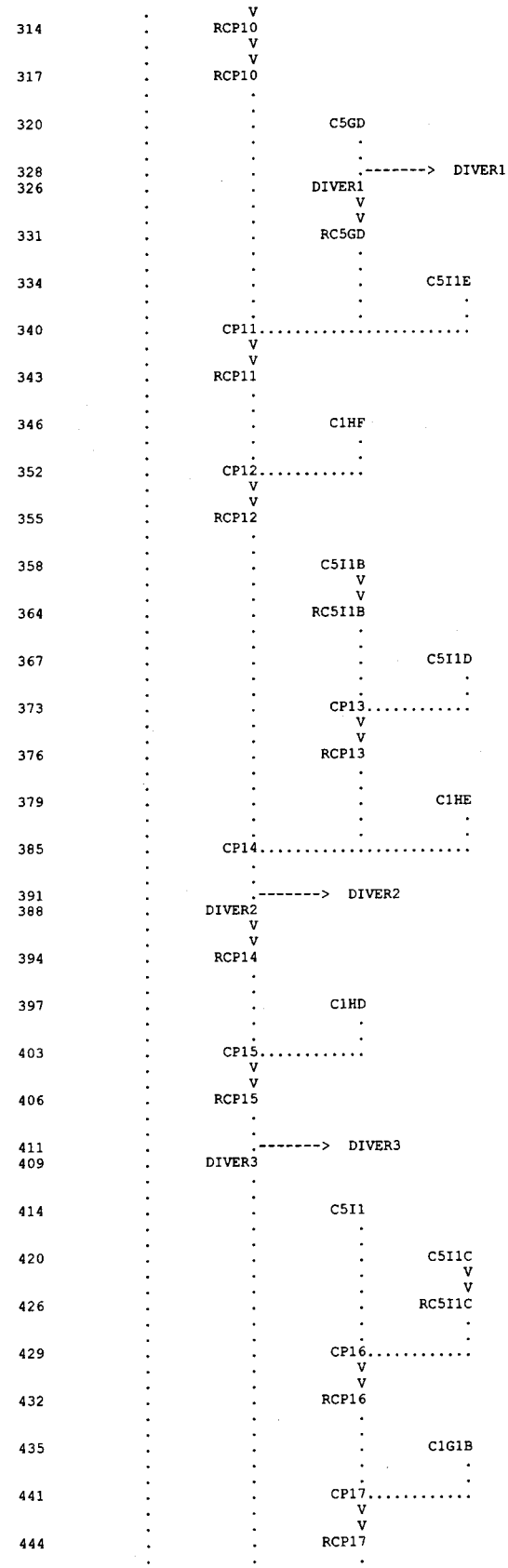
2077          KK C-1TOT7
2078          KM   TOTAL FLOW IN C1
2079          HC        3
              *

2080          ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK




127 CP6A
131 C5ICB
137 C5ICB
142 C5I2A
148 CP6B
151 CP6
155 DB2
170 RDB2
176 C1G2C
182 C1G2D
188 CP7A
192 C1G2B1
198 RG2B1
202 C1G2B2
208 CP7B
212 C1G2A
218 RC1G2A
222 CP7C
226 CP7
230 CP7DB
246 CP7DB
261 RCP7
266 C1NA
272 RC1NA
277 CP8
280 RCP8
284 C5GC
290 RC5GC
293 C5GB
299 CP9
302 RCP9
305 C5GA
311 CP10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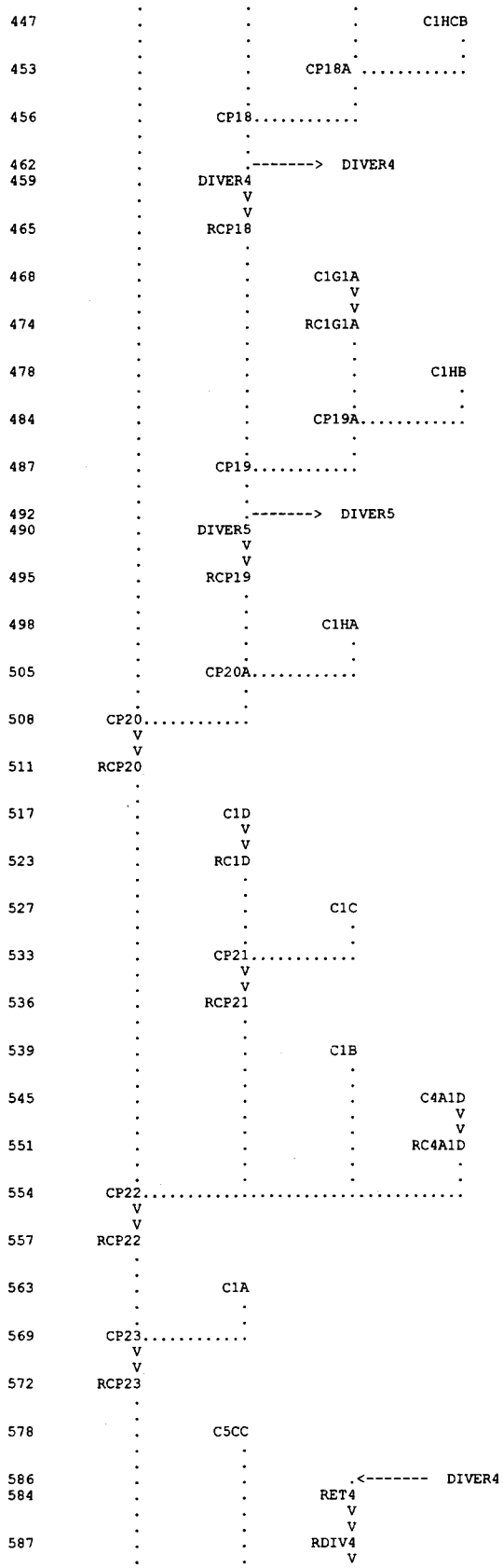
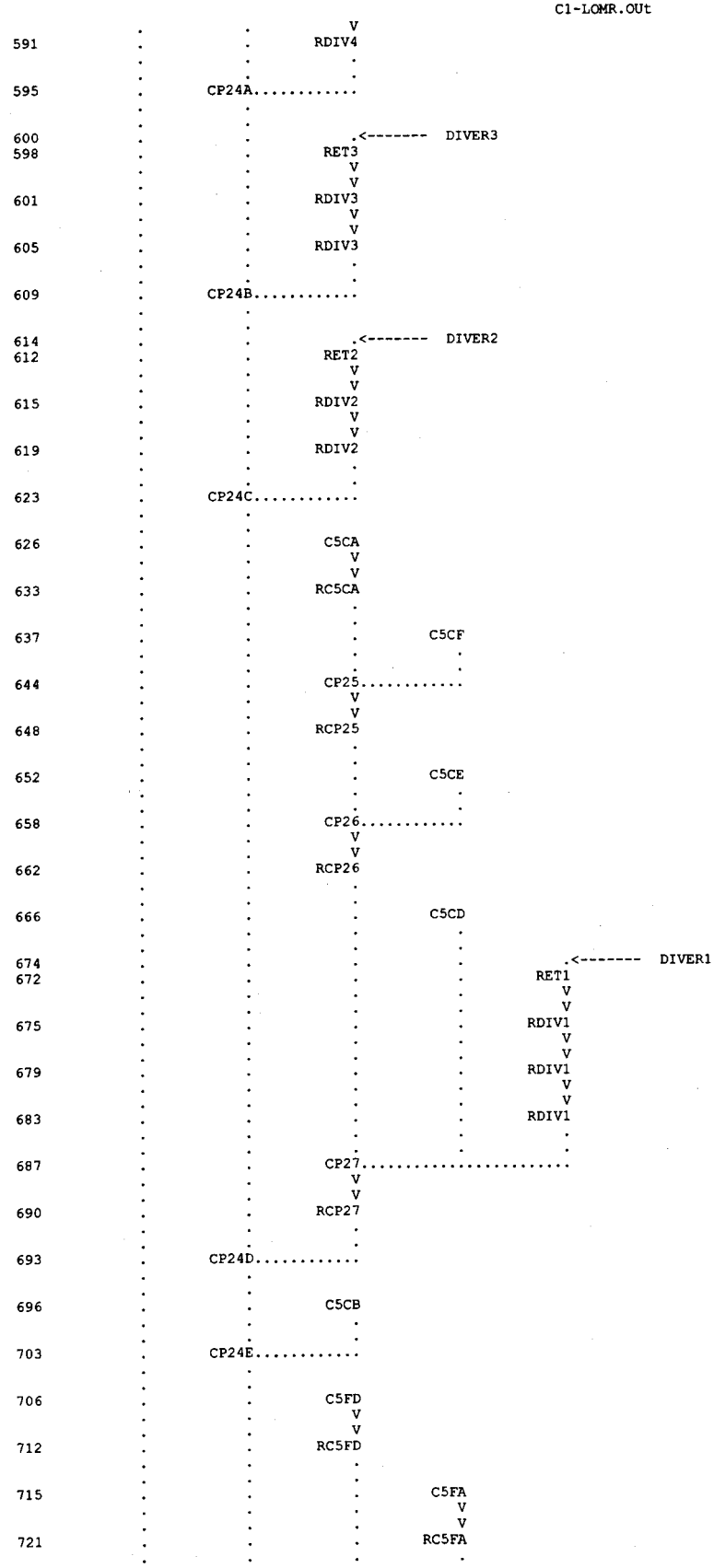
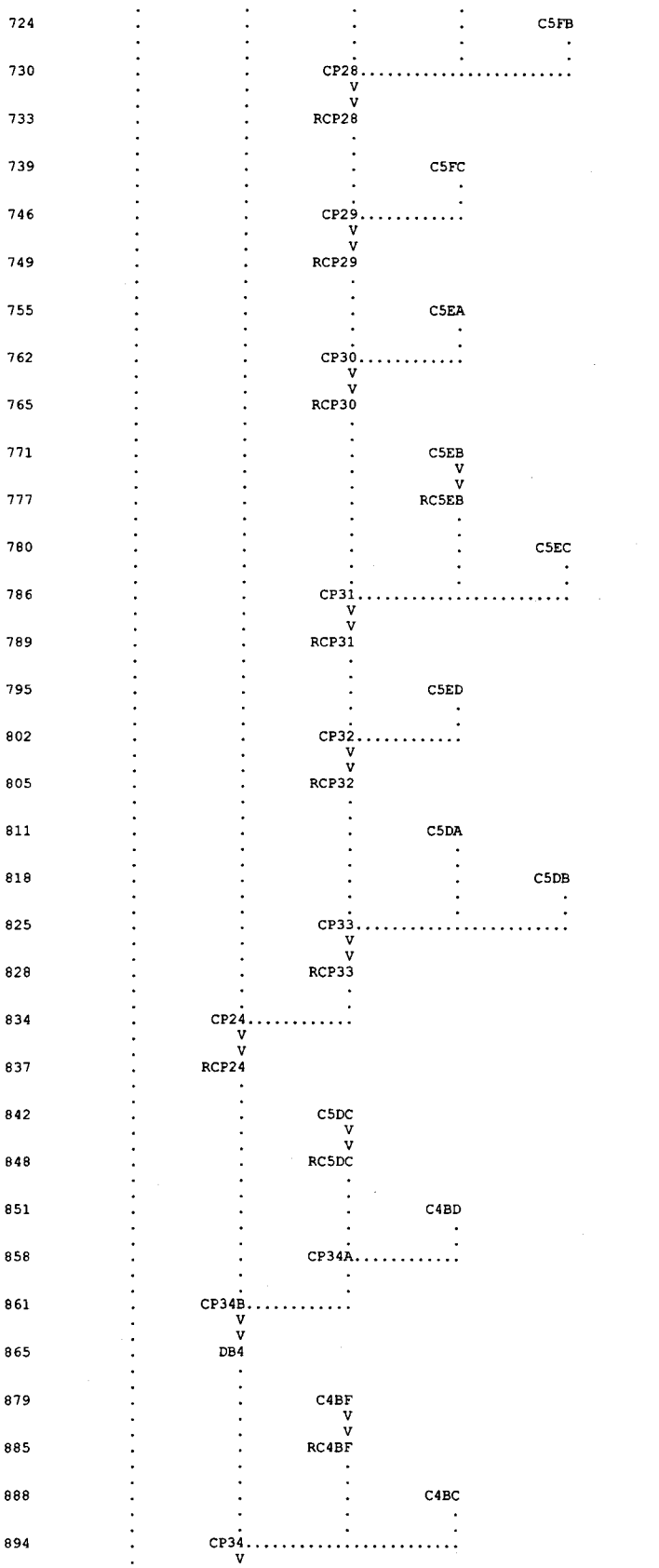
CP11
RCP11
CP12
RCP12
CP13
RCP13
CP14
DIVER2
RCP14
CP15
RCP15
DIVER3
RCP16
CP16
RCP17
C5GD
DIVER1
RC5GD
C5I1E
C1HF
C5I1B
RC5I1B
C5I1D
C1HE
C5I1
C5I1C
RC5I1C
C1G1B


447 C1HCB
453 CP18A
456 CP18
462
459 DIVER4
DIVER4
465 RCP18
468 C1G1A
474 RC1G1A
478 C1HB
484 CP19A
487 CP19
492
490 DIVER5
DIVER5
495 RCP19
498 C1HA
505 CP20A
508 CP20
511 RCP20
517 C1D
523 RC1D
527 C1C
533 CP21
536 RCP21
539 C1B
545 C4A1D
551 RC4A1D
554 CP22
557 RCP22
563 C1A
569 CP23
572 RCP23
578 C5CC
586 DIVER4
584 RET4
587 RDIV4


591 RDIV4
595 CP24A
600
598 RET3
601 RDIV3
605 RDIV3
609 CP24B
614
612 RET2
615 RDIV2
619 RDIV2
623 CP24C
626 C5CA
633 RC5CA
637 C5CF
644 CP25
648 RCP25
652 C5CE
658 CP26
662 RCP26
666 C5CD
674
672 RET1
675 RDIV1
679 RDIV1
683 RDIV1
687 CP27
690 RCP27
693 CP24D
696 C5CB
703 CP24E
706 C5FD
712 RC5FD
715 C5FA
721 RC5FA
DIVER3
DIVER2
DIVER1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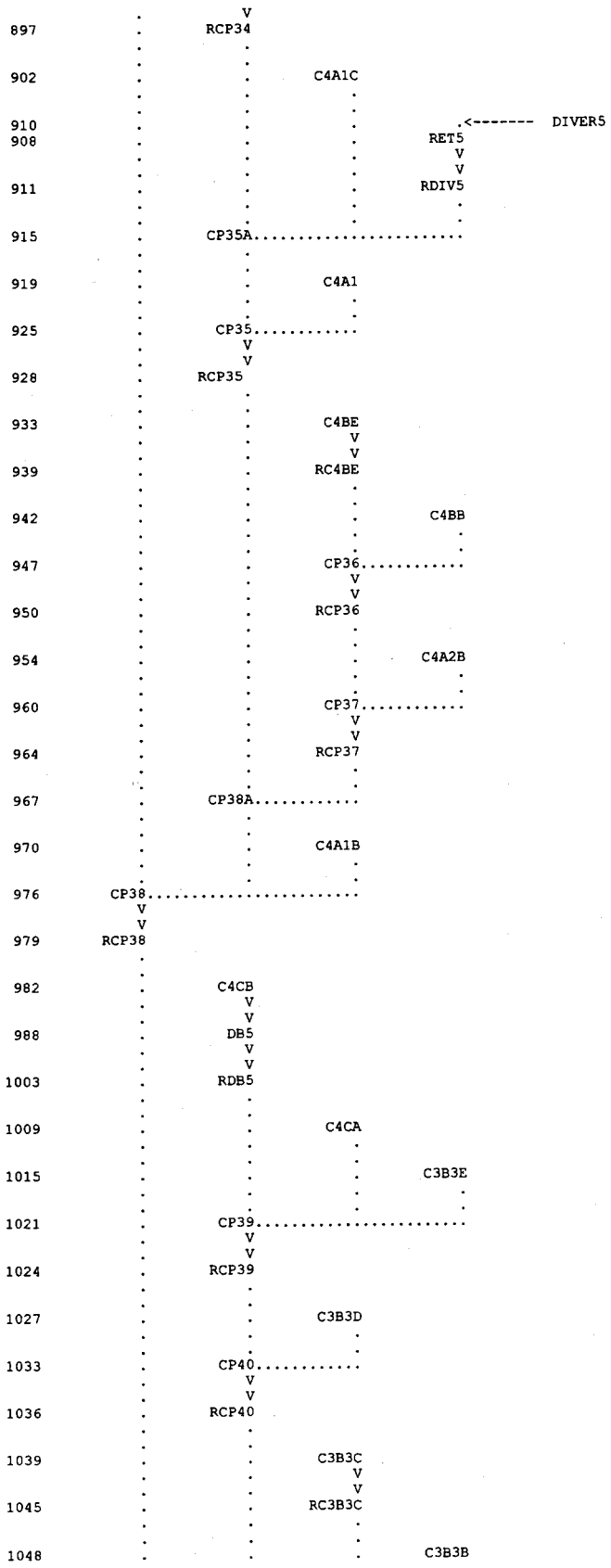
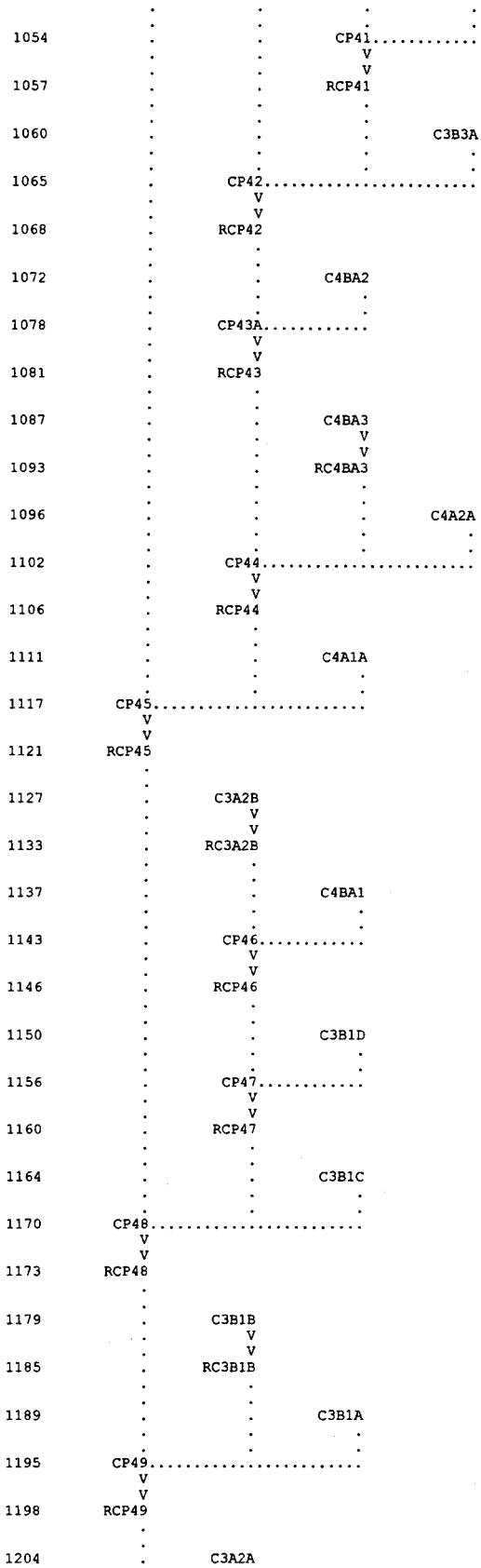
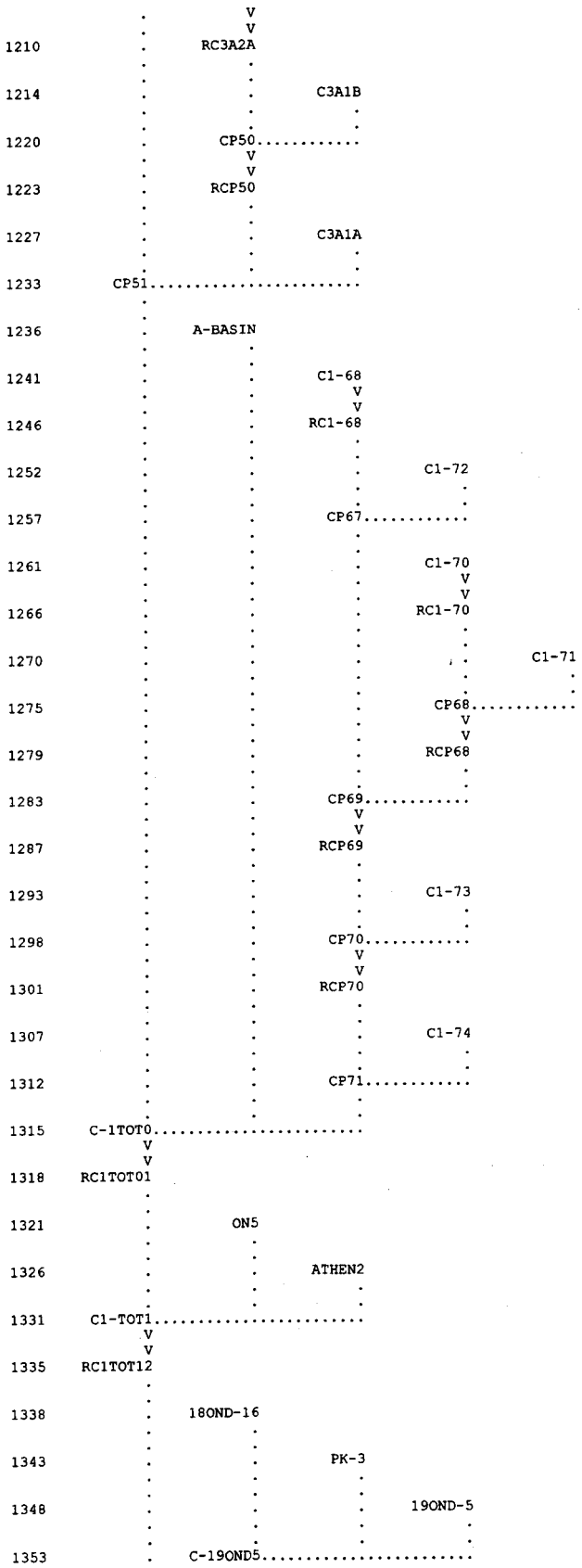
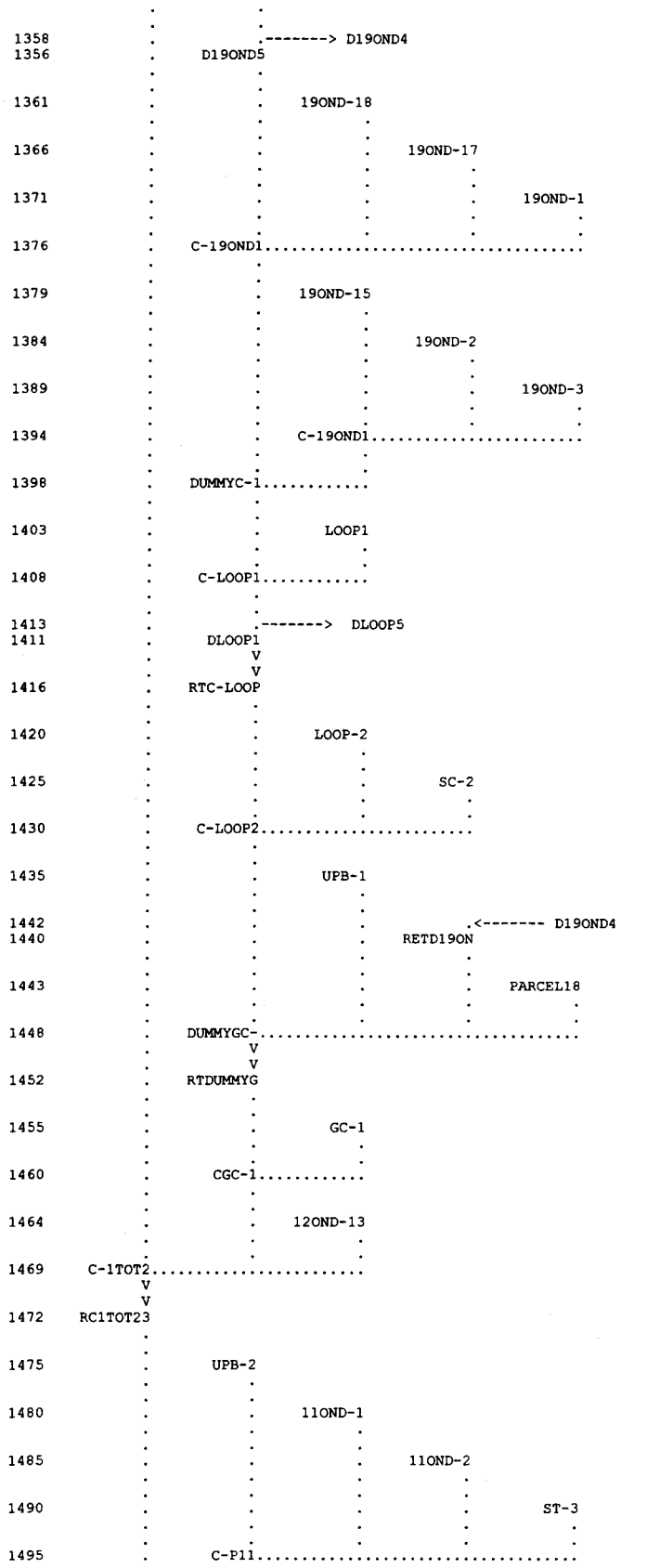
C5FB
730
CP28
733
RCP28
739
C5FC
746
CP29
749
RCP29
755
C5EA
762
CP30
765
RCP30
771
C5EB
777
RC5EB
780
C5EC
786
CP31
789
RCP31
795
C5ED
802
CP32
805
RCP32
811
C5DA
818
C5DB
825
CP33
828
RCP33
834
CP24
837
RCP24
842
C5DC
848
RC5DC
851
C4BD
858
CP34A
861
CP34B
865
DB4
879
C4BF
885
RC4BF
888
C4BC
894
CP34


897 RCP34
902 C4A1C
910 DIVER5
908 RET5
911 RDIV5
915 CP35A
919 C4A1
925 CP35
928 RCP35
933 C4BE
939 RC4BE
942 C4BB
947 CP36
950 RCP36
954 C4A2B
960 CP37
964 RCP37
967 CP38A
970 C4A1B
976 CP38
979 RCP38
982 C4CB
988 DB5
1003 RDB5
1009 C4CA
1015 C3B3E
1021 CP39
1024 RCP39
1027 C3B3D
1033 CP40
1036 RCP40
1039 C3B3C
1045 RC3B3C
1048 C3B3B


1054 CP41
1057 RCP41
1060 C3B3A
1065 CP42
1068 RCP42
1072 C4BA2
1078 CP43A
1081 RCP43
1087 C4BA3
1093 RC4BA3
1096 C4A2A
1102 CP44
1106 RCP44
1111 C4A1A
1117 CP45
1121 RCP45
1127 C3A2B
1133 RC3A2B
1137 C4BA1
1143 CP46
1146 RCP46
1150 C3B1D
1156 CP47
1160 RCP47
1164 C3B1C
1170 CP48
1173 RCP48
1179 C3B1B
1185 RC3B1B
1189 C3B1A
1195 CP49
1198 RCP49
1204 C3A2A


1210 RC3A2A
1214 C3A1B
1220 CP50
1223 RCP50
1227 C3A1A
1233 CP51
1236 A-BASIN
1241 C1-68
1246 RC1-68
1252 C1-72
1257 CP67
1261 C1-70
1266 RC1-70
1270 C1-71
1275 CP68
1279 RCP68
1283 CP69
1287 RCP69
1293 C1-73
1298 CP70
1301 RCP70
1307 C1-74
1312 CP71
1315 C-1TOT0
1318 RC1TOT01
1321 ON5
1326 ATHEN2
1331 C1-TOT1
1335 RC1TOT12
1338 18OND-16
1343 PK-3
1348 19OND-5
1353 C-19OND5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1356
D19OND5
D19OND4
1361
19OND-18
1366
19OND-17
1371
19OND-1
1376
C-19OND1
1379
19OND-15
1384
19OND-2
1389
19OND-3
1394
C-19OND1
1398
DUMMYC-1
1403
LOOP1
1408
C-LOOP1
1413
1411
DLOOP1
DLOOP5
1416
RTC-LOOP
1420
LOOP-2
1425
SC-2
1430
C-LOOP2
1435
UPB-1
1442
1440
RETD19ON
D19OND4
1443
PARCEL18
1448
DUMMYGC-
1452
RTDUMMYG
1455
GC-1
1460
CGC-1
1464
12OND-13
1469
C-1TOT2
1472
RC1TOT23
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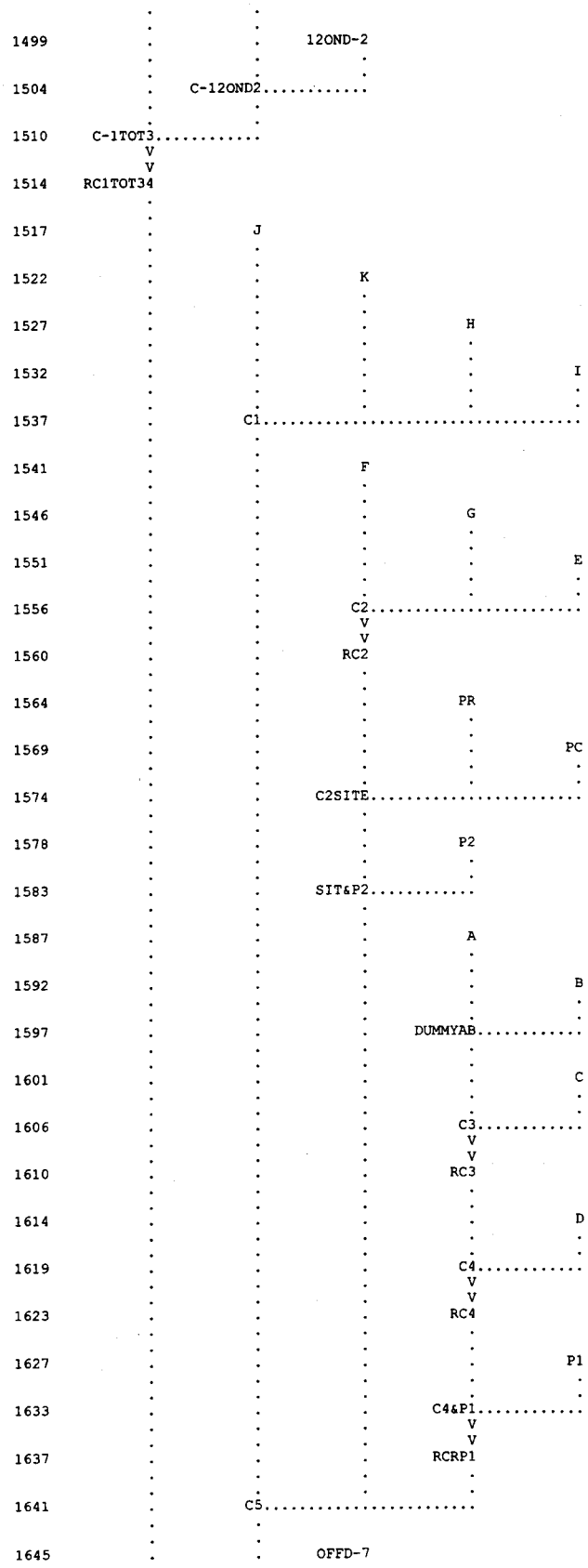
UPB-2
1480
11OND-1
1485
11OND-2
1490
ST-3
1495
C-P11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C-12OND2
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C-1TOT3
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1517
J
1522
K
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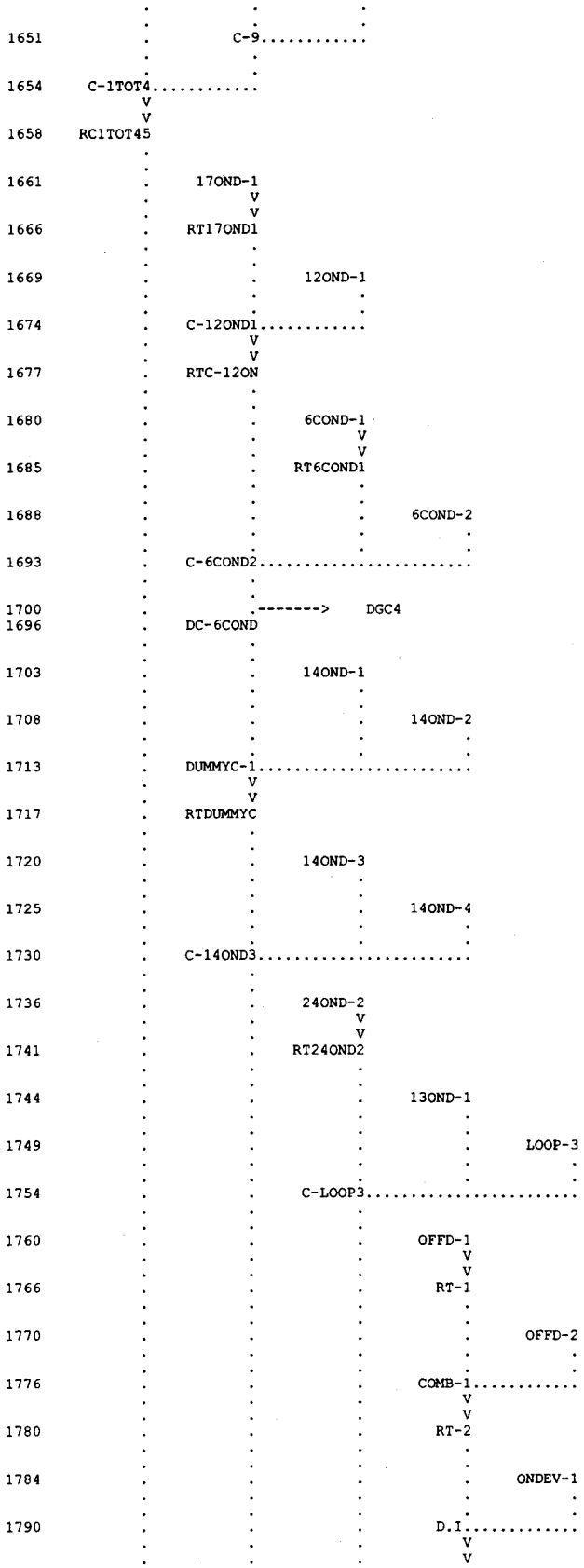
H
1532
I
1537
C1
1541
F
1546
G
1551
E
1556
C2
1560
RC2
1564
PR
1569
PC
1574
C2SITE
1578
P2
1583
SIT&P2
1587
A
1592
B
1597
DUMMYAB
1601
C
1606
C3
1610
RC3
1614
D
1619
C4
1623
RC4
1627
P1
1633
C4&P1
1637
RCRP1
1641
C5
1645
OFFD-7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1661 17OND-1
1666 RT17OND1
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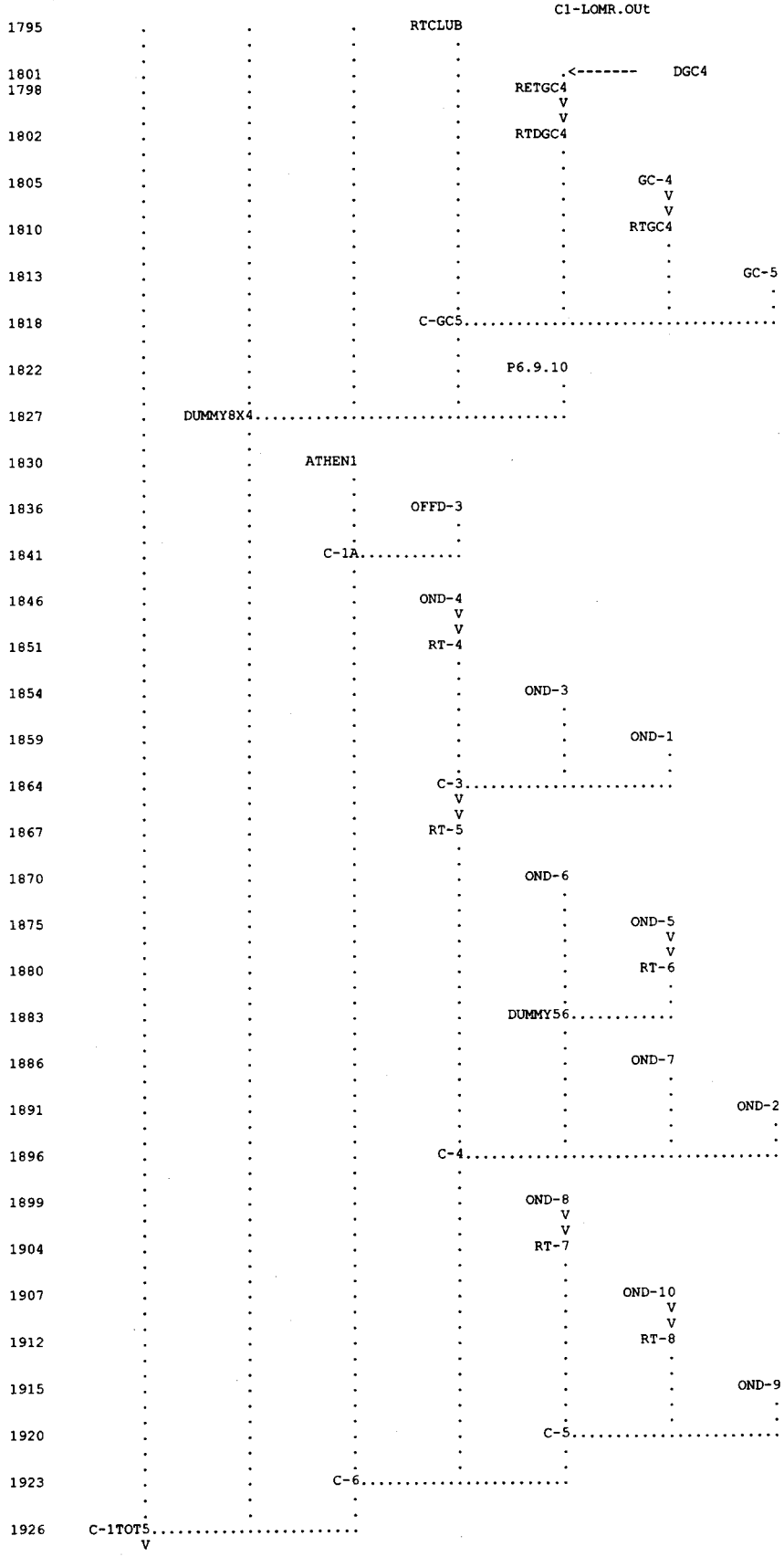
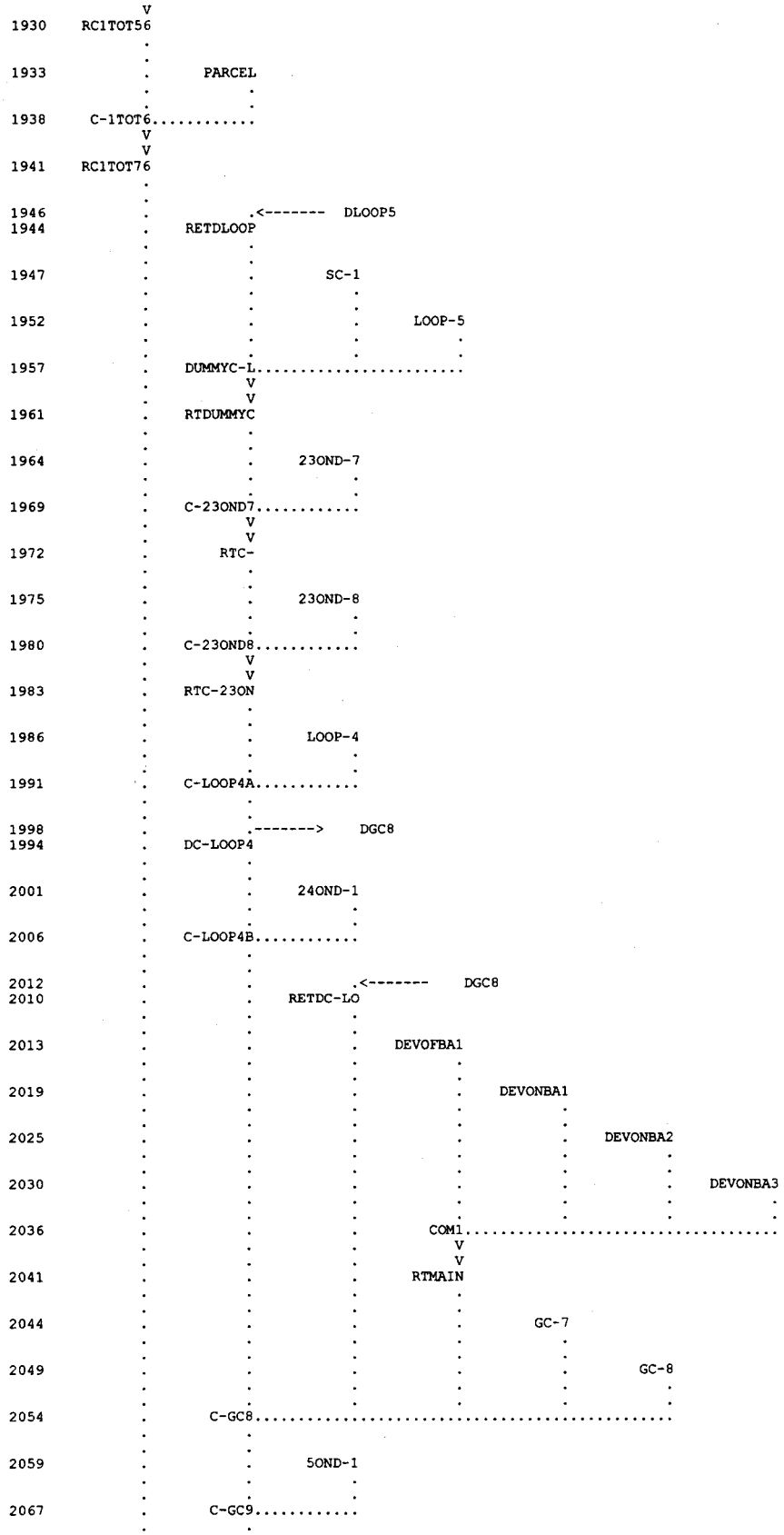
1677 RTC-12ON
1680 6COND-1
1685 RT6COND1
1688 6COND-2
1693 C-6COND2
1700 DGC4
1696 DC-6COND
1703 14OND-1
1708 14OND-2
1713 DUMMYC-1
1717 RTDUMMYC
1720 14OND-3
1725 14OND-4
1730 C-14OND3
1736 24OND-2
1741 RT24OND2
1744 13OND-1
1749 LOOP-3
1754 C-LOOP3
1760 OFFD-1
1766 RT-1
1770 OFFD-2
1776 COMB-1
1780 RT-2
1784 ONDEV-1
1790 D.I


1795
RTCLUB
1801
DGC4
1798
RETGC4
1802
RTDGC4
1805
GC-4
1810
RTGC4
1813
GC-5
1818
C-GC5
1822
P6.9.10
1827
DUMMY8X4
1830
ATHEN1
1836
OFFD-3
1841
C-1A
1846
OND-4
1851
RT-4
1854
OND-3
1859
OND-1
1864
C-3
1867
RT-5
1870
OND-6
1875
OND-5
1880
RT-6
1883
DUMMY56
1886
OND-7
1891
OND-2
1896
C-4
1899
OND-8
1904
RT-7
1907
OND-10
1912
RT-8
1915
OND-9
1920
C-5
1923
C-6
1926
C-1TOT5


1930 RC1TOT56
1933 PARCEL
1938 C-1TOT6
1941 RC1TOT76
1946 DLOOP5
1944 RETDLOOP
1947 SC-1
1952 LOOP-5
1957 DUMMYC-L
1961 RTDUMMYC
1964 23OND-7
1969 C-23OND7
1972 RTC-
1975 23OND-8
1980 C-23OND8
1983 RTC-23ON
1986 LOOP-4
1991 C-LOOP4A
1998 DGC8
1994 DC-LOOP4
2001 24OND-1
2006 C-LOOP4B
2012 DGC8
2010 RETDC-LO
2013 DEVOFBA1
2019 DEVONBA1
2025 DEVONBA2
2030 DEVONBA3
2036 COM1
2041 RTMAIN
2044 GC-7
2049 GC-8
2054 C-GC8
2059 5OND-1
2067 C-GC9

```
                .           .
2072            .           .        P5GC
                .           .         .
                .           .         .
2077     C-1TOT7.....................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   30JUN04  TIME  13:48:58   *
*                                       *
*****************************************
```

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

File: C1-LOMR.DAT

Post, Buckley, Schuh & Jernigan, Inc.

C1 CHANNEL COMBINED HYDROLOGY
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #5ID

```
*********************************
*********************************
*                               *
*           C1-LOMR             *
*                               *
*                               *
*          JUNE 2004            *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*          COMBINED             *
*      OFFSITE & ONSITE         *
*         HYDROLOGY             *
*********************************
*********************************
```

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

    IT          HYDROGRAPH TIME DATA
                      NMIN          3  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        450  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1   0  ENDING DATE
                    NDTIME       2227  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .05 HOURS
                      TOTAL TIME BASE   22.45 HOURS

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

    JP            MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR            MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .95       .88       .83       .80       .76       .73
```

*** ***

```
            **************
            *            *
 45 KK      *      DB1   *
            *            *
            **************
```

```
 50 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA
```

```
 51 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       STOR  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 52 SV            STORAGE          .0       1.2       4.6      10.3      22.6      38.7      54.9      73.4      92.6     113.5
                                 135.2     158.2     183.2     208.1     234.7     262.5     292.0     325.3

 54 SE            ELEVATION   2556.00   2558.00   2560.00   2562.00   2564.00   2566.00   2568.00   2570.00   2572.00   2574.00
                              2576.00   2578.00   2580.00   2582.00   2584.00   2586.00   2588.00   2590.00

 56 SQ            DISCHARGE        0.        1.       27.       58.       78.       95.      109.      121.      132.      142.
                                 151.      160.      169.      177.      184.      191.      198.      205.

 58 SE            ELEVATION   2556.00   2558.00   2560.00   2562.00   2564.00   2566.00   2568.00   2570.00   2572.00   2574.00
                              2576.00   2578.00   2580.00   2582.00   2584.00   2586.00   2588.00   2590.00

                                                          ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                STORAGE          .00      1.19      4.55     10.32     22.58     38.69     54.90     73.42     92.55    113.51
                OUTFLOW          .00      1.28     27.31     57.88     77.52     95.42    108.73    120.50    131.87    141.78
              ELEVATION      2556.00   2558.00   2560.00   2562.00   2564.00   2566.00   2568.00   2570.00   2572.00   2574.00

                STORAGE       135.16    158.22    183.23    208.10    234.67    262.55    292.02    325.32
                OUTFLOW       150.74    159.67    168.97    176.60    183.71    190.74    197.77    204.93
              ELEVATION      2576.00   2578.00   2580.00   2582.00   2584.00   2586.00   2588.00   2590.00

        ***               ***               ***               ***               ***

                                    HYDROGRAPH AT STATION      DB1
                                      FOR PLAN 1, RATIO =  .95

  PEAK FLOW      TIME                                  MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR         72-HR      22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      196.       5.55                     189.          146.          146.          146.
                                (INCHES)    .438         1.264         1.264         1.264
                                (AC-FT)      94.           270.          270.          270.

 PEAK STORAGE    TIME                                MAXIMUM AVERAGE STORAGE
                                          6-HR         24-HR         72-HR      22.45-HR
+  (AC-FT)        (HR)
       286.       5.55                     255.          152.          152.          152.

  PEAK STAGE     TIME                                  MAXIMUM AVERAGE STAGE
                                          6-HR         24-HR         72-HR      22.45-HR
+    (FEET)       (HR)
    2587.56       5.55                  2585.45       2576.46       2576.46       2576.46

                                    CUMULATIVE AREA =    4.01 SQ MI

        ***               ***               ***               ***               ***

                                    HYDROGRAPH AT STATION      DB1
                                      FOR PLAN 1, RATIO =  .88

  PEAK FLOW      TIME                                  MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR         72-HR      22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      188.       5.50                     180.          136.          136.          136.
                                (INCHES)    .418         1.177         1.177         1.177
                                (AC-FT)      89.           251.          251.          251.

 PEAK STORAGE    TIME                                MAXIMUM AVERAGE STORAGE
                                          6-HR         24-HR         72-HR      22.45-HR
+  (AC-FT)        (HR)
       250.       5.50                     221.          127.          127.          127.

  PEAK STAGE     TIME                                  MAXIMUM AVERAGE STAGE
                                          6-HR         24-HR         72-HR      22.45-HR
+    (FEET)       (HR)
    2585.12       5.50                  2582.97       2574.30       2574.30       2574.30

                                    CUMULATIVE AREA =    4.01 SQ MI

        ***               ***               ***               ***               ***

                                    HYDROGRAPH AT STATION      DB1
                                      FOR PLAN 1, RATIO =  .83

  PEAK FLOW      TIME                                  MAXIMUM AVERAGE FLOW
                                          6-HR         24-HR         72-HR      22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      182.       5.35                     173.          128.          128.          128.
                                (INCHES)    .402         1.112         1.112         1.112
                                (AC-FT)      86.           238.          238.          238.

 PEAK STORAGE    TIME                                MAXIMUM AVERAGE STORAGE
                                          6-HR         24-HR         72-HR      22.45-HR
+  (AC-FT)        (HR)
```

227.	5.40		199.	111.	111.	111.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2583.40	5.40		2581.24	2572.81	2572.81	2572.81

CUMULATIVE AREA = 4.01 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB1
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 178.	5.35		169.	124.	124.	124.
		(INCHES)	.393	1.072	1.072	1.072
		(AC-FT)	84.	229.	229.	229.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
213.	5.35	186.	102.	102.	102.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2582.39	5.35		2580.23	2571.94	2571.94	2571.94

CUMULATIVE AREA = 4.01 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB1
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 173.	5.35		163.	117.	117.	117.
		(INCHES)	.379	1.014	1.014	1.014
		(AC-FT)	81.	217.	217.	217.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
195.	5.35	169.	89.	89.	89.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2580.93	5.35		2578.81	2570.73	2570.73	2570.73

CUMULATIVE AREA = 4.01 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB1
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 166.	5.35		157.	110.	110.	110.
		(INCHES)	.364	.951	.951	.951
		(AC-FT)	78.	203.	203.	203.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
176.	5.35	151.	77.	77.	77.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2579.44	5.35		2577.35	2569.50	2569.50	2569.50

CUMULATIVE AREA = 4.01 SQ MI

*** *** *** *

```
 160 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

 161 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       STOR  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

 162 SV            STORAGE         .0       2.5      15.9      40.2      72.3     107.2     185.2     273.0     371.6     480.1
                                 598.5     630.2

 164 SE            ELEVATION    2323.00  2326.00  2328.00  2330.00  2332.00  2334.00  2338.00  2342.00  2346.00  2350.00
                                2354.00  2355.00

 166 SQ            DISCHARGE       0.       57.      109.      143.      170.      194.      234.      268.      299.      326.
                                 352.      358.

 168 SE            ELEVATION    2323.00  2326.00  2328.00  2330.00  2332.00  2334.00  2338.00  2342.00  2346.00  2350.00
                                2354.00  2355.00

                                                      ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                  STORAGE        .00      2.55     15.85     40.23     72.34    107.20    185.20    273.00    371.60    480.10
                  OUTFLOW        .00     56.78    108.70    142.90    170.40    193.90    234.10    268.40    298.70    326.10
                ELEVATION    2323.00  2326.00  2328.00  2330.00  2332.00  2334.00  2338.00  2342.00  2346.00  2350.00

                  STORAGE     598.50   630.20
                  OUTFLOW     351.60   357.60
                ELEVATION    2354.00  2355.00

        ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      DB2
                            FOR PLAN 1, RATIO =  .95

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      307.       6.20                  302.         252.        252.         252.
                               (INCHES)  .296         .925        .925         .925
                               (AC-FT)   150.         468.        468.         468.

  PEAK STORAGE   TIME                       MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     22.45-HR
+   (AC-FT)       (HR)
       404.       6.20                  386.         278.        278.         278.

   PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     22.45-HR
+    (FEET)       (HR)
    2347.21       6.20               2346.53      2341.43     2341.43      2341.43

                          CUMULATIVE AREA =    9.48 SQ MI

        ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      DB2
                            FOR PLAN 1, RATIO =  .88

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      293.       6.20                  288.         238.        238.         238.
                               (INCHES)  .282         .872        .872         .872
                               (AC-FT)   143.         441.        441.         441.

  PEAK STORAGE   TIME                       MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     22.45-HR
+   (AC-FT)       (HR)
       354.       6.20                  336.         238.        238.         238.

   PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     22.45-HR
+    (FEET)       (HR)
    2345.27       6.20               2344.57      2339.70     2339.70      2339.70

                          CUMULATIVE AREA =    9.48 SQ MI

        ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      DB2
                            FOR PLAN 1, RATIO =  .83

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     22.45-HR
+    (CFS)        (HR)
                                (CFS)
+      283.       6.20                  278.         227.        227.         227.
```

	(INCHES)	.272	.834	.834	.834
	(AC-FT)	138.	422.	422.	422.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
320.	6.20	303.	211.	211.	211.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2343.89	6.20	2343.21	2338.50	2338.50	2338.50

CUMULATIVE AREA = 9.48 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB2
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 277.	6.20	272.	221.	221.	221.
		(INCHES) .266	.810	.810	.810
		(AC-FT) 135.	410.	410.	410.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
300.	6.20	284.	196.	196.	196.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2343.10	6.20	2342.43	2337.79	2337.79	2337.79

CUMULATIVE AREA = 9.48 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB2
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 269.	6.20	262.	212.	212.	212.
		(INCHES) .257	.776	.776	.776
		(AC-FT) 130.	392.	392.	392.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
273.	6.20	258.	175.	175.	175.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2342.02	6.20	2341.30	2336.80	2336.80	2336.80

CUMULATIVE AREA = 9.48 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB2
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 258.	6.15	252.	202.	202.	202.
		(INCHES) .247	.740	.740	.740
		(AC-FT) 125.	374.	374.	374.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
247.	6.15	232.	154.	154.	154.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2340.80	6.15	2340.12	2335.78	2335.78	2335.78

CUMULATIVE AREA = 9.48 SQ MI

*** *** *** *

```
          **************
          *            *
230 KK    *    CP7DB   *
          *            *
          **************

236 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

237 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       STOR  TYPE OF INITIAL CONDITION
                    RSVRIC      -1.00  INITIAL CONDITION
                         X        .00 WORKING R AND D COEFFICIENT

238 SV            STORAGE         .0        .1        .7       1.9       3.9       7.0      11.2      16.1      21.5      27.2
                                 33.2      39.6      46.4      53.5      61.0      68.9      77.1      85.5      94.2     103.0

240 SE          ELEVATION    2230.00   2231.00   2232.00   2233.00   2234.00   2235.00   2236.00   2237.00   2238.00   2239.00
                             2240.00   2241.00   2242.00   2243.00   2244.00   2245.00   2246.00   2247.00   2248.00   2249.00

242 SQ            DISCHARGE       0.       70.      180.      317.      479.      659.      855.     1068.     1291.     1526.
                             1776.     2039.     2257.     2384.     2512.     2700.     2887.     3061.     3226.     3515.

244 SE          ELEVATION    2230.00   2231.00   2232.00   2233.00   2234.00   2235.00   2236.00   2237.00   2238.00   2239.00
                             2240.00   2241.00   2242.00   2243.00   2244.00   2245.00   2246.00   2247.00   2248.00   2249.00

                                                      ***

                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .13       .66      1.85      3.90      6.97     11.16     16.15     21.51     27.21
          OUTFLOW        .00     70.20    180.10    317.40    479.10    659.20    854.50   1068.10   1290.90   1525.90
        ELEVATION    2230.00   2231.00   2232.00   2233.00   2234.00   2235.00   2236.00   2237.00   2238.00   2239.00

          STORAGE       33.22     39.59     46.37     53.53     61.03     68.88     77.06     85.51     94.16    102.96
          OUTFLOW     1776.10   2038.60   2256.80   2384.20   2511.70   2700.00   2887.00   3060.90   3225.70   3515.40
        ELEVATION    2240.00   2241.00   2242.00   2243.00   2244.00   2245.00   2246.00   2247.00   2248.00   2249.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO       70.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

      ***           ***           ***           ***           ***

                        HYDROGRAPH AT STATION    CP7DB
                          FOR PLAN 1, RATIO =  .95

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     22.45-HR
+   (CFS)       (HR)
                              (CFS)
+     823.      4.05          465.        301.        301.        301.
                        (INCHES)         .386        .937        .937        .937
                         (AC-FT)         230.        558.        558.        558.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR        24-HR       72-HR     22.45-HR
+  (AC-FT)      (HR)
       10.      4.05            4.          2.          2.          2.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR        24-HR       72-HR     22.45-HR
+   (FEET)      (HR)
   2235.84      4.05       2233.85     2232.78     2232.78     2232.78

                        CUMULATIVE AREA =   11.18 SQ MI


      ***           ***           ***           ***           ***

                        HYDROGRAPH AT STATION    CP7DB
                          FOR PLAN 1, RATIO =  .88

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     22.45-HR
+   (CFS)       (HR)
                              (CFS)
+     728.      4.05          427.        279.        279.        279.
                        (INCHES)         .355        .870        .870        .870
                         (AC-FT)         212.        519.        519.        519.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR        24-HR       72-HR     22.45-HR
+  (AC-FT)      (HR)
        8.      4.05            4.          2.          2.          2.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR        24-HR       72-HR     22.45-HR
+   (FEET)      (HR)
   2235.35      4.05       2233.63     2232.63     2232.63     2232.63

                        CUMULATIVE AREA =   11.18 SQ MI
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HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 667.	4.05		401.	264.	264.	264.
		(INCHES)	.334	.823	.823	.823
		(AC-FT)	199.	491.	491.	491.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
7.	4.05	3.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2235.04	4.05	2233.48	2232.52	2232.52	2232.52

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 629.	4.05		386.	255.	255.	255.
		(INCHES)	.321	.795	.795	.795
		(AC-FT)	191.	474.	474.	474.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
6.	4.05	3.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2234.83	4.05	2233.39	2232.46	2232.46	2232.46

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 575.	4.05		365.	242.	242.	242.
		(INCHES)	.304	.755	.755	.755
		(AC-FT)	181.	450.	450.	450.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
6.	4.05	3.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2234.53	4.05	2233.26	2232.37	2232.37	2232.37

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 522.	4.10		343.	229.	229.	229.
		(INCHES)	.285	.713	.713	.713
		(AC-FT)	170.	425.	425.	425.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
5.	4.10	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR

+ (FEET)	(HR)				
2234.24	4.10	2233.12	2232.27	2232.27	2232.27

CUMULATIVE AREA = 11.18 SQ MI

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          *            *
246 KK    *     CP7DB  *
          *            *
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251 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

252 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

253 SV STORAGE	.0	.7	5.4	13.6	21.9	30.4	39.0	47.8	56.6	65.6
	74.7	84.0	93.5	103.1	112.8					
255 SE ELEVATION	2220.00	2221.00	2222.00	2223.00	2224.00	2225.00	2226.00	2227.00	2228.00	2229.00
	2230.00	2231.00	2232.00	2233.00	2234.00					
257 SQ DISCHARGE	0.	13.	37.	152.	340.	578.	850.	1155.	1488.	1846.
	2225.	2481.	2701.	3036.	3463.					
259 SE ELEVATION	2220.00	2221.00	2222.00	2223.00	2224.00	2225.00	2226.00	2227.00	2228.00	2229.00
	2230.00	2231.00	2232.00	2233.00	2234.00					

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.68	5.42	13.62	21.95	30.42	39.03	47.76	56.62	65.61
OUTFLOW	.00	13.20	37.20	152.00	340.30	578.10	849.70	1155.10	1488.10	1845.50
ELEVATION	2220.00	2221.00	2222.00	2223.00	2224.00	2225.00	2226.00	2227.00	2228.00	2229.00
STORAGE	74.74	84.02	93.46	103.05	112.79					
OUTFLOW	2224.90	2481.10	2700.80	3035.50	3463.40					
ELEVATION	2230.00	2231.00	2232.00	2233.00	2234.00					

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
	(CFS)				
+ 693.	4.45	456.	291.	291.	291.
	(INCHES)	.379	.906	.906	.906
	(AC-FT)	226.	540.	540.	540.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
34.	4.45	26.	19.	19.	19.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2225.42	4.45	2224.46	2223.54	2223.54	2223.54

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .88

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
	(CFS)				
+ 623.	5.35	417.	270.	270.	270.
	(INCHES)	.347	.840	.840	.840
	(AC-FT)	207.	501.	501.	501.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
32.	5.35	25.	18.	18.	18.

PEAK STAGE TIME MAXIMUM AVERAGE STAGE

+ (FEET)	(HR)	6-HR	24-HR	72-HR	22.45-HR
2225.16	5.35	2224.30	2223.43	2223.43	2223.43

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 575.	5.35		391.	255.	255.	255.
		(INCHES)	.325	.794	.794	.794
		(AC-FT)	194.	474.	474.	474.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
30.	5.35	24.	17.	17.	17.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2224.99	5.35	2224.19	2223.34	2223.34	2223.34

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 550.	5.40		376.	246.	246.	246.
		(INCHES)	.313	.767	.767	.767
		(AC-FT)	187.	457.	457.	457.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
29.	5.40	23.	17.	17.	17.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2224.88	5.40	2224.12	2223.29	2223.29	2223.29

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 514.	5.40		355.	234.	234.	234.
		(INCHES)	.295	.728	.728	.728
		(AC-FT)	176.	434.	434.	434.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
28.	5.40	22.	16.	16.	16.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2224.73	5.40	2224.03	2223.21	2223.21	2223.21

CUMULATIVE AREA = 11.18 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION CP7DB
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 478.	5.40		333.	221.	221.	221.
		(INCHES)	.277	.687	.687	.687
		(AC-FT)	165.	409.	409.	409.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE

+ (AC-FT)	(HR)	6-HR	24-HR	72-HR	22.45-HR
27.	5.40	21.	16.	16.	16.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2224.58	5.40	2223.92	2223.14	2223.14	2223.14

CUMULATIVE AREA = 11.18 SQ MI

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          *            *
865 KK    *     DB4    *
          *            *
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870 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

871 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

872 SV STORAGE	.0	2.0	13.0	31.0	61.0	97.0	118.0	140.0	171.0	200.0
	229.0	261.0	290.0	315.0	344.0	379.0	409.0	437.0	470.0	504.0
874 SE ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
	2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00
876 SQ DISCHARGE	0.	37.	80.	117.	142.	163.	173.	182.	191.	198.
	206.	213.	221.	228.	235.	242.	248.	2755.	7761.	14467.

878 SS SPILLWAY

CREL	2069.00	SPILLWAY CREST ELEVATION
SPWID	900.00	SPILLWAY WIDTH
COQW	3.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.00	13.00	31.00	61.00	97.00	118.00	140.00	171.00	200.00
OUTFLOW	.00	37.00	80.00	117.00	142.00	163.00	173.00	182.00	191.00	198.00
ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
STORAGE	229.00	261.00	290.00	315.00	344.00	379.00	409.00	437.00	470.00	504.00
OUTFLOW	206.00	213.00	221.00	228.00	235.00	242.00	248.00	2755.00	7761.00	14467.00
ELEVATION	2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00

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HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1914.	5.20		417.	241.	241.	241.
		(INCHES)	.579	1.250	1.250	1.250
		(AC-FT)	207.	447.	447.	447.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
428.	5.20	384.	238.	238.	238.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2069.66	5.20	2068.22	2062.64	2062.64	2062.64

CUMULATIVE AREA = 6.71 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .88

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
	(CFS)				

+ 732.	5.60		282.	203.	203.	203.
		(INCHES)	.391	1.053	1.053	1.053
		(AC-FT)	140.	377.	377.	377.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
414.	5.60	378.	234.	234.	234.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2069.19	5.60	2068.00	2062.43	2062.43	2062.43

CUMULATIVE AREA = 6.71 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .83

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 243.	6.20	236.	187.	187.	187.
	(INCHES)	.328	.968	.968	.968
	(AC-FT)	117.	346.	346.	346.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
386.	6.20	352.	215.	215.	215.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2068.23	6.20	2067.18	2061.75	2061.75	2061.75

CUMULATIVE AREA = 6.71 SQ MI

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HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 238.	6.15	231.	181.	181.	181.
	(INCHES)	.320	.940	.940	.940
	(AC-FT)	114.	336.	336.	336.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
361.	6.20	328.	197.	197.	197.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2067.48	6.15	2066.39	2061.10	2061.10	2061.10

CUMULATIVE AREA = 6.71 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)				
		(CFS)			
+ 231.	6.15	222.	173.	173.	173.
	(INCHES)	.308	.900	.900	.900
	(AC-FT)	110.	322.	322.	322.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
327.	6.15	295.	172.	172.	172.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2066.42	6.15	2065.24	2060.18	2060.18	2060.18

CUMULATIVE AREA = 6.71 SQ MI

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HYDROGRAPH AT STATION DB4
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 222.	6.15		214.	165.	165.	165.
		(INCHES)	.297	.855	.855	.855
		(AC-FT)	106.	306.	306.	306.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)					
293.	6.15		263.	148.	148.	148.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2065.14	6.15		2064.10	2059.21	2059.21	2059.21

CUMULATIVE AREA = 6.71 SQ MI

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988 KK    *     DB5    *
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993 KO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

994 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

995 SV	STORAGE	1.2	3.3	12.1	28.0	49.0	79.8	115.0	166.1	232.2	320.1
		418.8	534.5	605.5	681.1	765.1	846.8	943.4	1044.8	1261.8	1426.1
997 SE	ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
		2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.00	2506.00	2510.00
999 SQ	DISCHARGE	1.	23.	36.	46.	54.	60.	67.	72.	78.	82.
		87.	91.	94.	96.	98.	100.	101.	103.	107.	111.
1001 SE	ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
		2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.00	2506.00	2510.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	1.20	3.30	12.10	28.00	49.00	79.80	115.00	166.10	232.20	320.10
OUTFLOW	.50	22.90	36.10	45.70	53.60	60.40	66.50	72.30	77.50	82.40
ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
STORAGE	418.80	534.50	605.50	681.10	765.10	846.80	943.40	1044.80	1261.80	1426.10
OUTFLOW	87.00	91.20	93.50	95.60	97.60	99.50	101.40	103.40	107.20	110.70
ELEVATION	2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.00	2506.00	2510.00

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 90.	6.05		89.	80.	80.	80.
		(INCHES)	.153	.514	.514	.514
		(AC-FT)	44.	148.	148.	148.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)					
492.	6.05		477.	370.	370.	370.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2488.54	6.05		2488.01	2481.86	2481.86	2481.86

CUMULATIVE AREA = 5.41 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .88

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 88.	6.05		87.	78.	78.	78.
		(INCHES)	.150	.499	.499	.499
		(AC-FT)	43.	144.	144.	144.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
435.	6.05	420.	322.	322.	322.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2486.55	6.05	2486.01	2479.89	2479.89	2479.89

CUMULATIVE AREA = 5.41 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 86.	6.05		85.	76.	76.	76.
		(INCHES)	.147	.487	.487	.487
		(AC-FT)	42.	140.	140.	140.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
396.	6.05	382.	290.	290.	290.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2485.08	6.05	2484.49	2478.46	2478.46	2478.46

CUMULATIVE AREA = 5.41 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .80

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 85.	6.05		84.	75.	75.	75.
		(INCHES)	.145	.480	.480	.480
		(AC-FT)	42.	138.	138.	138.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
374.	6.05	360.	272.	272.	272.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2484.18	6.05	2483.60	2477.62	2477.62	2477.62

CUMULATIVE AREA = 5.41 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 83.	6.05		83.	73.	73.	73.
		(INCHES)	.142	.469	.469	.469
		(AC-FT)	41.	135.	135.	135.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)				
343.	6.05	329.	247.	247.	247.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)				
2482.94	6.05	2482.37	2476.43	2476.43	2476.43

CUMULATIVE AREA = 5.41 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DB5
FOR PLAN 1, RATIO = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	22.45-HR
+ (CFS)	(HR)					
		(CFS)				
+ 82.	6.05		81.	71.	71.	71.
		(INCHES)	.140	.458	.458	.458
		(AC-FT)	40.	132.	132.	132.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (AC-FT)	(HR)					
313.	6.05		299.	222.	222.	222.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	22.45-HR
+ (FEET)	(HR)					
2481.66	6.05		2481.04	2475.15	2475.15	2475.15

CUMULATIVE AREA = 5.41 SQ MI

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 2

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .95	RATIO 2 .88	RATIO 3 .83	RATIO 4 .80	RATIO 5 .76	RATIO 6 .73
HYDROGRAPH AT										
+	C1H	4.01	1	FLOW	3972.	3540.	3246.	3076.	2840.	2601.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	DB1	4.01	1	FLOW	196.	188.	182.	178.	173.	166.
				TIME	5.55	5.50	5.35	5.35	5.35	5.35
			** PEAK STAGES IN FEET **							
			1	STAGE	2587.56	2585.12	2583.40	2582.39	2580.93	2579.44
				TIME	5.55	5.50	5.40	5.35	5.35	5.35
ROUTED TO										
+	RDB1	4.01	1	FLOW	196.	188.	182.	178.	173.	166.
				TIME	5.65	5.55	5.55	5.55	5.45	5.50
HYDROGRAPH AT										
+	C1HB1	.45	1	FLOW	227.	200.	181.	170.	155.	140.
				TIME	3.90	3.90	3.90	3.90	3.90	3.90
2 COMBINED AT										
+	CP2	4.46	1	FLOW	391.	355.	331.	317.	297.	277.
				TIME	3.95	3.95	3.95	3.95	3.95	3.95
ROUTED TO										
+	RCP2	4.46	1	FLOW	391.	355.	330.	316.	297.	277.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
HYDROGRAPH AT										
+	C1G3A	.27	1	FLOW	255.	228.	209.	198.	183.	168.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP3	4.73	1	FLOW	529.	474.	436.	414.	384.	353.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RCP3	4.73	1	FLOW	530.	475.	438.	416.	386.	356.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C1G3B	.73	1	FLOW	770.	685.	628.	595.	549.	502.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP4	5.46	1	FLOW	1205.	1072.	982.	929.	856.	782.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP4	5.46	1	FLOW	1186.	1059.	972.	922.	851.	779.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C1G3C	1.05	1	FLOW	991.	884.	812.	769.	711.	652.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP5	6.51	1	FLOW	2163.	1922.	1759.	1662.	1530.	1397.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C1G3D	.84	1	FLOW	889.	796.	732.	696.	645.	593.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP6A	7.35	1	FLOW	3019.	2690.	2466.	2334.	2153.	1971.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C5ICB	.73	1	FLOW	616.	539.	487.	457.	415.	374.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	C5ICB	.73	1	FLOW	611.	537.	487.	458.	418.	378.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										

+	C5I2A	1.40	1	FLOW	1240.	1089.	986.	927.	846.	764.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP6B	2.13	1	FLOW	1773.	1552.	1404.	1318.	1200.	1080.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP6	9.48	1	FLOW	4791.	4242.	3869.	3652.	3353.	3051.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	DB2	9.48	1	FLOW	307.	293.	283.	277.	269.	258.
				TIME	6.20	6.20	6.20	6.20	6.20	6.15
			** PEAK STAGES IN FEET **							
			1	STAGE	2347.21	2345.27	2343.89	2343.10	2342.02	2340.80
				TIME	6.20	6.20	6.20	6.20	6.20	6.15
ROUTED TO										
+	RDB2	9.48	1	FLOW	307.	293.	283.	277.	269.	258.
				TIME	6.25	6.25	6.25	6.25	6.25	6.25
HYDROGRAPH AT										
+	C1G2C	.29	1	FLOW	155.	133.	118.	110.	98.	87.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C1G2D	.22	1	FLOW	113.	96.	85.	78.	69.	60.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
3 COMBINED AT										
+	CP7A	10.00	1	FLOW	485.	434.	404.	390.	370.	350.
				TIME	3.65	3.65	4.95	4.95	4.95	4.95
HYDROGRAPH AT										
+	C1G2B1	.52	1	FLOW	192.	162.	143.	131.	116.	101.
				TIME	3.85	3.85	3.85	3.85	3.85	3.85
ROUTED TO										
+	RG2B1	.52	1	FLOW	193.	163.	143.	132.	117.	103.
				TIME	4.05	4.05	4.05	4.05	4.10	4.15
HYDROGRAPH AT										
+	C1G2B2	.31	1	FLOW	170.	147.	131.	122.	109.	97.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
2 COMBINED AT										
+	CP7B	.83	1	FLOW	292.	248.	218.	200.	177.	158.
				TIME	4.00	4.00	4.00	4.05	4.00	4.05
HYDROGRAPH AT										
+	C1G2A	.35	1	FLOW	226.	196.	176.	165.	149.	134.
				TIME	3.60	3.60	3.60	3.60	3.65	3.65
ROUTED TO										
+	RC1G2A	.35	1	FLOW	225.	198.	178.	167.	152.	135.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
2 COMBINED AT										
+	CP7C	1.18	1	FLOW	485.	408.	356.	328.	288.	252.
				TIME	3.80	3.85	3.85	3.85	3.90	3.95
2 COMBINED AT										
+	CP7	11.18	1	FLOW	939.	811.	730.	679.	614.	552.
				TIME	3.75	3.80	3.80	3.80	3.85	3.90
ROUTED TO										
+	CP7DB	11.18	1	FLOW	823.	728.	667.	629.	575.	522.
				TIME	4.05	4.05	4.05	4.05	4.05	4.10
			** PEAK STAGES IN FEET **							
			1	STAGE	2235.84	2235.35	2235.04	2234.83	2234.53	2234.24
				TIME	4.05	4.05	4.05	4.05	4.05	4.10
ROUTED TO										
+	CP7DB	11.18	1	FLOW	693.	623.	575.	550.	514.	478.
				TIME	4.45	5.35	5.35	5.40	5.40	5.40
			** PEAK STAGES IN FEET **							
			1	STAGE	2225.42	2225.16	2224.99	2224.88	2224.73	2224.58
				TIME	4.45	5.35	5.35	5.40	5.40	5.40
ROUTED TO										
+	RCP7	11.18	1	FLOW	693.	623.	575.	550.	514.	478.
				TIME	4.50	5.40	5.40	5.45	5.45	5.45
HYDROGRAPH AT										
+	C1NA	.41	1	FLOW	536.	478.	439.	417.	385.	353.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC1NA	.41	1	FLOW	502.	440.	405.	384.	351.	322.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP8	11.59	1	FLOW	886.	781.	714.	678.	626.	573.
				TIME	4.60	4.60	4.65	4.80	4.85	4.85

ROUTED TO										
+	RCP8	11.59	1	FLOW	882.	781.	712.	676.	625.	572.
				TIME	4.65	4.65	4.85	4.85	4.85	4.85
HYDROGRAPH AT										
+	C5GC	.11	1	FLOW	156.	140.	128.	122.	113.	104.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC5GC	.11	1	FLOW	146.	131.	121.	115.	107.	98.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	C5GB	.32	1	FLOW	321.	285.	260.	246.	226.	207.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP9	.44	1	FLOW	467.	416.	381.	361.	333.	305.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP9	.44	1	FLOW	466.	415.	380.	358.	330.	301.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C5GA	.27	1	FLOW	81.	65.	55.	49.	42.	37.
				TIME	3.70	3.70	3.75	3.75	4.95	4.95
2 COMBINED AT										
+	CP10	.71	1	FLOW	535.	469.	425.	397.	362.	326.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RCP10	.71	1	FLOW	530.	463.	417.	392.	358.	326.
				TIME	3.65	3.65	3.65	3.65	3.70	3.70
ROUTED TO										
+	RCP10	.71	1	FLOW	531.	464.	417.	397.	367.	335.
				TIME	3.70	3.70	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C5GD	.44	1	FLOW	121.	99.	84.	76.	65.	58.
				TIME	3.90	3.90	3.95	3.95	5.10	5.10
DIVERSION TO										
+	DIVER1	.44	1	FLOW	19.	17.	15.	14.	13.	12.
				TIME	3.90	3.90	3.95	3.95	5.10	5.10
HYDROGRAPH AT										
+	DIVER1	.44	1	FLOW	102.	82.	69.	62.	52.	45.
				TIME	3.90	3.90	3.95	3.95	5.10	5.10
ROUTED TO										
+	RC5GD	.44	1	FLOW	102.	82.	69.	62.	52.	45.
				TIME	4.00	4.05	4.05	4.05	4.10	5.25
HYDROGRAPH AT										
+	C5I1E	.16	1	FLOW	189.	166.	151.	142.	130.	118.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	CP11	1.32	1	FLOW	625.	545.	490.	462.	420.	374.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP11	1.32	1	FLOW	629.	538.	484.	461.	422.	381.
				TIME	3.75	3.75	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	C1HF	.10	1	FLOW	67.	58.	52.	49.	44.	40.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
2 COMBINED AT										
+	CP12	1.42	1	FLOW	691.	591.	528.	503.	459.	414.
				TIME	3.75	3.75	3.80	3.80	3.80	3.80
ROUTED TO										
+	RCP12	1.42	1	FLOW	688.	606.	536.	501.	460.	419.
				TIME	3.85	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT										
+	C5I1B	.52	1	FLOW	363.	307.	270.	248.	220.	191.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC5I1B	.52	1	FLOW	348.	293.	270.	249.	219.	185.
				TIME	3.55	3.55	3.55	3.55	3.55	3.60
HYDROGRAPH AT										
+	C5I1D	.12	1	FLOW	92.	80.	72.	67.	61.	54.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP13	.63	1	FLOW	440.	373.	342.	315.	279.	239.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP13	.63	1	FLOW	430.	366.	341.	316.	283.	243.
				TIME	3.60	3.65	3.65	3.65	3.65	3.65

HYDROGRAPH AT										
+	C1HE	.15	1	FLOW	86.	72.	64.	59.	52.	45.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	CP14	2.20	1	FLOW	1025.	863.	769.	708.	627.	542.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
DIVERSION TO										
+	DIVER2	2.20	1	FLOW	95.	80.	71.	65.	58.	50.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	DIVER2	2.20	1	FLOW	931.	784.	698.	642.	569.	492.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RCP14	2.20	1	FLOW	917.	764.	677.	626.	559.	488.
				TIME	3.65	3.65	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C1HD	.07	1	FLOW	53.	46.	41.	38.	34.	31.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP15	2.27	1	FLOW	960.	802.	708.	650.	581.	507.
				TIME	3.65	3.65	3.65	3.70	3.70	3.70
ROUTED TO										
+	RCP15	2.27	1	FLOW	960.	804.	709.	656.	590.	512.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
DIVERSION TO										
+	DIVER3	2.27	1	FLOW	178.	149.	131.	122.	109.	95.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
HYDROGRAPH AT										
+	DIVER3	2.27	1	FLOW	782.	655.	577.	534.	481.	417.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
HYDROGRAPH AT										
+	C5I1	.24	1	FLOW	177.	153.	137.	128.	115.	103.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C5I1C	.06	1	FLOW	49.	43.	39.	37.	34.	30.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RC5I1C	.06	1	FLOW	49.	43.	39.	37.	34.	31.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
2 COMBINED AT										
+	CP16	.31	1	FLOW	221.	191.	171.	160.	144.	128.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RCP16	.31	1	FLOW	217.	186.	170.	159.	144.	128.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C1G1B	.14	1	FLOW	143.	128.	119.	113.	105.	96.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP17	.45	1	FLOW	357.	309.	283.	265.	241.	217.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RCP17	.45	1	FLOW	354.	309.	284.	267.	243.	219.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C1HCB	.18	1	FLOW	180.	157.	141.	133.	121.	108.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP18A	.63	1	FLOW	402.	346.	317.	298.	272.	245.
				TIME	3.55	3.55	3.70	3.70	3.70	3.70
2 COMBINED AT										
+	CP18	2.90	1	FLOW	1178.	1001.	894.	822.	745.	658.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
DIVERSION TO										
+	DIVER4	2.90	1	FLOW	106.	90.	80.	74.	67.	59.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
HYDROGRAPH AT										
+	DIVER4	2.90	1	FLOW	1072.	911.	814.	748.	678.	599.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
ROUTED TO										
+	RCP18	2.90	1	FLOW	1055.	904.	805.	734.	657.	597.
				TIME	3.75	3.75	3.75	3.75	3.80	3.80
HYDROGRAPH AT										
+	C1G1A	.22	1	FLOW	185.	164.	150.	142.	130.	119.

				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RC1G1A	.22	1	FLOW	186.	165.	150.	142.	130.	119.
				TIME	3.75	3.75	3.75	3.75	3.80	3.80
HYDROGRAPH AT										
+	C1HB	.15	1	FLOW	200.	179.	165.	157.	145.	133.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP19A	.37	1	FLOW	292.	256.	232.	218.	199.	180.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP19	3.27	1	FLOW	1293.	1115.	998.	919.	836.	761.
				TIME	3.75	3.75	3.75	3.80	3.80	3.80
DIVERSION TO										
+	DIVER5	3.27	1	FLOW	440.	308.	220.	160.	98.	67.
				TIME	3.75	3.75	3.75	3.80	3.80	3.80
HYDROGRAPH AT										
+	DIVER5	3.27	1	FLOW	852.	808.	778.	758.	738.	695.
				TIME	3.75	3.75	3.75	3.80	3.80	3.80
ROUTED TO										
+	RCP19	3.27	1	FLOW	848.	813.	778.	764.	753.	695.
				TIME	3.80	3.85	3.85	3.85	3.85	3.85
HYDROGRAPH AT										
+	C1HA	.07	1	FLOW	21.	17.	14.	12.	10.	9.
				TIME	3.65	3.65	3.65	3.65	4.90	4.90
2 COMBINED AT										
+	CP20A	3.35	1	FLOW	863.	823.	787.	773.	760.	701.
				TIME	3.80	3.85	3.85	3.85	3.85	3.85
2 COMBINED AT										
+	CP20	14.94	1	FLOW	1458.	1281.	1199.	1142.	1071.	978.
				TIME	4.90	4.90	3.90	3.90	3.90	3.90
ROUTED TO										
+	RCP20	14.94	1	FLOW	1447.	1275.	1191.	1140.	1069.	972.
				TIME	4.90	4.95	3.95	3.95	3.90	3.90
HYDROGRAPH AT										
+	C1D	.40	1	FLOW	250.	216.	194.	181.	163.	145.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RC1D	.40	1	FLOW	251.	217.	194.	181.	163.	145.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C1C	.23	1	FLOW	161.	140.	126.	118.	108.	97.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP21	.63	1	FLOW	387.	334.	298.	278.	250.	223.
				TIME	3.65	3.65	3.65	3.65	3.65	3.70
ROUTED TO										
+	RCP21	.63	1	FLOW	387.	335.	300.	279.	251.	223.
				TIME	3.80	3.80	3.80	3.80	3.80	3.85
HYDROGRAPH AT										
+	C1B	.38	1	FLOW	330.	295.	271.	257.	237.	218.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C4A1D	.06	1	FLOW	40.	35.	31.	29.	26.	23.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RC4A1D	.06	1	FLOW	39.	34.	30.	28.	25.	23.
				TIME	3.60	3.60	3.65	3.65	3.65	3.65
4 COMBINED AT										
+	CP22	16.01	1	FLOW	1942.	1737.	1612.	1535.	1435.	1306.
				TIME	3.60	3.85	3.90	3.90	3.90	3.90
ROUTED TO										
+	RCP22	16.01	1	FLOW	1917.	1733.	1609.	1535.	1431.	1288.
				TIME	3.90	3.90	3.90	3.90	3.90	3.90
HYDROGRAPH AT										
+	C1A	.15	1	FLOW	108.	96.	87.	82.	75.	69.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP23	16.15	1	FLOW	2024.	1784.	1656.	1580.	1472.	1326.
				TIME	3.60	3.90	3.90	3.90	3.90	3.90
ROUTED TO										
+	RCP23	16.15	1	FLOW	2014.	1781.	1652.	1574.	1459.	1319.
				TIME	3.65	3.90	3.90	3.90	3.90	3.95
HYDROGRAPH AT										

+	C5CC	.33	1	FLOW	209.	182.	164.	153.	139.	125.
				TIME	3.65	3.65	3.65	3.70	3.70	3.70
HYDROGRAPH AT										
+	RET4	.00	1	FLOW	106.	90.	80.	74.	67.	59.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
ROUTED TO										
+	RDIV4	.00	1	FLOW	107.	90.	81.	76.	68.	58.
				TIME	3.75	3.75	3.80	3.80	3.80	3.80
ROUTED TO										
+	RDIV4	.00	1	FLOW	107.	91.	81.	76.	68.	59.
				TIME	3.85	3.85	3.90	3.90	3.90	3.90
2 COMBINED AT										
+	CP24A	.33	1	FLOW	290.	245.	215.	198.	175.	152.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	RET3	.00	1	FLOW	178.	149.	131.	122.	109.	95.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75
ROUTED TO										
+	RDIV3	.00	1	FLOW	180.	152.	134.	124.	111.	95.
				TIME	3.80	3.80	3.85	3.85	3.85	3.90
ROUTED TO										
+	RDIV3	.00	1	FLOW	178.	152.	133.	124.	111.	95.
				TIME	3.85	3.85	3.85	3.90	3.90	3.95
2 COMBINED AT										
+	CP24B	.33	1	FLOW	455.	386.	342.	314.	280.	243.
				TIME	3.80	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT										
+	RET2	.00	1	FLOW	95.	80.	71.	65.	58.	50.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RDIV2	.00	1	FLOW	95.	82.	73.	67.	60.	53.
				TIME	3.75	3.80	3.80	3.80	3.85	3.85
ROUTED TO										
+	RDIV2	.00	1	FLOW	96.	79.	71.	67.	58.	50.
				TIME	3.80	3.85	3.85	3.85	3.85	3.90
2 COMBINED AT										
+	CP24C	.33	1	FLOW	550.	464.	413.	381.	337.	293.
				TIME	3.80	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT										
+	C5CA	.30	1	FLOW	138.	116.	101.	92.	81.	69.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RC5CA	.30	1	FLOW	140.	117.	101.	93.	81.	68.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C5CF	.32	1	FLOW	175.	144.	124.	112.	97.	81.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP25	.62	1	FLOW	253.	207.	177.	160.	137.	114.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP25	.62	1	FLOW	256.	210.	180.	163.	133.	111.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C5CE	.32	1	FLOW	172.	142.	122.	111.	96.	82.
				TIME	3.50	3.50	3.50	3.55	3.55	3.55
2 COMBINED AT										
+	CP26	.95	1	FLOW	413.	335.	284.	255.	213.	175.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP26	.95	1	FLOW	394.	320.	275.	248.	207.	172.
				TIME	3.55	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C5CD	.27	1	FLOW	113.	95.	84.	77.	68.	59.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	RET1	.00	1	FLOW	19.	17.	15.	14.	13.	12.
				TIME	3.90	3.90	3.95	3.95	5.10	5.10
ROUTED TO										
+	RDIV1	.00	1	FLOW	20.	17.	16.	16.	16.	15.
				TIME	4.15	4.25	3.95	4.00	4.05	4.10
ROUTED TO										
+	RDIV1	.00	1	FLOW	20.	18.	19.	17.	16.	15.
				TIME	4.15	4.25	4.05	4.20	4.15	4.20

ROUTED TO	RDIV1	.00	1	FLOW	24.	24.	23.	21.	20.	20.
+				TIME	4.25	4.20	4.25	4.30	4.35	4.40
3 COMBINED AT	CP27	1.21	1	FLOW	483.	399.	344.	310.	262.	218.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO	RCP27	1.21	1	FLOW	476.	385.	335.	300.	262.	221.
+				TIME	3.60	3.65	3.65	3.65	3.65	3.65
2 COMBINED AT	CP24D	1.55	1	FLOW	904.	764.	674.	621.	553.	478.
+				TIME	3.80	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT	C5CB	.14	1	FLOW	92.	81.	73.	69.	63.	57.
+				TIME	3.70	3.70	3.70	3.70	3.70	3.70
2 COMBINED AT	CP24E	1.69	1	FLOW	987.	831.	735.	678.	601.	522.
+				TIME	3.80	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT	C5FD	.17	1	FLOW	211.	188.	172.	163.	150.	137.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	RC5FD	.17	1	FLOW	202.	179.	163.	154.	142.	131.
+				TIME	3.60	3.60	3.60	3.60	3.65	3.65
HYDROGRAPH AT	C5FA	.51	1	FLOW	809.	731.	677.	646.	603.	559.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	RC5FA	.51	1	FLOW	739.	674.	628.	601.	562.	522.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT	C5FB	.26	1	FLOW	130.	108.	94.	86.	75.	64.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
3 COMBINED AT	CP28	.94	1	FLOW	1071.	961.	885.	840.	777.	713.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO	RCP28	.94	1	FLOW	1041.	935.	861.	818.	753.	693.
+				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT	C5FC	.22	1	FLOW	141.	121.	107.	99.	88.	78.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT	CP29	1.16	1	FLOW	1179.	1040.	954.	904.	830.	762.
+				TIME	3.60	3.65	3.65	3.65	3.65	3.65
ROUTED TO	RCP29	1.16	1	FLOW	1207.	1047.	972.	927.	869.	793.
+				TIME	3.65	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT	C5EA	.49	1	FLOW	516.	458.	418.	395.	363.	331.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT	CP30	1.65	1	FLOW	1534.	1337.	1195.	1111.	1031.	942.
+				TIME	3.65	3.65	3.65	3.65	3.70	3.70
ROUTED TO	RCP30	1.65	1	FLOW	1519.	1319.	1173.	1112.	1028.	929.
+				TIME	3.70	3.70	3.70	3.75	3.75	3.75
HYDROGRAPH AT	C5EB	.55	1	FLOW	589.	531.	491.	468.	436.	404.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO	RC5EB	.55	1	FLOW	586.	530.	491.	468.	436.	404.
+				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT	C5EC	.22	1	FLOW	134.	113.	99.	91.	80.	70.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT	CP31	2.41	1	FLOW	2184.	1915.	1722.	1608.	1481.	1349.
+				TIME	3.70	3.70	3.70	3.70	3.75	3.75
ROUTED TO	RCP31	2.41	1	FLOW	2157.	1890.	1699.	1589.	1461.	1324.
+				TIME	3.75	3.75	3.75	3.80	3.80	3.80
HYDROGRAPH AT	C5ED	.16	1	FLOW	129.	113.	103.	96.	88.	79.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60

2 COMBINED AT										
+	CP32	2.57	1	FLOW	2232.	1955.	1758.	1642.	1505.	1363.
				TIME	3.75	3.75	3.75	3.75	3.80	3.80
ROUTED TO										
+	RCP32	2.57	1	FLOW	2209.	1928.	1736.	1634.	1492.	1348.
				TIME	3.75	3.75	3.75	3.80	3.80	3.80
HYDROGRAPH AT										
+	C5DA	1.06	1	FLOW	1544.	1389.	1283.	1221.	1136.	1048.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	C5DB	.53	1	FLOW	763.	690.	639.	610.	569.	528.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	CP33	4.17	1	FLOW	3545.	3115.	2822.	2653.	2420.	2175.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RCP33	4.17	1	FLOW	3427.	3006.	2715.	2558.	2337.	2103.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP24	5.85	1	FLOW	4184.	3604.	3217.	3007.	2719.	2414.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP24	5.85	1	FLOW	4071.	3512.	3118.	2894.	2616.	2321.
				TIME	3.55	3.55	3.55	3.55	3.60	3.60
HYDROGRAPH AT										
+	C5DC	.33	1	FLOW	438.	391.	358.	340.	314.	287.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC5DC	.33	1	FLOW	427.	358.	344.	332.	306.	270.
				TIME	3.70	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C4BD	.52	1	FLOW	301.	265.	240.	226.	207.	187.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
2 COMBINED AT										
+	CP34A	.85	1	FLOW	711.	619.	580.	554.	509.	453.
				TIME	3.70	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP34B	6.71	1	FLOW	4506.	3877.	3467.	3232.	2930.	2631.
				TIME	3.55	3.60	3.60	3.60	3.85	3.85
ROUTED TO										
+	DB4	6.71	1	FLOW	1914.	732.	243.	238.	231.	222.
				TIME	5.20	5.60	6.20	6.15	6.15	6.15
			** PEAK STAGES IN FEET **							
			1	STAGE	2069.66	2069.19	2068.23	2067.48	2066.42	2065.14
				TIME	5.20	5.60	6.20	6.15	6.15	6.15
HYDROGRAPH AT										
+	C4BF	.28	1	FLOW	298.	263.	239.	225.	206.	187.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC4BF	.28	1	FLOW	277.	244.	224.	212.	194.	177.
				TIME	3.60	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C4BC	.24	1	FLOW	190.	167.	152.	143.	131.	119.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
3 COMBINED AT										
+	CP34	7.22	1	FLOW	1990.	753.	537.	512.	476.	440.
				TIME	5.20	5.60	3.65	3.65	3.65	3.65
ROUTED TO										
+	RCP34	7.22	1	FLOW	2041.	769.	543.	520.	484.	444.
				TIME	5.25	5.65	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C4A1C	.52	1	FLOW	351.	308.	280.	263.	240.	217.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	RET5	.00	1	FLOW	440.	308.	220.	160.	98.	67.
				TIME	3.75	3.75	3.75	3.80	3.80	3.80
ROUTED TO										
+	RDIV5	.00	1	FLOW	461.	322.	236.	175.	92.	69.
				TIME	3.85	3.90	3.90	3.95	4.00	4.00
3 COMBINED AT										
+	CP35A	7.74	1	FLOW	2186.	967.	843.	798.	733.	664.
				TIME	5.25	3.85	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C4A1	.35	1	FLOW	182.	157.	141.	132.	119.	106.

				TIME	3.70	3.70	3.70	3.70	3.70	3.70
2 COMBINED AT										
+	CP35	8.09	1	FLOW	2255.	1106.	982.	928.	851.	769.
				TIME	5.25	3.85	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP35	8.09	1	FLOW	2303.	1099.	983.	918.	841.	760.
				TIME	5.25	3.80	3.80	3.80	3.85	3.85
HYDROGRAPH AT										
+	C4BE	.22	1	FLOW	175.	156.	143.	135.	125.	114.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RC4BE	.22	1	FLOW	174.	155.	142.	135.	124.	114.
				TIME	3.75	3.80	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	C4BB	.35	1	FLOW	272.	243.	224.	212.	197.	181.
				TIME	3.65	3.65	3.65	3.65	3.65	3.70
2 COMBINED AT										
+	CP36	.57	1	FLOW	434.	385.	352.	334.	308.	282.
				TIME	3.70	3.70	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP36	.57	1	FLOW	433.	386.	354.	335.	309.	283.
				TIME	3.75	3.80	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	C4A2B	.25	1	FLOW	161.	138.	122.	114.	101.	89.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP37	.82	1	FLOW	489.	435.	398.	376.	346.	316.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
ROUTED TO										
+	RCP37	.82	1	FLOW	489.	435.	397.	375.	345.	315.
				TIME	3.85	3.85	3.85	3.85	3.85	3.90
2 COMBINED AT										
+	CP38A	8.91	1	FLOW	2524.	1526.	1371.	1292.	1186.	1074.
				TIME	5.25	3.80	3.80	3.85	3.85	3.85
HYDROGRAPH AT										
+	C4A1B	.25	1	FLOW	101.	84.	73.	66.	58.	49.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
3 COMBINED AT										
+	CP38	25.31	1	FLOW	4177.	3333.	3042.	2876.	2622.	2375.
				TIME	5.25	3.85	3.85	3.85	3.85	3.90
ROUTED TO										
+	RCP38	25.31	1	FLOW	4099.	3332.	3032.	2856.	2619.	2358.
				TIME	5.25	3.85	3.85	3.85	3.90	3.90
HYDROGRAPH AT										
+	C4CB	5.41	1	FLOW	7410.	6642.	6118.	5814.	5393.	4963.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	DB5	5.41	1	FLOW	90.	88.	86.	85.	83.	82.
				TIME	6.05	6.05	6.05	6.05	6.05	6.05
			** PEAK STAGES IN FEET **							
			1	STAGE	2488.54	2486.55	2485.08	2484.18	2482.94	2481.66
				TIME	6.05	6.05	6.05	6.05	6.05	6.05
ROUTED TO										
+	RDB5	5.41	1	FLOW	90.	88.	86.	85.	83.	82.
				TIME	6.25	6.25	6.25	6.25	6.25	6.20
HYDROGRAPH AT										
+	C4CA	.20	1	FLOW	172.	154.	141.	134.	124.	113.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C3B3E	.22	1	FLOW	277.	251.	234.	223.	209.	195.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	CP39	5.83	1	FLOW	511.	465.	434.	416.	391.	365.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RCP39	5.83	1	FLOW	512.	466.	435.	417.	391.	365.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C3B3D	.26	1	FLOW	325.	295.	274.	261.	244.	227.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP40	6.08	1	FLOW	798.	724.	673.	643.	602.	559.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										

+	RCP40	6.08	1	FLOW	788.	714.	662.	633.	593.	548.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	C3B3C	1.24	1	FLOW	1844.	1668.	1547.	1477.	1379.	1279.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC3B3C	1.24	1	FLOW	1815.	1641.	1522.	1452.	1355.	1256.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	C3B3B	.32	1	FLOW	358.	322.	298.	283.	264.	244.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP41	1.56	1	FLOW	2170.	1960.	1816.	1733.	1616.	1496.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RCP41	1.56	1	FLOW	2122.	1925.	1787.	1706.	1585.	1468.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	C3B3A	.51	1	FLOW	620.	556.	512.	486.	451.	415.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	CP42	8.15	1	FLOW	3294.	2952.	2715.	2578.	2402.	2223.
				TIME	3.60	3.60	3.60	3.65	3.65	3.65
ROUTED TO										
+	RCP42	8.15	1	FLOW	3329.	2986.	2734.	2587.	2414.	2241.
				TIME	3.70	3.70	3.70	3.70	3.75	3.75
HYDROGRAPH AT										
+	C4BA2	.14	1	FLOW	90.	78.	69.	64.	57.	51.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CP43A	8.29	1	FLOW	3391.	3039.	2782.	2632.	2446.	2269.
				TIME	3.70	3.70	3.70	3.70	3.75	3.75
ROUTED TO										
+	RCP43	8.29	1	FLOW	3285.	2922.	2700.	2575.	2387.	2211.
				TIME	3.95	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	C4BA3	.41	1	FLOW	218.	190.	170.	159.	144.	129.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
ROUTED TO										
+	RC4BA3	.41	1	FLOW	219.	190.	171.	160.	145.	129.
				TIME	3.90	3.95	3.95	3.95	3.95	3.95
HYDROGRAPH AT										
+	C4A2A	.26	1	FLOW	231.	200.	179.	168.	151.	135.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	CP44	8.96	1	FLOW	3539.	3141.	2887.	2750.	2547.	2354.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP44	8.96	1	FLOW	3488.	3133.	2884.	2743.	2530.	2323.
				TIME	3.95	4.00	4.00	4.00	4.00	4.05
HYDROGRAPH AT										
+	C4A1A	.25	1	FLOW	83.	72.	64.	60.	54.	48.
				TIME	4.10	4.10	4.10	4.10	4.10	4.15
3 COMBINED AT										
+	CP45	34.52	1	FLOW	7309.	6433.	5799.	5447.	4995.	4554.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP45	34.52	1	FLOW	7290.	6381.	5789.	5439.	4984.	4524.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	C3A2B	.51	1	FLOW	562.	503.	463.	440.	408.	375.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RC3A2B	.51	1	FLOW	556.	496.	456.	431.	397.	364.
				TIME	3.65	3.65	3.65	3.65	3.65	3.70
HYDROGRAPH AT										
+	C4BA1	.48	1	FLOW	216.	181.	159.	146.	129.	112.
				TIME	3.60	3.60	3.60	3.60	3.65	3.65
2 COMBINED AT										
+	CP46	.99	1	FLOW	769.	676.	614.	576.	526.	475.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
ROUTED TO										
+	RCP46	.99	1	FLOW	765.	669.	603.	570.	525.	479.
				TIME	3.70	3.70	3.70	3.75	3.75	3.75

HYDROGRAPH AT										
+	C3B1D	.25	1	FLOW	157.	132.	116.	107.	95.	82.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP47	1.24	1	FLOW	800.	699.	635.	600.	552.	503.
				TIME	3.70	3.70	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP47	1.24	1	FLOW	800.	699.	641.	607.	557.	505.
				TIME	3.75	3.80	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	C3B1C	.24	1	FLOW	263.	234.	214.	202.	186.	170.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	CP48	36.00	1	FLOW	7806.	6850.	6161.	5786.	5304.	4822.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
ROUTED TO										
+	RCP48	36.00	1	FLOW	7803.	6816.	6148.	5779.	5295.	4799.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	C3B1B	.21	1	FLOW	105.	89.	79.	73.	65.	57.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RC3B1B	.21	1	FLOW	105.	89.	79.	73.	64.	56.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C3B1A	.24	1	FLOW	126.	108.	96.	90.	80.	71.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
3 COMBINED AT										
+	CP49	36.46	1	FLOW	7925.	6922.	6238.	5863.	5371.	4867.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP49	36.46	1	FLOW	7899.	6889.	6232.	5855.	5351.	4837.
				TIME	3.95	4.00	4.00	4.00	4.00	4.05
HYDROGRAPH AT										
+	C3A2A	.47	1	FLOW	590.	531.	492.	469.	436.	404.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RC3A2A	.47	1	FLOW	585.	531.	491.	466.	430.	392.
				TIME	3.85	3.85	3.85	3.85	3.85	3.85
HYDROGRAPH AT										
+	C3A1B	1.02	1	FLOW	1023.	901.	818.	771.	705.	639.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP50	1.49	1	FLOW	1217.	1065.	961.	902.	821.	740.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RCP50	1.49	1	FLOW	1217.	1053.	949.	900.	824.	730.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	C3A1A	.37	1	FLOW	315.	276.	249.	234.	213.	191.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	CP51	38.32	1	FLOW	8773.	7644.	6897.	6473.	5895.	5328.
				TIME	3.90	3.95	3.95	3.95	3.95	4.00
HYDROGRAPH AT										
+	A-BASIN	.34	1	FLOW	223.	199.	183.	174.	161.	148.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C1-68	.36	1	FLOW	226.	200.	182.	172.	158.	144.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
ROUTED TO										
+	RC1-68	.36	1	FLOW	226.	200.	183.	172.	158.	144.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	C1-72	.45	1	FLOW	265.	231.	209.	196.	178.	160.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
2 COMBINED AT										
+	CP67	.81	1	FLOW	476.	418.	379.	356.	325.	294.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	C1-70	.34	1	FLOW	212.	189.	173.	164.	151.	138.
				TIME	3.75	3.75	3.75	3.75	3.75	3.80
ROUTED TO										
+	RC1-70	.34	1	FLOW	213.	189.	174.	165.	152.	139.
				TIME	3.85	3.85	3.85	3.85	3.85	3.85

HYDROGRAPH AT										
+	C1-71	.29	1	FLOW	136.	118.	106.	99.	90.	80.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP68	.63	1	FLOW	345.	304.	276.	260.	238.	216.
				TIME	3.80	3.80	3.80	3.80	3.80	3.85
ROUTED TO										
+	RCP68	.63	1	FLOW	345.	304.	276.	261.	239.	217.
				TIME	3.85	3.85	3.90	3.90	3.90	3.90
2 COMBINED AT										
+	CP69	1.44	1	FLOW	772.	677.	614.	577.	526.	475.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP69	1.44	1	FLOW	765.	677.	613.	577.	526.	475.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	C1-73	.32	1	FLOW	193.	170.	155.	146.	134.	122.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
2 COMBINED AT										
+	CP70	1.77	1	FLOW	947.	837.	760.	715.	653.	590.
				TIME	3.75	3.80	3.80	3.80	3.80	3.80
ROUTED TO										
+	RCP70	1.77	1	FLOW	947.	838.	761.	716.	654.	591.
				TIME	3.85	3.85	3.85	3.85	3.85	3.85
HYDROGRAPH AT										
+	C1-74	.19	1	FLOW	177.	158.	145.	138.	128.	117.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	CP71	1.96	1	FLOW	1018.	902.	819.	771.	705.	638.
				TIME	3.85	3.85	3.85	3.85	3.85	3.85
3 COMBINED AT										
+	C-1TOT0	40.62	1	FLOW	9960.	8649.	7816.	7344.	6696.	6019.
				TIME	3.90	3.95	3.95	3.95	3.95	4.00
ROUTED TO										
+	RC1TOT01	40.62	1	FLOW	9893.	8635.	7794.	7313.	6647.	6011.
				TIME	3.95	3.95	3.95	3.95	3.95	4.00
HYDROGRAPH AT										
+	ON5	.04	1	FLOW	36.	32.	30.	28.	26.	24.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	ATHEN2	.00	1	FLOW	5.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C1-TOT1	40.66	1	FLOW	9906.	8646.	7804.	7323.	6656.	6018.
				TIME	3.95	3.95	3.95	3.95	3.95	4.00
ROUTED TO										
+	RC1TOT12	40.66	1	FLOW	9904.	8633.	7784.	7300.	6653.	6006.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
HYDROGRAPH AT										
+	18OND-16	.00	1	FLOW	2.	2.	2.	2.	2.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	PK-3	.00	1	FLOW	1.	1.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-5	.01	1	FLOW	5.	4.	4.	4.	4.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	C-19OND5	.01	1	FLOW	9.	8.	7.	7.	6.	6.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
DIVERSION TO										
+	D19OND4	.01	1	FLOW	2.	2.	2.	2.	2.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	D19OND5	.01	1	FLOW	6.	6.	5.	5.	4.	4.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-18	.00	1	FLOW	4.	3.	3.	3.	3.	2.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-17	.01	1	FLOW	6.	6.	5.	5.	5.	4.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-1	.00	1	FLOW	4.	3.	3.	3.	3.	3.

				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	C-19OND1	.02	1	FLOW	20.	18.	16.	16.	14.	13.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-15	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	19OND-2	.00	1	FLOW	4.	4.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	19OND-3	.00	1	FLOW	3.	3.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-19OND1	.01	1	FLOW	10.	9.	8.	8.	7.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	DUMMYC-1	.03	1	FLOW	29.	26.	24.	23.	21.	20.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	LOOP1	.00	1	FLOW	6.	6.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C-LOOP1	.04	1	FLOW	35.	32.	29.	28.	26.	24.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DLOOP5	.04	1	FLOW	12.	11.	10.	10.	9.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	DLOOP1	.04	1	FLOW	23.	20.	19.	18.	17.	15.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RTC-LOOP	.04	1	FLOW	22.	20.	19.	18.	16.	15.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	LOOP-2	.00	1	FLOW	5.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	SC-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-LOOP2	.04	1	FLOW	28.	25.	23.	22.	21.	19.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	UPB-1	.01	1	FLOW	10.	9.	8.	8.	7.	6.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	RETD19ON	.00	1	FLOW	2.	2.	2.	2.	2.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	PARCEL18	.06	1	FLOW	35.	32.	29.	28.	26.	24.
				TIME	3.95	3.95	3.95	3.95	3.95	3.95
4 COMBINED AT										
+	DUMMYGC-	.12	1	FLOW	61.	54.	50.	48.	44.	41.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RTDUMMYG	.12	1	FLOW	59.	53.	48.	46.	43.	40.
				TIME	3.60	3.60	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	GC-1	.02	1	FLOW	16.	14.	13.	12.	11.	10.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT										
+	CGC-1	.14	1	FLOW	75.	67.	62.	59.	54.	50.
				TIME	3.60	3.60	3.60	3.60	3.60	3.65
HYDROGRAPH AT										
+	12OND-13	.00	1	FLOW	4.	4.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-1TOT2	40.80	1	FLOW	9962.	8685.	7832.	7346.	6695.	6045.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
ROUTED TO										
+	RC1TOT23	40.80	1	FLOW	9956.	8676.	7817.	7330.	6692.	6036.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00

HYDROGRAPH AT

+	UPB-2	.00	1	FLOW	5.	5.	4.	4.	4.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	11OND-1	.01	1	FLOW	8.	7.	6.	6.	5.	5.
				TIME	3.55	3.55	3.55	3.55	3.55	3.60
HYDROGRAPH AT										
+	11OND-2	.01	1	FLOW	8.	7.	6.	6.	5.	5.
				TIME	3.55	3.55	3.55	3.55	3.55	3.60
HYDROGRAPH AT										
+	ST-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	C-P11	.03	1	FLOW	22.	20.	18.	17.	15.	14.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	12OND-2	.01	1	FLOW	13.	11.	11.	10.	9.	8.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	C-12OND2	.04	1	FLOW	35.	31.	28.	27.	24.	22.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	C-1TOT3	40.84	1	FLOW	9969.	8687.	7828.	7340.	6699.	6042.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
ROUTED TO										
+	RC1TOT34	40.84	1	FLOW	9965.	8680.	7818.	7328.	6697.	6036.
				TIME	3.95	3.95	3.95	3.95	4.00	4.00
HYDROGRAPH AT										
+	J	.05	1	FLOW	42.	38.	34.	33.	30.	27.
				TIME	3.55	3.55	3.55	3.60	3.60	3.60
HYDROGRAPH AT										
+	K	.05	1	FLOW	51.	46.	42.	40.	37.	34.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	H	.08	1	FLOW	68.	61.	57.	54.	50.	46.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	I	.01	1	FLOW	10.	9.	8.	8.	7.	7.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
4 COMBINED AT										
+	C1	.19	1	FLOW	167.	150.	138.	131.	121.	112.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	F	.10	1	FLOW	39.	33.	29.	27.	23.	20.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	G	.00	1	FLOW	4.	4.	4.	4.	3.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	E	.10	1	FLOW	27.	21.	18.	16.	14.	12.
				TIME	3.70	3.70	3.70	3.70	3.70	4.95
3 COMBINED AT										
+	C2	.21	1	FLOW	68.	56.	49.	44.	38.	33.
				TIME	3.65	3.65	3.70	3.70	3.70	3.70
ROUTED TO										
+	RC2	.21	1	FLOW	68.	56.	49.	44.	38.	33.
				TIME	3.80	3.80	3.80	3.80	3.80	3.80
HYDROGRAPH AT										
+	PR	.02	1	FLOW	1.	1.	0.	0.	0.	0.
				TIME	4.90	4.90	4.90	4.95	4.95	5.00
HYDROGRAPH AT										
+	PC	.05	1	FLOW	52.	47.	44.	42.	39.	36.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	C2SITE	.28	1	FLOW	87.	73.	64.	59.	52.	45.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	P2	.01	1	FLOW	14.	13.	12.	12.	11.	11.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	SIT&P2	.29	1	FLOW	101.	86.	76.	71.	63.	56.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	A	.11	1	FLOW	67.	57.	51.	48.	43.	38.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55

HYDROGRAPH AT	B	.23	1	FLOW	85.	71.	61.	55.	48.	40.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT	DUMMYAB	.33	1	FLOW	146.	122.	107.	98.	86.	74.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT	C	.10	1	FLOW	21.	16.	13.	12.	11.	10.
+				TIME	3.65	3.65	4.95	4.95	4.95	4.95
2 COMBINED AT	C3	.43	1	FLOW	163.	135.	116.	106.	92.	78.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO	RC3	.43	1	FLOW	162.	130.	113.	106.	92.	78.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT	D	.08	1	FLOW	39.	33.	29.	27.	24.	21.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT	C4	.51	1	FLOW	201.	163.	142.	133.	116.	99.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO	RC4	.51	1	FLOW	195.	158.	138.	129.	113.	97.
+				TIME	3.60	3.60	3.65	3.65	3.65	3.65
HYDROGRAPH AT	P1	.01	1	FLOW	10.	9.	9.	8.	8.	7.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT	C4&P1	.51	1	FLOW	203.	166.	143.	134.	118.	101.
+				TIME	3.60	3.60	3.60	3.60	3.65	3.65
ROUTED TO	RCRP1	.51	1	FLOW	201.	162.	142.	134.	117.	98.
+				TIME	3.65	3.65	3.65	3.65	3.65	3.70
3 COMBINED AT	C5	1.00	1	FLOW	450.	382.	340.	316.	282.	248.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT	OFFD-7	.15	1	FLOW	152.	137.	127.	121.	113.	104.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT	C-9	1.15	1	FLOW	597.	514.	463.	433.	392.	349.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
2 COMBINED AT	C-1TOT4	42.00	1	FLOW	10275.	8951.	8063.	7558.	6887.	6208.
+				TIME	3.95	3.95	3.95	3.95	4.00	4.00
ROUTED TO	RC1TOT45	42.00	1	FLOW	10264.	8925.	8027.	7536.	6878.	6183.
+				TIME	3.95	3.95	3.95	4.00	4.00	4.00
HYDROGRAPH AT	17OND-1	.01	1	FLOW	9.	8.	7.	7.	7.	6.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO	RT17OND1	.01	1	FLOW	9.	8.	7.	7.	6.	6.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT	12OND-1	.00	1	FLOW	4.	3.	3.	3.	3.	2.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT	C-12OND1	.01	1	FLOW	12.	11.	10.	9.	9.	8.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO	RTC-12ON	.01	1	FLOW	12.	11.	10.	9.	9.	8.
+				TIME	3.60	3.60	3.65	3.65	3.65	3.65
HYDROGRAPH AT	6COND-1	.00	1	FLOW	3.	3.	3.	3.	2.	2.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO	RT6COND1	.00	1	FLOW	3.	3.	3.	3.	2.	2.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT	6COND-2	.00	1	FLOW	3.	3.	3.	3.	2.	2.
+				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT	C-6COND2	.02	1	FLOW	18.	16.	14.	14.	13.	11.
+				TIME	3.60	3.60	3.60	3.60	3.60	3.60

DIVERSION TO										
+	DGC4	.02	1	FLOW	18.	16.	14.	14.	13.	11.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	DC-6COND	.02	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	14OND-1	.00	1	FLOW	4.	4.	4.	3.	3.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	14OND-2	.00	1	FLOW	4.	4.	4.	3.	3.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	DUMMYC-1	.03	1	FLOW	9.	8.	7.	7.	6.	6.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RTDUMMYC	.03	1	FLOW	9.	8.	7.	7.	6.	6.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	14OND-3	.01	1	FLOW	11.	10.	9.	9.	8.	8.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	14OND-4	.01	1	FLOW	8.	7.	7.	6.	6.	5.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	C-14OND3	.05	1	FLOW	28.	25.	23.	22.	20.	18.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	24OND-2	.01	1	FLOW	13.	12.	11.	10.	10.	9.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RT24OND2	.01	1	FLOW	13.	12.	11.	10.	10.	9.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	13OND-1	.00	1	FLOW	3.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	LOOP-3	.00	1	FLOW	4.	3.	3.	3.	3.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	C-LOOP3	.02	1	FLOW	17.	16.	14.	14.	13.	12.
				TIME	3.55	3.55	3.55	3.55	3.60	3.55
HYDROGRAPH AT										
+	OFFD-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RT-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	OFFD-2	.00	1	FLOW	1.	1.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	COMB-1	.00	1	FLOW	2.	2.	1.	1.	1.	1.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RT-2	.00	1	FLOW	2.	2.	1.	1.	1.	1.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	ONDEV-1	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	D.I.	.01	1	FLOW	5.	4.	4.	4.	4.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RTCLUB	.01	1	FLOW	5.	4.	4.	4.	3.	3.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
HYDROGRAPH AT										
+	RETGC4	.00	1	FLOW	18.	16.	14.	14.	13.	11.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
ROUTED TO										
+	RTDGC4	.00	1	FLOW	17.	16.	14.	13.	12.	11.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
HYDROGRAPH AT										
+	GC-4	.02	1	FLOW	12.	11.	10.	9.	8.	7.

				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RTGC4	.02	1	FLOW	12.	10.	9.	9.	8.	7.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	GC-5	.03	1	FLOW	26.	23.	20.	19.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT										
+	C-GC5	.06	1	FLOW	50.	44.	39.	36.	33.	29.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	P6.9.10	.05	1	FLOW	37.	33.	31.	29.	27.	25.
				TIME	3.70	3.70	3.70	3.70	3.70	3.70
4 COMBINED AT										
+	DUMMY8X4	.18	1	FLOW	126.	111.	101.	95.	87.	79.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	ATHEN1	.01	1	FLOW	9.	8.	8.	8.	7.	7.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	OFFD-3	.00	1	FLOW	6.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C-1A	.01	1	FLOW	14.	13.	13.	12.	12.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	OND-4	.00	1	FLOW	2.	2.	2.	2.	2.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RT-4	.00	1	FLOW	2.	2.	2.	2.	1.	1.
				TIME	3.60	3.60	3.60	3.60	3.65	3.65
HYDROGRAPH AT										
+	OND-3	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	4.85	4.85	4.90	4.90	5.45	.00
HYDROGRAPH AT										
+	OND-1	.00	1	FLOW	3.	2.	2.	2.	2.	2.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
3 COMBINED AT										
+	C-3	.01	1	FLOW	4.	4.	4.	3.	3.	3.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RT-5	.01	1	FLOW	4.	4.	4.	3.	3.	3.
				TIME	3.65	3.65	3.65	3.65	3.65	3.65
HYDROGRAPH AT										
+	OND-6	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	OND-5	.01	1	FLOW	2.	2.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RT-6	.01	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.65	3.65	3.70	3.70	3.75	3.75
2 COMBINED AT										
+	DUMMY56	.01	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.65	3.65	3.70	3.70	3.75	3.75
HYDROGRAPH AT										
+	OND-7	.00	1	FLOW	4.	4.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	OND-2	.00	1	FLOW	3.	3.	3.	2.	2.	2.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
4 COMBINED AT										
+	C-4	.02	1	FLOW	10.	9.	8.	8.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	OND-8	.00	1	FLOW	1.	1.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RT-7	.00	1	FLOW	1.	1.	0.	0.	0.	0.
				TIME	3.55	3.55	3.55	3.55	3.55	3.60
HYDROGRAPH AT										
+	OND-10	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										

+	RT-8	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.55	3.55	3.55	3.55	3.60	3.60
HYDROGRAPH AT										
+	OND-9	.00	1	FLOW	6.	5.	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-5	.01	1	FLOW	8.	7.	6.	6.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-6	.04	1	FLOW	32.	29.	27.	26.	24.	22.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C-1TOT5	42.22	1	FLOW	10339.	8992.	8089.	7589.	6927.	6228.
				TIME	3.95	3.95	3.95	4.00	4.00	4.00
ROUTED TO										
+	RC1TOT56	42.22	1	FLOW	10330.	8979.	8073.	7587.	6921.	6215.
				TIME	3.95	3.95	3.95	4.00	4.00	4.00
HYDROGRAPH AT										
+	PARCEL	.05	1	FLOW	63.	57.	53.	50.	47.	44.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	C-1TOT6	42.27	1	FLOW	10348.	8996.	8088.	7598.	6931.	6225.
				TIME	3.95	3.95	3.95	4.00	4.00	4.00
ROUTED TO										
+	RC1TOT76	42.27	1	FLOW	10342.	8985.	8081.	7596.	6925.	6215.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	RETDLOOP	.00	1	FLOW	12.	11.	10.	10.	9.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	SC-1	.00	1	FLOW	2.	2.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	LOOP-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	DUMMYC-L	.00	1	FLOW	15.	14.	13.	12.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RTDUMMYC	.00	1	FLOW	15.	13.	12.	12.	11.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	23OND-7	.00	1	FLOW	5.	4.	4.	4.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C-23OND7	.01	1	FLOW	19.	18.	16.	15.	14.	13.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RTC-	.01	1	FLOW	19.	17.	16.	15.	14.	13.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	23OND-8	.01	1	FLOW	13.	12.	11.	10.	10.	9.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
2 COMBINED AT										
+	C-23OND8	.02	1	FLOW	32.	29.	27.	25.	24.	22.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
ROUTED TO										
+	RTC-23ON	.02	1	FLOW	32.	28.	26.	25.	23.	21.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	LOOP-4	.00	1	FLOW	3.	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C-LOOP4A	.02	1	FLOW	34.	30.	28.	27.	25.	23.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
DIVERSION TO										
+	DGC8	.02	1	FLOW	19.	17.	16.	15.	14.	13.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	DC-LOOP4	.02	1	FLOW	15.	13.	12.	12.	11.	10.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
HYDROGRAPH AT										
+	24OND-1	.01	1	FLOW	14.	13.	12.	11.	10.	9.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55

+ 2 COMBINED AT	C-LOOP4B	.04	1	FLOW	29.	26.	24.	23.	21.	19.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ HYDROGRAPH AT	RETDC-LO	.00	1	FLOW	19.	17.	16.	15.	14.	13.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ HYDROGRAPH AT	DEVOFBA1	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	4.80	4.80	4.80
+ HYDROGRAPH AT	DEVONBA1	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	DEVONBA2	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
+ HYDROGRAPH AT	DEVONBA3	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
+ 4 COMBINED AT	COM1	.00	1	FLOW	3.	3.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
+ ROUTED TO	RTMAIN	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.55	3.60	3.60	3.60	3.60	3.60
+ HYDROGRAPH AT	GC-7	.03	1	FLOW	24.	21.	19.	17.	16.	14.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ HYDROGRAPH AT	GC-8	.03	1	FLOW	19.	17.	15.	14.	13.	11.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ 5 COMBINED AT	C-GC8	.10	1	FLOW	94.	83.	75.	71.	65.	59.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ HYDROGRAPH AT	5OND-1	.01	1	FLOW	8.	7.	7.	6.	6.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
+ 2 COMBINED AT	C-GC9	.11	1	FLOW	101.	89.	82.	77.	71.	64.
				TIME	3.55	3.55	3.55	3.55	3.55	3.55
+ HYDROGRAPH AT	P5GC	.09	1	FLOW	72.	65.	59.	56.	52.	48.
				TIME	3.60	3.60	3.60	3.60	3.60	3.60
+ 3 COMBINED AT	C-1TOT7	42.47	1	FLOW	10410.	9046.	8130.	7642.	6968.	6255.
				TIME	3.95	3.95	4.00	4.00	4.00	4.00

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RDB1	MANE	3.00	196.21	339.00	1.25	3.00	196.21	339.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2704E+03 EXCESS= .0000E+00 OUTFLOW= .2684E+03 BASIN STORAGE= .2108E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RDB1	MANE	3.00	187.64	333.00	1.17	3.00	187.64	333.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2517E+03 EXCESS= .0000E+00 OUTFLOW= .2498E+03 BASIN STORAGE= .1913E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RDB1	MANE	3.00	181.59	333.00	1.10	3.00	181.59	333.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2379E+03 EXCESS= .0000E+00 OUTFLOW= .2362E+03 BASIN STORAGE= .1755E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RDB1	MANE	3.00	177.98	333.00	1.06	3.00	177.98	333.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2293E+03 EXCESS= .0000E+00 OUTFLOW= .2277E+03 BASIN STORAGE= .1648E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RDB1	MANE	3.00	172.52	327.00	1.01	3.00	172.52	327.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2169E+03 EXCESS= .0000E+00 OUTFLOW= .2155E+03 BASIN STORAGE= .1493E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB1	MANE	3.00	166.40	330.00	.94	3.00	166.40	330.00	.94	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2033E+03 EXCESS= .0000E+00 OUTFLOW= .2021E+03 BASIN STORAGE= .1307E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.53	391.53	237.45	1.27	3.00	391.29	237.00	1.27	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3015E+03 EXCESS= .0000E+00 OUTFLOW= .3011E+03 BASIN STORAGE= .3778E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.57	355.37	237.00	1.17	3.00	355.37	237.00	1.17	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2788E+03 EXCESS= .0000E+00 OUTFLOW= .2785E+03 BASIN STORAGE= .3433E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.60	330.79	238.07	1.10	3.00	330.44	237.00	1.10	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2624E+03 EXCESS= .0000E+00 OUTFLOW= .2621E+03 BASIN STORAGE= .3155E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.62	316.72	237.48	1.06	3.00	316.37	237.00	1.06	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2523E+03 EXCESS= .0000E+00 OUTFLOW= .2520E+03 BASIN STORAGE= .2965E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.64	297.04	238.01	1.00	3.00	296.70	240.00	1.00	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2379E+03 EXCESS= .0000E+00 OUTFLOW= .2377E+03 BASIN STORAGE= .2695E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP2	MANE	1.67	276.73	240.64	.93	3.00	276.62	240.00	.93	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2225E+03 EXCESS= .0000E+00 OUTFLOW= .2222E+03 BASIN STORAGE= .2359E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	529.74	222.00	1.28	3.00	529.74	222.00	1.28	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3248E+03 EXCESS= .0000E+00 OUTFLOW= .3237E+03 BASIN STORAGE= .1098E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	475.09	222.00	1.18	3.00	475.09	222.00	1.18	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2994E+03 EXCESS= .0000E+00 OUTFLOW= .2984E+03 BASIN STORAGE= .9989E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	438.03	222.00	1.11	3.00	438.03	222.00	1.11	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2812E+03 EXCESS= .0000E+00 OUTFLOW= .2803E+03 BASIN STORAGE= .9192E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	416.41	222.00	1.07	3.00	416.41	222.00	1.07	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2701E+03 EXCESS= .0000E+00 OUTFLOW= .2693E+03 BASIN STORAGE= .8632E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	386.40	222.00	1.00	3.00	386.40	222.00	1.00	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2543E+03 EXCESS= .0000E+00 OUTFLOW= .2536E+03 BASIN STORAGE= .7862E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP3	MANE	3.00	356.13	222.00	.94	3.00	356.13	222.00	.94	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2373E+03 EXCESS= .0000E+00 OUTFLOW= .2366E+03 BASIN STORAGE= .6893E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	1186.07	219.00	1.31	3.00	1186.07	219.00	1.31	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3846E+03 EXCESS= .0000E+00 OUTFLOW= .3831E+03 BASIN STORAGE= .1623E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	1058.84	219.00	1.20	3.00	1058.84	219.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3521E+03 EXCESS= .0000E+00 OUTFLOW= .3508E+03 BASIN STORAGE= .1478E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	972.18	219.00	1.13	3.00	972.18	219.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3291E+03 EXCESS= .0000E+00 OUTFLOW= .3280E+03 BASIN STORAGE= .1363E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	921.55	219.00	1.08	3.00	921.55	219.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3154E+03 EXCESS= .0000E+00 OUTFLOW= .3142E+03 BASIN STORAGE= .1280E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	850.72	219.00	1.01	3.00	850.72	219.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2958E+03 EXCESS= .0000E+00 OUTFLOW= .2947E+03 BASIN STORAGE= .1170E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP4	MANE	3.00	778.67	219.00	.94	3.00	778.67	219.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2751E+03 EXCESS= .0000E+00 OUTFLOW= .2741E+03 BASIN STORAGE= .1026E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	610.90	219.00	1.34	3.00	610.90	219.00	1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5233E+02 EXCESS= .0000E+00 OUTFLOW= .5234E+02 BASIN STORAGE= .4986E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	537.22	219.00	1.16	3.00	537.22	219.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4551E+02 EXCESS= .0000E+00 OUTFLOW= .4552E+02 BASIN STORAGE= .4447E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	487.19	219.00	1.05	3.00	487.19	219.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4096E+02 EXCESS= .0000E+00 OUTFLOW= .4097E+02 BASIN STORAGE= .4276E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	458.23	219.00	.98	3.00	458.23	219.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3836E+02 EXCESS= .0000E+00 OUTFLOW= .3837E+02 BASIN STORAGE= .6359E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	418.20	219.00	.89	3.00	418.20	219.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3482E+02 EXCESS= .0000E+00 OUTFLOW= .3483E+02 BASIN STORAGE= .6131E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

C5ICB	MANE	3.00	377.60	219.00	.80	3.00	377.60	219.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3128E+02 EXCESS= .0000E+00 OUTFLOW= .3129E+02 BASIN STORAGE= .5271E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	306.98	375.00	.92	3.00	306.98	375.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4682E+03 EXCESS= .0000E+00 OUTFLOW= .4668E+03 BASIN STORAGE= .1473E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	293.15	375.00	.87	3.00	293.15	375.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4414E+03 EXCESS= .0000E+00 OUTFLOW= .4401E+03 BASIN STORAGE= .1392E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	282.69	375.00	.83	3.00	282.69	375.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4221E+03 EXCESS= .0000E+00 OUTFLOW= .4208E+03 BASIN STORAGE= .1327E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	276.70	375.00	.81	3.00	276.70	375.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4101E+03 EXCESS= .0000E+00 OUTFLOW= .4088E+03 BASIN STORAGE= .1285E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	268.52	375.00	.77	3.00	268.52	375.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3929E+03 EXCESS= .0000E+00 OUTFLOW= .3916E+03 BASIN STORAGE= .1228E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB2	MANE	3.00	258.13	375.00	.74	3.00	258.13	375.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3744E+03 EXCESS= .0000E+00 OUTFLOW= .3733E+03 BASIN STORAGE= .1169E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	192.92	243.00	.92	3.00	192.92	243.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2554E+02 EXCESS= .0000E+00 OUTFLOW= .2557E+02 BASIN STORAGE= .1695E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	163.33	243.00	.78	3.00	163.33	243.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2170E+02 EXCESS= .0000E+00 OUTFLOW= .2172E+02 BASIN STORAGE= .1799E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	143.14	243.00	.69	3.00	143.14	243.00	.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1917E+02 EXCESS= .0000E+00 OUTFLOW= .1919E+02 BASIN STORAGE= .1637E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	132.06	243.00	.64	3.00	132.06	243.00	.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1774E+02 EXCESS= .0000E+00 OUTFLOW= .1776E+02 BASIN STORAGE= .1796E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	117.47	246.00	.57	3.00	117.47	246.00	.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1581E+02 EXCESS= .0000E+00 OUTFLOW= .1583E+02 BASIN STORAGE= .1707E-01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RG2B1	MANE	3.00	103.14	249.00	.50	3.00	103.14	249.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1390E+02 EXCESS= .0000E+00 OUTFLOW= .1394E+02 BASIN STORAGE= .1756E-01 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RC1G2A	MANE	3.00	225.49	228.00	1.20	3.00	225.49	228.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2214E+02 EXCESS= .0000E+00 OUTFLOW= .2215E+02 BASIN STORAGE= .1190E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC1G2A	MANE	3.00	197.64	228.00	1.04	3.00	197.64	228.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1918E+02 EXCESS= .0000E+00 OUTFLOW= .1920E+02 BASIN STORAGE= .1138E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC1G2A	MANE	3.00	178.46	228.00	.93	3.00	178.46	228.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1722E+02 EXCESS= .0000E+00 OUTFLOW= .1723E+02 BASIN STORAGE= .1527E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC1G2A	MANE	3.00	167.29	228.00	.87	3.00	167.29	228.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1610E+02 EXCESS= .0000E+00 OUTFLOW= .1611E+02 BASIN STORAGE= .1211E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC1G2A	MANE	3.00	151.61	228.00	.79	3.00	151.61	228.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1457E+02 EXCESS= .0000E+00 OUTFLOW= .1458E+02 BASIN STORAGE= .1159E-01 PERCENT ERROR= -.2

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 FOR PLAN = 1  RATIO=  .00
   RC1G2A  MANE        3.00    135.42    228.00       .71      3.00    135.42    228.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1305E+02 EXCESS= .0000E+00 OUTFLOW= .1306E+02 BASIN STORAGE= .1522E-01 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    692.91    270.00       .90      3.00    692.91    270.00         .90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5406E+03 EXCESS= .0000E+00 OUTFLOW= .5386E+03 BASIN STORAGE= .2456E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    622.82    324.00       .84      3.00    622.82    324.00         .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5014E+03 EXCESS= .0000E+00 OUTFLOW= .4993E+03 BASIN STORAGE= .2355E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    575.45    324.00       .79      3.00    575.45    324.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4740E+03 EXCESS= .0000E+00 OUTFLOW= .4720E+03 BASIN STORAGE= .2278E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    549.58    327.00       .76      3.00    549.58    327.00         .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4575E+03 EXCESS= .0000E+00 OUTFLOW= .4556E+03 BASIN STORAGE= .2225E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    513.99    327.00       .72      3.00    513.99    327.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4342E+03 EXCESS= .0000E+00 OUTFLOW= .4323E+03 BASIN STORAGE= .2152E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
     RCP7  MANE        3.00    478.10    327.00       .68      3.00    478.10    327.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4097E+03 EXCESS= .0000E+00 OUTFLOW= .4079E+03 BASIN STORAGE= .2077E+01 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.04    502.42    209.71      1.54      3.00    502.00    210.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3389E+02 EXCESS= .0000E+00 OUTFLOW= .3390E+02 BASIN STORAGE= .3596E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.13    447.84    210.94      1.35      3.00    440.44    210.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2980E+02 EXCESS= .0000E+00 OUTFLOW= .2980E+02 BASIN STORAGE= .3335E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.20    407.86    211.67      1.23      3.00    405.50    210.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2715E+02 EXCESS= .0000E+00 OUTFLOW= .2716E+02 BASIN STORAGE= .3419E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.25    385.92    211.71      1.16      3.00    383.75    210.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2563E+02 EXCESS= .0000E+00 OUTFLOW= .2563E+02 BASIN STORAGE= .2765E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.32    356.08    211.50      1.06      3.00    351.48    210.00        1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2345E+02 EXCESS= .0000E+00 OUTFLOW= .2346E+02 BASIN STORAGE= .4015E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RC1NA  MANE        2.41    324.99    211.74       .97      3.00    322.13    210.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2135E+02 EXCESS= .0000E+00 OUTFLOW= .2136E+02 BASIN STORAGE= .3141E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP8   MANE        2.10    884.38    279.70       .92      3.00    882.47    279.00         .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5719E+03 EXCESS= .0000E+00 OUTFLOW= .5706E+03 BASIN STORAGE= .1552E+01 PERCENT ERROR=    .0
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          FOR PLAN = 1  RATIO=  .00
             RCP8   MANE          2.21    781.98    278.65       .85      3.00    781.45    279.00         .85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5290E+03 EXCESS= .0000E+00 OUTFLOW= .5277E+03 BASIN STORAGE= .1487E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP8   MANE          2.29    715.63    279.64       .80      3.00    711.52    291.00         .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4985E+03 EXCESS= .0000E+00 OUTFLOW= .4973E+03 BASIN STORAGE= .1439E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP8   MANE          2.34    677.39    290.26       .78      3.00    676.09    291.00         .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4808E+03 EXCESS= .0000E+00 OUTFLOW= .4796E+03 BASIN STORAGE= .1406E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP8   MANE          2.42    625.83    289.86       .73      3.00    625.03    291.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4552E+03 EXCESS= .0000E+00 OUTFLOW= .4540E+03 BASIN STORAGE= .1360E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP8   MANE          2.50    572.18    290.32       .69      3.00    571.83    291.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4291E+03 EXCESS= .0000E+00 OUTFLOW= .4279E+03 BASIN STORAGE= .1313E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00    146.30    213.00      1.73      3.00    146.30    213.00        1.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1022E+02 EXCESS= .0000E+00 OUTFLOW= .1023E+02 BASIN STORAGE= .3476E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00    131.44    213.00      1.53      3.00    131.44    213.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9042E+01 EXCESS= .0000E+00 OUTFLOW= .9046E+01 BASIN STORAGE= .3358E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00    121.22    213.00      1.40      3.00    121.22    213.00        1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8247E+01 EXCESS= .0000E+00 OUTFLOW= .8252E+01 BASIN STORAGE= .3271E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00    115.22    213.00      1.32      3.00    115.22    213.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7790E+01 EXCESS= .0000E+00 OUTFLOW= .7791E+01 BASIN STORAGE= .4119E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00    106.90    213.00      1.21      3.00    106.90    213.00        1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7161E+01 EXCESS= .0000E+00 OUTFLOW= .7162E+01 BASIN STORAGE= .4037E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RC5GC  MANE          3.00     98.37    213.00      1.11      3.00     98.37    213.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6528E+01 EXCESS= .0000E+00 OUTFLOW= .6529E+01 BASIN STORAGE= .3949E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9   MANE          3.00    465.65    216.00      1.68      3.00    465.65    216.00        1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3895E+02 EXCESS= .0000E+00 OUTFLOW= .3896E+02 BASIN STORAGE= .4586E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9   MANE          3.00    415.04    216.00      1.48      3.00    415.04    216.00        1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3437E+02 EXCESS= .0000E+00 OUTFLOW= .3438E+02 BASIN STORAGE= .6498E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9   MANE          3.00    380.33    216.00      1.35      3.00    380.33    216.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3129E+02 EXCESS= .0000E+00 OUTFLOW= .3131E+02 BASIN STORAGE= .6256E-02 PERCENT ERROR=   -.1
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FOR PLAN = 1 RATIO= .00
RCP9 MANE 3.00 358.04 216.00 1.27 3.00 358.04 216.00 1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2952E+02 EXCESS= .0000E+00 OUTFLOW= .2953E+02 BASIN STORAGE= .5896E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP9 MANE 3.00 329.68 216.00 1.17 3.00 329.68 216.00 1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2709E+02 EXCESS= .0000E+00 OUTFLOW= .2710E+02 BASIN STORAGE= .5720E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP9 MANE 3.00 300.74 216.00 1.06 3.00 300.74 216.00 1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2465E+02 EXCESS= .0000E+00 OUTFLOW= .2466E+02 BASIN STORAGE= .5534E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 530.02 219.00 1.28 3.00 530.02 219.00 1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4845E+02 EXCESS= .0000E+00 OUTFLOW= .4847E+02 BASIN STORAGE= .5788E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 462.99 219.00 1.12 3.00 462.99 219.00 1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4218E+02 EXCESS= .0000E+00 OUTFLOW= .4220E+02 BASIN STORAGE= .7163E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 417.40 219.00 1.01 3.00 417.40 219.00 1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3801E+02 EXCESS= .0000E+00 OUTFLOW= .3803E+02 BASIN STORAGE= .6420E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 391.99 219.00 .94 3.00 391.99 219.00 .94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3563E+02 EXCESS= .0000E+00 OUTFLOW= .3564E+02 BASIN STORAGE= .6547E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 357.63 222.00 .86 3.00 357.63 222.00 .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3239E+02 EXCESS= .0000E+00 OUTFLOW= .3240E+02 BASIN STORAGE= .6056E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 325.61 222.00 .77 3.00 325.61 222.00 .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2916E+02 EXCESS= .0000E+00 OUTFLOW= .2917E+02 BASIN STORAGE= .5717E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 530.58 222.00 1.28 3.00 530.58 222.00 1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4847E+02 EXCESS= .0000E+00 OUTFLOW= .4849E+02 BASIN STORAGE= .7557E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 463.68 222.00 1.12 3.00 463.68 222.00 1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4220E+02 EXCESS= .0000E+00 OUTFLOW= .4221E+02 BASIN STORAGE= .6292E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 416.74 225.00 1.01 3.00 416.74 225.00 1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3803E+02 EXCESS= .0000E+00 OUTFLOW= .3804E+02 BASIN STORAGE= .5874E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 397.05 225.00 .94 3.00 397.05 225.00 .94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3564E+02 EXCESS= .0000E+00 OUTFLOW= .3566E+02 BASIN STORAGE= .6146E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP10 MANE 3.00 367.15 225.00 .86 3.00 367.15 225.00 .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3240E+02 EXCESS= .0000E+00 OUTFLOW= .3242E+02 BASIN STORAGE= .5827E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP10	MANE	3.00	335.36	225.00	.77	3.00	335.36	225.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2917E+02 EXCESS= .0000E+00 OUTFLOW= .2919E+02 BASIN STORAGE= .5553E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	101.96	240.00	.59	3.00	101.96	240.00	.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1404E+02 EXCESS= .0000E+00 OUTFLOW= .1404E+02 BASIN STORAGE= .6331E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	81.93	243.00	.48	3.00	81.93	243.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1146E+02 EXCESS= .0000E+00 OUTFLOW= .1147E+02 BASIN STORAGE= .6272E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	68.74	243.00	.41	3.00	68.74	243.00	.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9796E+01 EXCESS= .0000E+00 OUTFLOW= .9804E+01 BASIN STORAGE= .5664E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	61.53	243.00	.37	3.00	61.53	243.00	.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8868E+01 EXCESS= .0000E+00 OUTFLOW= .8876E+01 BASIN STORAGE= .7050E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	51.85	246.00	.32	3.00	51.85	246.00	.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7629E+01 EXCESS= .0000E+00 OUTFLOW= .7638E+01 BASIN STORAGE= .7022E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC5GD	MANE	3.00	45.23	315.00	.27	3.00	45.23	315.00	.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6442E+01 EXCESS= .0000E+00 OUTFLOW= .6451E+01 BASIN STORAGE= .6191E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP11	MANE	2.56	630.45	225.07	1.06	3.00	629.18	225.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7472E+02 EXCESS= .0000E+00 OUTFLOW= .7473E+02 BASIN STORAGE= .3933E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP11	MANE	2.70	540.60	226.99	.92	3.00	537.60	225.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6425E+02 EXCESS= .0000E+00 OUTFLOW= .6426E+02 BASIN STORAGE= .4264E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP11	MANE	2.82	485.82	225.54	.82	3.00	484.23	228.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5736E+02 EXCESS= .0000E+00 OUTFLOW= .5737E+02 BASIN STORAGE= .4078E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP11	MANE	2.89	462.07	228.12	.76	3.00	461.42	228.00	.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5351E+02 EXCESS= .0000E+00 OUTFLOW= .5352E+02 BASIN STORAGE= .4696E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP11	MANE	3.00	423.76	227.82	.69	3.00	421.84	228.00	.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4818E+02 EXCESS= .0000E+00 OUTFLOW= .4818E+02 BASIN STORAGE= .4027E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP11	MANE	3.00	380.70	228.00	.61	3.00	380.70	228.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4294E+02 EXCESS= .0000E+00 OUTFLOW= .4295E+02 BASIN STORAGE= .4614E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	688.27	231.00	1.08	3.00	688.27	231.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8194E+02 EXCESS= .0000E+00 OUTFLOW= .8196E+02 BASIN STORAGE= .1000E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	605.56	231.00	.93	3.00	605.56	231.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7044E+02 EXCESS= .0000E+00 OUTFLOW= .7045E+02 BASIN STORAGE= .8592E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	535.70	231.00	.83	3.00	535.70	231.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6294E+02 EXCESS= .0000E+00 OUTFLOW= .6296E+02 BASIN STORAGE= .8247E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	500.64	231.00	.78	3.00	500.64	231.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5878E+02 EXCESS= .0000E+00 OUTFLOW= .5879E+02 BASIN STORAGE= .7760E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	460.15	234.00	.70	3.00	460.15	234.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5291E+02 EXCESS= .0000E+00 OUTFLOW= .5293E+02 BASIN STORAGE= .7854E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12	MANE	3.00	419.41	234.00	.62	3.00	419.41	234.00	.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4719E+02 EXCESS= .0000E+00 OUTFLOW= .4721E+02 BASIN STORAGE= .9111E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	2.78	355.18	213.92	.91	3.00	348.04	213.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2522E+02 EXCESS= .0000E+00 OUTFLOW= .2522E+02 BASIN STORAGE= .3789E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	2.97	301.82	213.90	.77	3.00	293.47	213.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2132E+02 EXCESS= .0000E+00 OUTFLOW= .2133E+02 BASIN STORAGE= .3725E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	3.00	270.32	213.00	.68	3.00	270.32	213.00	.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1874E+02 EXCESS= .0000E+00 OUTFLOW= .1875E+02 BASIN STORAGE= .4843E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	3.00	248.52	213.00	.63	3.00	248.52	213.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1729E+02 EXCESS= .0000E+00 OUTFLOW= .1729E+02 BASIN STORAGE= .4723E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	3.00	218.78	213.00	.55	3.00	218.78	213.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1533E+02 EXCESS= .0000E+00 OUTFLOW= .1533E+02 BASIN STORAGE= .4550E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1B	MANE	2.70	187.85	213.30	.48	3.00	184.65	216.00	.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1339E+02 EXCESS= .0000E+00 OUTFLOW= .1340E+02 BASIN STORAGE= .4216E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	430.07	216.00	.97	3.00	430.07	216.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3292E+02 EXCESS= .0000E+00 OUTFLOW= .3294E+02 BASIN STORAGE= .7154E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	366.27	219.00	.83	3.00	366.27	219.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2802E+02 EXCESS= .0000E+00 OUTFLOW= .2803E+02 BASIN STORAGE= .7359E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	341.48	219.00	.73	3.00	341.48	219.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2474E+02 EXCESS= .0000E+00 OUTFLOW= .2476E+02 BASIN STORAGE= .6928E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	316.47	219.00	.68	3.00	316.47	219.00	.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2289E+02 EXCESS= .0000E+00 OUTFLOW= .2290E+02 BASIN STORAGE= .8591E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	282.79	219.00	.60	3.00	282.79	219.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2039E+02 EXCESS= .0000E+00 OUTFLOW= .2041E+02 BASIN STORAGE= .8355E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP13	MANE	3.00	243.48	219.00	.53	3.00	243.48	219.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1795E+02 EXCESS= .0000E+00 OUTFLOW= .1796E+02 BASIN STORAGE= .7552E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP14	MANE	1.65	921.91	219.90	.94	3.00	916.66	219.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1105E+03 EXCESS= .0000E+00 OUTFLOW= .1105E+03 BASIN STORAGE= .3400E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14	MANE	1.77	773.76	219.61	.81	3.00	764.47	219.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9468E+02 EXCESS= .0000E+00 OUTFLOW= .9468E+02 BASIN STORAGE= .3417E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14	MANE	1.85	691.20	220.73	.72	3.00	677.25	222.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8427E+02 EXCESS= .0000E+00 OUTFLOW= .8428E+02 BASIN STORAGE= .3410E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14	MANE	1.92	635.43	220.53	.67	3.00	625.86	222.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7845E+02 EXCESS= .0000E+00 OUTFLOW= .7845E+02 BASIN STORAGE= .2816E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14	MANE	2.01	562.36	221.44	.60	3.00	558.54	222.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7037E+02 EXCESS= .0000E+00 OUTFLOW= .7037E+02 BASIN STORAGE= .2909E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14	MANE	2.13	487.77	221.96	.53	3.00	487.59	222.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6248E+02 EXCESS= .0000E+00 OUTFLOW= .6249E+02 BASIN STORAGE= .2838E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	960.20	222.00	.95	3.00	960.20	222.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1149E+03 EXCESS= .0000E+00 OUTFLOW= .1149E+03 BASIN STORAGE= .6202E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	804.47	222.00	.81	3.00	804.47	222.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9849E+02 EXCESS= .0000E+00 OUTFLOW= .9851E+02 BASIN STORAGE= .7362E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	708.58	222.00	.72	3.00	708.58	222.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8768E+02 EXCESS= .0000E+00 OUTFLOW= .8769E+02 BASIN STORAGE= .6606E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	655.90	225.00	.67	3.00	655.90	225.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8163E+02 EXCESS= .0000E+00 OUTFLOW= .8164E+02 BASIN STORAGE= .6493E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	589.81	225.00	.61	3.00	589.81	225.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7324E+02 EXCESS= .0000E+00 OUTFLOW= .7325E+02 BASIN STORAGE= .6603E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15	MANE	3.00	512.37	225.00	.54	3.00	512.37	225.00	.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6504E+02 EXCESS= .0000E+00 OUTFLOW= .6505E+02 BASIN STORAGE= .6121E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	49.43	222.00	1.45	3.00	49.43	222.00	1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4962E+01 EXCESS= .0000E+00 OUTFLOW= .4964E+01 BASIN STORAGE= .2729E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	43.46	222.00	1.26	3.00	43.46	222.00	1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4334E+01 EXCESS= .0000E+00 OUTFLOW= .4335E+01 BASIN STORAGE= .2483E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	39.42	222.00	1.14	3.00	39.42	222.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3914E+01 EXCESS= .0000E+00 OUTFLOW= .3915E+01 BASIN STORAGE= .2322E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	37.09	222.00	1.07	3.00	37.09	222.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3674E+01 EXCESS= .0000E+00 OUTFLOW= .3675E+01 BASIN STORAGE= .2262E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	33.87	222.00	.98	3.00	33.87	222.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3346E+01 EXCESS= .0000E+00 OUTFLOW= .3347E+01 BASIN STORAGE= .2829E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5I1C	MANE	3.00	30.60	222.00	.88	3.00	30.60	222.00	.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3017E+01 EXCESS= .0000E+00 OUTFLOW= .3018E+01 BASIN STORAGE= .2711E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP16	MANE	2.80	219.12	218.60	1.25	3.00	217.01	219.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2045E+02 EXCESS= .0000E+00 OUTFLOW= .2046E+02 BASIN STORAGE= .2918E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP16	MANE	2.97	186.38	219.71	1.08	3.00	186.24	219.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1766E+02 EXCESS= .0000E+00 OUTFLOW= .1767E+02 BASIN STORAGE= .3015E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP16	MANE	3.00	170.49	219.00	.96	3.00	170.49	219.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1582E+02 EXCESS= .0000E+00 OUTFLOW= .1582E+02 BASIN STORAGE= .3210E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP16	MANE	3.00	159.27	219.00	.90	3.00	159.27	219.00	.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1477E+02 EXCESS= .0000E+00 OUTFLOW= .1478E+02 BASIN STORAGE= .3134E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP16	MANE	3.00	143.84	219.00	.81	3.00	143.84	219.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1334E+02 EXCESS= .0000E+00 OUTFLOW= .1335E+02 BASIN STORAGE= .2949E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP16	MANE	3.00	128.30	219.00	.73	3.00	128.30	219.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1192E+02 EXCESS= .0000E+00 OUTFLOW= .1193E+02 BASIN STORAGE= .2834E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP17	MANE	3.00	354.49	222.00	1.42	3.00	354.49	222.00	1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3405E+02 EXCESS= .0000E+00 OUTFLOW= .3406E+02 BASIN STORAGE= .6983E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP17	MANE	3.00	309.34	222.00	1.24	3.00	309.34	222.00	1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2976E+02 EXCESS= .0000E+00 OUTFLOW= .2976E+02 BASIN STORAGE= .6338E-02 PERCENT ERROR= .0

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          FOR PLAN = 1  RATIO=  .00
             RCP17  MANE          3.00    283.98    222.00      1.12      3.00    283.98    222.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2691E+02 EXCESS= .0000E+00 OUTFLOW= .2691E+02 BASIN STORAGE= .5961E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP17  MANE          3.00    266.96    222.00      1.05      3.00    266.96    222.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2528E+02 EXCESS= .0000E+00 OUTFLOW= .2528E+02 BASIN STORAGE= .7980E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP17  MANE          3.00    243.37    222.00       .96      3.00    243.37    222.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2305E+02 EXCESS= .0000E+00 OUTFLOW= .2306E+02 BASIN STORAGE= .7298E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP17  MANE          3.00    219.33    222.00       .87      3.00    219.33    222.00         .87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2082E+02 EXCESS= .0000E+00 OUTFLOW= .2083E+02 BASIN STORAGE= .6821E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          2.39   1059.83    224.73       .82      3.00   1054.60    225.00         .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1270E+03 EXCESS= .0000E+00 OUTFLOW= .1270E+03 BASIN STORAGE= .5258E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          2.55    909.96    224.54       .71      3.00    903.98    225.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1095E+03 EXCESS= .0000E+00 OUTFLOW= .1095E+03 BASIN STORAGE= .4490E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          2.67    807.00    224.23       .63      3.00    804.51    225.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9787E+02 EXCESS= .0000E+00 OUTFLOW= .9788E+02 BASIN STORAGE= .4736E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          2.76    746.19    226.43       .59      3.00    734.02    225.00         .59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9131E+02 EXCESS= .0000E+00 OUTFLOW= .9131E+02 BASIN STORAGE= .4675E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          2.87    670.25    226.90       .53      3.00    656.90    228.00         .53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8230E+02 EXCESS= .0000E+00 OUTFLOW= .8231E+02 BASIN STORAGE= .4935E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          3.00    596.67    228.00       .47      3.00    596.67    228.00         .47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7349E+02 EXCESS= .0000E+00 OUTFLOW= .7349E+02 BASIN STORAGE= .4299E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC1G1A  MANE          3.00    186.10    225.00      1.55      3.00    186.10    225.00        1.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1853E+02 EXCESS= .0000E+00 OUTFLOW= .1855E+02 BASIN STORAGE= .1063E-01 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RC1G1A  MANE          3.00    164.85    225.00      1.37      3.00    164.85    225.00        1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1634E+02 EXCESS= .0000E+00 OUTFLOW= .1636E+02 BASIN STORAGE= .9874E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RC1G1A  MANE          3.00    150.23    225.00      1.24      3.00    150.23    225.00        1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1487E+02 EXCESS= .0000E+00 OUTFLOW= .1489E+02 BASIN STORAGE= .9464E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RC1G1A  MANE          3.00    141.68    225.00      1.17      3.00    141.68    225.00        1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1403E+02 EXCESS= .0000E+00 OUTFLOW= .1404E+02 BASIN STORAGE= .1078E-01 PERCENT ERROR=   -.2
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FOR PLAN = 1 RATIO= .00
RC1G1A MANE 3.00 130.28 228.00 1.08 3.00 130.28 228.00 1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1287E+02 EXCESS= .0000E+00 OUTFLOW= .1288E+02 BASIN STORAGE= .1049E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RC1G1A MANE 3.00 119.50 228.00 .98 3.00 119.50 228.00 .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1170E+02 EXCESS= .0000E+00 OUTFLOW= .1171E+02 BASIN STORAGE= .9927E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 848.01 228.00 .78 3.00 848.01 228.00 .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1364E+03 EXCESS= .0000E+00 OUTFLOW= .1364E+03 BASIN STORAGE= .8183E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 812.62 231.00 .70 3.00 812.62 231.00 .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1215E+03 EXCESS= .0000E+00 OUTFLOW= .1215E+03 BASIN STORAGE= .7745E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 778.16 231.00 .63 3.00 778.16 231.00 .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1106E+03 EXCESS= .0000E+00 OUTFLOW= .1106E+03 BASIN STORAGE= .9686E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 764.44 231.00 .60 3.00 764.44 231.00 .60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1041E+03 EXCESS= .0000E+00 OUTFLOW= .1041E+03 BASIN STORAGE= .9735E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 753.18 231.00 .54 3.00 753.18 231.00 .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9483E+02 EXCESS= .0000E+00 OUTFLOW= .9485E+02 BASIN STORAGE= .7458E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP19 MANE 3.00 694.82 231.00 .49 3.00 694.82 231.00 .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8520E+02 EXCESS= .0000E+00 OUTFLOW= .8521E+02 BASIN STORAGE= .9757E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE .97 1455.88 295.29 .89 3.00 1446.88 294.00 .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7092E+03 EXCESS= .0000E+00 OUTFLOW= .7085E+03 BASIN STORAGE= .7828E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE 1.01 1281.41 295.11 .82 3.00 1275.25 297.00 .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6507E+03 EXCESS= .0000E+00 OUTFLOW= .6501E+03 BASIN STORAGE= .7483E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE 1.04 1196.89 235.78 .76 3.00 1190.72 237.00 .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6094E+03 EXCESS= .0000E+00 OUTFLOW= .6088E+03 BASIN STORAGE= .7225E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE 1.06 1142.52 235.67 .73 3.00 1139.61 237.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5849E+03 EXCESS= .0000E+00 OUTFLOW= .5843E+03 BASIN STORAGE= .7046E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE 1.08 1069.34 232.55 .69 3.00 1068.84 234.00 .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5502E+03 EXCESS= .0000E+00 OUTFLOW= .5496E+03 BASIN STORAGE= .6800E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP20 MANE 1.12 972.31 233.51 .64 3.00 971.99 234.00 .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5139E+03 EXCESS= .0000E+00 OUTFLOW= .5133E+03 BASIN STORAGE= .6549E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	250.65	222.00	1.12	3.00	250.65	222.00	1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2385E+02 EXCESS= .0000E+00 OUTFLOW= .2386E+02 BASIN STORAGE= .1427E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	216.74	222.00	.96	3.00	216.74	222.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2058E+02 EXCESS= .0000E+00 OUTFLOW= .2058E+02 BASIN STORAGE= .1330E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	193.94	222.00	.86	3.00	193.94	222.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1841E+02 EXCESS= .0000E+00 OUTFLOW= .1841E+02 BASIN STORAGE= .1261E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	180.84	222.00	.80	3.00	180.84	222.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1717E+02 EXCESS= .0000E+00 OUTFLOW= .1717E+02 BASIN STORAGE= .1180E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	162.85	222.00	.73	3.00	162.85	222.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1549E+02 EXCESS= .0000E+00 OUTFLOW= .1549E+02 BASIN STORAGE= .1720E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1D	MANE	3.00	144.75	222.00	.65	3.00	144.75	222.00	.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1382E+02 EXCESS= .0000E+00 OUTFLOW= .1382E+02 BASIN STORAGE= .1628E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	387.27	228.00	1.15	3.00	387.27	228.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3856E+02 EXCESS= .0000E+00 OUTFLOW= .3856E+02 BASIN STORAGE= .2030E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	335.10	228.00	.99	3.00	335.10	228.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3334E+02 EXCESS= .0000E+00 OUTFLOW= .3335E+02 BASIN STORAGE= .2819E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	299.68	228.00	.89	3.00	299.68	228.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2988E+02 EXCESS= .0000E+00 OUTFLOW= .2989E+02 BASIN STORAGE= .2646E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	279.18	228.00	.83	3.00	279.18	228.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2791E+02 EXCESS= .0000E+00 OUTFLOW= .2791E+02 BASIN STORAGE= .2555E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	250.92	228.00	.75	3.00	250.92	228.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2522E+02 EXCESS= .0000E+00 OUTFLOW= .2523E+02 BASIN STORAGE= .2621E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP21	MANE	3.00	223.15	231.00	.67	3.00	223.15	231.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2255E+02 EXCESS= .0000E+00 OUTFLOW= .2255E+02 BASIN STORAGE= .2355E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.60	39.47	217.36	1.10	3.00	38.98	216.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3626E+01 EXCESS= .0000E+00 OUTFLOW= .3627E+01 BASIN STORAGE= .6145E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.68	34.10	217.17	.95	3.00	33.57	216.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3126E+01 EXCESS= .0000E+00 OUTFLOW= .3126E+01 BASIN STORAGE= .5890E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.75	30.55	217.17	.85	3.00	30.07	219.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2795E+01 EXCESS= .0000E+00 OUTFLOW= .2795E+01 BASIN STORAGE= .6226E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.80	28.53	217.23	.79	3.00	28.11	219.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2606E+01 EXCESS= .0000E+00 OUTFLOW= .2606E+01 BASIN STORAGE= .5315E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.86	25.81	217.96	.71	3.00	25.39	219.00	.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2350E+01 EXCESS= .0000E+00 OUTFLOW= .2350E+01 BASIN STORAGE= .5945E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4A1D	MANE	1.94	22.97	217.44	.63	3.00	22.61	219.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2095E+01 EXCESS= .0000E+00 OUTFLOW= .2095E+01 BASIN STORAGE= .5877E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	1.78	1932.09	217.43	.92	3.00	1916.60	234.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7831E+03 EXCESS= .0000E+00 OUTFLOW= .7818E+03 BASIN STORAGE= .1598E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	1.85	1734.52	233.71	.84	3.00	1732.80	234.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7156E+03 EXCESS= .0000E+00 OUTFLOW= .7144E+03 BASIN STORAGE= .1527E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	1.91	1609.31	234.35	.78	3.00	1608.74	234.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6678E+03 EXCESS= .0000E+00 OUTFLOW= .6666E+03 BASIN STORAGE= .1475E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	1.94	1535.39	234.62	.75	3.00	1534.90	234.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6398E+03 EXCESS= .0000E+00 OUTFLOW= .6386E+03 BASIN STORAGE= .1439E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	1.99	1434.07	234.39	.70	3.00	1431.25	234.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6004E+03 EXCESS= .0000E+00 OUTFLOW= .5992E+03 BASIN STORAGE= .1388E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP22	MANE	2.06	1294.56	236.34	.65	3.00	1288.16	234.00	.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5591E+03 EXCESS= .0000E+00 OUTFLOW= .5580E+03 BASIN STORAGE= .1337E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	.90	2025.66	217.76	.92	3.00	2014.07	219.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7926E+03 EXCESS= .0000E+00 OUTFLOW= .7920E+03 BASIN STORAGE= .8192E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	.94	1782.11	234.43	.84	3.00	1781.18	234.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7236E+03 EXCESS= .0000E+00 OUTFLOW= .7229E+03 BASIN STORAGE= .7831E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	.97	1654.84	235.00	.78	3.00	1651.79	234.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6753E+03 EXCESS= .0000E+00 OUTFLOW= .6747E+03 BASIN STORAGE= .7562E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	.98	1578.37	235.08	.75	3.00	1573.85	234.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6469E+03 EXCESS= .0000E+00 OUTFLOW= .6463E+03 BASIN STORAGE= .7376E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	1.01	1471.83	235.03	.70	3.00	1459.04	234.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6065E+03 EXCESS= .0000E+00 OUTFLOW= .6059E+03 BASIN STORAGE= .7118E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP23	MANE	1.05	1326.03	235.67	.65	3.00	1319.20	237.00	.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5648E+03 EXCESS= .0000E+00 OUTFLOW= .5642E+03 BASIN STORAGE= .6857E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	107.03	225.00	-1.00	3.00	107.03	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	90.18	225.00	-1.00	3.00	90.18	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	81.22	228.00	-1.00	3.00	81.22	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	75.72	228.00	-1.00	3.00	75.72	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	67.85	228.00	-1.00	3.00	67.85	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	58.40	228.00	-1.00	3.00	58.40	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	106.55	231.00	-1.00	3.00	106.55	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	90.70	231.00	-1.00	3.00	90.70	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	80.67	234.00	-1.00	3.00	80.67	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	75.77	234.00	-1.00	3.00	75.77	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	68.42	234.00	-1.00	3.00	68.42	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV4	MANE	3.00	58.88	234.00	-1.00	3.00	58.88	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	180.18	228.00	-1.00	3.00	180.18	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	151.75	228.00	-1.00	3.00	151.75	228.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	133.59	231.00	-1.00	3.00	133.59	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	124.28	231.00	-1.00	3.00	124.28	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	110.90	231.00	-1.00	3.00	110.90	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV3	MANE	3.00	95.11	234.00	-1.00	3.00	95.11	234.00	-1.00

FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	2.89	177.97	231.24	-1.00	3.00	177.72	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	3.00	152.10	231.00	-1.00	3.00	152.10	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	3.00	133.24	231.00	-1.00	3.00	133.24	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	3.00	124.34	234.00	-1.00	3.00	124.34	234.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	3.00	111.06	234.00	-1.00	3.00	111.06	234.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV3	MANE	3.00	94.70	237.00	-1.00	3.00	94.70	237.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	95.13	225.00	-1.00	3.00	95.13	225.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	81.71	228.00	-1.00	3.00	81.71	228.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	73.47	228.00	-1.00	3.00	73.47	228.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	66.78	228.00	-1.00	3.00	66.78	228.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	60.22	231.00	-1.00	3.00	60.22	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	3.00	52.77	231.00	-1.00	3.00	52.77	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.02	95.65	227.81	-1.00	3.00	95.50	228.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.14	79.87	228.71	-1.00	3.00	78.57	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.23	71.16	229.36	-1.00	3.00	70.80	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.31	66.57	231.01	-1.00	3.00	66.55	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.40	59.47	233.17	-1.00	3.00	58.42	231.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDIV2	MANE	2.53	50.79	232.68	-1.00	3.00	50.41	234.00	-1.00
FOR PLAN = 1 RATIO= .00									
RC5CA	MANE	3.00	139.69	222.00	.85	3.00	139.69	222.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1350E+02 EXCESS= .0000E+00 OUTFLOW= .1350E+02 BASIN STORAGE= .1206E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5CA	MANE	3.00	116.57	222.00	.71	3.00	116.57	222.00	.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1134E+02 EXCESS= .0000E+00 OUTFLOW= .1134E+02 BASIN STORAGE= .1105E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5CA	MANE	3.00	101.24	222.00	.63	3.00	101.24	222.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9924E+01 EXCESS= .0000E+00 OUTFLOW= .9926E+01 BASIN STORAGE= .1034E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5CA	MANE	3.00	92.56	222.00	.58	3.00	92.56	222.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9129E+01 EXCESS= .0000E+00 OUTFLOW= .9130E+01 BASIN STORAGE= .1032E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5CA	MANE	3.00	80.68	222.00	.51	3.00	80.68	222.00	.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8060E+01 EXCESS= .0000E+00 OUTFLOW= .8061E+01 BASIN STORAGE= .9722E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5CA	MANE	2.70	69.31	224.10	.44	3.00	68.17	222.00	.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7017E+01 EXCESS= .0000E+00 OUTFLOW= .7019E+01 BASIN STORAGE= .1097E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP25	MANE	3.00	255.95	216.00	.76	3.00	255.95	216.00	.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2509E+02 EXCESS= .0000E+00 OUTFLOW= .2510E+02 BASIN STORAGE= .4437E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP25	MANE	3.00	210.43	216.00	.63	3.00	210.43	216.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2092E+02 EXCESS= .0000E+00 OUTFLOW= .2093E+02 BASIN STORAGE= .4174E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP25	MANE	3.00	180.06	216.00	.55	3.00	180.06	216.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1821E+02 EXCESS= .0000E+00 OUTFLOW= .1822E+02 BASIN STORAGE= .3984E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP25	MANE	3.00	162.65	216.00	.50	3.00	162.65	216.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1669E+02 EXCESS= .0000E+00 OUTFLOW= .1670E+02 BASIN STORAGE= .3918E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP25	MANE	2.85	135.76	216.60	.44	3.00	133.42	216.00	.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1465E+02 EXCESS= .0000E+00 OUTFLOW= .1466E+02 BASIN STORAGE= .4360E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP25	MANE	2.55	113.38	216.75	.38	3.00	110.85	216.00	.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1266E+02 EXCESS= .0000E+00 OUTFLOW= .1267E+02 BASIN STORAGE= .4120E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP26	MANE	1.55	402.26	213.79	.74	3.00	393.56	213.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3708E+02 EXCESS= .0000E+00 OUTFLOW= .3708E+02 BASIN STORAGE= .2356E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP26	MANE	1.68	325.59	213.89	.61	3.00	319.74	216.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3084E+02 EXCESS= .0000E+00 OUTFLOW= .3084E+02 BASIN STORAGE= .2004E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP26	MANE	1.80	276.71	214.19	.53	3.00	275.19	216.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2680E+02 EXCESS= .0000E+00 OUTFLOW= .2680E+02 BASIN STORAGE= .2343E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP26 MANE 1.88 248.47 214.25 .49 3.00 247.53 216.00 .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2454E+02 EXCESS= .0000E+00 OUTFLOW= .2454E+02 BASIN STORAGE= .2309E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP26 MANE 2.02 207.29 215.94 .43 3.00 206.97 216.00 .43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2151E+02 EXCESS= .0000E+00 OUTFLOW= .2151E+02 BASIN STORAGE= .2009E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP26 MANE 2.18 171.92 216.13 .37 3.00 171.61 216.00 .37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1852E+02 EXCESS= .0000E+00 OUTFLOW= .1853E+02 BASIN STORAGE= .2167E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 19.69 249.00 -1.00 3.00 19.69 249.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 17.15 255.00 -1.00 3.00 17.15 255.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 16.37 237.00 -1.00 3.00 16.37 237.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 15.63 240.00 -1.00 3.00 15.63 240.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 15.78 243.00 -1.00 3.00 15.78 243.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 15.10 246.00 -1.00 3.00 15.10 246.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 20.09 249.00 -1.00 3.00 20.09 249.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 17.92 255.00 -1.00 3.00 17.92 255.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 18.71 243.00 -1.00 3.00 18.71 243.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 16.60 252.00 -1.00 3.00 16.60 252.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 15.77 249.00 -1.00 3.00 15.77 249.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 15.16 252.00 -1.00 3.00 15.16 252.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 24.02 255.00 -1.00 3.00 24.02 255.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 23.61 252.00 -1.00 3.00 23.61 252.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 23.45 255.00 -1.00 3.00 23.45 255.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV1 MANE 3.00 20.89 258.00 -1.00 3.00 20.89 258.00 -1.00

FOR PLAN = 1 RATIO= .00

RDIV1	MANE	3.00	20.02	261.00	-1.00	3.00	20.02	261.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV1	MANE	3.00	19.64	264.00	-1.00	3.00	19.64	264.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP27	MANE	2.36	480.18	217.38	.83	3.00	476.24	216.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5393E+02 EXCESS= .0000E+00 OUTFLOW= .5394E+02 BASIN STORAGE= .3101E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP27	MANE	2.55	393.00	216.88	.70	3.00	384.63	219.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4522E+02 EXCESS= .0000E+00 OUTFLOW= .4523E+02 BASIN STORAGE= .3730E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP27	MANE	2.71	335.41	219.29	.61	3.00	335.35	219.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3959E+02 EXCESS= .0000E+00 OUTFLOW= .3959E+02 BASIN STORAGE= .3172E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP27	MANE	2.82	303.01	217.20	.56	3.00	299.98	219.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3644E+02 EXCESS= .0000E+00 OUTFLOW= .3645E+02 BASIN STORAGE= .3703E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP27	MANE	3.00	262.19	219.00	.50	3.00	262.19	219.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3219E+02 EXCESS= .0000E+00 OUTFLOW= .3220E+02 BASIN STORAGE= .3126E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP27	MANE	3.00	220.88	219.00	.43	3.00	220.88	219.00	.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2797E+02 EXCESS= .0000E+00 OUTFLOW= .2798E+02 BASIN STORAGE= .3667E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	202.34	216.00	1.66	3.00	202.34	216.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1508E+02 EXCESS= .0000E+00 OUTFLOW= .1509E+02 BASIN STORAGE= .6114E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	178.95	216.00	1.46	3.00	178.95	216.00	1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1330E+02 EXCESS= .0000E+00 OUTFLOW= .1330E+02 BASIN STORAGE= .5921E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	162.91	216.00	1.33	3.00	162.91	216.00	1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+02 EXCESS= .0000E+00 OUTFLOW= .1211E+02 BASIN STORAGE= .5780E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	153.56	216.00	1.25	3.00	153.56	216.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1141E+02 EXCESS= .0000E+00 OUTFLOW= .1142E+02 BASIN STORAGE= .5575E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	141.89	219.00	1.15	3.00	141.89	219.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1047E+02 EXCESS= .0000E+00 OUTFLOW= .1047E+02 BASIN STORAGE= .6228E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FD	MANE	3.00	130.81	219.00	1.05	3.00	130.81	219.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9516E+01 EXCESS= .0000E+00 OUTFLOW= .9520E+01 BASIN STORAGE= .6090E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	738.80	216.00	1.97	3.00	738.80	216.00	1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5319E+02 EXCESS= .0000E+00 OUTFLOW= .5325E+02 BASIN STORAGE= .9752E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	674.10	216.00	1.76	3.00	674.10	216.00	1.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4747E+02 EXCESS= .0000E+00 OUTFLOW= .4752E+02 BASIN STORAGE= .1431E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	628.30	216.00	1.61	3.00	628.30	216.00	1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4360E+02 EXCESS= .0000E+00 OUTFLOW= .4364E+02 BASIN STORAGE= .1408E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	601.05	216.00	1.53	3.00	601.05	216.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4136E+02 EXCESS= .0000E+00 OUTFLOW= .4140E+02 BASIN STORAGE= .1395E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	562.47	216.00	1.42	3.00	562.47	216.00	1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3828E+02 EXCESS= .0000E+00 OUTFLOW= .3831E+02 BASIN STORAGE= .1374E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5FA	MANE	3.00	522.17	216.00	1.30	3.00	522.17	216.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3516E+02 EXCESS= .0000E+00 OUTFLOW= .3518E+02 BASIN STORAGE= .1352E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	1041.13	219.00	1.59	3.00	1041.13	219.00	1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7957E+02 EXCESS= .0000E+00 OUTFLOW= .7961E+02 BASIN STORAGE= .4430E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	934.84	219.00	1.41	3.00	934.84	219.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7021E+02 EXCESS= .0000E+00 OUTFLOW= .7024E+02 BASIN STORAGE= .3964E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	861.00	219.00	1.28	3.00	861.00	219.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6394E+02 EXCESS= .0000E+00 OUTFLOW= .6396E+02 BASIN STORAGE= .3891E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	817.63	219.00	1.21	3.00	817.63	219.00	1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6034E+02 EXCESS= .0000E+00 OUTFLOW= .6036E+02 BASIN STORAGE= .3827E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	752.85	219.00	1.11	3.00	752.85	219.00	1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5540E+02 EXCESS= .0000E+00 OUTFLOW= .5540E+02 BASIN STORAGE= .4590E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP28	MANE	3.00	693.15	219.00	1.01	3.00	693.15	219.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5044E+02 EXCESS= .0000E+00 OUTFLOW= .5044E+02 BASIN STORAGE= .4512E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	1207.10	219.00	1.48	3.00	1207.10	219.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9170E+02 EXCESS= .0000E+00 OUTFLOW= .9174E+02 BASIN STORAGE= .7523E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	1046.65	222.00	1.30	3.00	1046.65	222.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8054E+02 EXCESS= .0000E+00 OUTFLOW= .8057E+02 BASIN STORAGE= .7195E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	972.01	222.00	1.18	3.00	972.01	222.00	1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7307E+02 EXCESS= .0000E+00 OUTFLOW= .7310E+02 BASIN STORAGE= .7081E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	927.06	222.00	1.11	3.00	927.06	222.00	1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6880E+02 EXCESS= .0000E+00 OUTFLOW= .6883E+02 BASIN STORAGE= .6994E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	868.58	222.00	1.02	3.00	868.58	222.00	1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6294E+02 EXCESS= .0000E+00 OUTFLOW= .6296E+02 BASIN STORAGE= .7202E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP29	MANE	3.00	792.58	222.00	.92	3.00	792.58	222.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5708E+02 EXCESS= .0000E+00 OUTFLOW= .5710E+02 BASIN STORAGE= .7095E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	1519.20	222.00	1.51	3.00	1519.20	222.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1329E+03 EXCESS= .0000E+00 OUTFLOW= .1330E+03 BASIN STORAGE= .4973E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	1318.74	222.00	1.33	3.00	1318.74	222.00	1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1168E+03 EXCESS= .0000E+00 OUTFLOW= .1168E+03 BASIN STORAGE= .6597E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	1172.90	222.00	1.21	3.00	1172.90	222.00	1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1060E+03 EXCESS= .0000E+00 OUTFLOW= .1060E+03 BASIN STORAGE= .6499E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	1112.48	225.00	1.14	3.00	1112.48	225.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9978E+02 EXCESS= .0000E+00 OUTFLOW= .9980E+02 BASIN STORAGE= .6428E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	1028.21	225.00	1.04	3.00	1028.21	225.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9129E+02 EXCESS= .0000E+00 OUTFLOW= .9130E+02 BASIN STORAGE= .6415E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP30	MANE	3.00	929.25	225.00	.94	3.00	929.25	225.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8279E+02 EXCESS= .0000E+00 OUTFLOW= .8280E+02 BASIN STORAGE= .6325E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5EB	MANE	3.00	586.19	222.00	2.05	3.00	586.19	222.00	2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5978E+02 EXCESS= .0000E+00 OUTFLOW= .5981E+02 BASIN STORAGE= .7121E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5EB	MANE	3.00	529.55	222.00	1.84	3.00	529.55	222.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5351E+02 EXCESS= .0000E+00 OUTFLOW= .5353E+02 BASIN STORAGE= .6803E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5EB	MANE	3.00	490.62	222.00	1.69	3.00	490.62	222.00	1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4926E+02 EXCESS= .0000E+00 OUTFLOW= .4928E+02 BASIN STORAGE= .6575E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5EB	MANE	3.00	467.89	222.00	1.61	3.00	467.89	222.00	1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4680E+02 EXCESS= .0000E+00 OUTFLOW= .4682E+02 BASIN STORAGE= .6438E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5EB	MANE	3.00	436.21	222.00	1.49	3.00	436.21	222.00	1.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4341E+02 EXCESS= .0000E+00 OUTFLOW= .4343E+02 BASIN STORAGE= .6242E-02 PERCENT ERROR= -.1

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          FOR PLAN = 1  RATIO=  .00
             RC5EB  MANE          3.00    403.72    222.00      1.37      3.00    403.72    222.00        1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3996E+02 EXCESS= .0000E+00 OUTFLOW= .3998E+02 BASIN STORAGE= .6035E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   2157.16    225.00      1.58      3.00   2157.16    225.00        1.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2036E+03 EXCESS= .0000E+00 OUTFLOW= .2036E+03 BASIN STORAGE= .4282E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   1889.77    225.00      1.39      3.00   1889.77    225.00        1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1794E+03 EXCESS= .0000E+00 OUTFLOW= .1795E+03 BASIN STORAGE= .3885E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   1698.74    225.00      1.27      3.00   1698.74    225.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1633E+03 EXCESS= .0000E+00 OUTFLOW= .1633E+03 BASIN STORAGE= .3828E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   1589.10    228.00      1.20      3.00   1589.10    228.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1540E+03 EXCESS= .0000E+00 OUTFLOW= .1540E+03 BASIN STORAGE= .3533E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   1461.17    228.00      1.10      3.00   1461.17    228.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1413E+03 EXCESS= .0000E+00 OUTFLOW= .1413E+03 BASIN STORAGE= .5141E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP31  MANE          3.00   1323.99    228.00      1.00      3.00   1323.99    228.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1285E+03 EXCESS= .0000E+00 OUTFLOW= .1285E+03 BASIN STORAGE= .5070E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.23   2212.66    225.49      1.57      3.00   2209.13    225.00        1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2151E+03 EXCESS= .0000E+00 OUTFLOW= .2151E+03 BASIN STORAGE= .1452E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.29   1938.18    225.67      1.38      3.00   1928.25    225.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1894E+03 EXCESS= .0000E+00 OUTFLOW= .1894E+03 BASIN STORAGE= .1533E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.34   1750.06    226.04      1.26      3.00   1736.17    225.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1723E+03 EXCESS= .0000E+00 OUTFLOW= .1723E+03 BASIN STORAGE= .1420E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.37   1642.48    227.30      1.18      3.00   1634.35    228.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1625E+03 EXCESS= .0000E+00 OUTFLOW= .1625E+03 BASIN STORAGE= .1544E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.41   1493.15    228.61      1.09      3.00   1491.60    228.00        1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1489E+03 EXCESS= .0000E+00 OUTFLOW= .1489E+03 BASIN STORAGE= .1670E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP32  MANE          1.46   1353.91    229.20       .99      3.00   1348.03    228.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1354E+03 EXCESS= .0000E+00 OUTFLOW= .1354E+03 BASIN STORAGE= .1506E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          1.81   3497.67    211.64      1.71      3.00   3426.89    213.00        1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3790E+03 EXCESS= .0000E+00 OUTFLOW= .3791E+03 BASIN STORAGE= .3597E-02 PERCENT ERROR=    .0
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          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          1.89   3075.67    212.04       1.51       3.00   3005.56    213.00        1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3356E+03 EXCESS= .0000E+00 OUTFLOW= .3356E+03 BASIN STORAGE= .3299E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          1.96   2770.68    211.69       1.38       3.00   2715.08    213.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3063E+03 EXCESS= .0000E+00 OUTFLOW= .3064E+03 BASIN STORAGE= .2834E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          2.00   2607.68    212.32       1.30       3.00   2557.90    213.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2896E+03 EXCESS= .0000E+00 OUTFLOW= .2896E+03 BASIN STORAGE= .3278E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          2.07   2337.97    213.09       1.20       3.00   2336.56    213.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2665E+03 EXCESS= .0000E+00 OUTFLOW= .2665E+03 BASIN STORAGE= .3282E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP33  MANE          2.15   2127.57    212.65       1.09       3.00   2103.41    213.00        1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2433E+03 EXCESS= .0000E+00 OUTFLOW= .2433E+03 BASIN STORAGE= .2766E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.62   4105.58    213.37       1.64       3.00   4070.85    213.00        1.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5114E+03 EXCESS= .0000E+00 OUTFLOW= .5114E+03 BASIN STORAGE= .2732E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.70   3557.52    214.65       1.44       3.00   3511.99    213.00        1.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4485E+03 EXCESS= .0000E+00 OUTFLOW= .4485E+03 BASIN STORAGE= .2849E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.77   3173.25    214.54       1.30       3.00   3117.81    213.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4065E+03 EXCESS= .0000E+00 OUTFLOW= .4065E+03 BASIN STORAGE= .2897E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.82   2957.07    214.25       1.23       3.00   2894.45    213.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3826E+03 EXCESS= .0000E+00 OUTFLOW= .3827E+03 BASIN STORAGE= .2649E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.88   2673.74    214.45       1.12       3.00   2615.80    216.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3498E+03 EXCESS= .0000E+00 OUTFLOW= .3499E+03 BASIN STORAGE= .2715E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP24  MANE          1.96   2349.11    213.81       1.01       3.00   2321.16    216.00        1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3169E+03 EXCESS= .0000E+00 OUTFLOW= .3170E+03 BASIN STORAGE= .3142E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RC5DC  MANE          3.00    427.13    222.00       1.57       3.00    427.13    222.00        1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2722E+02 EXCESS= .0000E+00 OUTFLOW= .2727E+02 BASIN STORAGE= .2371E-01 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
             RC5DC  MANE          3.00    358.34    225.00       1.38       3.00    358.34    225.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2397E+02 EXCESS= .0000E+00 OUTFLOW= .2401E+02 BASIN STORAGE= .2741E-01 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .00
             RC5DC  MANE          3.00    344.13    225.00       1.25       3.00    344.13    225.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2178E+02 EXCESS= .0000E+00 OUTFLOW= .2181E+02 BASIN STORAGE= .2688E-01 PERCENT ERROR=   -.3
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FOR PLAN = 1 RATIO= .00

RC5DC	MANE	3.00	332.14	225.00	1.18	3.00	332.14	225.00	1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2053E+02 EXCESS= .0000E+00 OUTFLOW= .2056E+02 BASIN STORAGE= .2661E-01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RC5DC	MANE	3.00	306.01	225.00	1.08	3.00	306.01	225.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1880E+02 EXCESS= .0000E+00 OUTFLOW= .1883E+02 BASIN STORAGE= .2899E-01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RC5DC	MANE	3.00	270.08	225.00	.98	3.00	270.08	225.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1707E+02 EXCESS= .0000E+00 OUTFLOW= .1711E+02 BASIN STORAGE= .2864E-01 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	276.62	216.00	1.35	3.00	276.62	216.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2001E+02 EXCESS= .0000E+00 OUTFLOW= .2003E+02 BASIN STORAGE= .1111E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	244.32	219.00	1.18	3.00	244.32	219.00	1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1748E+02 EXCESS= .0000E+00 OUTFLOW= .1749E+02 BASIN STORAGE= .1046E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	224.17	219.00	1.07	3.00	224.17	219.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1578E+02 EXCESS= .0000E+00 OUTFLOW= .1580E+02 BASIN STORAGE= .1024E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	212.23	219.00	1.00	3.00	212.23	219.00	1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1481E+02 EXCESS= .0000E+00 OUTFLOW= .1483E+02 BASIN STORAGE= .9508E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	193.90	219.00	.91	3.00	193.90	219.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1349E+02 EXCESS= .0000E+00 OUTFLOW= .1350E+02 BASIN STORAGE= .1196E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC4BF	MANE	3.00	176.67	219.00	.82	3.00	176.67	219.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1216E+02 EXCESS= .0000E+00 OUTFLOW= .1217E+02 BASIN STORAGE= .1172E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	2041.33	315.00	1.25	3.00	2041.33	315.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4852E+03 EXCESS= .0000E+00 OUTFLOW= .4828E+03 BASIN STORAGE= .3757E+01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	769.10	339.00	1.06	3.00	769.10	339.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4099E+03 EXCESS= .0000E+00 OUTFLOW= .4070E+03 BASIN STORAGE= .3755E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	543.46	225.00	.97	3.00	543.46	225.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3763E+03 EXCESS= .0000E+00 OUTFLOW= .3732E+03 BASIN STORAGE= .3665E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	519.71	225.00	.94	3.00	519.71	225.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3646E+03 EXCESS= .0000E+00 OUTFLOW= .3616E+03 BASIN STORAGE= .3558E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	484.45	225.00	.89	3.00	484.45	225.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3475E+03 EXCESS= .0000E+00 OUTFLOW= .3447E+03 BASIN STORAGE= .3385E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP34	MANE	3.00	443.91	225.00	.85	3.00	443.91	225.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3291E+03 EXCESS= .0000E+00 OUTFLOW= .3264E+03 BASIN STORAGE= .3189E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	460.85	231.00	-1.00	3.00	460.85	231.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	322.45	234.00	-1.00	3.00	322.45	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	236.25	234.00	-1.00	3.00	236.25	234.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	175.21	237.00	-1.00	3.00	175.21	237.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	92.43	240.00	-1.00	3.00	92.43	240.00	-1.00

FOR PLAN = 1 RATIO= .00

RDIV5	MANE	3.00	68.79	240.00	-1.00	3.00	68.79	240.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	2302.72	315.00	1.30	3.00	2302.72	315.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5622E+03 EXCESS= .0000E+00 OUTFLOW= .5598E+03 BASIN STORAGE= .3576E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	1099.13	228.00	1.09	3.00	1099.13	228.00	1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4728E+03 EXCESS= .0000E+00 OUTFLOW= .4699E+03 BASIN STORAGE= .3574E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	982.59	228.00	.99	3.00	982.59	228.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4308E+03 EXCESS= .0000E+00 OUTFLOW= .4280E+03 BASIN STORAGE= .3486E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	918.41	228.00	.95	3.00	918.41	228.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4149E+03 EXCESS= .0000E+00 OUTFLOW= .4122E+03 BASIN STORAGE= .3381E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	840.72	231.00	.90	3.00	840.72	231.00	.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3924E+03 EXCESS= .0000E+00 OUTFLOW= .3898E+03 BASIN STORAGE= .3212E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RCP35	MANE	3.00	759.67	231.00	.85	3.00	759.67	231.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3691E+03 EXCESS= .0000E+00 OUTFLOW= .3667E+03 BASIN STORAGE= .3027E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	173.86	225.00	1.60	3.00	173.86	225.00	1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1880E+02 EXCESS= .0000E+00 OUTFLOW= .1881E+02 BASIN STORAGE= .1088E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	154.66	228.00	1.41	3.00	154.66	228.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1663E+02 EXCESS= .0000E+00 OUTFLOW= .1664E+02 BASIN STORAGE= .9537E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	142.05	228.00	1.29	3.00	142.05	228.00	1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1516E+02 EXCESS= .0000E+00 OUTFLOW= .1517E+02 BASIN STORAGE= .8115E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	134.69	228.00	1.22	3.00	134.69	228.00	1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1432E+02 EXCESS= .0000E+00 OUTFLOW= .1433E+02 BASIN STORAGE= .1079E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	124.43	228.00	1.12	3.00	124.43	228.00	1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1317E+02 EXCESS= .0000E+00 OUTFLOW= .1317E+02 BASIN STORAGE= .9963E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BE	MANE	3.00	113.92	228.00	1.02	3.00	113.92	228.00	1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1200E+02 EXCESS= .0000E+00 OUTFLOW= .1201E+02 BASIN STORAGE= .9225E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	432.95	225.00	1.65	3.00	432.95	225.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5002E+02 EXCESS= .0000E+00 OUTFLOW= .5002E+02 BASIN STORAGE= .1057E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	385.80	228.00	1.46	3.00	385.80	228.00	1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4439E+02 EXCESS= .0000E+00 OUTFLOW= .4439E+02 BASIN STORAGE= .9487E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	353.82	228.00	1.34	3.00	353.82	228.00	1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4059E+02 EXCESS= .0000E+00 OUTFLOW= .4059E+02 BASIN STORAGE= .1159E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	335.18	228.00	1.27	3.00	335.18	228.00	1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3840E+02 EXCESS= .0000E+00 OUTFLOW= .3840E+02 BASIN STORAGE= .1038E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	309.23	228.00	1.17	3.00	309.23	228.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3539E+02 EXCESS= .0000E+00 OUTFLOW= .3539E+02 BASIN STORAGE= .9723E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP36	MANE	3.00	282.68	228.00	1.07	3.00	282.68	228.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3235E+02 EXCESS= .0000E+00 OUTFLOW= .3235E+02 BASIN STORAGE= .9062E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	488.97	231.00	1.42	3.00	488.97	231.00	1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6174E+02 EXCESS= .0000E+00 OUTFLOW= .6175E+02 BASIN STORAGE= .9233E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	434.53	231.00	1.25	3.00	434.53	231.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5435E+02 EXCESS= .0000E+00 OUTFLOW= .5435E+02 BASIN STORAGE= .1214E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	397.02	231.00	1.13	3.00	397.02	231.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4940E+02 EXCESS= .0000E+00 OUTFLOW= .4940E+02 BASIN STORAGE= .9768E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	375.25	231.00	1.07	3.00	375.25	231.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4656E+02 EXCESS= .0000E+00 OUTFLOW= .4656E+02 BASIN STORAGE= .1282E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	344.86	231.00	.98	3.00	344.86	231.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4266E+02 EXCESS= .0000E+00 OUTFLOW= .4266E+02 BASIN STORAGE= .1222E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP37	MANE	3.00	314.54	234.00	.89	3.00	314.54	234.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3875E+02 EXCESS= .0000E+00 OUTFLOW= .3875E+02 BASIN STORAGE= .1156E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	.93	4155.98	316.00	1.05	3.00	4099.21	315.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1423E+04 EXCESS= .0000E+00 OUTFLOW= .1421E+04 BASIN STORAGE= .1320E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	1.00	3332.90	229.46	.93	3.00	3331.97	231.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1255E+04 EXCESS= .0000E+00 OUTFLOW= .1254E+04 BASIN STORAGE= .1283E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	1.03	3037.49	231.87	.86	3.00	3031.62	231.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1159E+04 EXCESS= .0000E+00 OUTFLOW= .1158E+04 BASIN STORAGE= .1241E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	1.05	2867.06	231.71	.82	3.00	2855.77	231.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1111E+04 EXCESS= .0000E+00 OUTFLOW= .1110E+04 BASIN STORAGE= .1205E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	1.08	2625.68	232.97	.77	3.00	2618.58	234.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1043E+04 EXCESS= .0000E+00 OUTFLOW= .1042E+04 BASIN STORAGE= .1151E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP38	MANE	1.11	2363.99	234.61	.72	3.00	2358.39	234.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9741E+03 EXCESS= .0000E+00 OUTFLOW= .9732E+03 BASIN STORAGE= .1094E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	89.67	375.00	.51	3.00	89.67	375.00	.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1486E+03 EXCESS= .0000E+00 OUTFLOW= .1467E+03 BASIN STORAGE= .1972E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	87.58	375.00	.49	3.00	87.58	375.00	.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1440E+03 EXCESS= .0000E+00 OUTFLOW= .1422E+03 BASIN STORAGE= .1935E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	85.94	375.00	.48	3.00	85.94	375.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1406E+03 EXCESS= .0000E+00 OUTFLOW= .1388E+03 BASIN STORAGE= .1904E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	84.91	375.00	.47	3.00	84.91	375.00	.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1385E+03 EXCESS= .0000E+00 OUTFLOW= .1367E+03 BASIN STORAGE= .1887E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	83.48	375.00	.46	3.00	83.48	375.00	.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1355E+03 EXCESS= .0000E+00 OUTFLOW= .1337E+03 BASIN STORAGE= .1863E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RDB5	MANE	3.00	81.98	375.00	.45	3.00	81.98	375.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1322E+03 EXCESS= .0000E+00 OUTFLOW= .1305E+03 BASIN STORAGE= .1830E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	511.71	219.00	.61	3.00	511.71	219.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1920E+03 EXCESS= .0000E+00 OUTFLOW= .1911E+03 BASIN STORAGE= .1116E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	466.44	219.00	.58	3.00	466.44	219.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1827E+03 EXCESS= .0000E+00 OUTFLOW= .1818E+03 BASIN STORAGE= .1095E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	435.34	219.00	.56	3.00	435.34	219.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1761E+03 EXCESS= .0000E+00 OUTFLOW= .1752E+03 BASIN STORAGE= .1078E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	417.08	219.00	.55	3.00	417.08	219.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1722E+03 EXCESS= .0000E+00 OUTFLOW= .1713E+03 BASIN STORAGE= .1068E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	391.44	219.00	.53	3.00	391.44	219.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1666E+03 EXCESS= .0000E+00 OUTFLOW= .1657E+03 BASIN STORAGE= .1055E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP39	MANE	3.00	365.29	219.00	.51	3.00	365.29	219.00	.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1607E+03 EXCESS= .0000E+00 OUTFLOW= .1599E+03 BASIN STORAGE= .1036E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.46	790.29	217.17	.68	3.00	788.05	216.00	.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2201E+03 EXCESS= .0000E+00 OUTFLOW= .2197E+03 BASIN STORAGE= .4602E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.51	717.32	217.29	.64	3.00	714.39	216.00	.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+03 EXCESS= .0000E+00 OUTFLOW= .2074E+03 BASIN STORAGE= .4513E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.55	666.39	216.82	.61	3.00	661.68	216.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1991E+03 EXCESS= .0000E+00 OUTFLOW= .1987E+03 BASIN STORAGE= .4442E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.57	637.38	217.21	.60	3.00	632.82	216.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1940E+03 EXCESS= .0000E+00 OUTFLOW= .1936E+03 BASIN STORAGE= .4401E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.61	597.09	217.59	.57	3.00	593.29	216.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1869E+03 EXCESS= .0000E+00 OUTFLOW= .1865E+03 BASIN STORAGE= .4344E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP40	MANE	1.65	553.33	216.75	.55	3.00	548.17	216.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1794E+03 EXCESS= .0000E+00 OUTFLOW= .1791E+03 BASIN STORAGE= .4267E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1814.66	213.00	2.11	3.00	1814.66	213.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1393E+03 EXCESS= .0000E+00 OUTFLOW= .1394E+03 BASIN STORAGE= .6152E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1641.03	213.00	1.89	3.00	1641.03	213.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1248E+03 EXCESS= .0000E+00 OUTFLOW= .1248E+03 BASIN STORAGE= .5939E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1521.80	213.00	1.74	3.00	1521.80	213.00	1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1149E+03 EXCESS= .0000E+00 OUTFLOW= .1150E+03 BASIN STORAGE= .5784E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1452.22	213.00	1.65	3.00	1452.22	213.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1092E+03 EXCESS= .0000E+00 OUTFLOW= .1093E+03 BASIN STORAGE= .5691E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1355.28	213.00	1.54	3.00	1355.28	213.00	1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1013E+03 EXCESS= .0000E+00 OUTFLOW= .1014E+03 BASIN STORAGE= .5556E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3B3C	MANE	3.00	1255.91	213.00	1.41	3.00	1255.91	213.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9334E+02 EXCESS= .0000E+00 OUTFLOW= .9338E+02 BASIN STORAGE= .5413E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	2121.86	219.00	2.08	3.00	2121.86	219.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1731E+03 EXCESS= .0000E+00 OUTFLOW= .1734E+03 BASIN STORAGE= .1412E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	1924.81	219.00	1.86	3.00	1924.81	219.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1550E+03 EXCESS= .0000E+00 OUTFLOW= .1551E+03 BASIN STORAGE= .1363E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	1787.39	219.00	1.72	3.00	1787.39	219.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1426E+03 EXCESS= .0000E+00 OUTFLOW= .1428E+03 BASIN STORAGE= .1328E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	1706.34	219.00	1.63	3.00	1706.34	219.00	1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1355E+03 EXCESS= .0000E+00 OUTFLOW= .1357E+03 BASIN STORAGE= .1306E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	1585.19	219.00	1.51	3.00	1585.19	219.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1257E+03 EXCESS= .0000E+00 OUTFLOW= .1258E+03 BASIN STORAGE= .1221E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP41	MANE	3.00	1468.27	219.00	1.39	3.00	1468.27	219.00	1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1157E+03 EXCESS= .0000E+00 OUTFLOW= .1158E+03 BASIN STORAGE= .1117E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	3328.85	222.00	1.01	3.00	3328.85	222.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4424E+03 EXCESS= .0000E+00 OUTFLOW= .4407E+03 BASIN STORAGE= .3708E+01 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	2985.78	222.00	.93	3.00	2985.78	222.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4064E+03 EXCESS= .0000E+00 OUTFLOW= .4048E+03 BASIN STORAGE= .3638E+01 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	2733.81	222.00	.87	3.00	2733.81	222.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3817E+03 EXCESS= .0000E+00 OUTFLOW= .3797E+03 BASIN STORAGE= .3583E+01 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	2587.27	222.00	.84	3.00	2587.27	222.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3673E+03 EXCESS= .0000E+00 OUTFLOW= .3654E+03 BASIN STORAGE= .3551E+01 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	2413.90	225.00	.79	3.00	2413.90	225.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3473E+03 EXCESS= .0000E+00 OUTFLOW= .3454E+03 BASIN STORAGE= .3506E+01 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

RCP42	MANE	3.00	2240.84	225.00	.75	3.00	2240.84	225.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3268E+03 EXCESS= .0000E+00 OUTFLOW= .3249E+03 BASIN STORAGE= .3446E+01 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	3284.63	237.00	1.00	3.00	3284.63	237.00	1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4485E+03 EXCESS= .0000E+00 OUTFLOW= .4438E+03 BASIN STORAGE= .8632E+01 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	2921.79	240.00	.92	3.00	2921.79	240.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4114E+03 EXCESS= .0000E+00 OUTFLOW= .4068E+03 BASIN STORAGE= .8461E+01 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	2699.66	240.00	.86	3.00	2699.66	240.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3856E+03 EXCESS= .0000E+00 OUTFLOW= .3808E+03 BASIN STORAGE= .8328E+01 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	2574.72	240.00	.83	3.00	2574.72	240.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3708E+03 EXCESS= .0000E+00 OUTFLOW= .3661E+03 BASIN STORAGE= .8248E+01 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	2386.90	240.00	.78	3.00	2386.90	240.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3503E+03 EXCESS= .0000E+00 OUTFLOW= .3456E+03 BASIN STORAGE= .8138E+01 PERCENT ERROR= -1.0

FOR PLAN = 1 RATIO= .00

RCP43	MANE	3.00	2210.54	240.00	.73	3.00	2210.54	240.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3292E+03 EXCESS= .0000E+00 OUTFLOW= .3246E+03 BASIN STORAGE= .7995E+01 PERCENT ERROR= -1.0

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	218.51	234.00	1.32	3.00	218.51	234.00	1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2857E+02 EXCESS= .0000E+00 OUTFLOW= .2858E+02 BASIN STORAGE= .1128E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	189.95	237.00	1.14	3.00	189.95	237.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2478E+02 EXCESS= .0000E+00 OUTFLOW= .2479E+02 BASIN STORAGE= .9948E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	170.89	237.00	1.03	3.00	170.89	237.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2226E+02 EXCESS= .0000E+00 OUTFLOW= .2228E+02 BASIN STORAGE= .1270E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	159.93	237.00	.96	3.00	159.93	237.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2083E+02 EXCESS= .0000E+00 OUTFLOW= .2084E+02 BASIN STORAGE= .1044E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	144.76	237.00	.87	3.00	144.76	237.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1887E+02 EXCESS= .0000E+00 OUTFLOW= .1888E+02 BASIN STORAGE= .9693E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4BA3	MANE	3.00	129.38	237.00	.78	3.00	129.38	237.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1691E+02 EXCESS= .0000E+00 OUTFLOW= .1692E+02 BASIN STORAGE= .1254E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.18	3526.51	238.46	1.02	3.00	3488.27	237.00	1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4862E+03 EXCESS= .0000E+00 OUTFLOW= .4859E+03 BASIN STORAGE= .5080E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.22	3146.35	238.79	.93	3.00	3132.50	240.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4433E+03 EXCESS= .0000E+00 OUTFLOW= .4430E+03 BASIN STORAGE= .4975E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.26	2884.34	240.02	.86	3.00	2884.32	240.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4135E+03 EXCESS= .0000E+00 OUTFLOW= .4132E+03 BASIN STORAGE= .4894E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.28	2744.74	239.79	.83	3.00	2743.03	240.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3967E+03 EXCESS= .0000E+00 OUTFLOW= .3963E+03 BASIN STORAGE= .4845E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.31	2535.36	241.61	.78	3.00	2529.70	240.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3732E+03 EXCESS= .0000E+00 OUTFLOW= .3729E+03 BASIN STORAGE= .4778E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP44	MANE	1.34	2345.81	242.16	.73	3.00	2322.61	243.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3492E+03 EXCESS= .0000E+00 OUTFLOW= .3489E+03 BASIN STORAGE= .4693E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.81	7296.42	237.63	1.04	3.00	7289.76	237.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1921E+04 EXCESS= .0000E+00 OUTFLOW= .1920E+04 BASIN STORAGE= .1715E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.84	6425.72	238.09	.93	3.00	6381.33	237.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1709E+04 EXCESS= .0000E+00 OUTFLOW= .1708E+04 BASIN STORAGE= .1670E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.87	5792.80	238.82	.86	3.00	5789.30	240.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1582E+04 EXCESS= .0000E+00 OUTFLOW= .1580E+04 BASIN STORAGE= .1623E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.89	5441.54	240.41	.82	3.00	5438.90	240.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1516E+04 EXCESS= .0000E+00 OUTFLOW= .1515E+04 BASIN STORAGE= .1583E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.92	4985.87	240.28	.77	3.00	4983.95	240.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1424E+04 EXCESS= .0000E+00 OUTFLOW= .1423E+04 BASIN STORAGE= .1523E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP45	MANE	.95	4535.55	240.41	.72	3.00	4524.13	240.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1330E+04 EXCESS= .0000E+00 OUTFLOW= .1329E+04 BASIN STORAGE= .1460E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3A2B	MANE	3.00	555.74	219.00	1.72	3.00	555.74	219.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4718E+02 EXCESS= .0000E+00 OUTFLOW= .4722E+02 BASIN STORAGE= .1332E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2B	MANE	3.00	496.44	219.00	1.53	3.00	496.44	219.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4189E+02 EXCESS= .0000E+00 OUTFLOW= .4192E+02 BASIN STORAGE= .1283E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2B	MANE	3.00	455.53	219.00	1.40	3.00	455.53	219.00	1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3832E+02 EXCESS= .0000E+00 OUTFLOW= .3835E+02 BASIN STORAGE= .1247E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2B	MANE	3.00	430.82	219.00	1.32	3.00	430.82	219.00	1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3626E+02 EXCESS= .0000E+00 OUTFLOW= .3629E+02 BASIN STORAGE= .1112E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RC3A2B MANE 3.00 397.37 219.00 1.22 3.00 397.37 219.00 1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3343E+02 EXCESS= .0000E+00 OUTFLOW= .3346E+02 BASIN STORAGE= .1061E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RC3A2B MANE 3.00 363.53 222.00 1.12 3.00 363.53 222.00 1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3057E+02 EXCESS= .0000E+00 OUTFLOW= .3060E+02 BASIN STORAGE= .1034E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 764.87 222.00 1.28 3.00 764.87 222.00 1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6774E+02 EXCESS= .0000E+00 OUTFLOW= .6777E+02 BASIN STORAGE= .6099E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 669.05 222.00 1.12 3.00 669.05 222.00 1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5927E+02 EXCESS= .0000E+00 OUTFLOW= .5929E+02 BASIN STORAGE= .5683E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 603.08 222.00 1.02 3.00 603.08 222.00 1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5361E+02 EXCESS= .0000E+00 OUTFLOW= .5363E+02 BASIN STORAGE= .7647E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 569.75 225.00 .95 3.00 569.75 225.00 .95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5037E+02 EXCESS= .0000E+00 OUTFLOW= .5039E+02 BASIN STORAGE= .6681E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 524.96 225.00 .87 3.00 524.96 225.00 .87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4596E+02 EXCESS= .0000E+00 OUTFLOW= .4598E+02 BASIN STORAGE= .6478E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP46 MANE 3.00 479.06 225.00 .79 3.00 479.06 225.00 .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4154E+02 EXCESS= .0000E+00 OUTFLOW= .4155E+02 BASIN STORAGE= .5842E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 799.64 225.00 1.17 3.00 799.64 225.00 1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7729E+02 EXCESS= .0000E+00 OUTFLOW= .7730E+02 BASIN STORAGE= .9990E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 699.47 228.00 1.02 3.00 699.47 228.00 1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6728E+02 EXCESS= .0000E+00 OUTFLOW= .6729E+02 BASIN STORAGE= .1103E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 640.99 228.00 .92 3.00 640.99 228.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6063E+02 EXCESS= .0000E+00 OUTFLOW= .6063E+02 BASIN STORAGE= .1499E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 606.83 228.00 .86 3.00 606.83 228.00 .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5683E+02 EXCESS= .0000E+00 OUTFLOW= .5683E+02 BASIN STORAGE= .1297E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 557.19 228.00 .78 3.00 557.19 228.00 .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5165E+02 EXCESS= .0000E+00 OUTFLOW= .5166E+02 BASIN STORAGE= .1216E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP47 MANE 3.00 504.68 228.00 .71 3.00 504.68 228.00 .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4649E+02 EXCESS= .0000E+00 OUTFLOW= .4650E+02 BASIN STORAGE= .1079E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.79	7804.41	237.09	1.05	3.00	7803.22	237.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2014E+04 EXCESS= .0000E+00 OUTFLOW= .2013E+04 BASIN STORAGE= .1715E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.82	6840.57	238.00	.93	3.00	6815.60	237.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1789E+04 EXCESS= .0000E+00 OUTFLOW= .1788E+04 BASIN STORAGE= .1671E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.85	6160.36	238.22	.86	3.00	6148.07	240.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1654E+04 EXCESS= .0000E+00 OUTFLOW= .1653E+04 BASIN STORAGE= .1624E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.87	5787.01	238.14	.82	3.00	5778.77	240.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1585E+04 EXCESS= .0000E+00 OUTFLOW= .1583E+04 BASIN STORAGE= .1583E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.90	5297.38	240.81	.77	3.00	5295.48	240.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1487E+04 EXCESS= .0000E+00 OUTFLOW= .1485E+04 BASIN STORAGE= .1524E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP48	MANE	.93	4808.16	240.40	.72	3.00	4798.99	240.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1386E+04 EXCESS= .0000E+00 OUTFLOW= .1385E+04 BASIN STORAGE= .1461E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	104.75	222.00	.87	3.00	104.75	222.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9671E+01 EXCESS= .0000E+00 OUTFLOW= .9673E+01 BASIN STORAGE= .9610E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	89.12	222.00	.74	3.00	89.12	222.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8231E+01 EXCESS= .0000E+00 OUTFLOW= .8233E+01 BASIN STORAGE= .1288E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	78.67	222.00	.65	3.00	78.67	222.00	.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7284E+01 EXCESS= .0000E+00 OUTFLOW= .7286E+01 BASIN STORAGE= .1214E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	72.69	222.00	.60	3.00	72.69	222.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6748E+01 EXCESS= .0000E+00 OUTFLOW= .6749E+01 BASIN STORAGE= .1170E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	64.48	222.00	.54	3.00	64.48	222.00	.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6023E+01 EXCESS= .0000E+00 OUTFLOW= .6024E+01 BASIN STORAGE= .1122E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3B1B	MANE	3.00	56.28	222.00	.48	3.00	56.28	222.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5307E+01 EXCESS= .0000E+00 OUTFLOW= .5308E+01 BASIN STORAGE= .1036E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.18	7901.34	236.25	1.05	3.00	7899.15	237.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2035E+04 EXCESS= .0000E+00 OUTFLOW= .2033E+04 BASIN STORAGE= .2574E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.23	6917.48	238.80	.93	3.00	6889.44	240.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1807E+04 EXCESS= .0000E+00 OUTFLOW= .1805E+04 BASIN STORAGE= .2508E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.28	6235.11	239.76	.86	3.00	6232.19	240.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1670E+04 EXCESS= .0000E+00 OUTFLOW= .1668E+04 BASIN STORAGE= .2437E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.30	5859.13	239.68	.82	3.00	5855.27	240.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1599E+04 EXCESS= .0000E+00 OUTFLOW= .1597E+04 BASIN STORAGE= .2376E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.34	5354.21	240.22	.77	3.00	5350.77	240.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1499E+04 EXCESS= .0000E+00 OUTFLOW= .1497E+04 BASIN STORAGE= .2288E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP49	MANE	1.39	4854.51	241.50	.72	3.00	4837.29	243.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1397E+04 EXCESS= .0000E+00 OUTFLOW= .1395E+04 BASIN STORAGE= .2194E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	584.83	231.00	1.88	3.00	584.83	231.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4719E+02 EXCESS= .0000E+00 OUTFLOW= .4723E+02 BASIN STORAGE= .7244E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	531.11	231.00	1.68	3.00	531.11	231.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4215E+02 EXCESS= .0000E+00 OUTFLOW= .4220E+02 BASIN STORAGE= .6993E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	490.74	231.00	1.54	3.00	490.74	231.00	1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3875E+02 EXCESS= .0000E+00 OUTFLOW= .3878E+02 BASIN STORAGE= .7090E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	466.15	231.00	1.47	3.00	466.15	231.00	1.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3678E+02 EXCESS= .0000E+00 OUTFLOW= .3681E+02 BASIN STORAGE= .7008E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	430.49	231.00	1.36	3.00	430.49	231.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3406E+02 EXCESS= .0000E+00 OUTFLOW= .3409E+02 BASIN STORAGE= .6888E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3A2A	MANE	3.00	392.27	231.00	1.25	3.00	392.27	231.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3131E+02 EXCESS= .0000E+00 OUTFLOW= .3133E+02 BASIN STORAGE= .6720E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.07	1219.67	213.11	1.53	3.00	1216.90	213.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1214E+03 EXCESS= .0000E+00 OUTFLOW= .1214E+03 BASIN STORAGE= .4101E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.18	1057.11	213.91	1.35	3.00	1053.11	213.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1070E+03 EXCESS= .0000E+00 OUTFLOW= .1070E+03 BASIN STORAGE= .4302E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.27	957.18	213.79	1.23	3.00	948.86	213.00	1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9727E+02 EXCESS= .0000E+00 OUTFLOW= .9728E+02 BASIN STORAGE= .4125E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.33	904.32	212.27	1.16	3.00	899.88	213.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9179E+02 EXCESS= .0000E+00 OUTFLOW= .9180E+02 BASIN STORAGE= .3978E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.42	826.96	213.11	1.06	3.00	823.87	213.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8413E+02 EXCESS= .0000E+00 OUTFLOW= .8414E+02 BASIN STORAGE= .4589E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP50	MANE	2.52	730.77	214.57	.96	3.00	730.39	213.00	.96	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7644E+02 EXCESS= .0000E+00 OUTFLOW= .7645E+02 BASIN STORAGE= .4721E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	226.06	225.00	1.36	3.00	226.06	225.00	1.36	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2583E+02 EXCESS= .0000E+00 OUTFLOW= .2583E+02 BASIN STORAGE= .1452E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	200.17	225.00	1.20	3.00	200.17	225.00	1.20	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2275E+02 EXCESS= .0000E+00 OUTFLOW= .2275E+02 BASIN STORAGE= .1969E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	182.61	225.00	1.09	3.00	182.61	225.00	1.09	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2068E+02 EXCESS= .0000E+00 OUTFLOW= .2069E+02 BASIN STORAGE= .1879E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	172.45	225.00	1.03	3.00	172.45	225.00	1.03	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1950E+02 EXCESS= .0000E+00 OUTFLOW= .1950E+02 BASIN STORAGE= .1745E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	158.41	225.00	.94	3.00	158.41	225.00	.94	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1787E+02 EXCESS= .0000E+00 OUTFLOW= .1787E+02 BASIN STORAGE= .1672E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-68	MANE	3.00	144.17	225.00	.85	3.00	144.17	225.00	.85	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1623E+02 EXCESS= .0000E+00 OUTFLOW= .1623E+02 BASIN STORAGE= .1596E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	212.60	231.00	1.52	3.00	212.60	231.00	1.52	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2792E+02 EXCESS= .0000E+00 OUTFLOW= .2793E+02 BASIN STORAGE= .9684E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	189.44	231.00	1.35	3.00	189.44	231.00	1.35	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2475E+02 EXCESS= .0000E+00 OUTFLOW= .2475E+02 BASIN STORAGE= .1258E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	173.68	231.00	1.23	3.00	173.68	231.00	1.23	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2261E+02 EXCESS= .0000E+00 OUTFLOW= .2261E+02 BASIN STORAGE= .1172E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	164.54	231.00	1.17	3.00	164.54	231.00	1.17	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2138E+02 EXCESS= .0000E+00 OUTFLOW= .2138E+02 BASIN STORAGE= .1136E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	151.93	231.00	1.07	3.00	151.93	231.00	1.07	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1968E+02 EXCESS= .0000E+00 OUTFLOW= .1968E+02 BASIN STORAGE= .1129E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1-70	MANE	3.00	139.08	231.00	.98	3.00	139.08	231.00	.98	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1797E+02 EXCESS= .0000E+00 OUTFLOW= .1797E+02 BASIN STORAGE= .1076E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	344.85	231.00	1.32	3.00	344.85	231.00	1.32	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4478E+02 EXCESS= .0000E+00 OUTFLOW= .4478E+02 BASIN STORAGE= .1083E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	303.54	231.00	1.16	3.00	303.54	231.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3936E+02 EXCESS= .0000E+00 OUTFLOW= .3936E+02 BASIN STORAGE= .9603E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	276.32	234.00	1.06	3.00	276.32	234.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3572E+02 EXCESS= .0000E+00 OUTFLOW= .3572E+02 BASIN STORAGE= .9040E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	260.64	234.00	.99	3.00	260.64	234.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3364E+02 EXCESS= .0000E+00 OUTFLOW= .3364E+02 BASIN STORAGE= .8786E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	239.01	234.00	.91	3.00	239.01	234.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3078E+02 EXCESS= .0000E+00 OUTFLOW= .3078E+02 BASIN STORAGE= .8663E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP68	MANE	3.00	217.06	234.00	.83	3.00	217.06	234.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2792E+02 EXCESS= .0000E+00 OUTFLOW= .2792E+02 BASIN STORAGE= .1118E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	2.98	768.07	226.60	1.28	3.00	765.43	228.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9799E+02 EXCESS= .0000E+00 OUTFLOW= .9799E+02 BASIN STORAGE= .2067E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	3.00	677.06	228.00	1.12	3.00	677.06	228.00	1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8595E+02 EXCESS= .0000E+00 OUTFLOW= .8595E+02 BASIN STORAGE= .1801E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	3.00	613.48	228.00	1.01	3.00	613.48	228.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7788E+02 EXCESS= .0000E+00 OUTFLOW= .7788E+02 BASIN STORAGE= .1715E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	3.00	576.77	228.00	.95	3.00	576.77	228.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7326E+02 EXCESS= .0000E+00 OUTFLOW= .7326E+02 BASIN STORAGE= .1673E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	3.00	526.15	228.00	.87	3.00	526.15	228.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6693E+02 EXCESS= .0000E+00 OUTFLOW= .6693E+02 BASIN STORAGE= .1636E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP69	MANE	3.00	474.97	228.00	.79	3.00	474.97	228.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6058E+02 EXCESS= .0000E+00 OUTFLOW= .6058E+02 BASIN STORAGE= .2060E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	947.42	231.00	1.28	3.00	947.42	231.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1208E+03 EXCESS= .0000E+00 OUTFLOW= .1208E+03 BASIN STORAGE= .2896E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	838.47	231.00	1.13	3.00	838.47	231.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1060E+03 EXCESS= .0000E+00 OUTFLOW= .1060E+03 BASIN STORAGE= .2542E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	760.71	231.00	1.02	3.00	760.71	231.00	1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9611E+02 EXCESS= .0000E+00 OUTFLOW= .9612E+02 BASIN STORAGE= .2436E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	715.71	231.00	.96	3.00	715.71	231.00	.96	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9043E+02 EXCESS= .0000E+00 OUTFLOW= .9043E+02 BASIN STORAGE= .2291E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	653.53	231.00	.88	3.00	653.53	231.00	.88	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8265E+02 EXCESS= .0000E+00 OUTFLOW= .8265E+02 BASIN STORAGE= .2224E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP70	MANE	3.00	590.53	231.00	.79	3.00	590.53	231.00	.79	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7484E+02 EXCESS= .0000E+00 OUTFLOW= .7484E+02 BASIN STORAGE= .2852E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	.83	9949.43	235.16	1.08	3.00	9893.43	237.00	1.08	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2340E+04 EXCESS= .0000E+00 OUTFLOW= .2339E+04 BASIN STORAGE= .2452E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	.87	8640.14	237.46	.96	3.00	8634.89	237.00	.96	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2075E+04 EXCESS= .0000E+00 OUTFLOW= .2074E+04 BASIN STORAGE= .2395E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	.91	7799.67	237.28	.88	3.00	7793.87	237.00	.88	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1913E+04 EXCESS= .0000E+00 OUTFLOW= .1912E+04 BASIN STORAGE= .2333E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	.93	7334.13	237.68	.84	3.00	7313.39	237.00	.84	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1828E+04 EXCESS= .0000E+00 OUTFLOW= .1827E+04 BASIN STORAGE= .2280E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	.97	6693.41	237.91	.79	3.00	6647.13	237.00	.79	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1709E+04 EXCESS= .0000E+00 OUTFLOW= .1708E+04 BASIN STORAGE= .2203E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC1TOT01	MANE	1.01	6015.47	239.19	.73	3.00	6011.21	240.00	.73	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1587E+04 EXCESS= .0000E+00 OUTFLOW= .1586E+04 BASIN STORAGE= .2121E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RC1TOT12	MANE	.28	9904.15	236.80	1.08	3.00	9903.82	237.00	1.08	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2342E+04 EXCESS= .0000E+00 OUTFLOW= .2341E+04 BASIN STORAGE= .1310E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .88

RC1TOT12	MANE	.30	8639.77	237.31	.96	3.00	8633.14	237.00	.96	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2077E+04 EXCESS= .0000E+00 OUTFLOW= .2076E+04 BASIN STORAGE= .1279E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .83

RC1TOT12	MANE	.28	7797.19	237.61	.88	3.00	7784.47	237.00	.88	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1915E+04 EXCESS= .0000E+00 OUTFLOW= .1914E+04 BASIN STORAGE= .1246E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .80

RC1TOT12	MANE	.34	7316.75	237.72	.84	3.00	7299.85	237.00	.84	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1829E+04 EXCESS= .0000E+00 OUTFLOW= .1828E+04 BASIN STORAGE= .1218E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .76

RC1TOT12	MANE	.23	6656.26	237.57	.79	3.00	6652.85	240.00	.79	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1710E+04 EXCESS= .0000E+00 OUTFLOW= .1709E+04 BASIN STORAGE= .1177E+01 PERCENT ERROR= .0

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          FOR PLAN = 1  RATIO=  .73
          RC1TOT12  MANE          .38   6010.84    240.45       .73      3.00   6006.19    240.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1588E+04 EXCESS= .0000E+00 OUTFLOW= .1587E+04 BASIN STORAGE= .1133E+01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .95
          RTC-LOOP  MANE          1.05     22.65    212.18       .95      3.00     22.34    213.00         .95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1847E+01 EXCESS= .0000E+00 OUTFLOW= .1852E+01 BASIN STORAGE= .9051E-05 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .88
          RTC-LOOP  MANE          1.00     20.19    212.70       .84      3.00     20.09    213.00         .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1647E+01 EXCESS= .0000E+00 OUTFLOW= .1652E+01 BASIN STORAGE= .9009E-05 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .83
          RTC-LOOP  MANE           .98     18.78    212.25       .78      3.00     18.55    213.00         .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1512E+01 EXCESS= .0000E+00 OUTFLOW= .1517E+01 BASIN STORAGE= .7348E-05 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .80
          RTC-LOOP  MANE          1.17     17.85    212.37       .73      3.00     17.66    213.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1434E+01 EXCESS= .0000E+00 OUTFLOW= .1438E+01 BASIN STORAGE= .8128E-05 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .76
          RTC-LOOP  MANE          1.19     16.57    212.47       .68      3.00     16.42    213.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1326E+01 EXCESS= .0000E+00 OUTFLOW= .1331E+01 BASIN STORAGE= .9528E-05 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .73
          RTC-LOOP  MANE          1.07     15.20    212.87       .62      3.00     15.17    213.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1218E+01 EXCESS= .0000E+00 OUTFLOW= .1223E+01 BASIN STORAGE= .1008E-04 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .95
          RTDUMMYG  MANE          2.30     59.66    216.68      1.48      3.00     58.98    216.00        1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9062E+01 EXCESS= .0000E+00 OUTFLOW= .9077E+01 BASIN STORAGE= .2924E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .88
          RTDUMMYG  MANE          2.34     53.88    217.31      1.32      3.00     52.86    216.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8106E+01 EXCESS= .0000E+00 OUTFLOW= .8116E+01 BASIN STORAGE= .2909E-04 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .83
          RTDUMMYG  MANE          2.34     49.19    216.65      1.22      3.00     48.50    219.00        1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7459E+01 EXCESS= .0000E+00 OUTFLOW= .7473E+01 BASIN STORAGE= .2842E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .80
          RTDUMMYG  MANE          2.41     46.81    218.45      1.16      3.00     46.22    219.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7086E+01 EXCESS= .0000E+00 OUTFLOW= .7097E+01 BASIN STORAGE= .3223E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .76
          RTDUMMYG  MANE          2.43     43.67    217.24      1.07      3.00     42.72    219.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6569E+01 EXCESS= .0000E+00 OUTFLOW= .6580E+01 BASIN STORAGE= .3469E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .73
          RTDUMMYG  MANE          2.48     40.42    218.23       .99      3.00     39.69    219.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6047E+01 EXCESS= .0000E+00 OUTFLOW= .6060E+01 BASIN STORAGE= .3083E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .95
          RC1TOT23  MANE          .23   9957.03    236.94      1.08      3.00   9956.39    237.00        1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2352E+04 EXCESS= .0000E+00 OUTFLOW= .2351E+04 BASIN STORAGE= .6935E+00 PERCENT ERROR=    .0
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FOR PLAN = 1 RATIO= .88
RC1TOT23 MANE .13 8682.68 237.25 .96 3.00 8675.64 237.00 .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2086E+04 EXCESS= .0000E+00 OUTFLOW= .2085E+04 BASIN STORAGE= .6774E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .83
RC1TOT23 MANE .26 7826.97 237.38 .88 3.00 7817.49 237.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1923E+04 EXCESS= .0000E+00 OUTFLOW= .1922E+04 BASIN STORAGE= .6599E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .80
RC1TOT23 MANE .11 7344.71 237.29 .84 3.00 7330.16 237.00 .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1837E+04 EXCESS= .0000E+00 OUTFLOW= .1836E+04 BASIN STORAGE= .6451E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .76
RC1TOT23 MANE .23 6691.61 239.91 .79 3.00 6691.54 240.00 .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1717E+04 EXCESS= .0000E+00 OUTFLOW= .1716E+04 BASIN STORAGE= .6232E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .73
RC1TOT23 MANE .21 6040.51 240.30 .73 3.00 6035.58 240.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1594E+04 EXCESS= .0000E+00 OUTFLOW= .1594E+04 BASIN STORAGE= .6001E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95
RC1TOT34 MANE .19 9965.24 236.98 1.08 3.00 9964.90 237.00 1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2354E+04 EXCESS= .0000E+00 OUTFLOW= .2354E+04 BASIN STORAGE= .4578E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .88
RC1TOT34 MANE .17 8683.13 237.16 .96 3.00 8679.66 237.00 .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2088E+04 EXCESS= .0000E+00 OUTFLOW= .2087E+04 BASIN STORAGE= .4471E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .83
RC1TOT34 MANE .13 7825.30 237.20 .88 3.00 7817.89 237.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1924E+04 EXCESS= .0000E+00 OUTFLOW= .1924E+04 BASIN STORAGE= .4356E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .80
RC1TOT34 MANE .18 7338.50 237.32 .84 3.00 7328.03 237.00 .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1838E+04 EXCESS= .0000E+00 OUTFLOW= .1838E+04 BASIN STORAGE= .4258E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .76
RC1TOT34 MANE .23 6696.55 240.00 .79 3.00 6696.54 240.00 .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1718E+04 EXCESS= .0000E+00 OUTFLOW= .1718E+04 BASIN STORAGE= .4258E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .73
RC1TOT34 MANE .13 6039.86 240.13 .73 3.00 6035.83 240.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+04 EXCESS= .0000E+00 OUTFLOW= .1595E+04 BASIN STORAGE= .3961E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC2 MANE 3.00 67.51 228.00 .68 3.00 67.51 228.00 .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7628E+01 EXCESS= .0000E+00 OUTFLOW= .7628E+01 BASIN STORAGE= .3152E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC2 MANE 3.00 56.15 228.00 .58 3.00 56.15 228.00 .58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6408E+01 EXCESS= .0000E+00 OUTFLOW= .6408E+01 BASIN STORAGE= .2752E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC2 MANE 3.00 48.60 228.00 .50 3.00 48.60 228.00 .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5614E+01 EXCESS= .0000E+00 OUTFLOW= .5614E+01 BASIN STORAGE= .2479E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC2	MANE	3.00	44.29	228.00	.46	3.00	44.29	228.00	.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5167E+01 EXCESS= .0000E+00 OUTFLOW= .5168E+01 BASIN STORAGE= .3244E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC2	MANE	3.00	38.44	228.00	.41	3.00	38.44	228.00	.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4567E+01 EXCESS= .0000E+00 OUTFLOW= .4568E+01 BASIN STORAGE= .2497E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC2	MANE	3.00	32.62	228.00	.36	3.00	32.62	228.00	.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3980E+01 EXCESS= .0000E+00 OUTFLOW= .3981E+01 BASIN STORAGE= .3037E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.73	162.59	215.81	.64	3.00	162.09	216.00	.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1477E+02 EXCESS= .0000E+00 OUTFLOW= .1477E+02 BASIN STORAGE= .6008E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.86	130.79	217.67	.54	3.00	130.27	216.00	.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1231E+02 EXCESS= .0000E+00 OUTFLOW= .1231E+02 BASIN STORAGE= .5218E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.97	114.76	216.91	.47	3.00	112.52	216.00	.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1073E+02 EXCESS= .0000E+00 OUTFLOW= .1074E+02 BASIN STORAGE= .6255E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	3.00	106.21	216.00	.43	3.00	106.21	216.00	.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9845E+01 EXCESS= .0000E+00 OUTFLOW= .9846E+01 BASIN STORAGE= .5150E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	3.00	92.03	216.00	.38	3.00	92.03	216.00	.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8651E+01 EXCESS= .0000E+00 OUTFLOW= .8652E+01 BASIN STORAGE= .4768E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	3.00	78.10	216.00	.33	3.00	78.10	216.00	.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7486E+01 EXCESS= .0000E+00 OUTFLOW= .7487E+01 BASIN STORAGE= .6157E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.28	197.40	216.81	.67	3.00	195.08	216.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1812E+02 EXCESS= .0000E+00 OUTFLOW= .1812E+02 BASIN STORAGE= .9858E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.38	161.50	217.67	.56	3.00	158.48	216.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1514E+02 EXCESS= .0000E+00 OUTFLOW= .1514E+02 BASIN STORAGE= .9680E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.45	140.03	217.86	.49	3.00	137.51	219.00	.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1324E+02 EXCESS= .0000E+00 OUTFLOW= .1324E+02 BASIN STORAGE= .9181E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.49	130.63	216.99	.45	3.00	128.52	219.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1216E+02 EXCESS= .0000E+00 OUTFLOW= .1216E+02 BASIN STORAGE= .9079E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.56	114.79	217.48	.40	3.00	113.47	219.00	.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1072E+02 EXCESS= .0000E+00 OUTFLOW= .1072E+02 BASIN STORAGE= .9831E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	1.66	97.52	217.35	.34	3.00	97.29	219.00	.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9303E+01 EXCESS= .0000E+00 OUTFLOW= .9303E+01 BASIN STORAGE= .9890E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.49	201.62	218.73	.70	3.00	200.97	219.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1909E+02 EXCESS= .0000E+00 OUTFLOW= .1909E+02 BASIN STORAGE= .3441E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.59	163.82	220.01	.58	3.00	162.36	219.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1602E+02 EXCESS= .0000E+00 OUTFLOW= .1602E+02 BASIN STORAGE= .3492E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.66	142.69	218.42	.51	3.00	142.45	219.00	.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1408E+02 EXCESS= .0000E+00 OUTFLOW= .1408E+02 BASIN STORAGE= .3709E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.70	133.84	218.80	.47	3.00	133.72	219.00	.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1298E+02 EXCESS= .0000E+00 OUTFLOW= .1298E+02 BASIN STORAGE= .3204E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.77	117.27	218.97	.42	3.00	117.26	219.00	.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1150E+02 EXCESS= .0000E+00 OUTFLOW= .1150E+02 BASIN STORAGE= .2948E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCRP1	MANE	2.86	100.17	219.94	.37	3.00	97.74	222.00	.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1003E+02 EXCESS= .0000E+00 OUTFLOW= .1003E+02 BASIN STORAGE= .3243E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RC1TOT45	MANE	.34	10268.14	237.32	1.08	3.00	10264.05	237.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2416E+04 EXCESS= .0000E+00 OUTFLOW= .2415E+04 BASIN STORAGE= .1779E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .88

RC1TOT45	MANE	.34	8942.00	237.47	.96	3.00	8924.79	237.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2141E+04 EXCESS= .0000E+00 OUTFLOW= .2140E+04 BASIN STORAGE= .1738E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .83

RC1TOT45	MANE	.43	8054.66	237.70	.88	3.00	8026.77	237.00	.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1973E+04 EXCESS= .0000E+00 OUTFLOW= .1971E+04 BASIN STORAGE= .1693E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .80

RC1TOT45	MANE	.43	7554.04	238.05	.84	3.00	7536.48	240.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1884E+04 EXCESS= .0000E+00 OUTFLOW= .1882E+04 BASIN STORAGE= .1655E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .76

RC1TOT45	MANE	.43	6879.81	240.15	.79	3.00	6878.19	240.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1760E+04 EXCESS= .0000E+00 OUTFLOW= .1758E+04 BASIN STORAGE= .1711E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .73

RC1TOT45	MANE	.42	6199.95	240.86	.73	3.00	6183.11	240.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1633E+04 EXCESS= .0000E+00 OUTFLOW= .1631E+04 BASIN STORAGE= .1540E+01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT17OND1	MANE	1.25	9.04	216.02	1.48	3.00	9.04	216.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7841E+00 EXCESS= .0000E+00 OUTFLOW= .7867E+00 BASIN STORAGE= .4907E-05 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .88

RT17OND1	MANE	1.43	8.09	216.01	1.31	3.00	8.09	216.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6950E+00 EXCESS= .0000E+00 OUTFLOW= .6978E+00 BASIN STORAGE= .4925E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .83

RT17OND1	MANE	1.37	7.39	215.30	1.19	3.00	7.37	216.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6349E+00 EXCESS= .0000E+00 OUTFLOW= .6372E+00 BASIN STORAGE= .4821E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .80

RT17OND1	MANE	1.49	6.99	215.42	1.13	3.00	6.97	216.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6003E+00 EXCESS= .0000E+00 OUTFLOW= .6023E+00 BASIN STORAGE= .5178E-05 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .76

RT17OND1	MANE	1.43	6.53	216.27	1.04	3.00	6.50	216.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5527E+00 EXCESS= .0000E+00 OUTFLOW= .5548E+00 BASIN STORAGE= .6127E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .73

RT17OND1	MANE	1.51	6.01	216.23	.95	3.00	5.97	216.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5047E+00 EXCESS= .0000E+00 OUTFLOW= .5067E+00 BASIN STORAGE= .4575E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .95

RTC-12ON	MANE	1.33	12.13	218.30	1.48	3.00	12.08	216.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1085E+01 EXCESS= .0000E+00 OUTFLOW= .1088E+01 BASIN STORAGE= .1814E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .88

RTC-12ON	MANE	1.50	10.82	217.63	1.31	3.00	10.73	216.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9623E+00 EXCESS= .0000E+00 OUTFLOW= .9645E+00 BASIN STORAGE= .2002E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .83

RTC-12ON	MANE	1.55	9.87	218.11	1.20	3.00	9.72	219.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8784E+00 EXCESS= .0000E+00 OUTFLOW= .8805E+00 BASIN STORAGE= .2127E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .80

RTC-12ON	MANE	1.60	9.34	217.99	1.13	3.00	9.23	219.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8303E+00 EXCESS= .0000E+00 OUTFLOW= .8323E+00 BASIN STORAGE= .1974E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .76

RTC-12ON	MANE	1.56	8.70	218.64	1.04	3.00	8.62	219.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7650E+00 EXCESS= .0000E+00 OUTFLOW= .7670E+00 BASIN STORAGE= .1812E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .73

RTC-12ON	MANE	1.64	7.97	218.47	.95	3.00	7.90	219.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6988E+00 EXCESS= .0000E+00 OUTFLOW= .7005E+00 BASIN STORAGE= .1792E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .95

RT6COND1	MANE	1.15	3.24	214.08	1.48	3.00	3.22	213.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2588E+00 EXCESS= .0000E+00 OUTFLOW= .2597E+00 BASIN STORAGE= .1158E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .88

RT6COND1	MANE	1.25	2.90	214.43	1.31	3.00	2.87	213.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2293E+00 EXCESS= .0000E+00 OUTFLOW= .2302E+00 BASIN STORAGE= .1094E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .83

RT6COND1	MANE	1.32	2.66	214.07	1.19	3.00	2.64	213.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2095E+00 EXCESS= .0000E+00 OUTFLOW= .2102E+00 BASIN STORAGE= .1429E-05 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .80

RT6COND1	MANE	1.29	2.53	214.34	1.13	3.00	2.50	213.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1981E+00 EXCESS= .0000E+00 OUTFLOW= .1988E+00 BASIN STORAGE= .1557E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .76

RT6COND1	MANE	1.30	2.35	215.30	1.04	3.00	2.32	213.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1824E+00 EXCESS= .0000E+00 OUTFLOW= .1831E+00 BASIN STORAGE= .1580E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .73

RT6COND1	MANE	1.35	2.16	215.48	.95	3.00	2.12	213.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1665E+00 EXCESS= .0000E+00 OUTFLOW= .1673E+00 BASIN STORAGE= .1148E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .95

RTDUMMYC	MANE	1.64	8.70	215.91	.45	3.00	8.66	216.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7057E+00 EXCESS= .0000E+00 OUTFLOW= .7096E+00 BASIN STORAGE= .1124E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .88

RTDUMMYC	MANE	1.70	7.72	214.91	.40	3.00	7.72	216.00	.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6255E+00 EXCESS= .0000E+00 OUTFLOW= .6286E+00 BASIN STORAGE= .1034E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .83

RTDUMMYC	MANE	1.80	7.12	216.04	.37	3.00	7.12	216.00	.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5714E+00 EXCESS= .0000E+00 OUTFLOW= .5743E+00 BASIN STORAGE= .8052E-05 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .80

RTDUMMYC	MANE	1.82	6.77	216.71	.35	3.00	6.75	216.00	.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5403E+00 EXCESS= .0000E+00 OUTFLOW= .5432E+00 BASIN STORAGE= .1102E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .76

RTDUMMYC	MANE	1.77	6.26	215.38	.32	3.00	6.22	216.00	.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4974E+00 EXCESS= .0000E+00 OUTFLOW= .5007E+00 BASIN STORAGE= .8685E-05 PERCENT ERROR= -.7

FOR PLAN = 1 RATIO= .73

RTDUMMYC	MANE	1.83	5.76	215.64	.29	3.00	5.72	216.00	.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4542E+00 EXCESS= .0000E+00 OUTFLOW= .4572E+00 BASIN STORAGE= .1048E-04 PERCENT ERROR= -.7

FOR PLAN = 1 RATIO= .95

RT24OND2	MANE	1.52	13.23	216.86	1.48	3.00	13.19	216.00	1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1164E+01 EXCESS= .0000E+00 OUTFLOW= .1169E+01 BASIN STORAGE= .1385E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .88

RT24OND2	MANE	1.59	11.88	216.73	1.31	3.00	11.76	216.00	1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1031E+01 EXCESS= .0000E+00 OUTFLOW= .1036E+01 BASIN STORAGE= .1283E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .83

RT24OND2	MANE	1.73	10.95	216.65	1.20	3.00	10.80	216.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9422E+00 EXCESS= .0000E+00 OUTFLOW= .9467E+00 BASIN STORAGE= .1117E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .80

RT24OND2	MANE	1.69	10.36	216.88	1.13	3.00	10.21	216.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8908E+00 EXCESS= .0000E+00 OUTFLOW= .8946E+00 BASIN STORAGE= .1084E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .76

RT24OND2	MANE	1.68	9.57	216.03	1.04	3.00	9.57	216.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8202E+00 EXCESS= .0000E+00 OUTFLOW= .8239E+00 BASIN STORAGE= .1220E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .73

RT24OND2	MANE	1.77	8.83	216.86	.95	3.00	8.65	216.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7489E+00 EXCESS= .0000E+00 OUTFLOW= .7523E+00 BASIN STORAGE= .1105E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .95

RT-1	MANE	1.54	1.07	216.31	.81	3.00	1.06	216.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8221E-01 EXCESS= .0000E+00 OUTFLOW= .8239E-01 BASIN STORAGE= .1336E-08 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .88

RT-1	MANE	1.61	.90	215.24	.69	3.00	.90	216.00	.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6979E-01 EXCESS= .0000E+00 OUTFLOW= .6995E-01 BASIN STORAGE= .1801E-08 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .83

RT-1	MANE	1.63	.81	216.38	.61	3.00	.80	216.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6163E-01 EXCESS= .0000E+00 OUTFLOW= .6181E-01 BASIN STORAGE= .1219E-08 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .80

RT-1	MANE	1.61	.75	216.37	.56	3.00	.74	216.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5702E-01 EXCESS= .0000E+00 OUTFLOW= .5720E-01 BASIN STORAGE= .1315E-08 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .76

RT-1	MANE	1.71	.65	217.16	.50	3.00	.65	216.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5079E-01 EXCESS= .0000E+00 OUTFLOW= .5089E-01 BASIN STORAGE= .1259E-08 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .73

RT-1	MANE	1.74	.58	217.14	.44	3.00	.57	216.00	.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4464E-01 EXCESS= .0000E+00 OUTFLOW= .4475E-01 BASIN STORAGE= .1464E-08 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .95

RT-2	MANE	.99	1.98	216.98	.81	3.00	1.97	216.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1603E+00 EXCESS= .0000E+00 OUTFLOW= .1605E+00 BASIN STORAGE= .3624E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .88

RT-2	MANE	.97	1.67	217.28	.69	3.00	1.67	216.00	.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1360E+00 EXCESS= .0000E+00 OUTFLOW= .1362E+00 BASIN STORAGE= .3325E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .83

RT-2	MANE	1.01	1.49	217.44	.61	3.00	1.47	216.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1202E+00 EXCESS= .0000E+00 OUTFLOW= .1204E+00 BASIN STORAGE= .3687E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .80

RT-2	MANE	1.08	1.38	217.07	.56	3.00	1.36	216.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1112E+00 EXCESS= .0000E+00 OUTFLOW= .1114E+00 BASIN STORAGE= .3579E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .76

RT-2	MANE	1.14	1.21	217.71	.50	3.00	1.20	216.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9900E-01 EXCESS= .0000E+00 OUTFLOW= .9910E-01 BASIN STORAGE= .3984E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .73

RT-2	MANE	1.19	1.06	218.30	.44	3.00	1.04	216.00	.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8705E-01 EXCESS= .0000E+00 OUTFLOW= .8713E-01 BASIN STORAGE= .3252E-08 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95

RTCLUB	MANE	2.56	4.77	216.02	1.46	3.00	4.77	216.00	1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4619E+00 EXCESS= .0000E+00 OUTFLOW= .4656E+00 BASIN STORAGE= .1416E-04 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .88

RTCLUB	MANE	2.71	4.32	215.57	1.30	3.00	4.29	216.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4135E+00 EXCESS= .0000E+00 OUTFLOW= .4175E+00 BASIN STORAGE= .1743E-04 PERCENT ERROR= -1.0

```
          FOR PLAN = 1  RATIO=  .83
            RTCLUB  MANE          2.73      3.90    216.93      1.20      3.00      3.86    216.00       1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3811E+00 EXCESS= .0000E+00 OUTFLOW= .3838E+00 BASIN STORAGE= .1573E-04 PERCENT ERROR=   -.7

          FOR PLAN = 1  RATIO=  .80
            RTCLUB  MANE          2.80      3.73    216.70      1.14      3.00      3.68    216.00       1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3625E+00 EXCESS= .0000E+00 OUTFLOW= .3655E+00 BASIN STORAGE= .1685E-04 PERCENT ERROR=   -.8

          FOR PLAN = 1  RATIO=  .76
            RTCLUB  MANE          2.82      3.50    215.36      1.06      3.00      3.46    216.00       1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3368E+00 EXCESS= .0000E+00 OUTFLOW= .3406E+00 BASIN STORAGE= .1241E-04 PERCENT ERROR=  -1.1

          FOR PLAN = 1  RATIO=  .73
            RTCLUB  MANE          2.98      3.20    216.97       .98      3.00      3.13    216.00        .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3111E+00 EXCESS= .0000E+00 OUTFLOW= .3145E+00 BASIN STORAGE= .1652E-04 PERCENT ERROR=  -1.1

          FOR PLAN = 1  RATIO=  .95
            RTDGC4  MANE          3.00     17.29    219.77     -1.00      3.00     17.19    222.00      -1.00


          FOR PLAN = 1  RATIO=  .88
            RTDGC4  MANE          3.00     15.75    222.13     -1.00      3.00     15.73    222.00      -1.00


          FOR PLAN = 1  RATIO=  .83
            RTDGC4  MANE          3.00     14.10    220.73     -1.00      3.00     13.92    222.00      -1.00


          FOR PLAN = 1  RATIO=  .80
            RTDGC4  MANE          3.00     13.31    223.42     -1.00      3.00     13.28    222.00      -1.00


          FOR PLAN = 1  RATIO=  .76
            RTDGC4  MANE          3.00     12.51    222.78     -1.00      3.00     12.35    222.00      -1.00


          FOR PLAN = 1  RATIO=  .73
            RTDGC4  MANE          3.00     11.13    221.07     -1.00      3.00     11.12    222.00      -1.00


          FOR PLAN = 1  RATIO=  .95
              RTGC4  MANE          2.49     12.27    217.98      1.03      3.00     11.90    219.00       1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9698E+00 EXCESS= .0000E+00 OUTFLOW= .9778E+00 BASIN STORAGE= .3051E-04 PERCENT ERROR=   -.8

          FOR PLAN = 1  RATIO=  .88
              RTGC4  MANE          2.77     10.34    217.69       .89      3.00     10.19    219.00        .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8376E+00 EXCESS= .0000E+00 OUTFLOW= .8431E+00 BASIN STORAGE= .3349E-04 PERCENT ERROR=   -.7

          FOR PLAN = 1  RATIO=  .83
              RTGC4  MANE          2.73      9.21    220.07       .80      3.00      9.17    219.00        .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7498E+00 EXCESS= .0000E+00 OUTFLOW= .7558E+00 BASIN STORAGE= .3157E-04 PERCENT ERROR=   -.8

          FOR PLAN = 1  RATIO=  .80
              RTGC4  MANE          2.80      8.65    217.76       .74      3.00      8.56    219.00        .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6998E+00 EXCESS= .0000E+00 OUTFLOW= .7054E+00 BASIN STORAGE= .3222E-04 PERCENT ERROR=   -.8

          FOR PLAN = 1  RATIO=  .76
              RTGC4  MANE          3.00      7.99    219.44       .67      3.00      7.90    219.00        .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6318E+00 EXCESS= .0000E+00 OUTFLOW= .6373E+00 BASIN STORAGE= .3526E-04 PERCENT ERROR=   -.9

          FOR PLAN = 1  RATIO=  .73
              RTGC4  MANE          3.00      7.12    218.59       .60      3.00      7.07    219.00        .60
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .5642E+00 EXCESS= .0000E+00 OUTFLOW= .5686E+00 BASIN STORAGE= .4235E-04 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .95

RT-4	MANE	3.00	2.29	216.55	1.24	3.00	2.22	216.00	1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1472E+00 EXCESS= .0000E+00 OUTFLOW= .1517E+00 BASIN STORAGE= .2577E-04 PERCENT ERROR= -3.0

FOR PLAN = 1 RATIO= .88

RT-4	MANE	3.00	1.82	214.93	1.07	3.00	1.78	216.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1286E+00 EXCESS= .0000E+00 OUTFLOW= .1313E+00 BASIN STORAGE= .2722E-04 PERCENT ERROR= -2.1

FOR PLAN = 1 RATIO= .83

RT-4	MANE	3.00	1.85	216.84	.98	3.00	1.74	216.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1162E+00 EXCESS= .0000E+00 OUTFLOW= .1197E+00 BASIN STORAGE= .2408E-04 PERCENT ERROR= -3.0

FOR PLAN = 1 RATIO= .80

RT-4	MANE	3.00	1.53	214.86	.91	3.00	1.52	216.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1091E+00 EXCESS= .0000E+00 OUTFLOW= .1115E+00 BASIN STORAGE= .2440E-04 PERCENT ERROR= -2.3

FOR PLAN = 1 RATIO= .76

RT-4	MANE	2.71	1.59	217.80	.83	3.00	1.45	219.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9937E-01 EXCESS= .0000E+00 OUTFLOW= .1019E+00 BASIN STORAGE= .2251E-04 PERCENT ERROR= -2.6

FOR PLAN = 1 RATIO= .73

RT-4	MANE	2.87	1.36	217.40	.74	3.00	1.28	219.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8963E-01 EXCESS= .0000E+00 OUTFLOW= .9129E-01 BASIN STORAGE= .2198E-04 PERCENT ERROR= -1.9

FOR PLAN = 1 RATIO= .95

RT-5	MANE	2.66	4.25	217.53	.86	3.00	4.25	219.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4094E+00 EXCESS= .0000E+00 OUTFLOW= .4127E+00 BASIN STORAGE= .6544E-04 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .88

RT-5	MANE	2.80	3.78	217.65	.77	3.00	3.75	219.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3643E+00 EXCESS= .0000E+00 OUTFLOW= .3676E+00 BASIN STORAGE= .7612E-04 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .83

RT-5	MANE	2.85	3.56	218.47	.71	3.00	3.54	219.00	.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3369E+00 EXCESS= .0000E+00 OUTFLOW= .3399E+00 BASIN STORAGE= .6593E-04 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .80

RT-5	MANE	2.78	3.38	219.21	.67	3.00	3.36	219.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3199E+00 EXCESS= .0000E+00 OUTFLOW= .3226E+00 BASIN STORAGE= .6337E-04 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .76

RT-5	MANE	2.99	3.01	219.87	.63	3.00	2.97	219.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2984E+00 EXCESS= .0000E+00 OUTFLOW= .3013E+00 BASIN STORAGE= .6274E-04 PERCENT ERROR= -1.0

FOR PLAN = 1 RATIO= .73

RT-5	MANE	3.00	2.78	219.75	.59	3.00	2.74	219.00	.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2762E+00 EXCESS= .0000E+00 OUTFLOW= .2810E+00 BASIN STORAGE= .6309E-04 PERCENT ERROR= -1.8

FOR PLAN = 1 RATIO= .95

RT-6	MANE	3.00	1.88	219.38	.48	3.00	1.84	219.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1388E+00 EXCESS= .0000E+00 OUTFLOW= .1403E+00 BASIN STORAGE= .2097E-04 PERCENT ERROR= -1.1

FOR PLAN = 1 RATIO= .88

RT-6	MANE	3.00	1.40	218.38	.39	3.00	1.40	219.00	.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1126E+00 EXCESS= .0000E+00 OUTFLOW= .1142E+00 BASIN STORAGE= .2204E-04 PERCENT ERROR= -1.5

FOR PLAN = 1 RATIO= .83

RT-6	MANE	2.81	1.22	220.70	.33	3.00	1.18	222.00	.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9576E-01 EXCESS= .0000E+00 OUTFLOW= .9687E-01 BASIN STORAGE= .2428E-04 PERCENT ERROR= -1.2

FOR PLAN = 1 RATIO= .80

RT-6	MANE	2.99	1.04	220.50	.30	3.00	1.04	222.00	.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8644E-01 EXCESS= .0000E+00 OUTFLOW= .8818E-01 BASIN STORAGE= .2205E-04 PERCENT ERROR= -2.0

FOR PLAN = 1 RATIO= .76

RT-6	MANE	3.00	.90	223.89	.26	3.00	.84	225.00	.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7409E-01 EXCESS= .0000E+00 OUTFLOW= .7517E-01 BASIN STORAGE= .2078E-04 PERCENT ERROR= -1.5

FOR PLAN = 1 RATIO= .73

RT-6	MANE	2.73	.73	224.98	.22	3.00	.73	225.00	.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6220E-01 EXCESS= .0000E+00 OUTFLOW= .6361E-01 BASIN STORAGE= .2062E-04 PERCENT ERROR= -2.3

FOR PLAN = 1 RATIO= .95

RT-7	MANE	1.53	.67	213.01	.48	3.00	.67	213.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4037E-01 EXCESS= .0000E+00 OUTFLOW= .4070E-01 BASIN STORAGE= .1090E-05 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .88

RT-7	MANE	1.68	.53	213.48	.39	3.00	.52	213.00	.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3274E-01 EXCESS= .0000E+00 OUTFLOW= .3304E-01 BASIN STORAGE= .1294E-05 PERCENT ERROR= -.9

FOR PLAN = 1 RATIO= .83

RT-7	MANE	1.82	.44	213.12	.33	3.00	.43	213.00	.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2786E-01 EXCESS= .0000E+00 OUTFLOW= .2808E-01 BASIN STORAGE= .1214E-05 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .80

RT-7	MANE	1.79	.39	213.07	.30	3.00	.38	213.00	.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2515E-01 EXCESS= .0000E+00 OUTFLOW= .2539E-01 BASIN STORAGE= .1229E-05 PERCENT ERROR= -1.0

FOR PLAN = 1 RATIO= .76

RT-7	MANE	2.07	.34	214.19	.25	3.00	.31	213.00	.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2155E-01 EXCESS= .0000E+00 OUTFLOW= .2173E-01 BASIN STORAGE= .1301E-05 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .73

RT-7	MANE	2.19	.26	215.28	.21	3.00	.24	216.00	.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1809E-01 EXCESS= .0000E+00 OUTFLOW= .1834E-01 BASIN STORAGE= .1315E-05 PERCENT ERROR= -1.3

FOR PLAN = 1 RATIO= .95

RT-8	MANE	1.10	1.71	214.01	.47	3.00	1.71	213.00	.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1211E+00 EXCESS= .0000E+00 OUTFLOW= .1215E+00 BASIN STORAGE= .1137E-05 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .88

RT-8	MANE	1.20	1.37	214.57	.39	3.00	1.35	213.00	.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9823E-01 EXCESS= .0000E+00 OUTFLOW= .9862E-01 BASIN STORAGE= .1397E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .83

RT-8	MANE	1.19	1.16	215.09	.33	3.00	1.13	213.00	.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8357E-01 EXCESS= .0000E+00 OUTFLOW= .8393E-01 BASIN STORAGE= .1243E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .80

RT-8	MANE	1.34	1.02	214.96	.30	3.00	.99	213.00	.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7544E-01 EXCESS= .0000E+00 OUTFLOW= .7565E-01 BASIN STORAGE= .1323E-05 PERCENT ERROR= -.3

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 FOR PLAN = 1  RATIO=  .76
     RT-8  MANE          1.47       .85    215.31       .25      3.00       .82    216.00         .25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6466E-01 EXCESS= .0000E+00 OUTFLOW= .6493E-01 BASIN STORAGE= .1029E-05 PERCENT ERROR=   -.4

 FOR PLAN = 1  RATIO=  .73
     RT-8  MANE          1.47       .70    215.08       .21      3.00       .68    216.00         .21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5428E-01 EXCESS= .0000E+00 OUTFLOW= .5449E-01 BASIN STORAGE= .1303E-05 PERCENT ERROR=   -.4

 FOR PLAN = 1  RATIO=  .95
 RC1TOT56  MANE           .24  10330.86    237.20      1.08      3.00  10330.27    237.00        1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2431E+04 EXCESS= .0000E+00 OUTFLOW= .2431E+04 BASIN STORAGE= .7104E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .88
 RC1TOT56  MANE           .13   8989.82    237.22       .96      3.00   8979.14    237.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2155E+04 EXCESS= .0000E+00 OUTFLOW= .2154E+04 BASIN STORAGE= .6938E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .83
 RC1TOT56  MANE           .13   8088.67    237.33       .88      3.00   8072.51    237.00         .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1985E+04 EXCESS= .0000E+00 OUTFLOW= .1984E+04 BASIN STORAGE= .6760E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .80
 RC1TOT56  MANE           .22   7587.20    239.86       .84      3.00   7586.89    240.00         .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1895E+04 EXCESS= .0000E+00 OUTFLOW= .1894E+04 BASIN STORAGE= .6609E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .76
 RC1TOT56  MANE           .18   6923.42    240.21       .79      3.00   6920.52    240.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1770E+04 EXCESS= .0000E+00 OUTFLOW= .1769E+04 BASIN STORAGE= .6827E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .73
 RC1TOT56  MANE           .18   6225.90    240.39       .73      3.00   6215.22    240.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1642E+04 EXCESS= .0000E+00 OUTFLOW= .1642E+04 BASIN STORAGE= .6150E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .17  10342.24    237.00      1.08      3.00  10342.22    237.00        1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2436E+04 EXCESS= .0000E+00 OUTFLOW= .2436E+04 BASIN STORAGE= .5073E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .18   8990.58    237.16       .96      3.00   8985.41    237.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2159E+04 EXCESS= .0000E+00 OUTFLOW= .2158E+04 BASIN STORAGE= .4955E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .19   8086.73    237.64       .88      3.00   8081.10    240.00         .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1988E+04 EXCESS= .0000E+00 OUTFLOW= .1988E+04 BASIN STORAGE= .4827E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .19   7595.65    240.04       .84      3.00   7595.50    240.00         .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1899E+04 EXCESS= .0000E+00 OUTFLOW= .1898E+04 BASIN STORAGE= .4720E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .20   6926.35    240.16       .79      3.00   6924.77    240.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1773E+04 EXCESS= .0000E+00 OUTFLOW= .1773E+04 BASIN STORAGE= .4584E+00 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
 RC1TOT76  MANE           .21   6221.79    240.20       .73      3.00   6215.08    240.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1645E+04 EXCESS= .0000E+00 OUTFLOW= .1645E+04 BASIN STORAGE= .4392E+00 PERCENT ERROR=    .0
```

FOR PLAN = 1 RATIO= .95
RTDUMMYC MANE .55 15.24 210.88 11.92 3.00 14.80 210.00 11.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1263E+01 EXCESS= .0000E+00 OUTFLOW= .1265E+01 BASIN STORAGE= .7050E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .88
RTDUMMYC MANE .50 13.87 211.01 10.70 3.00 13.35 210.00 10.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1134E+01 EXCESS= .0000E+00 OUTFLOW= .1135E+01 BASIN STORAGE= .6152E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .83
RTDUMMYC MANE .46 12.80 211.17 9.87 3.00 12.36 210.00 9.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1046E+01 EXCESS= .0000E+00 OUTFLOW= .1048E+01 BASIN STORAGE= .6432E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .80
RTDUMMYC MANE .53 12.25 211.08 9.39 3.00 11.78 210.00 9.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9956E+00 EXCESS= .0000E+00 OUTFLOW= .9969E+00 BASIN STORAGE= .5798E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .76
RTDUMMYC MANE .56 11.36 210.85 8.73 3.00 10.98 210.00 8.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9257E+00 EXCESS= .0000E+00 OUTFLOW= .9269E+00 BASIN STORAGE= .5281E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .73
RTDUMMYC MANE .51 10.62 210.96 8.07 3.00 10.17 210.00 8.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8549E+00 EXCESS= .0000E+00 OUTFLOW= .8562E+00 BASIN STORAGE= .6791E-06 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .95
RTC- MANE 1.28 19.31 212.45 4.83 3.00 19.13 213.00 4.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1595E+01 EXCESS= .0000E+00 OUTFLOW= .1601E+01 BASIN STORAGE= .1451E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .88
RTC- MANE 1.20 17.49 212.55 4.33 3.00 17.33 213.00 4.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1428E+01 EXCESS= .0000E+00 OUTFLOW= .1434E+01 BASIN STORAGE= .1212E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .83
RTC- MANE 1.31 16.05 212.43 3.99 3.00 15.94 213.00 3.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1315E+01 EXCESS= .0000E+00 OUTFLOW= .1321E+01 BASIN STORAGE= .1266E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .80
RTC- MANE 1.36 15.23 213.26 3.79 3.00 15.16 213.00 3.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+01 EXCESS= .0000E+00 OUTFLOW= .1255E+01 BASIN STORAGE= .1374E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .76
RTC- MANE 1.30 14.19 213.28 3.52 3.00 14.13 213.00 3.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1160E+01 EXCESS= .0000E+00 OUTFLOW= .1166E+01 BASIN STORAGE= .1380E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .73
RTC- MANE 1.49 12.99 213.89 3.24 3.00 12.95 213.00 3.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1069E+01 EXCESS= .0000E+00 OUTFLOW= .1073E+01 BASIN STORAGE= .1092E-04 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .95
RTC-23ON MANE .68 31.94 214.20 2.54 3.00 31.56 213.00 2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2642E+01 EXCESS= .0000E+00 OUTFLOW= .2645E+01 BASIN STORAGE= .1428E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .88
RTC-23ON MANE .59 28.99 214.00 2.27 3.00 28.32 213.00 2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+01 EXCESS= .0000E+00 OUTFLOW= .2360E+01 BASIN STORAGE= .1476E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .83

RTC-23ON	MANE	.61	26.77	214.17	2.09	3.00	26.04	213.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2164E+01 EXCESS= .0000E+00 OUTFLOW= .2168E+01 BASIN STORAGE= .1499E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .80

RTC-23ON	MANE	.78	25.11	214.21	1.98	3.00	24.70	213.00	1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2053E+01 EXCESS= .0000E+00 OUTFLOW= .2055E+01 BASIN STORAGE= .1495E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .76

RTC-23ON	MANE	.65	23.60	214.19	1.83	3.00	22.91	213.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1901E+01 EXCESS= .0000E+00 OUTFLOW= .1904E+01 BASIN STORAGE= .1513E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .73

RTC-23ON	MANE	.80	21.42	214.64	1.68	3.00	21.01	213.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1743E+01 EXCESS= .0000E+00 OUTFLOW= .1745E+01 BASIN STORAGE= .1333E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95

RTMAIN	MANE	3.00	2.67	214.29	1.65	3.00	2.47	213.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2289E+00 EXCESS= .0000E+00 OUTFLOW= .2327E+00 BASIN STORAGE= .1269E-04 PERCENT ERROR= -1.7

FOR PLAN = 1 RATIO= .88

RTMAIN	MANE	3.00	2.43	214.87	1.50	3.00	2.27	216.00	1.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2083E+00 EXCESS= .0000E+00 OUTFLOW= .2120E+00 BASIN STORAGE= .1040E-04 PERCENT ERROR= -1.8

FOR PLAN = 1 RATIO= .83

RTMAIN	MANE	3.00	2.23	214.43	1.41	3.00	2.11	216.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1945E+00 EXCESS= .0000E+00 OUTFLOW= .1991E+00 BASIN STORAGE= .1089E-04 PERCENT ERROR= -2.4

FOR PLAN = 1 RATIO= .80

RTMAIN	MANE	3.00	2.26	215.46	1.35	3.00	2.16	216.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1865E+00 EXCESS= .0000E+00 OUTFLOW= .1907E+00 BASIN STORAGE= .1453E-04 PERCENT ERROR= -2.3

FOR PLAN = 1 RATIO= .76

RTMAIN	MANE	3.00	2.20	217.02	1.28	3.00	2.11	216.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1755E+00 EXCESS= .0000E+00 OUTFLOW= .1799E+00 BASIN STORAGE= .1459E-04 PERCENT ERROR= -2.5

FOR PLAN = 1 RATIO= .73

RTMAIN	MANE	3.00	1.96	215.92	1.20	3.00	1.94	216.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1643E+00 EXCESS= .0000E+00 OUTFLOW= .1685E+00 BASIN STORAGE= .1357E-04 PERCENT ERROR= -2.5

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

C-1 Watershed Hydrologic Reference Data

C-1 Channel System Flood Insurance Restudy per Carter & Burgess, December 2002

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

DRAFT

C-1 CHANNEL SYSTEM FLOOD INSURANCE RESTUDY

DECEMBER, 2002

Prepared by Carter & Burgess, Inc.

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SECTION 1.0 INTRODUCTION

Section 1.1 Purpose of Study

This Flood Insurance Study (FIS) has been prepared to revise and update a previous FIS report/flood Insurance Rate Map (FIRM) for the City of Henderson, Clark County, Nevada. This information will be used by the City of Henderson to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development. Changes to the floodplain are the result of the construction of structural flood control facilities funded by the Clark County Regional Flood Control District (CCRFCD). Figure 1 is a general vicinity map illustrating the watershed location in relation to the Las Vegas Valley.

Section 1.2 Authority and Acknowledgements

The sources of authority for this Flood Insurance Restudy are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Carter & Burgess, Inc. (C&B) prepared the hydrologic and hydraulic analyses performed for this restudy in cooperation with the CCRFCD. C&B was authorized by the CCFRCD to perform this study for these portions of the City of Henderson under contract, "Agreement of Professional Services for C-1 Channel System Flood Insurance Restudy," dated December 13, 2001. This restudy has been prepared in accordance with the Federal Emergency Management Agency's (FEMA) "Guidelines and Specifications for Flood Hazard Mapping Partners," dated February 2002.

This Flood Insurance restudy was completed in October 2002.

Section 1.3 Coordination

The area of study was outlined by the CCRFCD and coordinated with the City of Henderson. These agencies provided available hydrologic and hydraulic data, including the draft 2001 Flood Control Master Plan Update for the Las Vegas Valley.

Coordination with the CCRFCD and the City of Henderson began on January 8, 2002. Regular monthly progress meetings were conducted and attended by representatives of C&B, CCRFCD, and City of Henderson. Coordination with FEMA's Technical Evaluation Contractor, Michael Baker Jr, Inc. was initiated by C&B on January 21, 2002. Both the CCRFCD and the City of Henderson have provided a technical review of this report, and concur with the results presented herein. Letters of concurrence, correspondence, written comments, progress meeting agendas and progress meeting minutes are included in Section 1, Volume 1 of the Appendix, titled "General Documentation."

SECTION 2.0 AREA STUDIED

Section 2.1 Scope of Study

This Flood Insurance Restudy has been performed in order to reflect physical changes that impact the effective floodplain in Township 22 South, and Range 63 East, and Township 23 South, Range 63 East, Mount Diablo Base & Meridian, City of Henderson, Clark County, Nevada. Portions of the following Flood Insurance Rate Map (FIRM) Community Panels with an effective date of September 27, 2002 are included in the study area:

- Community Panel 32003 2615E
- Community Panel 32003 2955E
- Community Panel 32003 2620E
- Community Panel 32003 2605E

The total area studied includes approximately 38 square miles, bounded by the McCullough Range on the south and west, the River Mountains on the east, Lake Mead Drive on the north, and C-1 Channel on the west. The C-1 watershed is divided into three basins, namely:

- **Upper C-1,** including the Black Mountain (Southwest C-1) Detention Basin, the Mission Hills Western Interceptor, the Mission Hills Detention Basin and NDOT Detention Ponds;
- **Central C-1,** including the Equestrian Detention Basin, the Equestrian Levee, and the Equestrian Outfall;
- **Lower C-1** including the East C-1 Detention Basin, and the East C-1 Detention Basin Levee;

Figure 2 illustrates the overall study area, including existing flood control facilities in the watershed. Figure 3 illustrates the location of Detailed Methods Hydraulics and existing FEMA Case Nos., whereas Figure 4 illustrates the location of Approximate Methods Hydraulics.

This restudy utilizes existing information wherever possible, including facility as-built survey information, Letters of Map Revision (LOMR's) and Conditional Letters of Map Revision (CLOMR's) previously issued by the Federal Emergency Management Agency (FEMA), and as-built channel improvement plans for specific reaches of the C-1 Channel. Refer to the Bibliography for a complete list of previous hydrologic models in the restudy area.

Several Special Flood Hazard Areas (SFHAs) were not studied because structural controls do not exist at this time. These areas are generally located between Boulder Highway and the Union Pacific Railroad, north of Interstate 515, as illustrated on Figure 4. The SFHA Zone A bounded by Newport Drive, Race Track Road, the C-1 Channel, and Burkholder Drive was not studied as this area will become a future park. Other areas not studied include previous, accepted cases submitted to FEMA, such as the Equestrian Detention Basin and Levee (Case No. 99-09-628P), and the Mission Hills Detention Basin and Levee (Case No. 95-09-934P).

Potential SFHAs associated with existing channels and detention basins were also not part of this study. These areas are currently not mapped as a SFHA in the latest Digital Flood Insurance Rate Maps (DFIRM's). Specifically, these areas include the NDOT detention basins at I-515 and College Drive, the NDOT channels associated with the Wagon Wheel Interchange, the Boulder Highway channel along the south right-of-way of Boulder Highway, and the SNWA detention basin.

A CLOMR was issued on May 25, 1999 under Case No. 99-09-066R for the East C-1 Detention Basin Flood Control Improvements. An address of the conditions that must be met before a final determination can be made on revising the effective FIRM is included in Section 2.1.2. It is hereby requested that a final determination be made in this case.

Annotated FIRM's have been prepared to indicate areas of change to the 100-year floodplain. These maps can be found in Volume III, Section 4 of the Appendix. Technical back-up data have been provided in both hard copy and digital format to aid in the review and archive process.

Section 2.2 Community Description

The City of Henderson is located in southern Nevada in Clark County, approximately 15 miles southeast of the City of Las Vegas, in the Mojave Desert (Figures 1 and 2). The City of Henderson has a population of approximately 207,640, as of April 2002. The total area contained within the restudy area is approximately 38 square miles. Land use in the study area is primarily residential, and includes limited commercial and industrial development.

The climate of the City of Henderson is arid, with an average annual precipitation of less than 6-inches. Rainfall is characterized by two distinct meteorological events in the summer and winter. Monsoonal activity delivers high intensity, short-duration thunderstorms typically from July to September. During winter months, however, precipitation from frontal and Pacific storm movements have longer storm durations, lowered intensities, and larger aerial extent.

Section 2.3 Principal Flood Problems

Most flood problems in the watershed have been mitigated by the construction of flood control facilities, as indicated in previous sections of this report. Detention basins and conveyance facilities form a ring around the northern and western perimeter of the McCullough Range and the River Mountains, intercepting storm flows approaching from

the south and east. The Black Mountain (Southwest C-1) Detention Basin—Mission Hills Western Interceptor—Mission Hills Detention Basin and Levee intercept storm flows from the south, whereas the Equestrian Detention Basin and Levee, and the East C-1 Detention Basin and Levee intercept storm flows from the east (Figure 2). These facilities provide adequate protection from potential flood hazards. It is important to note that the C-1 watershed no longer functions as an alluvial system because of the construction of flood control facilities.

2.3.1 Drake Channel

A preliminary analysis was completed to assess the Drake Channel's ability to meet FEMA standards and reduce flood hazard areas. The Drake Channel east of Race Track Road exists as an earthen trapezoidal channel with a series of 18 gabion drop structures. The Drake Channel is expected to accept a good portion of the 100-year flow from its tributary watersheds. However, although the completion of the East C-1 Detention Basin and Levee have significantly reduced the 100-year flow rate to the Drake Channel, until future planned flood control facilities are completed some flow can be expected to continue north past the channel.

The following issues concern the Drake Channel east of Rack Track Road:

- As-built and geotechnical information could not be located;
- The southern bank shows signs of rill and gully erosion. Much of this erosion appears to have occurred before the construction of the East C-1 Detention Basin and Levee and is no longer an issue. However, storm flows draining west and north of the East C-1 Levee still drain over the south bank at some locations, which may cause future rill and gully erosion.
- The Drake Channel does not meet minimum hydraulic standards. Velocities exceed 5 fps without riprap armoring, and minimum freeboard requirements for subcritical flow are exceeded. In some locations the 100-year water surface elevation is slightly higher than the channel left and right overbanks.

Because of the above issues with the Drake Channel, the CCRFCD has decided not to certify the channel until the East C-1 Levee is extended north to further cut-off and significantly reduce storm flows from reaching the Drake. For this report, an assumption was made in the hydrologic modeling that the 100-year peak discharge flows west in the Drake to the C-1 Channel. No attempt is made to remove existing SFHAs north of Drake Channel at this time.

Section 2.4 Flood Protection Measures

The City of Henderson is a rapidly developing community, and has adopted strict local development regulations in order to mitigate storm-related losses. In addition, the CCRFCD has developed specific criteria for floodplain development in their Hydrologic Criteria and Drainage Design Manual, dated December 1991, and revised August 1999.

The CCRFCD has constructed numerous major flood control facilities to protect the City of Henderson from flood related damages. New facilities are planned for construction in the City of Henderson as part of the Clark County Regional Flood Control District's Flood Control Master Plan, however, this study is based on existing facilities as of January 2002 (Figure 2). Photographs of flood control facilities in the study area are located in the field review, located in Section 5.1, Volume IV.

Because existing LOMR's have been filed for the Equestrian Detention Basin and Levee, and the Mission Hills Detention Basin and Levee, record drawings and supporting information will not be submitted as part of this study. However, record information and supporting documentation will be submitted for all facilities not approved by FEMA at this time.

The following flood control facilities are included in the study area:

Upper C-1 Basin:

- Black Mountain (Southwest C-1) Detention Basin (CCRFCD Facility No. C1CH 0167)
  - 247 acre-feet of storage
  - Inflow of 2261 cfs
  - Outflow of 184 cfs
  - Record Drawings
  - Construction Complete

- Mission Hills Western Interceptor (CCRFCD Facility No. C1CH 0871 to 1012).
  - Record drawings
  - Construction complete

- Mission Hills Detention Basin (CCRFCD Facility No. C1CH 0737)
  - FEMA Case No. 95-09-934P
  - 403 acre-feet of storage
  - Inflow of 3923 cfs
  - Outflow of 323 cfs
  - Record Drawings
  - Construction complete

- Mission Hills Levee (CCRFCD Facility No. C1CH 0737).
  - FEMA Case No. 95-09-934P
  - Record Drawings
  - Construction complete

- NDOT Detention Ponds (CCRFCD Facility No. C1CH 0658)
  - 188 of storage (Pond A, 94 acre-feet; Pond B, 94 acre-feet) of storage
  - Inflow of 915 cfs
  - Outflow of 658 cfs
  - Record Drawings (personal communication, NDOT)
  - Construction complete

Central C-1 Basin:

- Equestrian Levee (CCRFCD Facility No. C1EQ 0301 to 0349)
  - FEMA Case No. 99-09-628P
  - Record Drawings
  - Construction complete

- Equestrian Detention Basin (CCRFCD Facility No. C1EQ 0246)
  - FEMA Case No. 99-09-628P
  - 389 acre-feet of storage
  - Inflow of 4219 cfs
  - Outflow of 223 cfs
  - Record drawings
  - Construction complete

- C-1 Channel, Middle Reach (CCRFCD Facility No. C1CH 0412 to 0520)
  - Drawings dated 6/26/01
  - Construction complete May, 2002.
  - As-built survey yet to be completed by Contractor
  - Record Drawings

Lower C-1 Basin:

- East C-1 Detention Basin (CCRFCD Facility No. C1IT 0492)
  - FEMA Case No. 99-09-066R
  - 271 acre-feet of storage
  - Inflow of 2391 cfs
  - Outflow of 408 cfs
  - Record Drawings
  - Construction complete

- East C-1 Levee (CCRFCD Facility No. C1IT 0246)
  - FEMA Case No. 99-09-066R
  - Record drawings
  - Construction complete

- C-1 Channel (CCRFCD Facility No. C1CH 0174 to C1CH 0365)
  - Record drawings
  - Construction complete

SECTION 3.0 ENGINEERING METHODS

Section 3.1 Hydrologic Analysis

Hydrologic modeling was conducted pursuant to the criteria outlined in the CCRFCD's Hydrologic Criteria and Drainage Design Manual, and the U.S. Army Corps of Engineer's HEC-1 Flood Hydrograph Package Users Manual (HEC, 1990) for the Natural Resource Conservation Service (NRCS) Unit Hydrograph Option. The hydrologic models performed for this FIS restudy can be found in Section 2.1, Volumes 1 and 2, "Hydrologic Analysis."

3.1.1 Methodology

Input parameters for the HEC-1 models utilized basin area, soils classification, land use, run-off curve numbers, basin topography, point precipitation, rainfall duration and distribution, time of concentration, and hydrograph lag times. Subbasin delineations were based on the 2001 CCRFCD Master Plan Update to the greatest extent possible. However, substantial changes were made to reflect existing conditions, Clark County 5-foot contour data, and field reconnaissance. These changes were centered upstream of the Drake Channel in the River Mountains, and upstream of the Equestrian Detention Basin. Subbasin delineations used in the Equestrian Detention Basin LOMR (Case No. 99-09-628P) were used as much as practical, however, these also were modified to reflect existing conditions. Infiltration and storage characteristics of the subbasins were simulated in the model using runoff curve numbers. Composite curve numbers were developed for each subbasin based upon land use, soil type, vegetation type, and antecedent moisture content (AMC) Type II. Point rainfall depths used in the CCRFCD's 1996 Master Plan Update were applied to the subbasins and adjusted according to local depth-area reduction factors (DARFs) for storms of 6-hour duration. Recurrence intervals of 2, 10, 25, 50 and 100-year events were simulated over the entire study area using three separate storm distribution patterns. The SDN3, SDN4, and SDN5 storm distributions were modeled, and results are tabulated in Section 2.1.4 "Overall Storm HEC-1 Model," Volume II. Time of concentration (t_c) calculations for each subbasin were developed using the criteria outlined in the CCRFCD's Hydrologic Criteria and Drainage Design Manual. The lag times for subbasins were based on the following equation: TLAG = 0.6t. Time of concentration calculations used for model input are presented in Section 2.3.3 and 2.3.4 "Curve Number Calculations," and "Time of Concentration Calculations," Volume II. Figure 5 illustrates existing soil conditions. Figure 6 illustrates existing land use; Figure 7 illustrates an overall watershed map.

3.1.2 Regional Analysis

Figure 7 illustrates the C-1 watershed subbasin layout and routing of storm flows. Refer to this figure and Figure 2 during the following discussion.

The hydrologic analysis begins in the **Upper C-1 Basin**, and quantifies flow from subbasins contributing to CCRFCD facilities in that region. Runoff from subbasin C1H

begins at the top of the McCullough Range and is intercepted by the Black Mountain (Southwest C-1) Detention Basin. The outfall structure from this detention basin drains east through the Mission Hills Western Interceptor, which picks up runoff from subbasins C1HB1, C1G3A, C1G3B, C1G3C, and C1G3D. This facility directs flow to the Mission Hills Detention Basin, which also intercepts flow from subbasins C5ICB and C5I2A. Quantified outflow from the Mission Hills Detention Basin is then routed via an 84-inch pipe to the NDOT Detention Basin at I-515 and College Drive, and is routed to the upper C-1 Channel. Subbasins contributing flow in this area include C1G2B1, C1G2A, C1G2B, C1G2C, C1G2D, C5I1 and C5I1C. Subbasins in the Mission Hills Range include C5GB and C5GC, which are routed to subbasin C5GA. Runoff from these basins is routed south along Boulder Highway, where a future facility will convey stormwater to the C-1 Channel. A series of five small culverts under the Boulder Highway divert flow from subbasins C5I1B, C5GD, C5I1E, C5I1D, C1HF, C1HE, C1HD, C1HCB, and C1HB into the Central C-1 Basin, which were described in detail in a previous LOMR for the Equestrian Detention Basin, Case No. 95-09-934P. At least three other culverts cross Boulder Highway in the vicinity of the Race Track Road intersection, however, these were not included as part of this study (Figure 3). Land use in this drainage area is primarily residential, which is bisected by the existing railroad, I-515, and the Boulder Highway. Pertinent concentration points have been identified, and flows at these locations are tabulated on Figure 7. Please refer to the HEC-1 schematic and Figure 7 for model details on hydrograph routing parameters.

In the **Central C-1 Basin**, stormwater runoff from the southeastern portion of the region begins in the River Mountains in subbasins C5FA, C5FD, C5FB, C5FC, C5EA, C5EB, C5EC, C5ED, and C5DA. Flows quantified in these areas are routed along the Equestrian Levee to the Equestrian Detention Basin. Flows crossing through culverts under the Boulder Highway (Upper C-1 Basin), are routed through basins C5CA, C5CD, C5CC, C5CF, and C5CE to the Equestrian Detention Basin. Flow from basin C5DC, and C4BD are also directed to the Equestrian Detention Basin. The Southern Nevada Water Authority constructed a water treatment facility to treat raw water from Lake Mead before distribution to the Las Vegas Valley. Associated with this treatment facility is an onsite detention basin with a 48-inch pipeline outfall. This outfall drains subbasin C4BF to the Equestrian Detention Basin through subbasin C4BD. Flows discharging from the Equestrian Detention Basin are routed to the future Burkholder Channel. This outfall-- the Equestrian Detention Basin Outfall-- intercepts flow from subbasins C4A1C and C4A1B and directs these flows to the C-1 Channel. The C-1 Channel intercepts all flow from the Upper and Central C-1 basins at Burkholder Road. Pertinent concentration points have been identified and flows at these locations are tabulated on Figure 7. Refer to the HEC-1 schematic and Figure 7 for details on hydrograph routing parameters.

The **Lower C-1 Basin** includes hydrologic subbasins which begin in the River Mountains. Storm water runoff from subbasin C4CB is intercepted by the East C-1 Detention Basin. Outflow from this detention basin, as well as flow from subbasins C4CA, C3B3E and C3B3D are routed along the East C-1 Levee to the Drake Channel. The Drake Channel also intercepts flow from subbasin C4BA2, C3B3C, C3B3B, and C3B3A. Storm water runoff from subbasins C4BA3, C4A2A and C4A1A is then routed to the C-1 Channel. Below the Drake Channel, flow from subbasins C3A2B, C3A2A, C4BA1, C3B1D, C3B1C, C3B1B, C3B1A, C3A1B, and C3A1A are also routed to the C-1

Channel. Pertinent concentration points have been identified, and flows at these locations are tabulated in Tables 1 & 2, and on Figure 7. Please refer to the HEC-1 schematic and Figure 7 for details on hydrograph routing parameters.

3.1.3 Local Analysis

Detailed, local hydrologic analysis was necessary to quantify storm flows in subbasin C4A1. A SFHA Zone A adjacent to Newport Townhomes was removed by Approximate Methods Hydraulics. The hydrologic analysis, and associated exhibits, are located in Section 2.1.5. "Local Hydrology"—Volume II.

3.1.4 Study Assumptions and Modifications made to the existing Flood Insurance Study

Several assumptions have been made in development of this hydrology. For one, the study assumes that alluvial processes no longer apply to the C-1 system. This assumption is reasonable given the extensive construction of structural controls. The East C-1 Levee and East C-1 Detention Basin truncate the apex of an alluvial fan spreading west from the River Mountains. The Equestrian and Mission Hills flood control facilities further cutoff storm runoff and direct storm flows into detention basins with controlled outflow. Given this level of construction, Section "G" of the latest regulations for study contractors, titled "Flood Insurance Study Guidelines and Specifications for Study Contractors" does not apply. A newly created SFHA draining northwest from the East C-1 Levee is therefore categorized as a Zone A.

Another assumption has been made about the Drake Channel. Although the Drake Channel does not meet CCRFCD hydraulic criteria, it is assumed that the Drake Channel intercepts the 100-year peak discharge and conveys the flow to the C-1 Channel.

3.1.5 Results

Results from the hydrologic model were used to establish existing stormwater flows throughout the study area, and specific points of concentration were identified for input to the hydraulic model of the C-1 Channel in specific reaches. Table 1 is a storm flow summary for each subbasin based on an SDN3 storm distribution for the 1 percent chance storm event. Table 2 is a storm flow summary for each point of concentration based on SDN3, SDN4, and SDN5 for 1 percent chance storm event. SDN3 controls where the watershed is less than 8 square miles, whereas, SDN4 and SDN5 control where the watershed is between 8 and 12 square miles, and greater than 12 square miles, respectively.

Table 1 – Storm Flow Summary (SDN3)

Subbasin Number	Area (acres)	Area (sq mi)	100-yr pk discharge (cfs)
C1G1A	143.36	0.22	255
C1G1B	90.88	0.14	200
C1G2C	187.52	0.29	210
C1G2D	143.36	0.22	153
C1G3B	469.12	0.73	1014
C1G3C	670.72	1.05	1372
C1G3D	535.68	0.84	1246
C1A	89.60	0.14	149
C1B	241.28	0.38	450
C1C	147.20	0.23	213
C1D	256.00	0.40	338
C1G2A	221.44	0.35	309
C1G2B1	321.92	0.50	260
C1G2B2	197.76	0.31	230
C1G3A	174.72	0.27	358
C1H	2559.99	4.00	5490
C1HA	46.72	0.07	27
C1HB	94.08	0.15	278
C1HB1	288.00	0.45	305
C1HCB	115.84	0.18	249
C1HD	46.72	0.07	72
C1HE	94.08	0.15	115
C1HF	56.32	0.09	90
C1NA	264.96	0.41	744
C3A1A	239.36	0.37	433
C3A1B	673.92	1.05	1403
C3A2A	303.36	0.47	825
C3A2B	327.68	0.51	769
C3B1A	160.64	0.25	170
C3B1B	128.00	0.20	139
C3B1C	153.60	0.24	374
C3B1D	156.80	0.25	215
C3B3A	327.68	0.51	838
C3B3B	204.80	0.32	508
C3B3C	793.60	1.24	2610
C3B3D	160.00	0.25	455
C3B3E	147.20	0.23	396
C4A1	223.36	0.35	248
C4A1A	189.44	0.30	109
C4A1B	172.80	0.27	134

Subbasin Number	Area (acres)	Area sq (mi)	100-yr pk discharge (cfs)
C4A1C	332.80	0.52	481
C4A1D	38.40	0.06	52
C4A2A	160.00	0.25	322
C4A2B	160.00	0.25	203
C4BA1	294.40	0.46	289
C4BA2	72.32	0.11	92
C4BA3	260.48	0.41	296
C4BB	222.72	0.35	377
C4BC	153.60	0.24	255
C4BD	335.36	0.52	409
C4BE	140.80	0.22	241
C4BF	166.40	0.26	417
C4CA	128.00	0.20	237
C4CB	3455.99	5.40	10493
C5GA	174.08	0.27	109
C5GB	204.80	0.32	451
C5GC	70.85	0.11	223
C5GD	289.28	0.45	163
C5CA	190.08	0.30	185
C5CB	89.60	0.14	127
C5CC	214.40	0.34	286
C5CD	170.88	0.27	153
C5CE	207.36	0.32	221
C5CF	206.72	0.32	228
C5DA	650.24	1.02	2210
C5DB	346.24	0.54	1079
C5DC	206.08	0.32	601
C5EA	311.68	0.49	690
C5EB	369.28	0.58	806
C5EC	140.80	0.22	179
C5ED	103.68	0.16	178
C5FA	334.72	0.52	1125
C5FB	158.08	0.25	167
C5FC	142.08	0.22	191
C5FD	112.64	0.18	294
C5I1	153.60	0.24	238
C5I1B	337.92	0.53	479
C5I1C	32.00	0.05	68
C5I1D	71.04	0.11	126
C5I1E	104.32	0.16	266
C5I2A	896.00	1.40	1698
C5ICB	469.12	0.73	850

Table 2 – Storm Flow Summary (SDN3 – SDN5)

Concentration Point	Area (acres)	Area sq (mi)	100-yr pk discharge (cfs)
1			
2	2854.39	4.46	481
3	3027.19	4.73	637
4	3494.39	5.46	1343
5	4166.38	6.51	2442
6	6067.18	9.48	4916
7	7155.17	11.18	915
8	7417.57	11.59	799
9	281.60	0.44	626
10	454.40	0.71	665
11	844.80	1.32	798
12	908.80	1.42	870
13	403.20	0.63	574
14	1407.99	2.20	1315
15	1452.79	2.27	1185
16	198.40	0.31	291
17	288.00	0.45	478
18	1855.99	2.90	1522
19	2092.79	3.27	1431
20	9561.56	14.94	1178
21	403.20	0.63	531
22	10246.36	16.01	1511
23	10335.96	16.15	1549
24	3743.99	5.85	4748

Concentration Point	Area (acres)	Area sq (mi)	100-yr pk discharge (cfs)
25	396.80	0.62	307
26	608.00	0.95	508
27	774.40	1.21	589
28	601.60	0.94	1447
29	742.40	1.16	1506
30	1056.00	1.65	2023
31	1542.39	2.41	2964
32	1644.79	2.57	3001
33	2668.79	4.17	4356
34	4620.78	7.22	960
35	5177.58	8.09	1417
36	364.80	0.57	615
37	524.80	0.82	704
38	16198.34	25.31	2546
39	3731.19	5.83	607
40	3891.18	6.08	953
41	998.40	1.56	2788
42	5215.98	8.15	3427
43	5305.58	8.29	3482
44	5734.38	8.96	3914
45	22092.71	34.52	4380
46	633.60	0.99	1052
47	793.60	1.24	1104
48	23039.91	36.00	4660
49	23334.31	36.46	4702
50	953.60	1.49	1434
51	24524.70	38.32	5175

Section 3.2 Hydraulic Analysis

Hydraulic modeling was performed using the U.S. Army Corps of Engineer's HEC-RAS hydraulic modeling program. This program performs steady flow calculations, intended for calculating water surface profiles for steady or gradually varied flow. HEC-RAS includes a culvert analysis routing adapted from the Federal Highway Administration's Hydraulic Design of Highway Culverts Publication HDS No. 5 (FHWA 1985). The computational procedure is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction (Manning's Equation), and contraction/expansion (coefficient multiplied by the change in velocity head). The momentum equation is utilized in situations where the water surface profile is rapidly varied, as in hydraulic jumps, or at junction structures.

3.2.1 Detailed Zone A Analysis

Cross sections for the C-1 Channel detailed hydraulic analysis were developed using as-built facility construction plans, and were supplemented with ground survey information and field reconnaissance. Hydraulic structures were detailed using these same plans, and also supplemented with field reconnaissance and ground surveys. Two separate facilities were studied to this level of detail, namely 1) the C-1 Channel from Lake Mead Drive to Boulder Highway, and 2) the East C-1 Levee.

3.2.1.1 C-1 Channel, Lake Mead Drive to Boulder Highway

Base maps for C-1 Channel hydraulics were assembled using three sets of existing plans for the lower and middle reaches. The model on the lower reach was based on plans prepared by VTN Nevada, titled "C-1 Channel, Lake Mead Drive to the Drake Confluence," dated 1993, and "C-1 Channel Phase II, Drake Confluence to Burkholder Boulevard" dated 1994. The datum for these plans was based on 1929 National Geodetic Vertical Datum (NGVD). The model on the middle reach was based on plans prepared by the LBG, titled "Upper and Middle Reaches of the C-1 Channel, Phase 1," dated 2001. The LBG plans were based on 1988 North American Vertical Datum (NAVD), therefore, the VTN plans were adjusted vertically to conform to the 1988 NAVD by adding 1.86 feet to match LBG plan elevations. Base maps from the three sets of plans were tied together to form one continuous hydraulic base map from Lake Mead Drive to Boulder Highway, which is located in Section 2.2.1.1 " C-1 Channel, Lake Mead Drive to Boulder Highway." in Volume II.

In general, the C-1 Channel is concrete lined, varying in cross section configuration from trapezoidal to rectangular, and slopes at ~ 2 % to the north. Velocities range from 37.46 fps to 15.63 fps under supercritical flow conditions, with one notable exception at the Drake Channel confluence. Immediately upstream of the Drake Channel confluence a drop structure/energy dissipater forces a hydraulic jump to subcritical flow conditions at the confluence. Downstream of the Drake confluence channel flow resumes at 1.07 % slope and the flow regime becomes supercritical once again. Transition structures are located at various bridge crossings, such that the trapezoidal cross section transitions to

a rectangular section upstream and downstream of the bridge. The following is a list of bridge structures modeled between Lake Mead Drive and Boulder Highway:

- Lake Mead Drive
- Warm Springs Road Crossing
- Pedestrian Crossing
- Burkholder Boulevard
- Boulder Highway

Channel roughness coefficients were derived from the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual, Table 702, which assigns Manning's Roughness Coefficients to different types of channel lining. Cross sections were placed at changes in channel geometry, and at all hydraulic structures as recommended in the HEC-RAS User's Manual. Cross section locations are depicted on the hydraulic base maps, as shown in Section 4.3.3 "C-1 Channel" in Volume III.

The report entitled *Alternatives Summary memorandum for the Upper & Middle Reaches of the C-1 Channel*, prepared by the LBG, dated December 22, 1999, included an analysis of the potential for roll waves formulation in the C-1 Channel. Because of the relative steepness of the channel, and resulting supercritical flow regime; the potential for roll wave formulation was analyzed by LBG. Based on the results of this report, which was reviewed and approved by the CCRFCD and the City of Henderson, LBG concluded that sufficient length between major hydraulic structures (transition structures and culverts) would prevent the formation of roll waves (slug flow). This being the case, the study contractor has not included a roll wave analysis in this FIS restudy, as the conditions computed by the LBG are representative of the reach of the C-1 Channel being studied herein by detailed methods.

Photographs of all hydraulic structures in the C-1 Channel have been taken, and are included in 5.1 "Field Review/Photographs," in Volume IV. Figure 3 illustrates the sections of the C-1 Channel studied by detailed methods hydraulics.

3.2.1.2 East C-1 Levee

The East C-1 Levee was constructed as part of the East C-1 Detention Basin in April, 1998. Both the detention basin and the levee were constructed to protect the Southern Nevada Water Authority (SNWA) River Mountains Treatment Plant, effectively truncating the apex of the alluvial fan spreading west from the River Mountains escarpment. The levee has a 7:1ss floodside, lined with 12-inches of soil cement, whereas the landward side has 4:1ss. The 100-year storm flows leaving the detention basin are 96.8 cfs, (bulked 10%; see Section 3.4.1, Sedimentation Analysis, for bulking factor determination), with slow velocities (< 5 fps) and shallow depth of flow (<1 foot). Flows increase to 667.7 cfs (10% bulked) where an unnamed wash drains west from the River Mountains. Detailed Methods Hydraulics were done for the East C-1 Levee but combined with Reach 2C using Approximate Methods Hydraulics. A hydraulic work map for the levee is located in Section 4.3.3, Volume IV. Further information such as plans, design reports, and getechnical information is provided electronically in Section 5, "Miscellaneous Reference Material," Volume IV.

3.2.2 Approximate Zone A Analysis

An approximate analysis was performed for three reaches in order to re-define the SFHA Zone A for the specific reach. These reaches have been named Reach 2, Reach 3, and Reach 4, as described below.

3.2.2.1 Reach 2

Reach 2 is broken into three segments: Reach 2A, 2B, and 2C. The intent of the Approximate Methods Hydraulics for Reach 2 is to define the SFHA associated with the storm flows leaving the East C-1 Levee and River Mountains.

Storm flows from Reach 2B and Reach 2C combine to form Reach 2A immediately north of the East C-1 Levee (3830 cfs, 10% bulked). Velocities for this reach range from 6.2 to 8 fps with depths greater than 1-foot, therefore defining a SFHA Zone A, as shown on the annotated FIRM and 400 scale approximate methods work maps.

Reach 2C was modeled using the plans from the East C-1 Levee, as described in Section 3.2.1.2. A SFHA Zone A was defined where storm flows increased to 667.7 cfs (10% bulked) because depths were greater than 1-foot. The newly defined SFHA ties to the existing SFHA Zone A upstream in the River Mountains. Where the 100-year peak drops to 96.8 cfs, depths are less than 1-foot and therefore the SFHA Zone A has been removed up to the Black Mountain(Southwest C-1) Detention Basin.

Reach 2B models 3769 cfs (10% bulked) draining west from the River Mountains. A SFHA Zone A is necessary as depths of flow are greater than 1-foot. This newly created SFHA ties into an existing SFHA Zone A located in the River Mountains. Velocities for this reach range from 10.4 to 10.9 fps.

3.2.2.2 Reach 3

Reach 3 is located on the eastern edge of subbasin C1NA, at the location of Foothills High School. The intent of this model is to demonstrate the 100-year peak discharge is contained in the existing channel immediately downstream (north) of the NDOT Detention Basins. Velocities for this reach range from 5.4 to 9.3 fps, conveying 1006 cfs (10% bulked), greater than 1-foot in depth. The SFHA Zone A is therefore modified to the existing channel.

3.2.2.3 Reach 4

Reach 4 is located immediately downstream of the Black Mountain (Southwest C-1) Detention and Mission Hills Western Interceptor. The intent of this model is to reduce or eliminate the SFHA Zone A located in subbasins C1G2B1 and C1G2B2. The model reach upstream of cross section 12 shows flow depths less than 1-foot, with velocities less than 5 fps, at a flow rate of 286 cfs (10% bulked) therefore allowing for the removal

of the SFHA Zone A in C1G2B1. The lower half of Reach 4 (cross sections 1-12) shows flows depths greater than 1-foot, with velocities ranging from 4.3 to 7.3 fps, and a flow rate of 490 to 799 cfs (10% bulked). The SFHA Zone A was redefined based on the 100-year water surface elevations, but not entirely removed.

Section 3.3 Vertical Datum

All base flood elevations shown in the FIS Restudy have been referenced to NAVD88. Because the community and some of the as-built information utilized was referenced to NGVD29, a vertical adjustment factor of 1.86 feet and 2.31 feet, was applied to NGVD29 elevations at various locations. Survey notes and electronic files are located in Section 5, Volume IV.

Section 3.4 Sedimentation Analysis

Prior to the placement of flood control facilities the C-1 system comprised a typical alluvial watershed found in the arid southwest. Storm runoff flowed north and west from the McCullough Range and River Mountains to form alluvial bajadas that coalesced in the vicinity of the present C-1 Channel. Converging contours forming a continuous low point along the present day C-1 Channel that can still be seen under the existing, developed watershed.

The lithology of the River Mountains and McCullough Range contributes to sediment laden runoff that forms the alluvial depositional surface. The River Mountains generally consist of a reddish-orange volcanic rock (dacite) supporting little or no vegetation, whereas the McCullough Range consists (generally) of a black volcanic rock (basalt) also supporting little or no vegetation. Both mountain ranges provide sediment laden silt, sands, and gravels transported downstream as both wash load and bed load. A normal fault of tectonic origin—typical of the basin and range physiographic province—strikes north-south along the base of the River Mountains forming a mountain block escarpment. This escarpment—combined with a sediment laden watershed---forms the basis of the River Mountain alluvial fan and bajada.

Superimposed on the River Mountain—McCullough Range alluvial system are flood control facilities that greatly diminish sediment transport, truncating the alluvial depositional environment. Facilities that act as barriers to sediment transport include the:

- Black Mountain (Southwest C-1) Detention Basin
- Mission Hills Western Interceptor
- Mission Hills Detention Basin
- Equestrian Detention Basin
- Equestrian Levee
- East C-1 Detention Basin
- East C-1 Levee

Sediment transport analysis has been performed for the Mission Hills and Equestrian System, and the Black Mountain (Southwest C-1) and East C-1 Detention Basins. These analyses are made a part of this study as supporting documentation to this

sediment transport analysis, and may be found electronically under Section 5, "Miscellaneous Reference Material" on the enclosed compact disk.

The existing structural controls not only trap sediment, but also remove the River Mountain-McCullough bajadas from consideration as active alluvial fans. The East C-1 Levee truncates the apex of the River Mountains alluvial fan, allowing for removal of SFHAs Zones A and AO associated with River Mountains runoff.

Section 3.4.1 Sediment Transport

The Modified Uniform Soil Loss Equation (MUSCLE) was used to determine wash load bulking factors for various detailed and approximate methods hydraulic analysis. The US Army Corp of Engineers' HEC-6 "Scour and Deposition in Rivers and Reservoirs" sediment transport program was utilized for the East C-1 Levee to analyze long term aggradation and/or degradation. Other bed load analyses were not performed because bed load sediment transport is intercepted at the various flood control facilities. Therefore, this analysis is limited to wash load determination using the MUSCLE, following guidelines set forth in the CCRFCD's Hydrologic Criteria and Drainage Design Manual.

The entire C-1 watershed was analyzed by subbasin for SDN3 to estimate sediment yields. The Uniform Soil Loss Equation (USLE) is defined as:

$A = RKLSCP$

where:

A = estimated annual soil loss in ton/acre
R = rainfall/erosivity factor
K = soil erodability factor
L = slope-length factor
S = slope steepness factor
C = cropping factor
P = conservation practice factor

Because sediment yield is strongly related to flow characteristics and less to rainfall characteristics, William and Berndt (1972) modified the USLE to by replacing R with a runoff factor applicable to short-term, high intensity events. The USLE is therefore modified as

$Y_s = 95(VQ_p)^{0.56}KLSCP$

where:

Y_s = storm event sediment yield in tons
Q_p = storm event peak flow in cfs
V = storm event runoff volume in acre-feet

Using the above methodology, a bulking factor was determined at approximately 5% for estimating wash load in the watershed. However, a conservative approach was taken to estimating wash load, such that 10% was used as a bulking factor on hydraulic models. HEC-6 was used to estimate long-term aggradation and degradation of the East C-1 Levee; results for the East C-1 Levee show no significant degradation for the East C-1 Levee.

3.4.1.1 Determination of Sediment Yield due to Overland Erosion

The MUSLE was used to determine estimated sediment yields for the entire Henderson Basin. Figure 8 shows grain size distribution curves taken closest to the surface from soils borings located in various sections of the watershed. Although these samples were taken from logs of test borings, an assumption was made that these distributions applied to sediment load in washes found throughout the Henderson Basin. Using the grain size distributions, the soil erodibility factor K was determined from the nomograph shown in Figure 9 (Wischmeier, 1971). The soil erodibility factor is a function of the percent silt, percent coarse sand, soil structure, permeability, and percent of organic matter.

The contour-length method developed by Williams and Berndt (1976) was used to determine the slope steepness factor, S, of the MUSLE, defined as follows:

$$S = 0.25Z(LC_{25} + LC_{50} + LC_{75})/DA$$

where:

Z	=	total watershed height (ft)
LC_{25}	=	contour length at 25% of Z (ft)
LC_{50}	=	contour length at 50% of Z (ft)
LC_{75}	=	contour length at 75% of Z (ft)
DA	=	drainage area (ft^2)

The slope-length factor L was determined using the contour-extreme point method (Williams and Berndt, 1976):

$$\lambda = \frac{(LC \times LB)}{(2EP\sqrt{LC^2 - LB^2})}$$

where:

λ	=	slope length
LC	=	total length of contours
LB	=	length around the base of the contour
EP	=	number of extreme points on the contour

The topographic factor LS was determined by the equation:

$$LS = (\lambda/72.6)^{0.5}\, 0.065 + 0.0454S + 0.0065S^2)$$

where:

S = slope in percentage

The cropping management factor C, ranging from 0 to 1, was determined by the following equation (Wishmeier, 1972):

$$C = C_I C_{II} C_{III}$$

where:

C_I = Effect of Canopy Cover
C_{II} = Effect of mulch or close-growing vegetation
C_{III} = Tillage and residential effect of the land use

Figures 10, 11 and 12 show the influence of vegetal canopy, effect of plant residues or close-growing stems at the soil surface, and the type III effects on undisturbed land areas.

The effect of conservation practices on erosion control such as contouring, strip cropping, and terracing is measured by erosion control factor P. For wildland areas this factor is set at 1.0, since these erosion control practices do not apply. For developed areas, P can be estimated from aerial photographs.

The values of LS, K, C, and P factors for all subbasins were estimated using the above methodologies and tabulated. The MUSLE was then applied to estimate the sediment yields due to overland flow for the 2-year, 5-year, 10-year, 25-year, and 100-year storm events. Runoff peak discharges and volumes of hydrographs were generated from HEC-1 and tabulated to estimate wash load. It was assumed in this analysis that wash load was transmitted directly through the detention basins, or that no sediment was trapped.

Section 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and Local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and delineations of the 1- and 0.2- percent-annual-chance (500-year) floodplain boundaries. The 1-percent-annual-chance floodway is also provided to assist communities in developing floodplain management measures. This information is present on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Table and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

Section 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2- (500-year) flood is employed to indicate additional areas of flood risk in the community. For this FIS restudy, each stream reach that has been studied by detailed methods, the 1-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined by detailed hydraulic analysis.

The 1-percent-annual-chance floodplain boundaries are shown on the annotated FIRM, Section 4.1, Volume III. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone A). As directed by the community, only the 1-percent-annual chance floodplain boundary has been shown, and delineation of the 0.2 percent-annual-chance floodplain is outside the scope of this study. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitation of the map scale and/or lack of detailed topographic data. For the stream reaches studied by approximate methods (Reaches 2, 3, & 4), the 1-percent-annual-chance floodplain boundary is also shown on the annotated FIRM.

Section 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in area beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0-foot, provided that hazardous velocities are not produced.

This FIS restudy does not delineate regulatory floodways. The 1-percent-annual-chance flood is conveyed by or contained in the publicly owned and maintained facilities as indicated on the annotated FIRM and associated work maps.

Section 5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones delineated in this FIS restudy are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in this FIS restudy by approximate and detailed methods. Base Flood Elevations (BFEs) are not shown within this zone on the annotated FIRM in Section 4.1.2, Volume III.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annuyal chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs are shown within this zone.

Section 6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0. Insurance agents use the zones in conjunction with information on structures and their contents to assign premium rates for flood insurance policies. For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual chance floodplain, and the locations of selected cross sections used in the hydraulic analyses.

Section 7.0 OTHER STUDIES

Previous Studies and Reports:

- Black Mountain Detention Basin: VTN Nevada, *Black Mountain Detention Basin,* April 1999
- C-1 Channel: LBG, *Upper and Middle Reaches of the C-1 Channel – Phase 1,* June 2001
- C-1 Channel: VTN Nevada, *C-1 Channel Flood Control System Facilities Report,* September 1992
- East C-1 Detention Basin and Levee: VTN Nevada, *East C-1 Detention Basin,* June 1998
- Equestrian Detention Basin: Poggemeyer Design Group, Letter of Map Revision for the Equestrian Detention Basin, 1998
- FIS Hydrology Report: James M. Montgomery, *Las Vegas Valley Flood Insurance Study,* September 1991
- Mission Hills Detention Basin: VTN Nevada, *Mission Hills Detention Basin,* April 1993
- Mission Hills Western Interceptor: VTN Nevada, *Design Calculation Notebook for the Mission Hills Western Interceptor,* July 1993

This FIS restudy either supersedes or is compatible with previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

Section 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS restudy can be obtained by contacting the Flood Insurance and Mitigation Division, Federal Emergency Management Agency, the Clark County Regional Flood Control District, or the City of Henderson.

Section 9.0 BIBLIOGRAPHY

Plans

Century West Engineering, *Construction Plans for Drake Channel Improvements,* August 1992

City of Henderson, *C-1A Channel,* January 1979

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VTN Nevada, *Mission Hills Detention Basin and Outfall Structure,* 1993

VTN Nevada, *Mission Hills Western Interceptor Channel,* 1996

VTN Nevada, *Black Mountain Detention Basin,* April 1999

Reports

Hunsaker & Associates, *C-1 Channel – Sausalito to Newport,* October 1994

L.R. Nelson, *C-1 Channel – Newport to Sausalito Channel Design,* February 1996

Louis Berger Group, *Upper and Middle Reaches of the C-1 Channel – Phase 1,* June 2001

Montgomery Watson, *C-1 Channel Improvements Lake Mead Drive,* November 1997

Orion Engineering, *Drainage Study for Sunset View Estates Unit 4,* March 2001

Poggemeyer Design Group, *Letter of Map Revision for the Equestrian Detention Basin,* 1998

VTN Nevada, *C-1 Channel Flood Control System Facilities Report*, September 1992

VTN Nevada, *C-1 Channel Burkholder to Lake Mead,* February 1994

VTN Nevada, *East C-1 Detention Basin,* June 1998

VTN Nevada, *Mission Hills Detention Basin,* April 1993

VTN Nevada, *Design Report for the Black Mountain Detention Basin*, April 1999

Section 10.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original FIS restudy and FIRM were printed. All users are advised to contact the Community Map Repository at the address below to obtain the most up-to-date flood hazard data.

City of Henderson
240 Water Street
Henderson, Nevada 89015

APPENDIX

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  - 2.2.2.1 Reach 2
  - 2.2.2.2 Reach 3
  - 2.2.2.3 Reach 4

2.3 Supporting Data
- 2.3.1 Curve Number Calculations
- 2.3.2 Time of Concentration Calculations Curve No. Calculations
- 2.3.3 Sedimentation Analysis

2.4 Key to Cross Section Labeling
- 2.4.1 Detailed Methods: C-1 Channel
- 2.4.2 Detailed Methods: East C-1 Levee
- 2.4.3 Approximate Methods --Reach 2
- 2.4.4 Approximate Methods – Reach 3
- 2.4.5 Approximate Methods – Reach 4

SECTION 3 DRAFT FLOOD INSURANCE RESTUDY

VOLUME 3

SECTION 4 MAPPING INFORMATION

4.1 FIRM, Clark County, Nevada Map Index
- 4.1.1 Effective FIRM
- 4.1.2 Annotated FIRM

4.2 Work Maps/Aerial Photographs – Approximate Methods
- 4.2.1 Work Maps (Effective)
- 4.2.2 Work Maps (Annotated)

VOLUME 4

4.3 Work Maps/Base Maps – Detailed Methods
- 4.3.1 C-1 Channel
- 4.3.2 East C-1 Levee

SECTION 5 MISCELLANEOUS REFERENCE MATERIAL

5.1 Photographs/Field Review

5.2 Survey Data
- 5.2.1 Point File
- 5.2.2 Survey Notes

5.3 Compact Discs

FIGURE 2: C-1 Channel System FIS Restudy Existing Facilities/Location Map

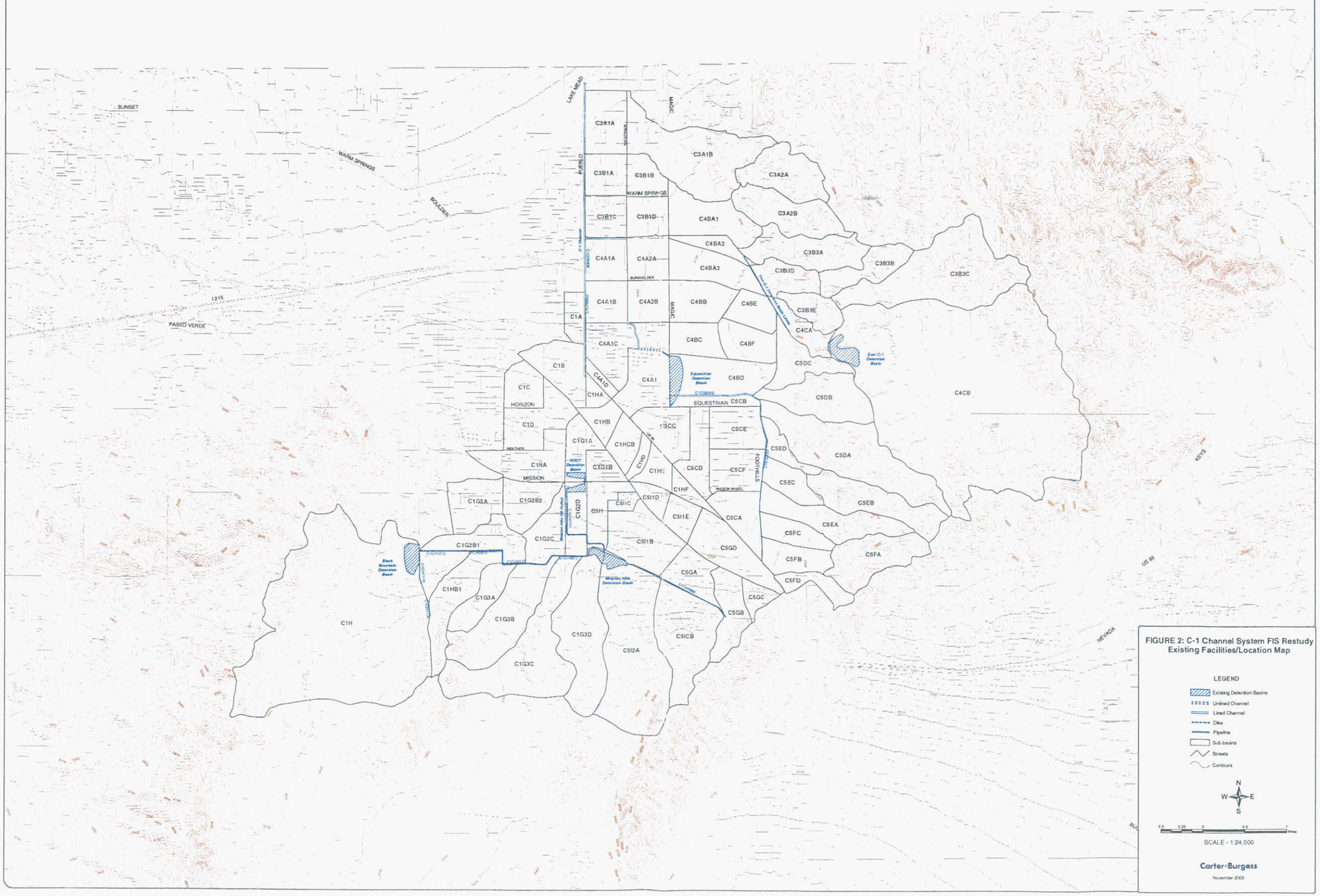


FIGURE 2: C-1 Channel System FIS Restudy
Existing Facilities/Location Map

LEGEND

- Existing Detention Basins
- Unlined Channel
- Lined Channel
- Dike
- Pipeline
- Sub-basins
- Streets
- Contours

N
W E
S

SCALE - 1:24,000

Carter Burgess

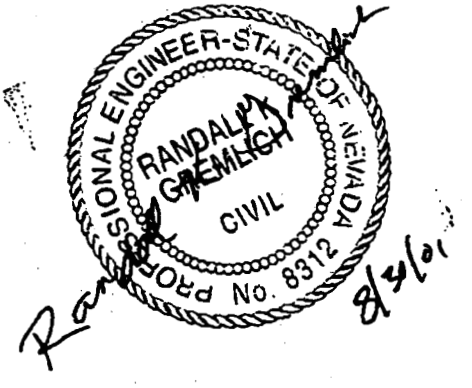
November 2002

Technical Drainage Study for Lake Mead Commons per G.C. Wallace, August 2001

RESPONSE TO COMMENTS ON THE TECHNICAL DRAINAGE STUDY FOR LAKE MEAD COMMONS OFFSITE IMPROVEMENTS

449.005

August 2001



Prepared for:

Lake Mead Properties
4534 W. Hacienda, Suite A
Las Vegas, NV 89118
Phone: (702) 227-9267
Fax: (702) 227-9273

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

March 29, 2001

Randall K. Gremlich, P.E.
G.C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, NV 89146

Re: 37 Acre Commercial Center a.k.a. Lake Mead Commons
Permit Number: 2001001043

Dear Randall K. Gremlich

This letter provides comments on the above referenced drainage study dated January 2, 2001. The City of Henderson reviewed this study and based on the documents submitted, **the subject study is approved conceptually only.** The following items are part of the approved study:

1. Clark County Regional Flood Control District concurrence is required.

2. A Technical Drainage Study will be required for each phase of development.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by the above named engineering firm may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage.

Please let me know if you have any questions concerning these comments.

Sincerely,

Joseph V. Damiani

Joseph V. Damiani, P.E.
Project Engineer

Cc: Curt Chandler, Janie Nihipali, CCRFCD

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT

Wm. Fraser, II, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

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City of Boulder City

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City of North Las Vegas

Bruce L. Woodbury
Clark County

April 17, 2001

Mr. Curt Chandler, P.E.
City of Henderson Public Works
240 Water Street
Henderson, NV 89015

DISTRICT CONCURRENCE: 37 ACRE COMMERCIAL CENTER (PN 2001001043)

Dear Mr. Chandler:

The District has reviewed the Conceptual Drainage Study dated January 2, 2001, for the above-captioned project as submitted by G. C. Wallace, Inc. In addition, the District is in receipt of the Conditional Letter of Acceptance from the City of Henderson Public Works dated March 29, 2001.

The District concurs with the acceptance of this Conceptual Drainage Study by the City of Henderson Public Works.

The District's review of this project was limited to issues of Regional Flood Control Significance as defined in the Uniform Regulations for the Control of Drainage. As noted in the study the site resides in a Special Flood Hazard Area (SFHA) designated as "Zone A" per the effective Flood Insurance Rate Map (FIRM). Therefore the consultant should be advised that this acceptance does not serve to amend the FIRM or remove the SFHA designation.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by G. C. Wallace, Inc. may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for the information, data or conclusions presented by the consulting engineer. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER II, P.E.
General Manager/Chief Engineer

BY: _____
Jon H. Hayslip, P.E.
Senior Engineer

cc: G. C. Wallace, Inc.

JHH:jms

File: 21-63-33.gcw

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

449.005

Name of Development: Lake Mead Commons Date: August 2001

Location of Development: a) Descriptive (Cross Streets): North/South: Lake Mead Drive East/West: Athens Avenue

b) Sect. 33 Twn. 21 S Rng. 63 E

Name of Owner: Lake Mead Properties Assessors Parcel No: 160-33-402 / 007 / 008 / 006

Telephone: (702) 227-9267 Facsimile No: (702) 227-9273

Address: 4534 West Hacienda, Suite A

Las Vegas, Nevada 89118

Contact Person - Name: Marjorie Mewbourn, E.I. Telephone No: (702) 804-2000

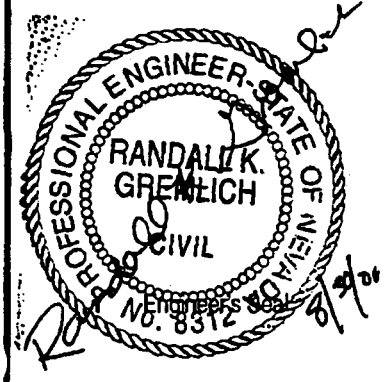
Firm: G. C. Wallace, Inc.

Address: 1555 South Rainbow Boulevard; Las Vegas, NV 89146

Type of Land Development / Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development	X	Other (Please specify below)
	Large Parcel Map		Building Permit	Street / Drainage	

1. Total Owned Land Area: At Site: 37 ac. Being Developed / Disturbed: 37 ac.
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ■ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? Yes* ■
4. Proposed type of development: (Residential, Commercial, etc.)? Commercial
5. Approximate upstream land area which drains to the subject site? ± 640 ac.
6. Has the site drainage been evaluated in the past? ■ NO If yes, please identify documentation:
   Conceptual Drainage Study for 37 Acre Commercial Site
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
   Culverts under Lake Mead Drive
8. Briefly describe your proposed schedule for the subject project: ASAP



Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE: STANDARD FORM 1

REVISED TABLE 1 HEC-1 SUMMARY (PROPOSED/ INTERIM CONDITIONS)		
Subbasin/ Combination Point	Q_{10} (cfs)	Q_{100} (cfs)
J	27	70
K	35	82
C1	62	153
F	15	67
G	4	7
C2	17	71
A	29	106
B	26	143
C	4	38
C3	51	266
D	16	65
H	47	108
I	6	15
C4	118	423
E	7	47
P1	9	16
C5	141	533
PR	<1	1
PC	36	83
P2	13	23
C6	209	685

*See Revised Figure 5

```
1*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*           SEPTEMBER 1990          *
*            VERSION 4.0            *
*                                   *
* RUN DATE  08/24/2001  TIME 10:35:35*
*                                   *
*************************************
```


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


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

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

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


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

              *DIAGRAM
    1         ID  ***************************************************************
    2         ID  *                    G.C. WALLACE, INC.                         *
    3         ID  ***************************************************************
    4         ID  * ..................................................... *
    5         ID  * :                                                   : *
    6         ID  * :     ATHENS AVENUE AND LAKE MEAD DRIVE IMPROVEMENTS: *
    7         ID  * :             PROPOSED/INTERIM CONDITIONS           : *
    8         ID  * :...................................................: *
    9         ID  * :         RETURN PERIODS . . . . . 10 AND 100 YEAR  : *
   10         ID  * :           DISTRIBUTION . . . . . 6-HOUR SDN3      : *
   11         ID  * :      100-YEAR RAINFALL . . . . . 3.00 INCHES      : *
   12         ID  * :       10-YEAR RAINFALL . . . . . 1.77 INCHES      : *
   13         ID  * :             PROJECT NO . . . . . 449.005          : *
   14         ID  * :               FILENAME . . . . . AALMDPRB.H1      : *
   15         ID  * :                   DATE . . . . . 7/2/01           : *
   16         ID  * :             MODELED BY . . . . . MM               : *
   17         ID  * :                                                   : *
   18         ID  * :...................................................: *
   19         ID  * :                                                   : *
   20         ID  * :            DEPTH-AREA REDUCTION FACTOR (DARF)     : *
   21         ID  * :                                                   : *
   22         ID  * :        AREA (MI^2)     DARF (10-YR)    DARF (100-YR) : *
   23         ID  * :        0.00-0.25         0.57            1.00        : *
   24         ID  * :        0.26-0.45         0.57            0.99        : *
   25         ID  * :        0.46-0.75         0.57            0.98        : *
   26         ID  * :        0.76-1.00         0.57            0.97        : *
   27         ID  * :                                                   : *
   28         ID  * : THE PRECIP RATIO OF 0.79 IS FOR THE 25-YEAR EVENT : *
   29         ID  * : THE PRECIP RATION OF 0.927 IF FOR THE 50-YEAR EVENT: *
   30         ID  * : LAKE MEAD DRIVE IS IN NDOT RIGHT OF WAY           : *
   31         ID  * :                                                   : *
   32         ID  * :           SEE FIGURE 5 FOR DRAINAGE BASINS        : *
   33         ID  * :...................................................: *
   34         ID  ***************************************************************
   35         IT      5       0       0     300
   36         IO      5       0
   37         IN      5       0       0
   38         JR   PREC    0.57    0.79   0.927    0.97    0.98    0.99    1.00
              *
```

```
 39          KK      J
 40          KM                AREA        32.8  AC
 41          KM                Lo           300  FT
 42          KM                So           2.6   %
 43          KM                Lt          2890  FT
 44          KM                St           5.5   %
 45          KM                V1           3.5  FPS
 46          KM                V2           6.9  FPS
 47          KM                Ti           8.0  MIN
 48          KM                Tt           8.1  MIN
 49          KM                Tcheck      27.7  MIN
 50          KM                Tlag        16.2  MIN
 51          KM                CN            86
 52          BA   .0512
1                                      HEC-1 INPUT                                                    PAGE  2

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

 53          PB    3.00
 54          PC   0.000   .0200   .0570   .0700   .0870   .1080   .1240   .1300   .1300   .1300
 55          PC   .1300   .1300   .1300   .1330   .1400   .1420   .1480   .1580   .1720   .1810
 56          PC   .1900   .1970   .1990   .2000   .2010   .2040   .2140   .2290   .2410   .2490
 57          PC   .2510   .2560   .2700   .2780   .2810   .2830   .2950   .3220   .3520   .4090
 58          PC   .4990   .5900   .7100   .7440   .7810   .8120   .8190   .8350   .8510   .8560
 59          PC   .8600   .8680   .8760   .8880   .9100   .9260   .9370   .9500   .9700   .9760
 60          PC   .9820   .9850   .9870   .9890   .9900   .9930   .9930   .9940   .9950   .9980
 61          PC   .9980   .9990  1.000
 62          LS      0     86
 63          UD  0.162
             *

 64          KK      K
 65          KM                AREA        33.8  AC
 66          KM                Lo           300  FT
 67          KM                So           3.0   %
 68          KM                Lt          2160  FT
 69          KM                St           5.5   %
 70          KM                V1           3.5  FPS
 71          KM                V2           6.9  FPS
 72          KM                Ti           7.1  MIN
 73          KM                Tt           6.4  MIN
 74          KM                Tcheck      23.7  MIN
 75          KM                Tlag        13.5  MIN
 76          KM                CN            88
 77          BA   .0529
 78          LS      0     88
 79          UD  0.135
             *

 80          KK     C1
 81          KM       COMBINE SUBBASINS J AND K
 82          HC      2
             *

 83          KK      F
 84          KM                AREA        66.7  AC
 85          KM                Lo           300  FT
 86          KM                So           2.4   %
 87          KM                Lt          4425  FT
 88          KM                St           3.2   %
 89          KM                V1           2.6  FPS
 90          KM                V2           5.2  FPS
 91          KM                Ti          11.7  MIN
 92          KM                Tt          15.7  MIN
 93          KM                Tcheck      36.3  MIN
 94          KM                Tlag        27.4  MIN
 95          KM                CN            75
 96          BA   .1043
 97          LS      0     75
 98          UD   .274
             *
1                                      HEC-1 INPUT                                                    PAGE  3

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

 99          KK      G
100          KM                AREA         2.1  AC
101          KM                Lo            40  FT
```

```
102          KM                So          2.0   %
103          KM                Lt         1245   FT
104          KM                St          1.0   %
105          KM                V1          1.5   FPS
106          KM                V2          3.0   FPS
107          KM                Ti          1.8   MIN
108          KM                Tt          9.8   MIN
109          KM                Tcheck     17.1   MIN
110          KM                Tlag       11.6   MIN
111          KM                CN           98
112          BA   .0032
113          LS      0      98
114          UD   0.116
             *

115          KK      C2
116          KM        COMBINE SUBBASINS F AND G
117          HC      2
             *

118          KK      A
119          KM                AREA       67.7   AC
120          KM                Lo          160   FT
121          KM                So         31.3   %
122          KM                Lt         4880   FT
123          KM                St         24.0   %
124          KM                V1          7.2   FPS
125          KM                V2         14.4   FPS
126          KM                Ti          3.4   MIN
127          KM                Tt          6.2   MIN
128          KM                Tcheck .   38.0   MIN
129          KM                Tlag        9.6   MIN
130          KM                CN           77
131          BA   .1058
132          LS      0      77
133          UD   0.096
             *

134          KK      B
135          KM                AREA      146.0   AC
136          KM                Lo          300   FT
137          KM                So          5.7   %
138          KM                Lt         6540   FT
139          KM                St         19.2   %
140          KM                V1          6.5   FPS
141          KM                V2         12.9   FPS
142          KM                Ti          9.3   MIN
143          KM                Tt          9.1   MIN
144          KM                Tcheck     48.0   MIN
145          KM                Tlag       18.4   MIN
146          KM                CN           72
```



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

147          BA   .2281
148          LS      0      72
149          UD   0.184
             *

150          KK      C
151          KM                AREA       61.6   AC
152          KM                Lo          300   FT
153          KM                So          4.7   %
154          KM                Lt         4070   FT
155          KM                St          4.2   %
156          KM                V1          3.0   FPS
157          KM                V2          6.0   FPS
158          KM                Ti         11.3   MIN
159          KM                Tt         12.7   MIN
160          KM                Tcheck     34.3   MIN
161          KM                Tlag       23.9   MIN
162          KM                CN           67
163          BA   .0962
164          LS      0      67
165          UD   0.239
             *

166          KK      C3
```

```
167          KM        COMBINE SUBBASINS A, B AND C
168          HC        3
             *

169          KK     RC3
170          KM        ROUTE C3 THROUGH SUBBASIN D
171          KM    LEN     SLOPE      n       NA      SHAPE       BW       SS
172          RD    1430    .0315   0.016              TRAP        1        50
             *

173          KK        D
174          KM                  AREA         49.4  AC
175          KM                  Lo            300  FT
176          KM                  So           14.8   %
177          KM                  Lt           3770  FT
178          KM                  St            5.2   %
179          KM                  V1            3.4  FPS
180          KM                  V2            6.7  FPS
181          KM                  Ti            6.1  MIN
182          KM                  Tt           10.6  MIN
183          KM                  Tcheck       32.6  MIN
184          KM                  Tlag         16.8  MIN
185          KM                  CN             76
186          BA    .0772
187          LS       0       76
188          UD    0.168
             *
1                                          HEC-1 INPUT                                                    PAGE  5

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

189          KK        H
190          KM                  AREA         50.4  AC
191          KM                  Lo            300  FT
192          KM                  So            1.7   %
193          KM                  Lt           3180  FT
194          KM                  St            2.8   %
195          KM                  V1            2.5  FPS
196          KM                  V2            4.9  FPS
197          KM                  Ti            8.3  MIN
198          KM                  Tt           12.4  MIN
199          KM                  Tcheck       29.3  MIN
200          KM                  Tlag         20.7  MIN
201          KM                  CN             89
202          BA    .0788
203          LS       0       89
204          UD    0.207
             *

205          KK        I
206          KM                  AREA          6.2  AC
207          KM                  Lo            210  FT
208          KM                  So            4.7   %
209          KM                  Lt           1910  FT
210          KM                  St            6.8   %
211          KM                  V1            3.9  FPS
212          KM                  V2            7.7  FPS
213          KM                  Ti            5.1  MIN
214          KM                  Tt            5.2  MIN
215          KM                  Tcheck       21.8  MIN
216          KM                  Tlag         10.3  MIN
217          KM                  CN             88
218          BA    .0096
219          LS       0       88
220          UD    0.103
             *

221          KK       C4
222          KM          COMBINE C3 AND SUBBASINS  D, H AND I
223          HC        4
             *

224          KK     RC4
225          KM        ROUTE C4 THROUGH SUBBASIN P1
226          KM    LEN     SLOPE      n       NA      SHAPE       BW       SS
227          RD    1960    .022    .016              TRAP        40        1
             *
```

```
228          KK       E
229          KM                AREA        64.9  AC
230          KM                Lo           250  FT
231          KM                So           2.0   %
232          KM                Lt          4255  FT
233          KM                St           3.3   %
234          KM                Vl           2.7  FPS
1                                        HEC-1 INPUT                                                    PAGE  6

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

235          KM                V2           5.3  FPS
236          KM                Ti          12.7  MIN
237          KM                Tt          14.8  MIN
238          KM                Tcheck      35.0  MIN
239          KM                Tlag        27.6  MIN
240          KM                CN            70
241          BA   .1013
242          LS        0      70
243          UD   0.276
             *
-------------------------------------------------------------------------------
244          KK       P1
245          KM          ATHENS AVENUE
246          KM                AREA         4.7  AC
247          KM                Lo            20  FT
248          KM                So           2.0   %
249          KM                Lt          2260  FT
250          KM                St           2.2   %
251          KM                Vl           3.0  FPS
252          KM                V2           4.6  FPS
253          KM                Ti           1.3  MIN
254          KM                Tt           9.2  MIN
255          KM                Tcheck      22.7  MIN
256          KM                Tlag        10.4  MIN
257          KM                CN            98
258          BA   .0074
259          LS        0      98
260          UD   0.104
             *

261          KK      C5
262          KM   COMBINE C2, C4, BASIN E AND BASIN P1
263          HC       4
             *

264          KK     RC5
265          KM         ROUTE C5 THROUGH SUBBASIN CR (FLOW PASSES THROUGH CHANNEL AND CULVERTS)
266          KM    LEN     SLOPE       n       NA      SHAPE       BW       SS
267          RD   1650    .0059    .025              TRAP        50        3
             *

268          KK       PR
269          KM                AREA        15.1  AC
270          KM                Lo           300  FT
271          KM                So           1.0   %
272          KM                Lt          1000  FT
273          KM                St           0.7   %
274          KM                Vl           1.7  FPS
275          KM                V2           2.6  FPS
276          KM                Ti          25.5  MIN
277          KM                Tt           8.2  MIN
278          KM                Tcheck      17.2  MIN
279          KM                Tlag        17.2  MIN
280          KM                CN            51
281          BA   .0236
1                                        HEC-1 INPUT                                                    PAGE  7

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

282          LS        0      51
283          UD   0.172
             *

284          KK       PC
285          KM                AREA        31.5  AC
286          KM                Lo           150  FT
287          KM                So           1.0   %
288          KM                Lt           800  FT
```

```
289          KM                  St          3.5   %
290          KM                  V1          3.8   FPS
291          KM                  V2          5.7   FPS
292          KM                  Ti          6.9   MIN
293          KM                  Tt          3.1   MIN
294          KM                  Tcheck     15.3   MIN
295          KM                  Tlag       10.0   MIN
296          KM                  CN           89
297          BA   .0492
298          LS      0       89
299          UD   0.100
             *

300          KK      P2
301          KM                  AREA        7.6   AC
302          KM                  Lo          100   FT
303          KM                  So          2.0   %
304          KM                  Lt          1600  FT
305          KM                  St          0.5   %
306          KM                  V1          1.4   FPS
307          KM                  V2          2.2   FPS
308          KM                  Ti          2.8   MIN
309          KM                  Tt         14.3   MIN
310          KM                  Tcheck     19.4   MIN
311          KM                  Tlag       17.1   MIN
312          KM                  CN           98
313          BA   .0119
314          LS      0       98
315          UD   0.171
             *

316          KK      C6
317          KM        COMBINE C1, C5 AND BASINS PR, PC AND P2
318          HC       5
             *
319          ZZ
```

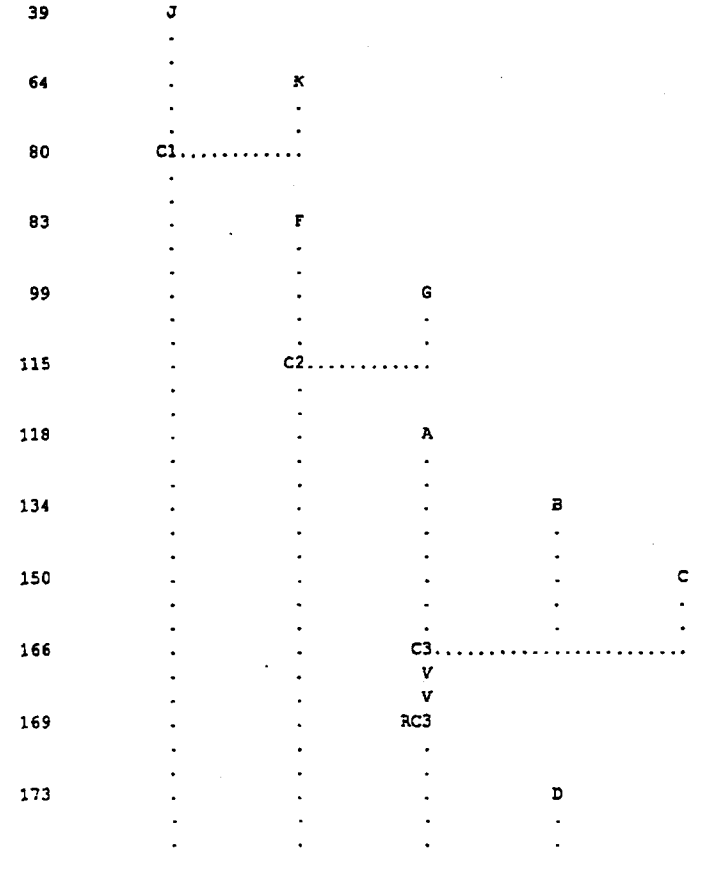
1

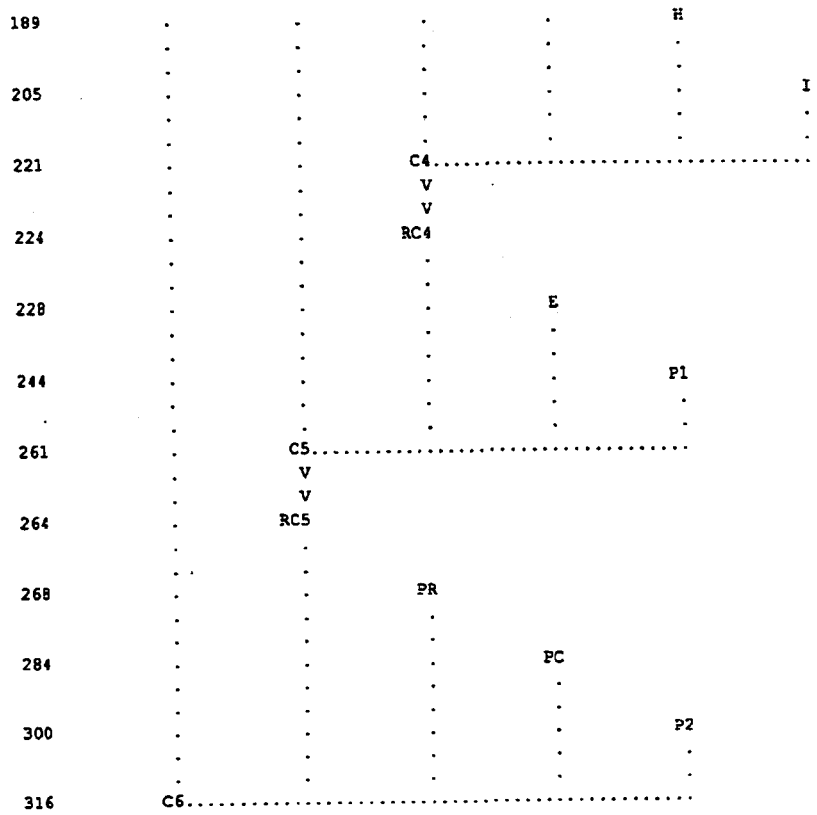
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  08/24/2001  TIME  10:35:35 *
*                                       *
*****************************************
```

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

```
*************************************************************
*                    G.C. WALLACE, INC.                     *
*************************************************************
*                                                           *
*  :                                                      :  *
*  :     ATHENS AVENUE AND LAKE MEAD DRIVE IMPROVEMENTS   :  *
*  :           PROPOSED/INTERIM CONDITIONS                :  *
*  :-------------------------------------------------------:  *
*  :        RETURN PERIODS . . . . . 10 AND 100 YEAR      :  *
*  :          DISTRIBUTION . . . . . 6-HOUR SDN3          :  *
*  :       100-YEAR RAINFALL . . . . . 3.00 INCHES        :  *
*  :        10-YEAR RAINFALL . . . . . 1.77 INCHES        :  *
*  :              PROJECT NO . . . . . 449.005            :  *
*  :                FILENAME . . . . . AALMDPR.HI         :  *
*  :                    DATE . . . . . 7/2/01             :  *
*  :              MODELED BY . . . . . MM                 :  *
*  :                                                      :  *
*  :-------------------------------------------------------:  *
*  :                                                      :  *
*  :           DEPTH-AREA REDUCTION FACTOR (DARF)         :  *
*  :                                                      :  *
*  :    AREA (MI^2)     DARF (10-YR)     DARF (100-YR)    :  *
*  :    0.00-0.25          0.57             1.00          :  *
*  :    0.26-0.45          0.57             0.99          :  *
*  :    0.46-0.75          0.57             0.98          :  *
*  :    0.76-1.00          0.57             0.97          :  *
*  :                                                      :  *
*  :  THE PRECIP RATIO OF 0.79 IS FOR THE 25-YEAR EVENT   :  *
*  :  THE PRECIP RATION OF 0.927 IF FOR THE 50-YEAR EVENT :  *
```

```
                    * :  LAKE MEAD DRIVE IS IN NDOT RIGHT OF WAY                 : *
                    * :                                                          : *
                    * :           SEE FIGURE 5 FOR DRAINAGE BASINS               : *
                    * :..........................................................: *
                    ************************************************************

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

    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME       0055  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

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

    JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                   .57       .79       .93       .97       .98       .99      1.00
1
```

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .57	RATIO 2 .79	RATIO 3 .93	RATIO 4 .97	RATIO 5 .98	RATIO 6 .99	RATIO 7 1.00
HYDROGRAPH AT											
+	J	.05	1	FLOW	27.	49.	63.	67.	68.	69.	70.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	K	.05	1	FLOW	35.	59.	74.	79.	80.	81.	82.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT											
+	C1	.10	1	FLOW	62.	107.	137.	146.	148.	150.	152.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	F	.10	1	FLOW	15.	40.	57.	63.	65.	66.	67.
				TIME	3.83	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	G	.00	1	FLOW	4.	5.	6.	6.	6.	6.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT											
+	C2	.11	1	FLOW	17.	42.	61.	67.	68.	69.	71.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	A	.11	1	FLOW	29.	65.	91.	100.	102.	104.	106.
				TIME	3.58	3.58	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	B	.23	1	FLOW	26.	79.	120.	133.	137.	140.	143.

				TIME	3.75	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	C	.10	1	FLOW	4.	18.	31.	35.	36.	37.	38.
				TIME	3.83	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT											
+	C3	.43	1	FLOW	51.	150.	228.	254.	260.	266.	273.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	RC3	.43	1	FLOW	51.	148.	220.	248.	250.	259.	262.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	D	.08	1	FLOW	16.	38.	55.	61.	62.	63.	65.
				TIME	3.67	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	H	.08	1	FLOW	47.	78.	97.	103.	105.	106.	108.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	I	.01	1	FLOW	6.	11.	14.	15.	15.	15.	15.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT											
+	C4	.60	1	FLOW	118.	271.	379.	419.	423.	435.	441.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RC4	.60	1	FLOW	113.	269.	381.	417.	426.	437.	440.
				TIME	3.75	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT											
+	E	.10	1	FLOW	7.	25.	39.	44.	45.	46.	47.
				TIME	3.83	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	P1	.01	1	FLOW	9.	12.	15.	15.	15.	16.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT											
+	C5	.81	1	FLOW	141.	339.	485.	533.	544.	558.	564.
				TIME	3.75	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RC5	.81	1	FLOW	143.	328.	479.	525.	529.	548.	554.
				TIME	3.83	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	PR	.02	1	FLOW	0.	0.	1.	1.	1.	1.	1.
				TIME	.08	4.92	4.92	4.92	4.92	4.92	4.92
HYDROGRAPH AT											
+	PC	.05	1	FLOW	36.	60.	75.	80.	81.	82.	83.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	P2	.01	1	FLOW	13.	18.	21.	22.	22.	23.	23.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT											
+	C6	1.00	1	FLOW	209.	442.	630.	685.	705.	714.	731.
				TIME	3.75	3.75	3.67	3.67	3.67	3.67	3.67

1

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

						INTERPOLATED TO COMPUTATION INTERVAL			
ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RC3	MANE	1.50	51.13	219.00	.19	5.00	51.13	220.00	.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4374E+01 EXCESS= .0000E+00 OUTFLOW= .4375E+01 BASIN STORAGE= .5161E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.79	148.43	220.16	.48	5.00	148.32	220.00	.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1091E+02 EXCESS= .0000E+00 OUTFLOW= .1091E+02 BASIN STORAGE= .5261E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.51	224.40	218.45	.70	5.00	219.99	220.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1595E+02 EXCESS= .0000E+00 OUTFLOW= .1595E+02 BASIN STORAGE= .5872E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.44	250.58	217.48	.77	5.00	248.16	220.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1767E+02 EXCESS= .0000E+00 OUTFLOW= .1767E+02 BASIN STORAGE= .5580E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.43	256.02	218.60	.79	5.00	249.96	220.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1805E+02 EXCESS= .0000E+00 OUTFLOW= .1805E+02 BASIN STORAGE= .5700E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.41	262.04	217.31	.81	5.00	259.07	220.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1848E+02 EXCESS= .0000E+00 OUTFLOW= .1848E+02 BASIN STORAGE= .5805E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC3	MANE	2.40	268.35	218.46	.82	5.00	261.71	220.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1887E+02 EXCESS= .0000E+00 OUTFLOW= .1887E+02 BASIN STORAGE= .5896E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	3.57	117.18	221.44	.29	5.00	113.39	225.00	.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9211E+01 EXCESS= .0000E+00 OUTFLOW= .9216E+01 BASIN STORAGE= .2360E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.63	270.43	220.54	.62	5.00	269.16	220.00	.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1975E+02 EXCESS= .0000E+00 OUTFLOW= .1975E+02 BASIN STORAGE= .2237E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.32	380.90	220.04	.87	5.00	380.84	220.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2753E+02 EXCESS= .0000E+00 OUTFLOW= .2754E+02 BASIN STORAGE= .2350E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.23	420.60	218.68	.95	5.00	417.11	220.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3015E+02 EXCESS= .0000E+00 OUTFLOW= .3016E+02 BASIN STORAGE= .2532E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.22	425.54	220.02	.97	5.00	425.53	220.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+02 EXCESS= .0000E+00 OUTFLOW= .3071E+02 BASIN STORAGE= .2316E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.20	437.27	219.97	.99	5.00	437.15	220.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3139E+02 EXCESS= .0000E+00 OUTFLOW= .3139E+02 BASIN STORAGE= .2321E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC4	MANE	2.19	445.36	218.96	1.01	5.00	440.32	220.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3196E+02 EXCESS= .0000E+00 OUTFLOW= .3196E+02 BASIN STORAGE= .2284E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5	MANE	5.00	142.74	230.00	.28	5.00	142.74	230.00	.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1220E+02 EXCESS= .0000E+00 OUTFLOW= .1221E+02 BASIN STORAGE= .3495E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5	MANE	4.63	331.60	227.04	.61	5.00	328.45	225.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2622E+02 EXCESS= .0000E+00 OUTFLOW= .2623E+02 BASIN STORAGE= .3836E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RC5	MANE	4.08	483.14	224.35	.85	5.00	479.07	225.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3679E+02 EXCESS= .0000E+00 OUTFLOW= .3680E+02 BASIN STORAGE= .3792E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5	MANE	3.94	525.82	224.86	.93	5.00	524.78	225.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4024E+02 EXCESS= .0000E+00 OUTFLOW= .4025E+02 BASIN STORAGE= .3421E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5	MANE	3.92	539.10	223.21	.95	5.00	529.03	225.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4103E+02 EXCESS= .0000E+00 OUTFLOW= .4104E+02 BASIN STORAGE= .4511E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5	MANE	3.88	547.85	225.03	.97	5.00	547.75	225.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4192E+02 EXCESS= .0000E+00 OUTFLOW= .4193E+02 BASIN STORAGE= .4578E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RC5	MANE	3.87	560.26	224.19	.99	5.00	553.85	225.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4270E+02 EXCESS= .0000E+00 OUTFLOW= .4271E+02 BASIN STORAGE= .3821E-02 PERCENT ERROR= .0

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

REVISED TABLE 5 HEC-1 SUMMARY (ULTIMATE CONDITIONS)		
Subbasin/ Combination Point	Q_{10} (cfs)	Q_{100} (cfs)
J	21	62
K	28	73
C1	49	135
F	25	87
G	4	7
C2	27	92
A	23	96
B	16	117
C	3	29
C3	33	219
D	12	58
H	48	112
I	5	14
C4	97	375
E	12	60
P1	9	16
C5	137	518
PR	<1	1
PC	36	83
P2	13	23
C6	192	658

*See revised Figure 5 for drainage basins

File: LMD.sf4.prb.wb2 08/30/01

LAKE MEAD COMMONS OFFSITE IMPROVEMENTS
Composite Curve Number Calculations - Proposed Conditions

Land Use	Curve Number by HSG			
	Soil # 117	Soil # 182	Soil # 187	Soil # 510
Desert/Natural	63	76	77	88
Commerical	89	92	92	95
Residential - 6000 sq ft lots	80	87	87	92
Residential - 20,000 sq ft lots	54	70	70	85
Residential - 40,000 sq ft lots	51	68	68	84
Traffic (streets)	98	98	98	98

* Curve numbers referenced from Table 602 of the Manual

Subbasin	Area (acre)	Partial Area Soil Type				Partial Area Proposed					Traffic	Composite CN
		% 117	% 182	% 187	% 510	% Desert	% Commercial	% 6,000 ft² lots	% 20,000 ft² lots	% 40,000 ft² lots		
P1	4.73	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	98.0
PC	31.50	0.99	0.00	0.00	0.01	0.00	1.00	0.00	0.00	0.00	0.00	89.1
PR	15.10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	51.0
P2	7.60	0.65	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	1.00	98.0

TIME OF CONCENTRATION

Athens Avenue and Lake Mead Drive Improvements

File: LMD.sf4.prB.wb2 — **Proposed/Interim and Ultimate Conditions - Onsite Basins** — BY: mm

Project No.: 449.005 — DATE: 08/30/01

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA MI^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	TOTAL LENGTH Ft (11)	Tc = (L/180)+10 Min (12)	Min (13)	Tlag= 0.6Tc/60 Hours	RAINFALL 100-YR Inches
P1	D	98.0	0.9036	4.73	0.0074	20	2.0	1.3	2260	2.2	3.0	4.6	9.2	2280	22.7	10.4	0.104	3.00/1.71
PC	D	89.1	0.7858	31.50	0.0492	150	1.0	6.9	800	3.5	3.8	5.7	3.1	950	15.3	10.0	0.100	3.00/1.71
PR	D	51.0	0.2832	15.10	0.0236	300	1.0	25.5	1000	0.7	1.7	2.6	8.2	1300	17.2	33.7	0.172	3.00/1.71
P2	D	98.0	0.9036	7.60	0.0119	100	2.0	2.8	1600	0.5	1.4	2.2	14.3	1700	19.4	17.1	0.171	3.00/1.71

Tc = Ti + Tt Tlag = 0.6 Tc

Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

K = 0.0132 (CN) - 0.39

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Existing; V1 = 14.8*(S/100)^1/2 Developed; V1 = 20.2*(S/100)^1/2

Existing; V2 = 29.4*(S/100)^1/2 Developed; V2 = 30.6*(S/100)^1/2

REFERENCE : CCRFCD Hydrologic Criteria and Drainage Design Manual — **STANDARD FORM 4**

```
1*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*        SEPTEMBER 1990             *
*         VERSION 4.0               *
*                                   *
* RUN DATE  08/24/2001  TIME  10:35:51 *
*                                   *
*************************************
```


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

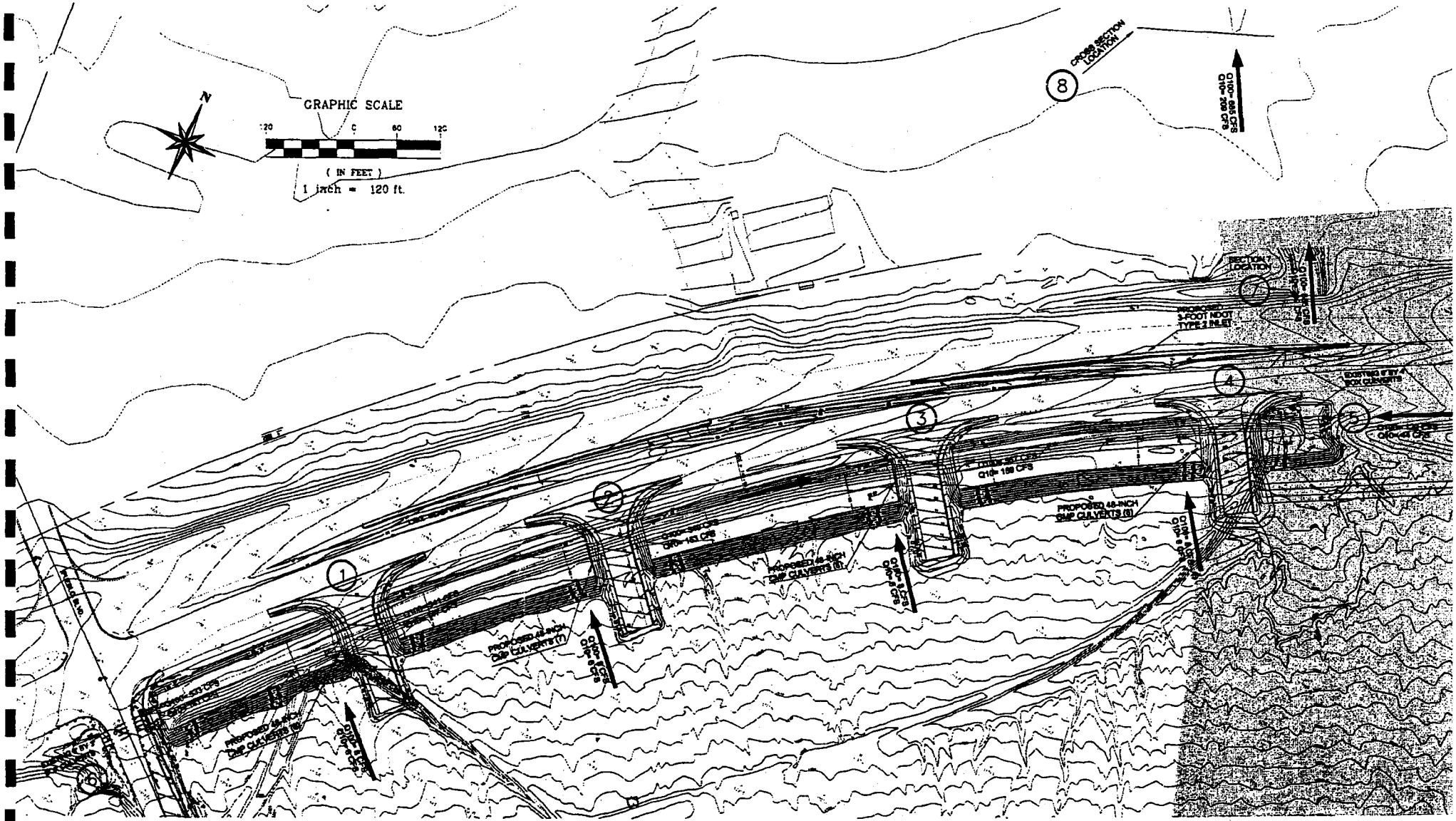

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

          *DIAGRAM
    1     ID  ************************************************************
    2     ID  *                    G.C. WALLACE, INC.                    *
    3     ID  ************************************************************
    4     ID  * ..................................................... *
    5     ID  * :                                                   : *
    6     ID  * :     ATHENS AVENUE AND LAKE MEAD DRIVE IMPROVEMENTS : *
    7     ID  * :                ULTIMATE CONDITIONS                : *
    8     ID  * :...................................................: *
    9     ID  * :         RETURN PERIODS . . . . . 10 AND 100 YEAR  : *
   10     ID  * :           DISTRIBUTION . . . . . 6-HOUR SDN3      : *
   11     ID  * :       100-YEAR RAINFALL . . . . . 3.00 INCHES     : *
   12     ID  * :        10-YEAR RAINFALL . . . . . 1.77 INCHES     : *
   13     ID  * :              PROJECT NO . . . . . 449.005        : *
   14     ID  * :                FILENAME . . . . . AALMDULR.H1    : *
   15     ID  * :                    DATE . . . . . 7/16/01        : *
   16     ID  * :              MODELED BY . . . . . MM              : *
   17     ID  * :                                                   : *
   18     ID  * :                                                   : *
   19     ID  * :...................................................: *
   20     ID  * :                                                   : *
   21     ID  * :             DEPTH-AREA REDUCTION FACTOR (DARF)    : *
   22     ID  * :                                                   : *
   23     ID  * :          AREA (MI^2)     DARF (10-YR)    DARF (100-YR)  : *
   24     ID  * :          0.00-0.25          0.57            1.00        : *
   25     ID  * :          0.26-0.45          0.57            0.99        : *
   26     ID  * :          0.46-0.75          0.57            0.98        : *
   27     ID  * :          0.76-1.00          0.57            0.97        : *
   28     ID  * :                                                   : *
   29     ID  * :                                                   : *
   30     ID  * :           SEE FIGURE 5 FOR DRAINAGE BASINS        : *
   31     ID  * :...................................................: *
   32     ID  ************************************************************
   33     IT      5       0       0     300
   34     IO      5       0
   35     IN      5       0       0
   36     JR   PREC    0.57    0.97    0.98    0.99    1.00
          *
   37     KK      J
   38     KM               AREA        32.8  AC
```



LEGEND

(1) **DESIGN POINT**

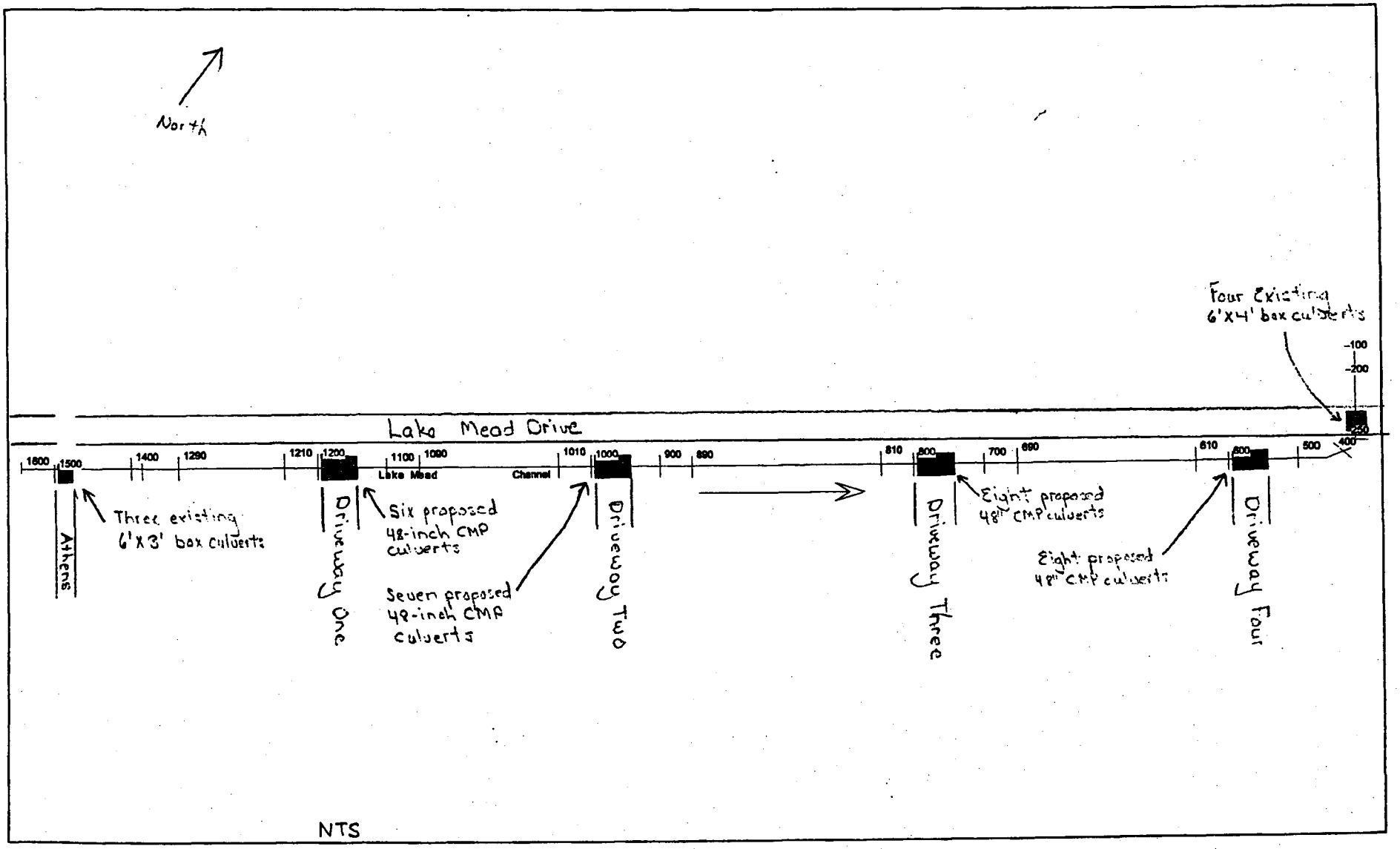
AREA OF FEMA ZONE A

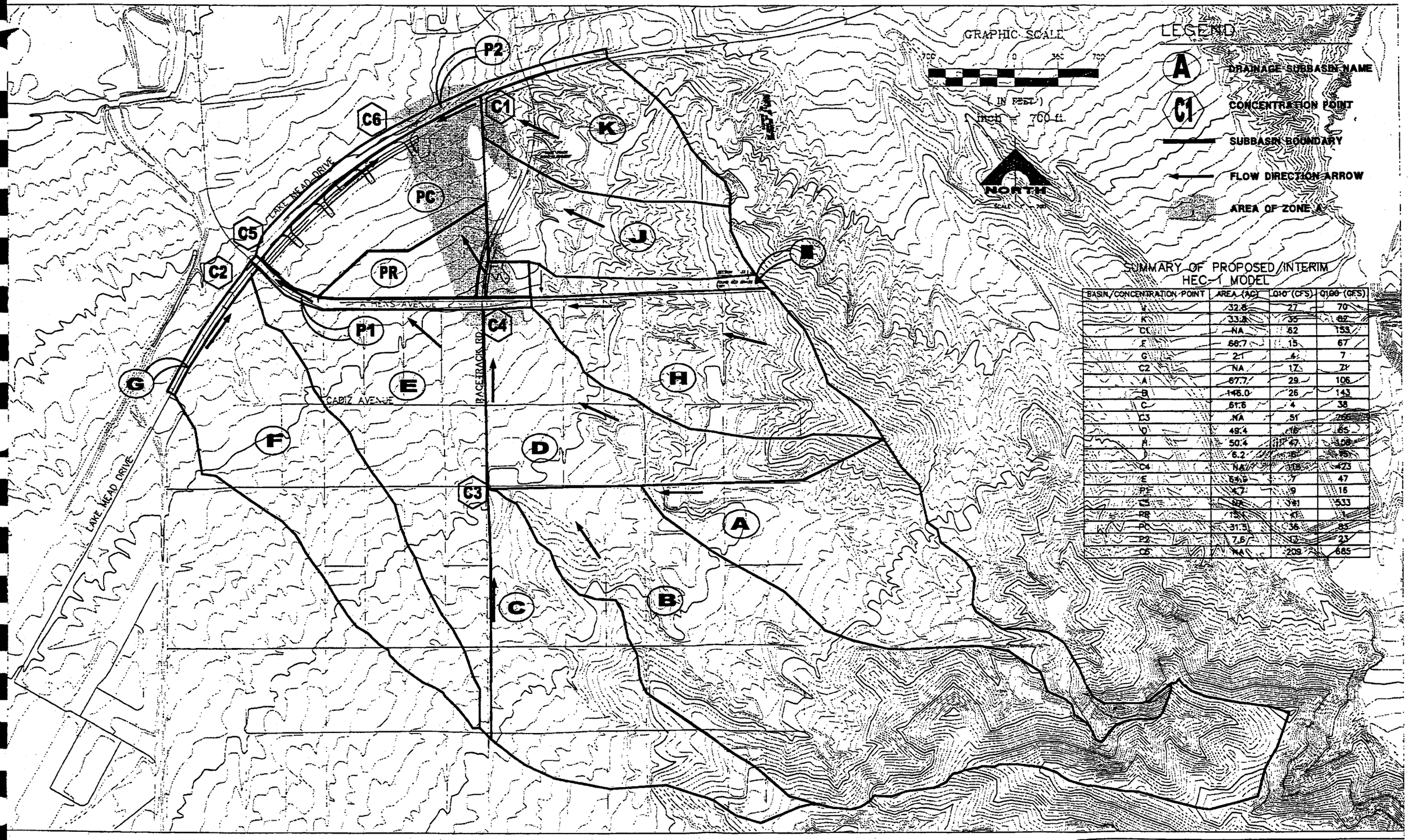
LAKE MEAD COMMONS

REVISED FIGURE 7

LAKE MEAD DRIVE IMPROVEMENTS

G.C. WALLACE, INC.
Engineering/Planners/Surveyors


North
Four Existing 6'x4' box culverts
Lake Mead Drive
1600
1500
1400
1290
1210
1200
1100
1090
Lake Mead
Channel
1010
1000
900
890
810
800
700
690
810
800
500
400
-100
-200
250
Athens
Three existing 6'x3' box culverts
Driveway One
Six proposed 48-inch CMP culverts
Seven proposed 48-inch CMP culverts
Driveway Two
Driveway Three
Eight proposed 48" CMP culverts
Eight proposed 48" CMP culverts
Driveway Four
NTS



SUMMARY OF PROPOSED/INTERIM HEC-1 MODEL

BASIN/CONCENTRATION POINT	AREA (AC)	Q10 (CFS)	Q100 (CFS)
J	32.6	27	70
K	33.3	35	82
C1	NA	62	153
F	68.7	15	67
G	2.1	4	7
C2	NA	17	71
A	67.7	29	106
B	145.0	26	143
C	51.6	4	38
C3	NA	51	255
D	49.4	16	65
H	50.4	47	108
I	6.2	18	65
C4	NA	118	423
E	64.5	7	47
P1	4.7	9	16
C5	NA	181	533
PR	15.1	41	1
PC	31.3	36	83
P2	7.5	10	23
C6	NA	209	685

LAKE MEAD COMMONS
OFFSITE IMPROVEMENTS

REVISED FIGURE 5
DRAINAGE BASINS

G.C. WALLACE, INC.
Engineering/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

Technical Drainage Study for Provenance, Mohawk Dr and Sunset Road per Pentacore, March 2001

TECHNICAL DRAINAGE STUDY

FOR

PROVENANCE

MOHAWK DRIVE AND SUNSET ROAD

March 16, 2001

Prepared for

The LandWell Company
875 West Warm Springs Road
Henderson, Nevada 89015

Project No. 0138.0105

Prepared by

DRAFT

PENTACORE

July 31, 2002

Kelly J. Wittwer, P.E.
Stantec/Pentacore Engineering Inc.
6763 West Charleston Boulevard
Las Vegas, NV 89102

Re: Provenance, Mohawk Drive & Sunset Road - Update
Permit Number: 2001001059

Dear Mr. Wittwer:

This letter provides comments on the above referenced drainage study dated March 14, 2002, Addendum, No. 1 dated May 7, 2002, and Addendum No. 2 dated June 11, 2002. The City of Henderson reviewed this study and based on the documents submitted, the **subject study is approved.** The following items are part of the approved study:

1. Clark County Regional Flood Control District concurrence is required.

2. Revise the WSE elevation information on Sheet 9 to match the HEC-RAS model information.

3. Provide the Q100 information on CMP profile on Sheet 9.

4. Provide the callout for the type of CMP to be used.

5. Provide contour elevations on the maps.

6. It appears the downstream side slope at Mohawk will require a traffic barrier on the roadway for slopes greater than 4:1. The barrier must be designed with openings to allow flow to be conveyed back into the channel in the event flow overtops the roadway.

Projects that disturb more than five acres of land must submit to the Nevada Division of Environmental Protection: (1) a "Notice of Intent" to discharge, (2) a request for inclusion in the Stormwater General Permit No. GNV0022241, and (3) a stormwater pollution prevention plan. For more information, please call (775) 687-4670, ext. 3138.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by the above named engineering firm may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage.

Please let me know if you have any questions concerning these comments.

Sincerely,

Jon H. Hayslip, P.E.
Project Engineer II

cc: Curt Chandler, Janie Nihipali, CCRFCD

Post-it® Fax Note 7671	Date 7-6-04	# of pages ▶ 1
To BRYCE CHRISTO	From ALEX KINGSTON	
Co./Dept. PBS&J	Co.	
Phone # 263-7275	Phone #	
Fax # 263-7200	Fax #	

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

March 5, 2002

Gale Wm. Fraser, II, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Cresent Hardy
Vice-Chairman
City of Mesquite

Shari Buck
City of North Las Vegas

Mayor James Gibson
City of Henderson

Michael Mack
City of Las Vegas

Chip Maxfield
Clark County

Bryan A. Nix
City of Boulder City

Bruce L. Woodbury
Clark County

Mr. Curt Chandler, P.E.
City of Henderson Public Works
240 Water St
Henderson, NV 89015

DISTRICT CONCURRENCE: MOHAWK DRIVE AND SUNSET ROAD (PN #2001001059)

Dear Mr. Chandler:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated March 16, 2001, Addendum No. 1 dated September 18, 2001, Addendum No. 2 dated November 19, 2001 and Addendum No. 3 dated December 21, 2001, for the above-mentioned project as submitted by Stantec Consulting, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Henderson Public Works dated January 16, 2002.

District concurs with acceptance of this Technical Drainage Study by City of Henderson Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*. As noted in study, site resides in a Special Flood Hazard Area (SFHA) designated as "Zone A" per the effective Flood Insurance Rate Map (FIRM). Therefore, consultant should be advised that this acceptance does not serve to amend the FIRM or remove the SFHA.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by Stantec Consulting, Inc. may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

BY: A R T

Andrew R. Trelease, P.E.
Senior Civil Engineer

ART:css

c: Kelly J. Wittwer, P.E., Stantec Consulting, Inc.

File: 22-63-5.STA

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: MOHAWK DRIVE AND SUNSET ROAD Date: 16-Mar-01

Location of Development: a) Descriptive MOHAWK DR EXTENDED NORTH OF LAKE MEAD DR AND SUNSET ROAD FROM MOHAWK DR. TO THE C-1

b) Sect. 5 Twn. 22S Rng. 63E

Name of Owner: LANDWELL CORP. Assessors Parcel No: 179-05-301-003

Contact Person- Name: Alex Kingston Telephone No: (702) 258-0115

Firm: Pentacore Engineering Inc.

Address: 6763 West Charleston Boulevard, Las Vegas, NV 89102

Type of Land Development/Land Disturbance Process:

- ☐ Rezoning
- ☐ Parcel Map
- ☐ Large Parcel Map
- ☐ Subdivision Map
- ☐ Planned Unit Development
- ☐ Building Permit
- ☐ Clearing and Grading Only
- ☒ Other (Please Specify Below) ROADWAYS

1. Total owned Land Area: At Site: 5 Acres Being Developed/Disturbed: 5 Acres
2. Is a Portion or all of the subject property in a designated FEMA Flood Hazard Area? (YES*) NO
3. Is the Property bordered or crossed by an existing of proposed Clark County Regional Flood Control District Master Planned Facility? (YES*) NO
4. Proposed type of development (Residential, Commercial, Etc.)? Roadway
5. Approximate upstream land area which drains to the subject site? See Study
6. Has the site drainage been evaluated in the past? (YES) NO If Yes, please Identify documentation: "Conceptual Drainage Study for the Future Provenance Master Plan" By Pentacore
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Discharge will drain to Las Vegas Wash
8. Briefly describe your proposed schedule for the subject project: Construction to begin within the next 6 months

Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*Review and concurrence of the Clark County Regional Flood Control District is required

Local Entity file No.

revision	date

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PENTACORE
Civil Engineering • Construction Management
Land Surveying • Planning • ADA Consulting
6763 W. Charleston Blvd. • Las Vegas, NV 89102
Telephone (702)258-0115 • Fax (702)258-0855

PROJECT NO. : 0138.0105 **DEVELOPMENT :** PROVENANCE

FILE : LWellSF4.xls **CALCULATED BY:** Jason Y. Lee **DATE :** 2/7/01

Sub-Basin Data					Initial/Overland Time (Ti)			Travel Time (Tt)				Tc	Tc Check (Urbanized Basins)		Final Tc	Tlag	Remarks
DESIG (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	VELOCITY (fps) (9)	Tt (min) (10)	Tc=Ti+Tt (min) (11)	TOTAL (ft) (12)	Tc (min) (13)	(min) (14)	Tlag (hrs)	
FUTURE CONDITION																	
ON1	90	0.798	23.0	0.0359	100	1.0	5.4	1700	2.0	5.4	5.2	10.7	1800.0	20.0	10.7	0.11	Developed
ON2	87	0.758	14.1	0.0220	100	1.0	6.1	1400	2.0	4.4	5.3	11.5	1500.0	18.3	11.5	0.11	Developed
ON3	84	0.719	13.4	0.0209	100	1.0	6.9	1300	2.0	4.3	5.0	11.9	1400.0	17.8	11.9	0.12	Developed
ON4	84	0.719	17.2	0.0269	100	1.0	6.9	1800	2.0	4.5	6.7	13.5	1900.0	20.6	13.5	0.14	Developed
ON5	88	0.772	22.5	0.0352	100	1.0	5.9	1500	2.0	5.2	4.8	10.7	1600.0	18.9	10.7	0.11	Developed
ON6	86	0.745	10.0	0.0156	100	1.0	6.4	1200	2.0	4.4	4.5	10.9	1300.0	17.2	10.9	0.11	Developed
ON7	88	0.772	19.6	0.0306	100	1.0	5.9	1500	2.0	5.0	5.0	10.9	1600.0	18.9	10.9	0.11	Developed
ON8	84	0.719	11.1	0.0173	100	1.0	6.9	1200	2.0	4.5	4.4	11.3	1300.0	17.2	11.3	0.11	Developed
ON9	92	0.824	12.5	0.0195	100	1.0	5.0	1200	2.0	4.6	4.3	9.3	1300.0	17.2	9.3	0.09	Developed
OFF1	84	0.719	41.1	0.0642	100	1.0	6.9	2400	2.0	6.1	6.6	13.4	2500.0	23.9	13.4	0.13	Developed
OFF2	87	0.758	25.0	0.0391	100	1.0	6.1	1900	2.0	5.4	5.9	12.0	2000.0	21.1	12.0	0.12	Developed
OFF3	86	0.745	13.0	0.0203	100	1.0	6.4	1300	2.0	4.3	5.0	11.4	1400.0	17.8	11.4	0.11	Developed
OFF4	88	0.772	16.6	0.0259	100	1.0	5.9	1700	2.0	4.7	6.0	11.9	1800.0	20.0	11.9	0.12	Developed

TI=(1.8(1.1-K)L^(1/2))/(S^1/3)

Tc= Ti+TT

K=0.0132(CN)-.39 Tlag=.6Tc

REFERENCE: **STANDARD FORM 4**

HEC1 S/N: 1333000362 HMVersion: 6.40 Data File: PROVEN-F.hc1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         SEPTEMBER 1990                *
*          VERSION 4.0                  *
*                                       *
*    RUN DATE  10/18/2000  TIME  14:44:14 *
*                                       *
*****************************************
```

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

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

```
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
:::                                     :::
:::  Full Microcomputer Implementation  :::
:::                 by                  :::
:::        Haestad Methods, Inc.        :::
:::                                     :::
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

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

          *DIAGRAM
    1     ID        PROVENANCE
    2     ID        FUTURE CONDITIONS   BY: JASON LEE
    3     ID        OCTOBER 18, 2000          FILE: PROVEN-F.HC1
    4     ID
    5     IT       2       0       0     300
    6     IO       5       0
    7     IN      .5       0       0
    8     JR    PREC     .58       1

    9     KK     ON1   BASIN ON1
   10     BA   .0359
   11     PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   12     PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   13     PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   14     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   15     PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   16     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   17     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   18     PC    .998    .999    1.00
   19     PB   2.86
   20     LS       0      90
   21     UD     .11

   22     KK     ON2   BASIN ON2
   23     BA   .0220
   24     LS       0      87
   25     UD     .11

   26     KK     CP1
   27     HC       2

   28     KK     ON3   BASIN ON3
   29     BA   .0209
   30     LS       0      84
   31     UD     .12

   32     KK     CP2
   33     HC       2

   34     KK     ON4   BASIN ON4
   35     BA   .0269
   36     LS       0      84
   37     UD     .14

   38     KK     CP3
   39     HC       2

   40     KK     ON8   BASIN ON8
   41     BA   .0173
   42     LS       0      84
   43     UD     .11
```

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

   44         KK     CP4
   45         HC       2

   46         KK     ON9    BASIN ON9
   47         BA   .0195
   48         LS       0       92
   49         UD     .09

   50         KK     CP5
   51         HC       2

   52         KK    OFF1    BASIN OFF1
   53         BA   .0642
   54         LS       0       84
   55         UD     .13

   56         KK    OFF2    BASIN OFF2
   57         BA   .0391
   58         LS       0       87
   59         UD     .12

   60         KK     CP6
   61         HC       2

   62         KK     ON6    BASIN ON6
   63         BA   .0156
   64         LS       0       86
   65         UD     .11

   66         KK     CP7
   67         HC       2

   68         KK    OFF3    BASIN OFF3
   69         BA   .0203
   70         LS       0       86
   71         UD     .11

   72         KK     CP8
   73         HC       2

   74         KK     ON7    BASIN ON7
   75         BA   .0306
   76         LS       0       88
   77         UD     .11

   78         KK     CP9
   79         HC       2

   80         KK    OFF4    BASIN OFF4
   81         BA   .0259
   82         LS       0       88
   83         UD     .12
```

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

   84         KK    CP10
   85         HC      2

   86         KK    CP11
   87         HC      2

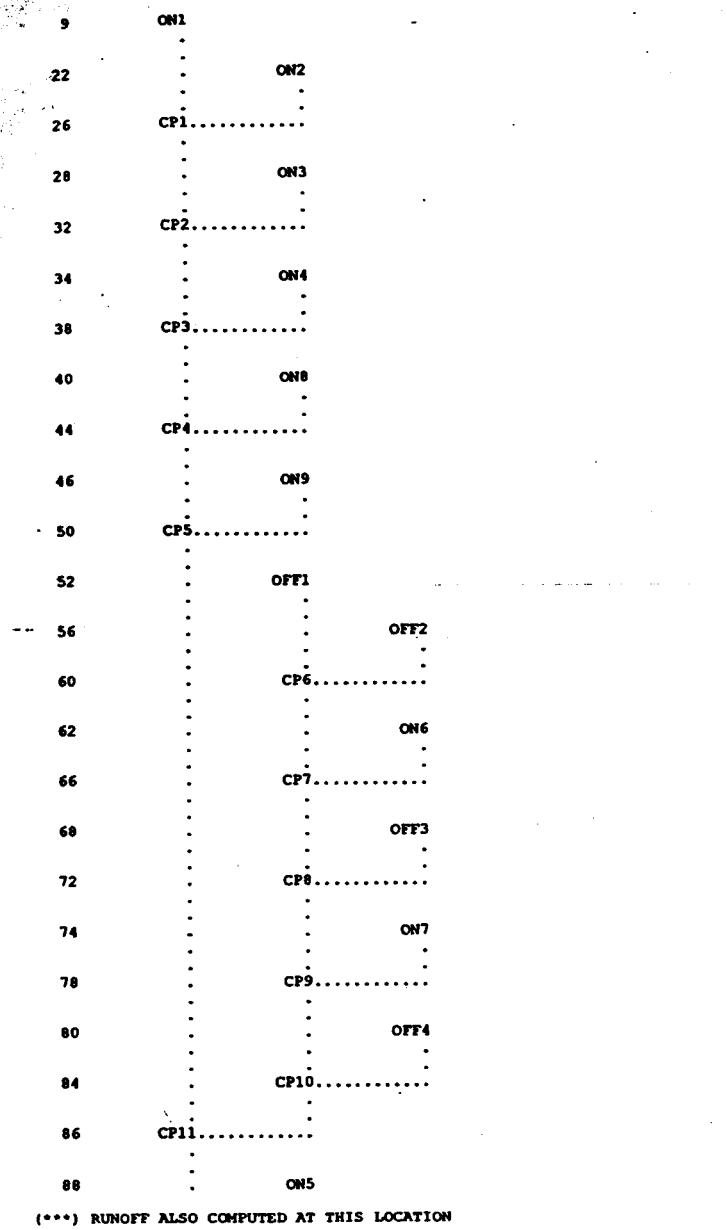
   88         KK     ON5   BASIN ON5
   89         BA   .0352
   90         LS      0      88
   91         UD     .11
   92         ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

FLOOD HYDROGRAPH PACKAGE (HEC-1)
SEPTEMBER 1990
VERSION 4.0

RUN DATE 10/18/2000 TIME 14:44:14

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

PROVENANCE
FUTURE CONDITIONS BY: JASON LEE
OCTOBER 18, 2000 FILE: PROVEN-F.HC1

6 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	2	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1 0	ENDING DATE
NDTIME	0958	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .03 HOURS
TOTAL TIME BASE 9.97 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.58 1.00

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .58	RATIO 2 1.00
HYDROGRAPH AT	ON1	.04	1	FLOW	28.	62.
				TIME	3.57	3.53
HYDROGRAPH AT	ON2	.02	1	FLOW	14.	34.
				TIME	3.57	3.53
2 COMBINED AT	CP1	.06	1	FLOW	43.	96.
				TIME	3.57	3.53
HYDROGRAPH AT	ON3	.02	1	FLOW	11.	28.
				TIME	3.57	3.57
2 COMBINED AT	CP2	.08	1	FLOW	53.	123.
				TIME	3.57	3.53
HYDROGRAPH AT	ON4	.03	1	FLOW	13.	35.
				TIME	3.60	3.57
2 COMBINED AT	CP3	.11	1	FLOW	66.	158.
				TIME	3.57	3.57
HYDROGRAPH AT	ON8	.02	1	FLOW	9.	24.
				TIME	3.57	3.57
2 COMBINED AT	CP4	.12	1	FLOW	75.	182.
				TIME	3.57	3.57
HYDROGRAPH AT	ON9	.02	1	FLOW	19.	38.
				TIME	3.53	3.53
2 COMBINED AT	CP5	.14	1	FLOW	92.	218.
				TIME	3.57	3.53
HYDROGRAPH AT	OFF1	.06	1	FLOW	32.	85.
				TIME	3.57	3.57
HYDROGRAPH AT	OFF2	.04	1	FLOW	25.	59.
				TIME	3.57	3.57
2 COMBINED AT	CP6	.10	1	FLOW	56.	144.
				TIME	3.57	3.57
HYDROGRAPH AT	ON6	.02	1	FLOW	9.	23.
				TIME	3.57	3.53
2 COMBINED AT	CP7	.12	1	FLOW	66.	167.
				TIME	3.57	3.57
HYDROGRAPH AT	OFF3	.02	1	FLOW	12.	30.
				TIME	3.57	3.53
2 COMBINED AT	CP8	.14	1	FLOW	78.	197.
				TIME	3.57	3.57
HYDROGRAPH AT	ON7	.03	1	FLOW	21.	49.
				TIME	3.57	3.53
2 COMBINED AT	CP9	.17	1	FLOW	99.	246.
				TIME	3.57	3.57
HYDROGRAPH AT	OFF4	.03	1	FLOW	18.	41.
				TIME	3.57	3.57
2 COMBINED AT	CP10	.20	1	FLOW	117.	287.
				TIME	3.57	3.57
2 COMBINED AT	CP11	.34	1	FLOW	209.	503.
				TIME	3.57	3.57
HYDROGRAPH AT	ON5	.04	1	FLOW	24.	57.
				TIME	3.57	3.53

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

FLOOD HYDROGRAPH PACKAGE (HEC-1)
SEPTEMBER 1990
VERSION 4.0

RUN DATE 10/18/2000 TIME 14:43:31

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

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

Full Microcomputer Implementation
by
Haestad Methods, Inc.

37 Brookside Road • Waterbury, Connecticut 06708 • (203) 755-1666

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

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

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              *DIAGRAM
    1         ID        PROVENANCE
    2         ID        EXISTING CONDITIONS   BY: JASON LEE
    3         ID        OCTOBER 18, 2000          FILE: PROVEN-E.HC1
    4         ID
    5         IT       2       0       0     300
    6         IO       5       0
    7         IN       5       0       0
    8         JR    PREC     .58       1

    9         KK     OF1   BASIN OF1
   10         BA   .0355
   11         PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   12         PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   13         PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   14         PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   15         PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   16         PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   17         PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   18         PC    .998    .999   1.00
   19         PB   2.86
   20         LS       0      82
   21         UD     .23

   22         KK      O1   BASIN O1
   23         BA   .0994
   24         LS       0      83
   25         UD     .30

   26         KK      O2   BASIN O2
   27         BA   .0959
   28         LS       0      77
   29         UD     .30

   30         KK     CP1
   31         HC       3

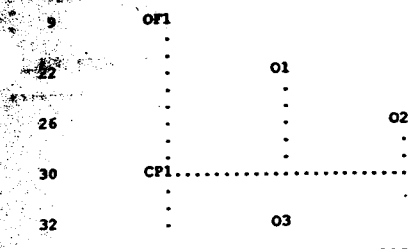
   32         KK      O3   BASIN O3
   33         BA   .0264
   34         LS       0      76
   35         UD     .18
   36         ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****************************************
*                                       *
*  HYDROLOGIC HYDROGRAPH PACKAGE (HEC-1)*
*        SEPTEMBER 1990                 *
*         VERSION 4.0                   *
*                                       *
*  RUN DATE 10/18/2000  TIME  14:43:31  *
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
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```
                    PROVENANCE
                    EXISTING CONDITIONS   BY: JASON LEE
                    OCTOBER 18, 2000          FILE: PROVEN-E.HC1

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     1   0  ENDING DATE
                      NDTIME      0958  ENDING TIME
                      ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL      .03 HOURS
                        TOTAL TIME BASE     9.97 HOURS

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

   JP           MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

   JR           MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .58      1.00
```

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

STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .58	RATIO 2 1.00
H AT□					
OF1	.04	1	FLOW	12.	34.
			TIME	3.70	3.67
H AT□					
O1	.10	1.	FLOW	31.	89.
			TIME	3.77	3.73
H AT□					
O2	.10	1	FLOW	17.	63.
			TIME	3.80	3.77
INED AT□					
CP1	.23	1	FLOW	59.	184.
			TIME	3.77	3.73
RAPH AT□					
O3	.03	1	FLOW	5.	21.
			TIME	3.67	3.63

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PENTACORE
Civil Engineering • Construction Management
Land Surveying • Planning • ADA Consulting
6763 W. Charleston Blvd. • Las Vegas, NV 89102
Telephone (702)258-0115 • Fax (702)258-0865

PROJECT NO. : 0138.0105 **DEVELOPMENT :** PROVENANCE

FILE : LWellSF4.xls **CALCULATED BY:** Jason Y. Lee **DATE :** 2/7/01

Sub-Basin Data					Initial/Overland Time (Ti)			Travel Time (Tt)				Tc	Tc Check (Urbanized Basins)		Final Tc	Tlag	Remarks
DESIG	CN	K	AREA (acres)	AREA (mi^2)	LENGTH (ft)	SLOPE (%)	Ti (min)	LENGTH (ft)	SLOPE (%)	VELOCITY (fps)	Tt (min)	Tc=Ti+Tt (min)	TOTAL (ft)	Tc (min)	(min)	Tlag (hrs)	
(1)		(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
EXISTING CONDITION																	
OF1	82	0.692	22.7	0.0355	200	1.5	9.1	3600	2.0	4.2	14.3	23.3	NA	NA	23.3	0.23	Existing
O1	83	0.706	63.6	0.0994	500	1.5	13.9	3300	2.0	3.5	15.7	29.6	NA	NA	29.6	0.30	Existing
O2	77	0.626	61.4	0.0959	500	1.5	16.7	2700	2.0	3.5	12.9	29.5	NA	NA	29.5	0.30	Existing
O3	76	0.613	16.9	0.0264	250	2.0	11.0	1500	2.0	3.7	6.8	17.8	NA	NA	17.8	0.18	Existing
DEVELOPED CONDITION																	
OF1	82	0.692	22.7	0.0355	200	1.5	9.1	3600	2.0	4.2	14.3	23.3	3800.0	31.1	23.3	0.23	Developed
O1	88	0.772	63.6	0.0994	100	1.0	5.9	3500	2.0	6.7	8.7	14.6	3600.0	30.0	14.6	0.15	Developed
O2	85	0.732	61.4	0.0959	100	1.0	6.6	2900	2.0	5.2	9.3	15.9	3000.0	26.7	15.9	0.16	Developed
O3	87	0.758	16.9	0.0264	100	1.0	6.1	1500	2.0	3.3	7.6	13.7	1600.0	18.9	13.7	0.14	Developed

$Ti=(1.8(1.1-K)L^{(1/2)})/(S^{1/3})$

$Tc= Ti+TT$

$K=0.0132(CN)-.39$ $Tlag=.6Tc$

REFERENCE: **STANDARD FORM 4**

STORM FLOW SUMMARY			
BASIN	AREA (acres)	Q_{10} (cfs)	Q_{100} (cfs)
ON1	23.0	28	62
ON2	14.1	14	34
ON3	13.4	11	28
ON4	17.2	13	35
ON5	22.5	24	57
ON6	10.0	9	23
ON7	19.6	21	49
ON8	11.1	9	24
ON9	12.5	19	38
OFF1	41.1	32	85
OFF2	25.0	25	59
OFF3	13.0	12	30
OFF4	16.6	18	41

CONCENTRATION POINT	Q_{10} (cfs)	Q_{100} (cfs)
CP1	43	96
CP2	53	123
CP3	66	158
CP4	75	182
CP5	92	218
CP6	56	144
CP7	66	167
CP8	78	197
CP9	99	246
CP10	117	287
CP11	209	503

Sunset Road
Mohawk Drive
Lake Mead Drive
1700
1680
1720
1740
1760
ON1
ON2
ON3
ON4
ON5
ON6
ON7
ON8
ON9
OFF1
OFF2
OFF3
OFF4
CP1
CP2
CP3
CP4
CP5
CP6
CP7
CP8
CP9
CP10
A
B
C

B Soils Type
01 Basin
CP Concentration
Basin Boundary
Flow Direction
Soils Delineation

Provenance Mohawk/Sunset Future Drainage Map

Figure 5

NORTH

400 0 400 800 Feet

PENTACORE
Geographic Information Systems

Update to the Technical Drainage Study for Loop Road per PBS&J, dated February 2002

UPDATE TO THE TECHNICAL DRAINAGE STUDY FOR TUSCANY LOOP ROAD

Prepared for:
Commerce Associates, LLC
5967 Harrison Drive, Unit B1
Las Vegas, NV 89120

Prepared by:
PBS&J
901 North Green Valley Parkway Suite #100
Henderson, Nevada 89074

Reference Number 511197.00

February 1, 2002

PBS&J

October 11, 2001

Mr. Mark A. Sorensen, P.E.
Post Buckley Schuh &Jernigan, Inc.
901 N. Green Valley Parkway, Suite 100
Henderson, NV 89014

Re: Technical Drainage Study for Tuscany Hills Loop Road
PDG #98168-D, 728-2F (LB)
City of Henderson Permit Number 2001740000

Dear Mr. Sorensen:

This letter provides comments on the above referenced study dated September 18, 2001. The City of Henderson and Poggemeyer Design Group, Inc. reviewed this study and based on the documents submitted, the subject study is approved. The following comments and restrictions are noted:

1) Clark County Regional Flood Control District concurrence is required.

2) All drainage study review fees, if any, above the original deposit, must be paid in full. You will be notified if any additional fees are required. If there are excess funds, you will be issued a refund check.

3) The grading plans for the above referenced drainage study titled, "Tuscany Olivia Parkway, Via Alatoire & Lake Mead Drive", signed, sealed, and dated by Lee C. Farris, P.E., on July 17, 2001, and the addendum signed and dated on September 12, 2001, has been reviewed to determine conformance to the current City of Henderson laws and regulations. The plan appears to meet the requirements for approval.

4) The finished floor elevations for the site must be constructed as shown on the grading plans.

5) The site is located within Zone A as shown on the Flood Insurance Rate Map Community Panel Numbers 32003C 2605 D dated August 16, 1995. A Zone A is designated as being a special flood hazard area, inundated by the 100-year flood, with no base flood elevation determined.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by the above named engineering firm may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage.

Please let me know if you have any questions concerning these comments.

Sincerely,

John R. Manning, P.E.
Project Engineer II

Cc: Curt Chandler, Janie Nihipali, CCRFCD

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT

Wm. Fraser, II, P.E.
General Manager/Chief Engineer

OF DIRECTORS

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City of Las Vegas

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Clark County

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City of Boulder City

Bruce L. Woodbury
Clark County

November 19, 2001

Mr. Curt Chandler, P.E.
City of Henderson Public Works
240 Water Street
Henderson, NV 89015

DISTRICT CONCURRENCE: TUSCANY HILLS LOOP ROAD (PN #2001740000)

Dear Mr. Chandler:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated July 17, 2000, and Addendum No. 1 dated September 18, 2001, for above-mentioned project as submitted by PBS & J, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Henderson Public Works dated October 11, 2001.

District concurs with acceptance of this Technical Drainage Study by City of Henderson Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*. As noted in study, site resides in a Special Flood Hazard Area (SFHA) designated as "Zone A" per the effective Flood Insurance Rate Map (FIRM). Therefore, consultant should be advised that this acceptance does not serve to amend the FIRM or remove the SFHA.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by PBS & J, Inc. may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

BY: _____
Andrew R. Trelease, P.E.
Senior Civil Engineer

ART:css

c: Mark A. Sorensen, P.E., PBS & J, Inc.

File: 21-63-32.PBS

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870
Website: http://www.ccrfcd.org

III. CHANGES TO THE ORIGINAL STUDY

This update analyzes the impact to Loop Road as a result of the future drainage patterns within the Tuscany Community being revised. Therefore, only the future condition drainage will be discussed in this study. A future condition drainage map, **Figure 2** (pg. 12), illustrates basins impacting Loop Road and their respective flow paths. Also included in this study is the analysis of the storm drain facilities to be constructed with the Loop Road improvement plans.

Note that changes in flow patterns and proposed facilities from that originally approved are many. As to aid to the reviewer, two exhibits labeled sheet 1 of 2 (**Master Storm drain Plan – Old Layout**) (pg. 13) and exhibit sheet 2 of 2 (**Master Storm drain Plan – New Layout**) (pg. 14) are included.

A. Hydrologic Analysis

Future condition drainage patterns within the Tuscany Community have been altered due to grading revisions of individual parcels (see **Figure 2**). This study developed the rainfall and runoff data for use with the HEC-1 Flood Hydrograph computer program, which is in accordance with the CCRFCD Hydrologic Criteria and Drainage Design Manual (CCRFCD, 1999). The methodology and calculations used to determine the hydrologic parameters are included in **Appendix I**. The HEC-1 runoff model is included in **Appendix II**. A basin flow summary is shown in **Table 1**.

Loop Road

The five (5) Loop Road basins, LOOP-1 through LOOP-5, consist of portions of Olivia Pkwy, which were not included in the parcel basins. Basin LOOP-1 flow plus flow from Parcel 19 is combined at combination point C-LOOP1. At this point, flow is split between basins LOOP-2 and LOOP-5 (see **Appendix III** for flow split calculation). Flow conveyed through basin LOOP-2 is combined at combination point C-LOOP2. Drop inlets at combination point C-LOOP2 collect all the flow, which is then discharged into golf course basin GC-1 via storm drain.

Basin LOOP-5 conveys the other portion of the flow split from basin LOOP-1 and SC-1 (sales center) north to Parcel 23 basins. Flow is conveyed through Parcel 23 basins via Olivia Pkwy and discharged into basin LOOP-4. The flow is then combined at combination point C-LOOP4A. Drop inlets at this location are designed to collect 28cfs from the street flow. This flow is discharged into the channel along the west side of Olivia Pkwy.

The remaining portion of the street flow continues along Olivia Pkwy and is combined with basin flow from 24OND-1 at combination point C-LOOP4B. Drop inlets at this location collect all the street flow. This flow is discharged into the channel along the west side of Olivia Pkwy.

Basin LOOP-3 conveys flow from basins 24OND-2 and 13OND-1 to combination point C-LOOP3. Drop inlets at this location collect all the street flow and discharge it into an 8'X4' RCB culvert. The culvert ultimately discharges into the C-1 Channel.

Clubhouse

The golf course clubhouse building is located in the center of the Tuscany Community. The technical drainage study for this parcel was approved by COH on 10-22-01. A portion of the flow from this site is discharged into golf course basins and ultimately into the golf course lake. The other portion is discharged into golf course basin GC-5 via storm drain and direct runoff. See referenced material for discussion on the Clubhouse (see **Appendix IV**).

Maintenance Building

The golf course maintenance building is located along the west property boundary between Parcel 5 and 25. The technical drainage study for this parcel was approved by COH on 11-19-01. Flow from this site is discharged into golf course basin GC-8. See referenced material for discussion on the Maintenance Building (see **Appendix IV**).

Sales Center

The proposed Sales Center is located in the parcel between basins LOOP-2 and LOOP-5. This parcel is divided into two (2) basins, SC-1 and SC-2. Basin SC-1 is discharged into basin LOOP-5 (Olivia Pkwy) and conveyed north. Basin SC-2 is discharged into basin LOOP-2 (Olivia Pkwy) and conveyed east.

Parcel 5

The portion of Parcel 5 impacting Loop Road is included in sub-basin 5OND-1. Flow from this basin is collected via drop inlets in Via Morrelli, which is the entrance road into Parcel 5 from Olivia Pkwy. The flow is discharged into the 10'X4' RCB and combined with flow from combination point C-GC8. This combined flow is ultimately discharged into golf course basin GC-9. The remaining portion of Parcel 5 is graded

to convey flow away from Olivia Pkwy. This portion does not impact any portion of Loop Road and is not addressed in this study.

Parcel 6-A

Parcel 6-A is graded to convey flow north. This parcel does not impact any portion of Loop Road and is not addressed in this study.

Parcel 6-B

The portion of Parcel 6-B impacting Loop Road is included in sub-basins 14OND-1 and 14OND-3. Flow from these basins is conveyed to combination point C-14OND3. Drop Inlets at this location collect the flow and discharge it to the 8'X4' RCB culvert. The culvert ultimately discharges into the C-1 Channel. The remaining portion of Parcel 6-B is graded to convey flow west and does not impact any portion of Loop Road. This portion is not addressed in this study.

Parcel 6-C

The portion of Parcel 6-C impacting Loop Road is divided into two (2) basins, 6COND-1 and 6COND-2. Flows from these basins are conveyed north via Olivia Pkwy. These two basins are combined with basins 17OND-1 and 12OND-1 at combination point C-6COND2. Flow at combination point C-6COND2 is collected via drop inlets and discharged into golf course basin GC-4. The remaining portion of Parcel 6-C is graded to convey flow through a drainage easement and into Parcel 6-B. This portion does not impact any portion of Loop Road and is not addressed in this study.

Parcel 10

Parcel 10 is graded to convey flow away from Via Alatoire. This parcel does not impact any portion of Loop Road and is not addressed in this study.

Parcel 11

Parcel 11 is divided into two (2) basins, 11OND-1 and 11OND-2. Flow from these basins is discharged into Via Alatiore and combined with offsite flow from basin SUN-1 (future Sunset Road) at combination point C-P11. Flow at combination point C-P11 is conveyed west along Via Alatoire and combined with basin 12OND-2 at combination point C-12OND2. Drop Inlets at this location collect the flow and discharge it into the C-1 Channel.

Parcel 12

Parcel 12 is divided into two (2) basins, 12OND-1 and 12OND-2. Flow from basin 12OND-1 is conveyed north via Olivia Pkwy. Flow from basin 12OND-2 is conveyed north to Via Alatoire and combined with Parcel 11 basins and offsite basin SUN-1 (future Sunset Road) at combination point C-12OND2. At this point flow is collected via drop inlets and discharged into the C-1 Channel.

Parcel 15

Parcel 15 is graded to convey flow away from Olivia Pkwy and ultimately discharge into golf course lakes. This parcel does not impact any portion of Loop Road and is not addressed in this study.

Parcels 16 & 17

Parcel 17 and a portion of Parcel 16 comprise basin 17OND-1. Flow is conveyed east via Olivia Pkwy. The remaining portion of Parcel 16 is graded to convey flow away from Olivia Pkwy and discharged into the adjacent golf course. This portion does not impact any portion of Loop Road and is not addressed in this study.

Parcels 18 & 19

Most of the flow generated from Parcel 18 is discharged into the adjacent golf course (basin GC-1) from the park to the west. A small portion of Parcel 18, basin 18OND-16, is conveyed through Parcel 19 and discharged into Olivia Pkwy.

Parcel 19 is divided into seven (7) basins (see **Figure 2**). Parcel 19 sub-basins plus basin 18OND-16 (Parcel 18) and PK-3 (park) are conveyed to basin LOOP-1 (Olivia Pkwy). A flow split occurs in Parcel 19 (HEC-1 node C-19OND5) where flow is diverted to basins not tributary to any portion of Loop Road. Flow split calculations are shown in **Appendix III**.

At the intersection of Olivia Parkway and Sunset Road (entrance to Tuscany site) a 4 foot Type A drop inlet (DI-10 from original study) will collect nuisance flow from the area and convey it to the proposed storm drain system within Sunset Road by Pentacore Engineering.

Parcel 22

Parcel 22 is graded to convey flow to the western property boundary. This parcel does not impact any portion of Loop Road and is not addressed in this study.

Parcels 23 & 25

Parcel 23 and a portion of Parcel 25 comprise basins 23OND-7 and 23OND-8. Flow from these basins is conveyed north via Olivia Pkwy. The remaining portion of Parcel 25 is graded to convey flow away from Olivia Pkwy and is not addressed in this study.

Parcel 24

Previously discussed under the Loop Road section: Parcel 24 is divided into two (2) basins, 24OND-1 and 24OND-2. Flow from basin 24OND-1 is discharged into basin LOOP-4 (Olivia Pkwy) and combined with other basin flows at combination point C-LOOP4B. At this point, flow is collected via drop inlets and discharged into the channel along the west side of Olivia Pkwy.

Flow from basin 24OND-2 is discharged into basin LOOP-3 (Olivia Pkwy) conveyed east. This basin is combined with basins LOOP-3 and 13OND-1 at combination point C-LOOP3. At this point, flow is collected via drop inlets and discharged into an 8'X4' RCB.

Golf Course

The Tuscany Community Golf Course is divided into eight (8) basins, GC-1 through GC-9. Basins GC-1, GC-2, GC-3, GC-6 and GC-9 do not impact any portion of Loop Road and are not addressed in this study.

Flow from basin GC-4 and combination point C-6COND2 (diverted Olivia Pkwy flow via storm drain) is routed through basin GC-5. Combination point C-GC5 combines flow from combination point C-6COND2, basins GC-4, GC-5 and a portion of the clubhouse. At this point the flow enters an 8'X4' RCB culvert and discharges into the C-1 Channel.

Flow from basin GC-7 is conveyed northwest to Olivia Pkwy. A 36-inch RCP conveys the flow under Olivia Pkwy and discharges into the channel along the west Olivia Pkwy.

Flow from basin GC-8 and the maintenance building is conveyed to the channel along the west side of Olivia Pkwy. These flows are combined

with other flows at combination point C-GC8. At this point the flow enters a 10'X4' RCB culvert and discharges into basin GC-9.

B. Hydraulic Analysis

The storm drain facilities along Loop Road have been modified as a result of the revised hydrologic analysis discussed above. There are eight (8) drop inlet locations along Loop Road. Each location has the same size drop inlet on both sides of the street. A summary of the drop inlet location and sizes is shown in **Table 3**. Hydraulic calculations are provided in **Appendix III** (i.e. drop inlet sizes, WSPG models, inlet control calculations). Refer to **Figure 2** for drop inlet location and storm drain discharge points.

The storm drain pipe/culverts were modeled using WSPG. Inlet control calculations were done at culvert entrances and drop inlet junctions. These calculations show that the pipe size will satisfactorily convey its respective flow.

A summary of the street flow depth calculations is shown in **Table 2**. These calculations were done at various points along Loop Road and show that the 100-yr flow is contained with the street ROW and CCRFCD criteria is satisfied. Refer to **Figure 2** for street section location.

Note that the channel along the west side of Olivia Pkwy and south of Parcel 5 is included in the street flow analyses. The channel is V-shaped with 3:1 side slopes. The 100-yr flow is 147cfs (combination point C-GC8) resulting in a depth of 3.02-feet and a velocity of 5.39fps. The channel is lined with riprap (D_{50}=6'') to a minimum height of 4-feet to prevent erosion. The channel conveys flow to a 10'X4' RCB, which discharges into golf course basin GC-9.

IV. CONCLUSION

This study presents the findings of a detailed evaluation of the future drainage conditions of the proposed improvements of Tuscany Loop Road as shown per *Tuscany Improvement Plans Olivia Parkway, Via Alatoire and Lake Mead Drive* prepared by PBS&J. The study demonstrates that the site will be able to convey the 100-yr peak flow rate under the conditions set forth by the CCRFCD Hydrologic Criteria and Drainage Manual. The proposed improvements will not have an adverse impact on downstream properties.

Development of Hydrologic Parameters

RAINFALL METHODOLOGY

A. Point Rainfall

The 100-year, 6-hour depth-duration-frequency values for the area were obtained from Figure 513 from the CCRFCD Hydrologic Criteria and Drainage Design Manual. The site is location outside of the McCarran rainfall area. Table 505 (CCRFCD, 1999) was used to adjust this value to be 2.86. The above tables and figures are shown within this Appendix.

The HEC-1 multi-ratio option (HEC, 1990) was used to model the 10 and 100-year design storms in the HEC-1 input file. The HEC-1 JR card was used to specify the precipitation by which to multiply the 100-year precipitation (point rainfall) values. The 10 and 100-year ratio are 0.61 and 1.00, respectively.

B. Storm Distribution

Table 503 in CCRFCD Manual specifies that the 6-hour storm distribution, SDN 3 should be used for drainage areas less than eight square miles.

RUNOFF METHODOLOGY

A. Lag Time

A CCRFCD Standard Form 4 (included) was completed to determine the time of concentration for each drainage basin. For all onsite sub-basins that comprise less than 1 square mile, the time of concentration was calculated as follows:

$$T_c = T_i + T_t$$

Where: T_c = Time of Concentration
T_i = Initial, inlet or overland flow time
T_t = Travel time in the ditch, gutter, etc.

Initial flow time was calculated as follows:

$$T_i = 1.8(1.1 - K)L_o^{1/2}/S^{1/3}$$

Where: T_i = Initial overland flow time (minutes)

$$K = 0.0132 * CN - 0.39$$

CN = Curve Number

L_o = Length of overland flow (max. 500 feet)

S = average basin slope (percent)

The lag time was calculated as follows:

$$T_{lag} = 0.6Tc \text{ (hours)}$$

B. Soils -- Curve Number Determination

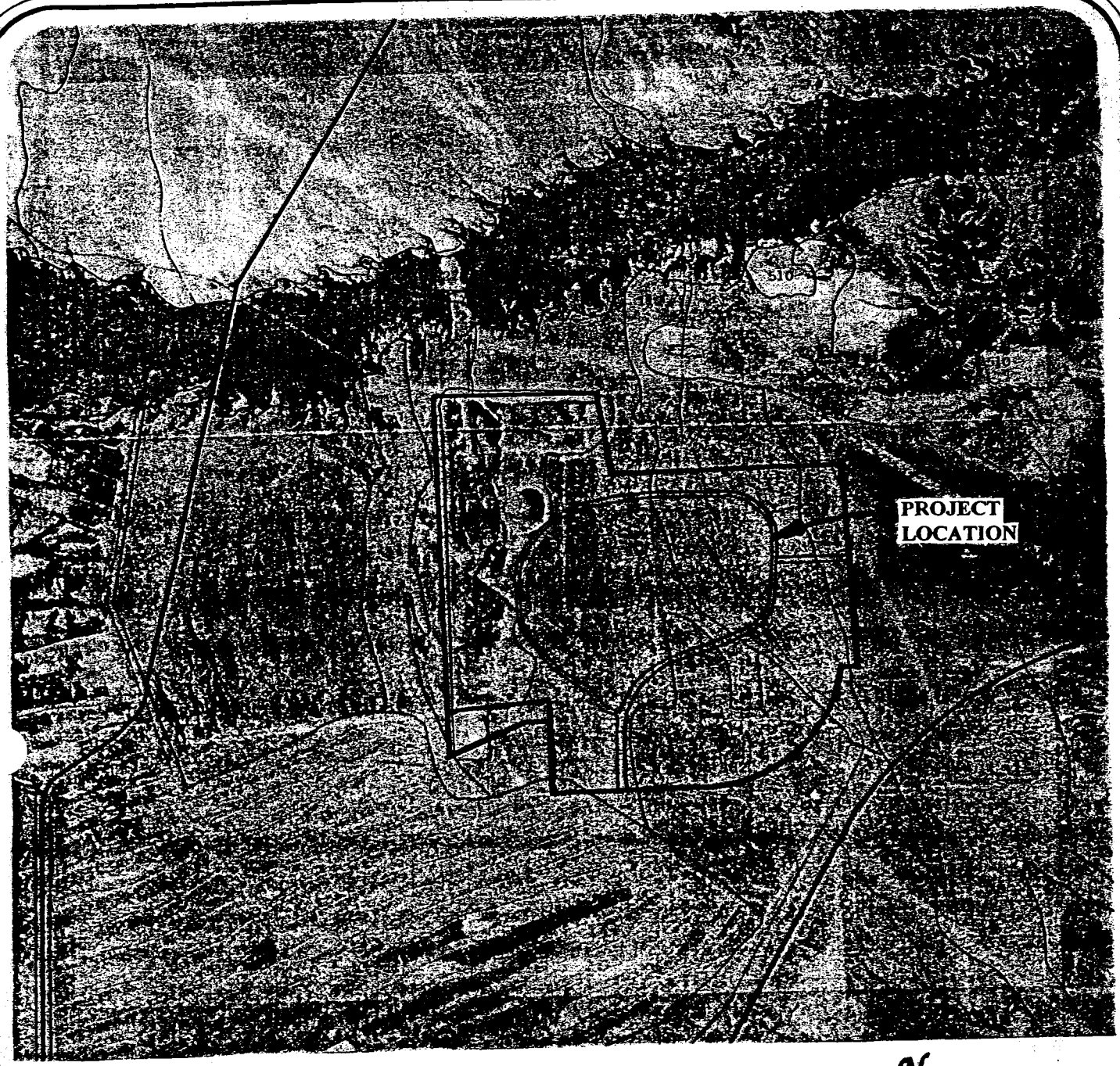
Soils information for the drainage basins was obtained from the Soil Conservation Service (SCS) Soil Survey of the Las Vegas Valley Area, Nevada, 1982. A SCS soil survey map is included in this Appendix. The hydrologic group classification for each soil in the soil composite was obtained from Table 15 of the SCS survey.

The following **Table 4,** (Curve Number Calculations) summarizes the computation of the curve numbers.

TABLE 4
CURVE NUMBER CALCULATIONS
Tuscany - Loop Road

BASIN NAME	COVER TYPE	SOIL COMPOSITION	MAP SYMBOL	HYDROLOGIC GROUP	CURVE NUMBER CALCULATIONS	COMPOSITE CURVE NUMBER
DEVELOPED CONDITIONS						
GC-4[1]	OPEN SPACE	100% Arizo	#112	A	1.0*(80)	80
GC-5[1]	OPEN SPACE	100% Caliza	#184	B	1.0*(80)	80
GC-7[1]	OPEN SPACE	100% Caliza	#184	B	1.0*(80)	80
GC-8[1]	OPEN SPACE	100% Pits	#610	D	1.0*(80)	80
LOOP-1	PAVED	100% Caliza	#184	B	1.0*(98)	98
LOOP-2	PAVED	100% Caliza	#184	B	1.0*(98)	98
LOOP-3	PAVED	100% Caliza	#184	B	1.0*(98)	98
LOOP-4	PAVED	100% Caliza	#184	B	1.0*(98)	98
LOOP-5	PAVED	100% Caliza	#184	B	1.0*(98)	98
PK-3	OPEN SPACE	100% Caliza	#182	B	1.0*(79)	79
SC-1	PAVED	100% Caliza	#184	B	1.0*(98)	98
SC-2	PAVED	100% Caliza	#184	B	1.0*(98)	98
SUN-1	PAVED	100% Arizo	#117	A	1.0*(98)	98
5OND-1	RESIDENTIAL	100% Pits	#610	D	1.0*(92)	92
6COND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
6COND-2	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
11OND-1	RESIDENTIAL	100% Arizo	#112	A	1.0*(80)	80
11OND-2	RESIDENTIAL	100% Arizo	#112	A	1.0*(80)	80
12OND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
12OND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
13OND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
14OND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
14OND-2	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
14OND-3	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
14OND-4	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
17OND-1	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
18OND-16	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-1	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-2	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-3	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-5	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-15	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-17	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
19OND-18	RESIDENTIAL	100% Caliza	#182	B	1.0*(87)	87
23OND-7	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
23OND-8	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
24OND-1	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87
24OND-2	RESIDENTIAL	100% Caliza	#184	B	1.0*(87)	87

[1] Note that all Golf Course basins use curve numbers corresponding to Open Space (good condition), soil group 'D'.
It is not known what type of soil was used for the golf course, therefore, the most conservative soil type was assumed.



2000 1000 0 2000 4000 6000

APPROX. SCALE: 1" = 2000'

N

SOILS MAP

PBSJ
901 North Green Valley Pkwy
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200

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TABLE 15.--SOIL AND WATER FEATURES

"Flooding" and "water table" and terms such as "rare" and "occasional" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
105*: McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
107 Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
112 Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
113 Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	High.
117 Arizo	A	None	---	>6.0	---	>60	---	---	---	High	Low.
120 Bluepoint	A	Rare	---	4.0-6.0	Jun-Sep	>60	---	---	---	High	Moderate.
127, 128, 129 Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
132 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
133*: Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Rock outcrop.											
134 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
140 Casaga	C	None	---	>6.0	---	>60	---	---	---	High	High.
150 Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
151 Cave	D	None	---	>6.0	---	>60	---	10-20	Thick	High	Low.
152, 155 Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
160 Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
181*: Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
182*: Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.
Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
183--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
184--- Caliza	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
187--- Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
190--- Dalian	B	None	---	>6.0	---	>60	---	---	---	High	Low.
191--- Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
192*: Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
200--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	Moderate.
206--- Glencarb	C	Occasional	Jul-Sep	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
222--- Glencarb	C	Rare	---	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
236--- Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
237--- Glencarb	B	Rare	---	>6.0	---	>60	---	40-60	Thick	High	Low.
240--- Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
252, 255--- Grapevine	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
260--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
262*: Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	Rare	---	>6.0	---	>60	---	9-20	Thick	High	Low.
263*: Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
264--- Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
419*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
430 Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.
440 Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
450 Cave Variant	D	None	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
502*:											
Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
[illegible]e	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
505*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
510*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
542*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
0*. adlands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

CCRFCD Criteria

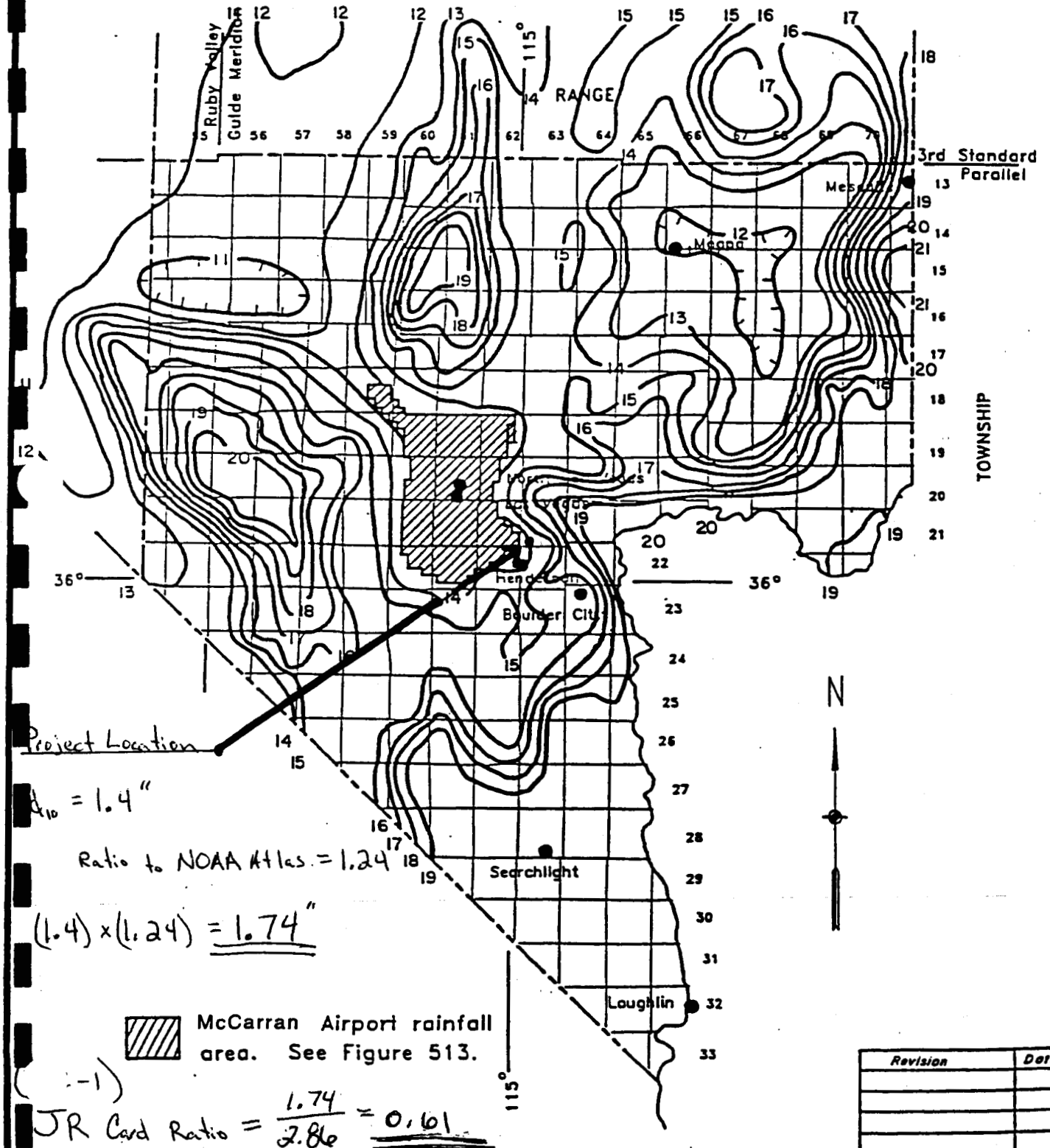
PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



$A_{10} = 1.4$"

Ratio to NOAA Atlas = 1.24

$(1.4) \times (1.24) = 1.74$"

McCarran Airport rainfall area. See Figure 513.

(I-1)

JR Card Ratio $= \frac{1.74}{2.86} = 0.61$

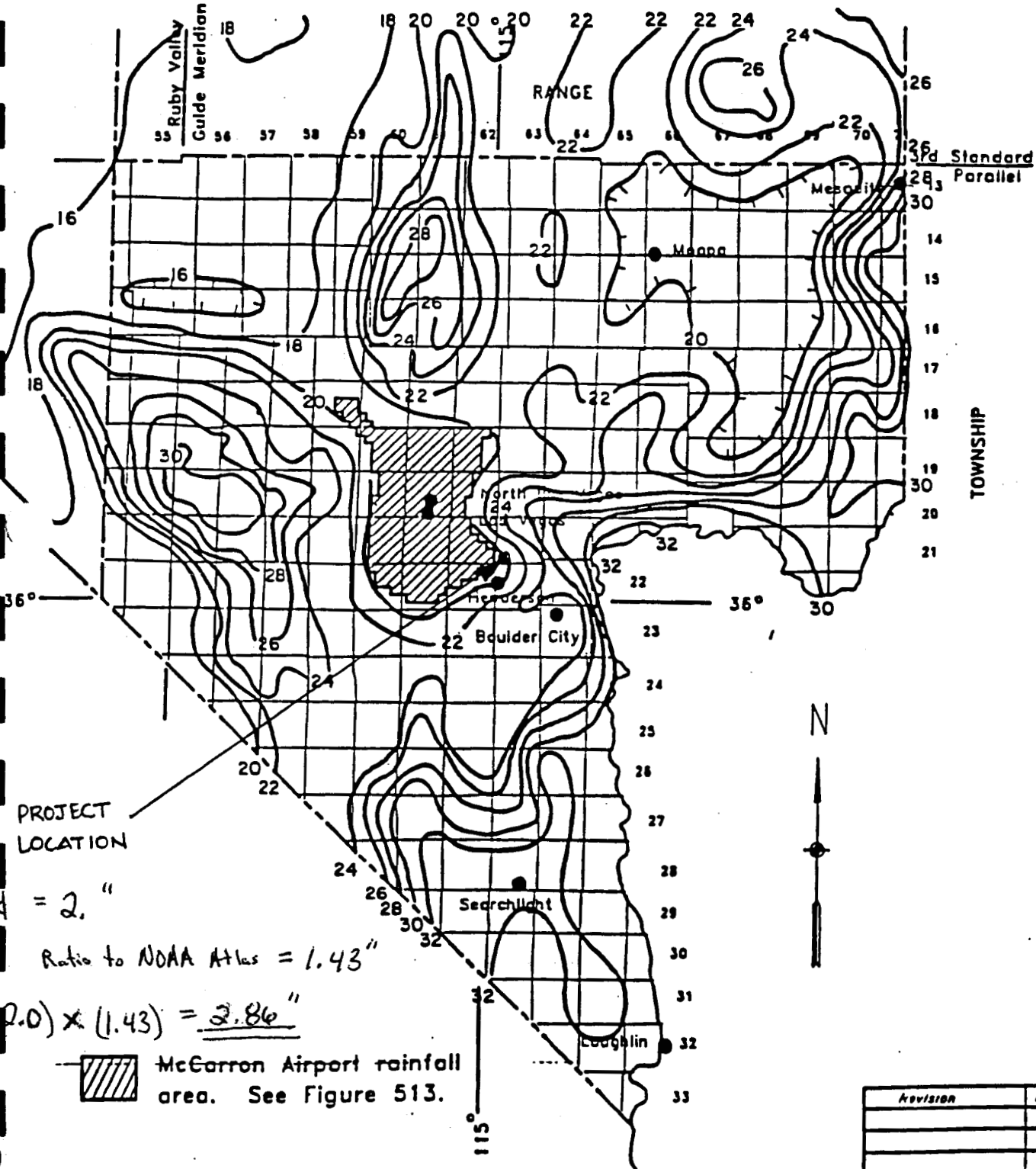
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
00 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

Standard Form 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc. **DEVELOPMENT: TUSCANY - GOLF COURSE** **DEVELOPED CONDITION**

Project No. : 511197

File: **CALCULATED BY : SCOTT PATTON** **DATE: NOVEMBER 2001**

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG:	CN	K	AREA (acres)	AREA (mi^2)	LENGTH (ft)	SLOPE (%)	Ti (min)	LENGTH (ft)	SLOPE (%)	LAND COVER k	VELOCITY* (fps)	Tt (min)	Tc = Ti + Tt (min)	TOTAL LENGTH (ft)	Tc = (L/180)+10 (min)	(min)	Tlag= 0.6Tc/60 (hrs)	
(1)		(2)	(3)		(4)	(5)	(6)	(7)	(8)		(9)	(10)	(11)	(12)	(13)	(14)		
GC-4	80	0.666	11.4	0.0178	140	14.2	3.8	1300	1.5	NA	2.39	9.1	12.9	1440	18.0	12.9	0.129	
GC-5	80	0.666	21.5	0.0336	60	33.3	1.9	1150	2.6	NA	3.64	5.3	7.1	1210	16.7	7.1	0.071	
GC-7	80	0.666	22.1	0.0345	100	13.0	3.3	2100	3.1	NA	3.77	9.3	12.6	2200	22.2	12.6	0.126	
GC-8	80	0.666	17.9	0.0280	65	20.0	2.3	1800	1.7	NA	2.87	10.5	12.8	1865	20.4	12.8	0.128	

Tc = Ti + Tt Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

Tlag = 0.6Tc K = 0.0132 (CN) - 0.39

* The velocity in column 9 is based on approximate channel properties.

REFERENCE :

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc.
Project No. : 511197
File: STDFRM4.XLS

DEVELOPMENT : TUSCANY - LOOP ROAD

CALCULATED BY : SCOTT PATTON

DEVELOPED CONDITIONS

DATE: NOVEMBER 2001

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc** = (min) (14)	Tlag= 0.6Tc/60 (hrs)	
LOOP-1	98	0.904	2.5	0.0039	20	2.0	1.3	750	3.1	NA	3.58	3.5	4.7	770	14.3	5.0	0.050	
LOOP-2	98	0.904	2.0	0.0031	20	2.0	1.3	830	4.7	NA	3.74	3.7	5.0	850	14.7	5.0	0.050	
LOOP-3	98	0.904	1.8	0.0028	20	2.0	1.3	1550	1.3	NA	2.34	11.0	12.3	1570	18.7	12.3	0.123	
LOOP-4	98	0.904	1.3	0.0020	20	2.0	1.3	800	4.7	NA	3.30	4.0	5.3	820	14.6	5.3	0.053	
LOOP-5	98	0.904	0.6	0.0009	20	2.0	1.3	500	2.5	NA	1.92	4.3	5.6	520	12.9	5.6	0.056	
6COND-1	87	0.758	2.1	0.0033	120	1.0	6.7	500	2.0	NA	2.52	3.3	10.0	620	13.4	10.0	0.100	
6COND-2	87	0.758	2.1	0.0033	120	1.0	6.7	500	2.2	NA	2.60	3.2	9.9	620	13.4	9.9	0.099	
12OND-1	87	0.758	2.4	0.0038	120	1.0	6.7	600	1.0	NA	2.15	4.7	11.4	720	14.0	11.4	0.114	
12OND-2	87	0.758	8.5	0.0133	120	1.0	6.7	1300	2.0	NA	4.09	5.3	12.0	1420	17.9	12.0	0.120	
13OND-1	87	0.758	1.4	0.0022	20	1.0	2.7	120	1.0	NA	1.86	1.1	3.8	140	10.8	5.0	0.050	
14OND-1	87	0.758	2.9	0.0045	120	1.0	6.7	520	2.0	NA	2.84	3.1	9.8	640	13.6	9.8	0.098	
14OND-2	87	0.758	2.9	0.0045	120	1.0	6.7	550	0.5	NA	1.81	5.1	11.8	670	13.7	11.8	0.118	
14OND-3	87	0.758	7.5	0.0117	120	1.0	6.7	900	1.6	NA	3.67	4.1	10.8	1020	15.7	10.8	0.108	
14OND-4	87	0.758	5.2	0.0081	120	1.0	6.7	800	2.2	NA	3.65	3.7	10.4	920	15.1	10.4	0.104	
17OND-1	87	0.758	6.4	0.0100	120	1.0	6.7	1270	1.0	NA	2.88	7.3	14.1	1390	17.7	14.1	0.141	

** The velocity in column 9 is based on approximate channel properties.*

$Tc = Ti + Tt \quad Ti = 1.8\,(1.1 - K)\,L^{1/2} / S^{1/3}$

$Tlag = 0.6Tc \quad K = 0.0132\,(CN) - 0.39$

****Minimum Tc recommended = 5.0 min. (Section 600 of the CCRFCD Manual, 1999)**

REFERENCE :

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc.
Project No. : 511197
File: STDFRM4.XLS

DEVELOPMENT : TUSCANY - SALES CENTER

CALCULATED BY : Scott Patton

DEVELOPED CONDITION

DATE: October 2001

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc** = (min) (14)	Tlag= 0.6Tc/60 (hrs)	
SC-1	98	0.904	0.7	0.00109	50	1.0	2.0	200	2.0	NA	2.38	1.4	3.4	250	11.4	5.0	0.050	
SC-2	98	0.904	1.0	0.00156	75	1.0	3.1	340	1.0	NA	2.13	2.7	5.7	415	12.3	5.7	0.057	

* The velocity in column 9 is based on approximate channel properties.

Tc = Ti + Tt

Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

Tlag = 0.6Tc

K = 0.0132 (CN) - 0.39

**Minimum Tc recommended = 5.0 min. (Section 600 of the CCRFCD Manual, 1999)

REFERENCE :

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc. **DEVELOPMENT:** TUSCANY - PARCEL 5 **DEVELOPED CONDITION**

Project No. :

File: STDRFRM4.XLS **CALCULATED BY :** PMW **DATE:** NOVEMBER 16, 2001

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc = (min) (14)	Tlag= 0.6Tc/60 (hrs)	Q_{100}/Q_{10} (cfs)
5OND-1	92	0.824	4.0	0.0063	120	1.0	5.4	530	1.0	NA	3.1	2.8	8.2	650	13.6	8.2	0.082	

$Tc = Ti + Tt$ $Ti = 1.8\ (1.1 - K)\ L^{1/2} / S^{1/3}$

$Tlag = 0.6Tc$ $K = 0.0132\ (CN) - 0.39$

* The velocity in column 9 is based on approximate channel properties.

REFERENCE :

STANDARD FORM 4

HEC-1 model (future condition)

```
**********                                    *
FLOOD HYDROGRAPH PACKAGE  (HEC-1)             *
         MAY   1991                           *
       VERSION 4.0.1E                         *
  Lahey F77L-EM/32 version 5.01               *
    Dodson & Associates, Inc.                 *
RU    TE  12/10/01  TIME  16:09:13            *
 *    **********                               *
```

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**********                                    *
*                                             *
*    U.S. ARMY CORPS OF ENGINEERS             *
*    HYDROLOGIC ENGINEERING CENTER            *
*          609 SECOND STREET                  *
*       DAVIS, CALIFORNIA 95616               *
*          (916) 551-1748                     *
*                                             *
**********                                    *
```

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

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

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


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

        1           ID        File: looprd.DAT
        2           ID
        3           ID             PBS&J, Inc.
        4           ID
        5           ID    FUTURE DRAINAGE CONDITION RUN
        6           ID
        7           ID   *********************************
        8           ID   *********************************
        9           ID   *                               *
       10           ID   *    TUSCANY MASTER PLANNED     *
       11           ID   *          COMMUNITY            *
       12           ID   *                               *
       13           ID   *      LOOP  ROAD UPDATE        *
       14           ID   *        (OLIVIA PKWY)          *
       15           ID   *                               *
       16           ID   *        DECEMBER 2001          *
       17           ID   *                               *
       18           ID   *      FILE : looprd.DAT        *
       19           ID   *                               *
       20           ID   *           SDN #3              *
       21           ID   *                               *
       22           ID   *                               *
       23           ID   *       FUTURE CONDITION        *
       24           ID   *                               *
       25           ID   *                               *
       26           ID   *********************************
       27           ID   *********************************
       28           ID
                    *DIAGRAM
FREE ***
       29           IT       3       0       0     300
       30           IO       5       0       0
       31           IN       5       0       0
       32           JR    PREC    1.00    0.61
                    *
       33           KK18OND-16
       34           KM   ONSITE DEVELOPED BASIN 18OND-16
       35           BA  0.0022
       36           PB    2.86
       37           PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
       38           PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
       39           PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
       40           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
       41           PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
       42           PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
       43           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
       44           PC    .998    .999   1.00
       45           LS       0      87
       46           UD   0.112
                    *
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      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       47           KK    PK-3
       48           KM   ONSITE DEVELOPED BASIN PK-3 (PARK BETWEEN PARCEL 18 & 19)
       49           BA  0.0020
       50           LS       0      79
       51           UD   0.098
                    *
       52           KK 19OND-5
       53           KM   ONSITE DEVELOPED BASIN 19OND-5
       54           BA  0.0051
       55           LS       0      87
```

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 56          UD   0.110
             *

 57          KK  C-19OND5
 58          KM   COMBINE 19OND-5, PK-3 and 18OND-16
 59          HC       3
             *

 60          KK D19OND5
 61          KM   FLOW SPLIT AT C-19OND5 (IN PARCEL 19)
 62          DT D19OND4
 63          DI       0      15
 64          DQ       0       4
             *

 65          KK  19OND-18
 66          KM   ONSITE DEVELOPED BASIN 19OND-18
 67          BA  0.0036
 68          LS       0      87
 69          UD   0.107
             *

 70          KK  19OND-17
 71          KM   ONSITE DEVELOPED BASIN 19OND-17
 72          BA  0.0066
 73          LS       0      87
 74          UD   0.107
             *

 75          KK 19OND-1
 76          KM   ONSITE DEVELOPED BASIN 19OND-1
 77          BA  0.0037
 78          LS       0      87
 79          UD   0.081
             *

 80          KK  C-19OMD1
 81          KM   COMBINE 19OND-1, 19OND-17, 19OND-18 and D19OND5
 82          KM   DISCHARGES INTO OLIVIA PKWY (Basin LOOP-1)
 83          HC       4
             *
                                        HEC-1 INPUT                                    PAGE  3

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

 84          KK  19OND-15
 85          KM   ONSITE DEVELOPED BASIN 19OND-15
 86          BA  0.0025
 87          LS       0      87
 88          UD   0.098
             *

 89          KK 19OND-2
 90          KM   ONSITE DEVELOPED BASIN 19OND-2
 91          BA  0.0041
 92          LS       0      87
 93          UD   0.086
             *

 94          KK 19OND-3
 95          KM   ONSITE DEVELOPED BASIN 19OND-3
 96          BA  0.0030
 97          LS       0      87
 98          UD   0.088
             *

 99          KK  C-19OND15
100          KM   COMBINE 19OND-2, 19OND-3 and 19OND-15
101          KM   DISCHARGES INTO OLIVIA PKWY (Basin LOOP-1)
102          HC       3
             *

103          KK  DUMMYC-19
104          KM   DUMMY COMBINATION POINT - TO MINIMIZE HYDROGRAPH STACK
105          KM   COMBINE C-19OND1 and C-19OND15
106          KM   FLOW DISCHARGED FROM PARCEL 19 INTO BASIN LOOP-1 (OLIVA PKWY)
107          HC       2
             *

108          KK  LOOP-1
109          KM   OLIIVA PKWY
110          BA  0.0039
111          LS       0      98
112          UD   0.047
             *

113          KK C-LOOP1
114          KM   COMBINE LOOP-1 and DUMMYC-19
115          HC       2
             *

116          KK  DLOOP1
117          KM   FLOW SPLIT AT C-LOOP1
118          DT  DLOOP5
119          DI       0      54
120          DQ       0      19
             *
                                        HEC-1 INPUT                                    PAGE  4

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

121          KK  RTC-LOOP1
             KM   ROUTE LOOP-1 THRU LOOP-2
```

```
123          KM   (FLOW AT C-LOOP1 MINUS FLOW SPLIT)
124          RT     830   0.047   0.016       0    TRAP     134       1
             *

125          KK  LOOP-2
126          KM   OLIVIA PKWY
127          BA  0.0031
128          LS       0      98
129          UD   0.050
             *

130          KK    SC-2
131          KM   SALES CENTER DEVELOPED BASIN 1 (sales center)
132          BA 0.00156
133          LS       0      98
134          UD   0.057
             *

135          KK C-LOOP2
136          KM   COMBINE LOOP-2, RTC-LOOP1 AND SC-2
137          HC       3
             *

138          KK  DC-LOOP2
139          KM   ALL FLOW @ C-LOOP2 IS COLLECTED IN DROP INLETS
140          KM   15' TYPE C W/ 5 GRATES ON BOTH SIDES OF STREET
141          KM   FLOW DISCHARGES INTO GOLF COURSE BASIN GC-1 (NEAR HOLE 16 TEE BOX)
142          DT    DGC1
143          DI       0     100
144          DQ       0     100
             *

145          KK 17OND-1
146          KM   ONSITE DEVELOPED BASIN 17OND-1
147          BA  0.0100
148          LS       0      87
149          UD   0.141
             *

150          KK  RT17OND1
151          KM   ROUTE 17OND-1 THRU 12OND-1
152          RT     600   0.007   0.016       0    TRAP    62.5       1
             *

153          KK 12OND-1
154          KM   ONSITE DEVELOPED BASIN 12OND-1
155          BA  0.0038
156          LS       0      87
157          UD   0.114
             *
```



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

158          KK  C-12OND1
159          KM   COMBINE 17OND-1 AND 12OND-1
160          HC       2
             *

161          KK  RTC-12OND1
162          KM   ROUTE C-12OND1 THRU 6COND-1 AND 6COND-2
163          RT    1000   0.021   0.016       0    TRAP    62.5       1
             *

164          KK 6COND-1
165          KM   ONSITE DEVELOPED BASIN 6COND-1
166          BA  0.0033
167          LS       0      87
168          UD   0.100
             *

169          KK  RT6COND1
170          KM   ROUTE 6COND-1 THRU 6COND-2
171          RT     500   0.022   0.016       0    TRAP    62.5       1
             *

172          KK 6COND-2
173          KM   ONSITE DEVELOPED BASIN 6COND-2
174          BA  0.0033
175          LS       0      87
176          UD   0.099
             *

177          KK  C-6COND2
178          KM   COMBINE RTC-12OND1, RT6COND1 AND 6COND-2
179          HC       3
             *

180          KK  DC-6COND2
181          KM   ALL FLOW @ C-6COND2 IS COLLECTED IN DROP INLETS
182          KM   12' TYPE C W/ 4 GRATES ON BOTH SIDES OF STREET
183          KM   FLOW DISCHARGES INTO GOLF COURSE (NEAR HOLE 8 GREEN)
184          DT    DGC4
185          DI       0      50
186          DQ       0      50
             *

187          KK 14OND-1
188          KM   ONSITE DEVELOPED BASIN 14OND-1 (PORTION OF PARCEL 14 & 6C)
189          BA  0.0045
190          LS       0      87
191          UD   0.098
             *
```

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

 192          KK 14OND-2
 193          KM   ONSITE DEVELOPED BASIN 14OND-2 (PORTION OF PARCEL 14)
 194          BA  0.0045
 195          LS       0      87
 196          UD   0.118
              *

 197          KK  DUMMYC-14
 198          KM   COMBINE 14OND-1 AND 14OND-2
 199          KM   DUMMY COMBINATION POINT FOR ROUTING PURPOSES ONLY
 200          HC       3
              *

 201          KK  RTDUMMYC-14
 202          KM   ROUTE DUMMYC-14 (14OND-1 AND 14OND-2) THRU 14OND-3
 203          RT     900   0.016   0.016       0    TRAP    70.5       1
              *

 204          KK 14OND-3
 205          KM   ONSITE DEVELOPED BASIN (PORTION OF PARCEL 14 & 6)
 206          BA  0.0117
 207          LS       0      87
 208          UD   0.108
              *

 209          KK 14OND-4
 210          KM   ONSITE DEVELOPED BASIN (PORTION OF PARCEL 14)
 211          BA  0.0081
 212          LS       0      87
 213          UD   0.104
              *

 214          KK  C-14OND3
 215          KM   COMBINE RTDUMMYC-14, 14OND-3 and 14OND-4
 216          HC       3
              *

 217          KK 24OND-2
 218          KM   ONSITE DEVELOPED BASIN 24OND-2
 219          BA 0.01484
 220          LS       0      87
 221          UD   0.144   0.052
              *

 222          KK  RT24OND2
 223          KM   ROUTE C-24OND2 thru LOOP-3
 224          RT    1000   0.013   0.016       0    TRAP    62.5       1
              *
                                   HEC-1 INPUT                                    PAGE  7
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 225          KK 13OND-1
 226          KM   ONSITE DEVELOPED BASIN (PARCEL 13)
 227          BA  0.0022
 228          LS       0      87
 229          UD   0.050
              *

 230          KK  LOOP-3
 231          KM   OLIVIA PKWY
 232          BA  0.0028
 233          LS       0      98
 234          UD   0.123
              *

 235          KK C-LOOP3
 236          KM   COMBINE RT24OND2, 13OND-1 and LOOP-3
 237          HC       3
              *

 238          KK  RETDLOOP5
 239          KM   RETRIEVE 13-cfs from flow split at C-LOOP1
 240          DR  DLOOP5
              *

 241          KK    SC-1
 242          KM   SALES CENTER DEVELOPED BASIN 1 (sales center
 243          BA 0.00109
 244          LS       0      98
 245          UD   0.050
              *

 246          KK  LOOP-5
 247          KM   OLIVIA PKWY
 248          BA  0.0009
 249          LS       0      98
 250          UD   0.056
              *

 251          KK  DUMMYC-LOOP5
 252          KM   COMBINE LOOP-5, SC-1 AND RETDLOOP5 (flow split)
 253          KM   DUMMY COMBINATION POINT FOR ROUTING PURPOSES ONLY
 254          HC       3
              *

 255          KK  RTDUMMYC-LOOP5
 256          KM   ROUTE DUMMYC-LOOP5 (LOOP-5 and SC-1) THRU 23OND-7
 257          RT     410   0.040   0.016       0    TRAP    70.5       1
```

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

  258     KK 23OND-7
  259     KM   ONSITE DEVELOPED BASIN 23OND-7
  260     BA 0.00422
  261     LS       0      87
  262     UD   0.062
          *

  263     KK  C-23OND7
  264     KM   COMBINE RTDUMMYC-LOOP5 AND 23OND-7
  265     HC       2
          *

  266     KK  RTC-23OND7
  267     KM   ROUTE C-23OND7 THRU 23OND-8
  268     RT     950   0.018   0.016       0    TRAP    70.5       1
          *

  269     KK 23OND-8
  270     KM   ONSITE DEVELOPED BASIN 23OND-8
  271     BA 0.01328
  272     LS       0      87
  273     UD   0.095
          *

  274     KK  C-23OND8
  275     KM   COMBINE RTC-23OND7 AND 23OND-8
  276     HC       2
          *

  277     KK  RTC-23OND8
  278     KM   ROUTE C-23OND8 THRU LOOP-4
  279     RT     800   0.047   0.016       0    TRAP    62.5       1
          *

  280     KK  LOOP-4
  281     KM   OLIVIA PKWY
  282     BA  0.0020
  283     LS       0      98
  284     UD   0.053
          *

  285     KK  C-LOOP4A
  286     KM   COMBINE RTC-23OND8 AND LOOP-4
  287     HC       2
          *

  288     KK  DC-LOOP4A
  289     KM   DIVERT 28cfs @ C-LOOP4A VIA DROP INLETS
  290     KM   10' TYPE C W/ 3 GRATES ON BOTH SIDES OF STREET
  291     KM   FLOW DISCHARGES INTO CHANNEL BETWEEN LOOP RD AND PARCEL 5
  292     DT    DGC8
  293     DI       0      50     100
  294     DQ       0      28      28
          *
```



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

  295     KK  24OND-1
  296     KM   ONSITE DEVELOPED BASIN 24OND-1
  297     BA   0.01484
  298     LS       0      87
  299     UD   0.127
          *

  300     KK   C-LOOP4B
  301     KM   COMBINE RTC-23OND8, LOOP-4 and 24OND-1
  302     KM   MINUS DIVERTED FLOW @ C-LOOP4A
  303     HC       2
          *

  304     KK  RETDC-LOOP4A
  305     KM   RETRIEVE 20-cfs DI'S @ C-LOOP4A
  306     DR    DGC8
          *

  307     KK  DEVOFBA1
  308     KM   PORTION OF BASIN MAIN (maintenance building)
  309     KM   FROM REFERENCED STUDY
  310     BA  0.0010
  311     LS       0      61
  312     UD   0.025
          *

  313     KK  DEVONBA1
  314     KM   PORTION OF BASIN MAIN (maintenance building)
  315     KM   FROM REFERENCED STUDY
  316     BA  0.00011
  317     LS       0      98
  318     UD   0.036
          *

  319     KK  DEVONBA2
  320     KM   PORTION OF BASIN MAIN (maintenance building)
  321     KM   FROM REFERENCED STUDY
  322     BA0.000232       8
  323     LS       0      98
  324     UD   0.059
          *
```

```
325          KK  DEVONBA3
326          KM   PORTION OF BASIN MAIN (maintenance building)
327          KM   FROM REFERENCED STUDY
328          BA  0.0013
329          LS        0       98
330          UD   0.039
             *
                                        HEC-1 INPUT                                        PAGE 10

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


331          KK    COM1
332          KM   COMBINED FLOW DISCHARGED FROM BASIN MAIN (maintenance building)
333          KM   FROM REFERENCED STUDY
334          KM   FLOW IS DISCHRGED INTO GOLF COURSE BASIN GC-8
335          HC        4
             *

336          KK  RTMAIN
337          KM   ROUTE MAINTENANCE BLDG FLOW THRU BASIN GC-8 (maintenance building)
338          RK     600    0.011    0.030        0     TRAP      100        3
             *

339          KK    GC-7
340          KM   ONSITE DEVELOPED BASIN GC-7 (golf course)
341          BA  0.0345
342          LS        0       80
343          UD   0.128
             *

344          KK    GC-8
345          KM   ONSITE DEVELOPED BASIN GC-8 (golf course)
346          BA  0.0280
347          LS        0       80
348          UD   0.127
             *

349          KK   C-GC8
350          KM   COMBINE ALL FLOW CONVEYED IN ROADSIDE CHANNEL
351          KM   BETWEEN LOOP ROAD AND PARCEL 5
352          KM   DISCHARGED INTO 10'x4' RCB
353          HC        5
             *

354          KK  5OND-1
355          KM   ONSITE DEVELOPED BASIN 5OND-1 (PORTION OF PARCEL 5)
356          KM   COLLECTED VIA DROP INLETS AND DISCHARGED INTO 10'X4' RCB
357          KM   9' TYPE C w/ 3 GRATES (both sides)
358          KM   10'X4' RCB DAYLIGHTS INTO GOLF COURSE BASIN GC-9
359          BA  0.0063
360          LS        0       92
361          UD   0.082
             *

362          KK   C-GC9
363          KM   COMBINE BASIN 5OND-1 AND C-GC8
364          KM   ALL FLOW CONVEYED IN 10'X4' RCB
365          KM   DISCHARGED INTO GOLF COURSE BASIN GC-9
366          HC        2
             *
                                        HEC-1 INPUT                                        PAGE 11

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


367          KK  OFFD-1
368          KM   PORTION OF CLUBHOUSE ACCES RD (clubhouse)
369          KM   FROM REFERENCED STUDY
370          BA  0.0019
371          LS        0       76
372          UD   0.119
             *

373          KK    RT-1
374          KM   ROUTE OFFD-1 THRU OFFD-2 (clubhouse)
375          RK     630    0.019    0.022        0     TRAP       10       15
             *

376          KK  OFFD-2
377          KM   PORTION OF CLUBHOUSE ACCES RD (clubhouse)
378          KM   FROM REFERENCED STUDY
379          BA  0.0018
380          LS        0       76
381          UD   0.136
             *

382          KK  COMB-1
383          KM   COMBINE RT-1 AND OFFD-2 (clubhouse)
384          KM   FROM REFERENCED STUDY
385          HC        2
             *

386          KK    RT-2
387          KM   ROUTE COMB-1 THRU ONDEV-1 (clubhouse)
388          RT     350    0.005    0.016        0     TRAP       10       15
             *

389          KK ONDEV-1
390          KM   ONSITE DEVELOPED CLUBHOUSE BASIN (clubhouse)
391          KM   FROM REFERENCED STUDY
392          BA  0.0023
393          LS        0       98
394          UD   0.065
```

```
                *
      395       KK    D.I.
      396       KM   TOTAL FLOW FROM CLUBHOUSE BASIN (clubhouse)
      397       KM   DISCHARGED INTO GOLF COURSE BASIN GC-5 VIA STORM DRAIN
      398       KM   FROM REFERENCED STUDY
      399       HC       2
                *
      400       KK  RTCLUB
      401       KM   ROUTE CLUBHOUSE FLOW THRU GC-5
      402       RK     800   0.025   0.030       0    TRAP     100       3
                *
```



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

      403       KK  RETGC4
      404       KM   RETREIVE FLOW DIVERTED FROM LOOP RD
      405       KM   COLLECTED VIA DI's @ C-6OND2
      406       DR    DGC4
                *
      407       KK  RTDGC4
      408       KM   ROUTE RETGC4 THRU BASIN GC-4
      409       RK    1300   0.015   0.030       0    TRAP     100       3
                *
      410       KK    GC-4
      411       KM   ONSITE DEVELOPED BASIN GC-4 (golf course)
      412       BA  0.0178
      413       LS       0      80
      414       UD   0.129
                *
      415       KK   RTGC4
      416       KM   ROUTE GC-4 THRU GC-5
      417       RK    1150   0.026   0.030       0    TRAP     100       3
                *
      418       KK    GC-5
      419       KM   ONSITE DEVELOPED BASIN GC-5 (golf course)
      420       BA  0.0336
      421       LS       0      80
      422       UD   0.076
                *
      423       KK   C-GC5
      424       KM   TOTAL FLOW COMBINED AT ENTRANCE TO 8'X4' RCB
      425       KM   DISCHARGED INTO C-1 CHANNEL
      426       HC       3
                *
      427       KK 11OND-1
      428       KM   ONSITE DEVELOPED BASIN 11OND-1 (parcel 11)
      429       BA  0.0125
      430       LS       0      80
      431       UD   0.155
                *
      432       KK 11OND-2
      433       KM   ONSITE DEVELOPED BASIN 11OND-2(parcel 11)
      434       BA  0.0125
      435       LS       0      80
      436       UD   0.155
                *
```

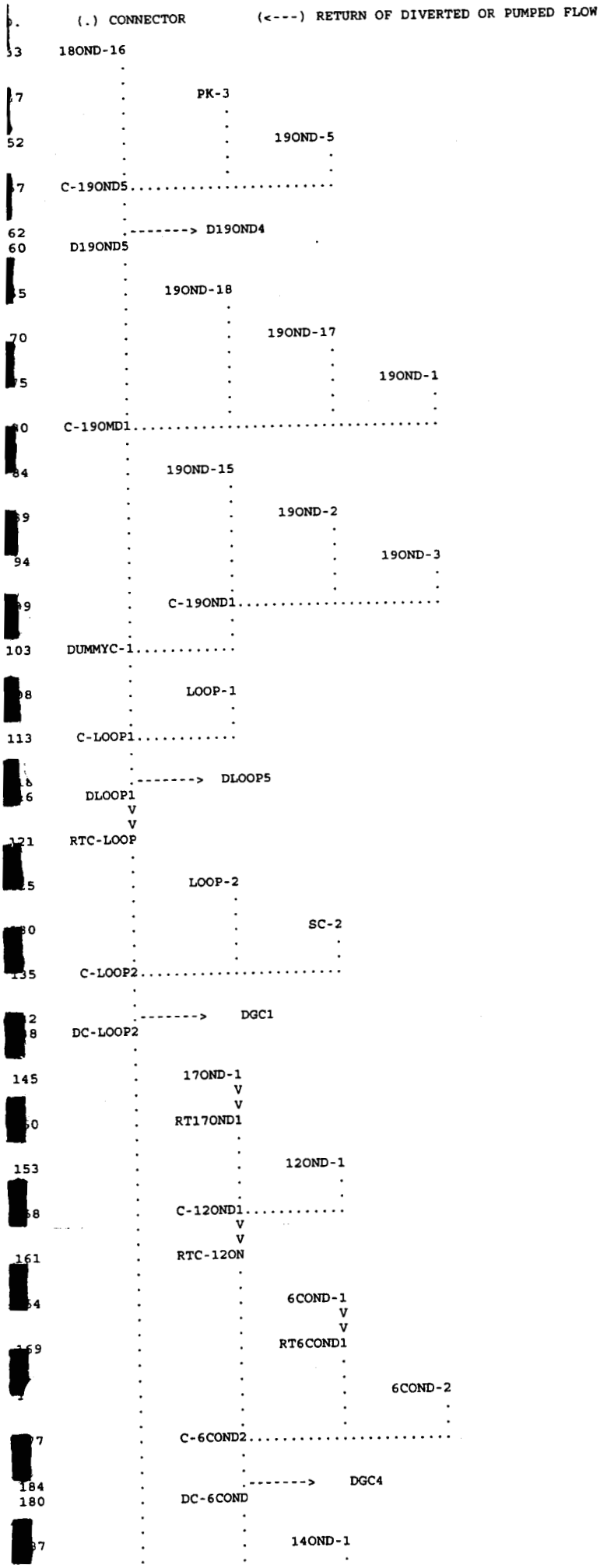


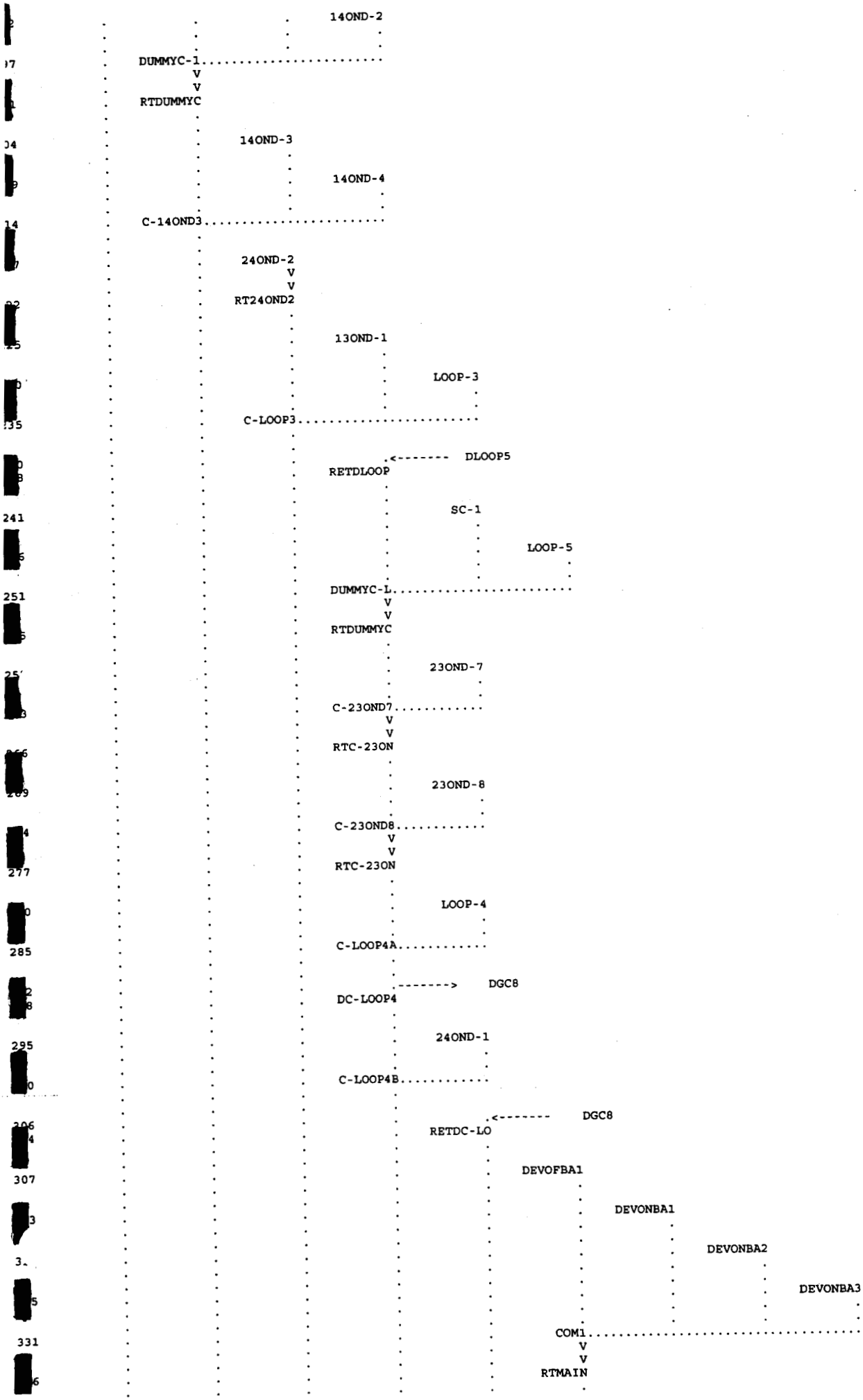
```
     LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

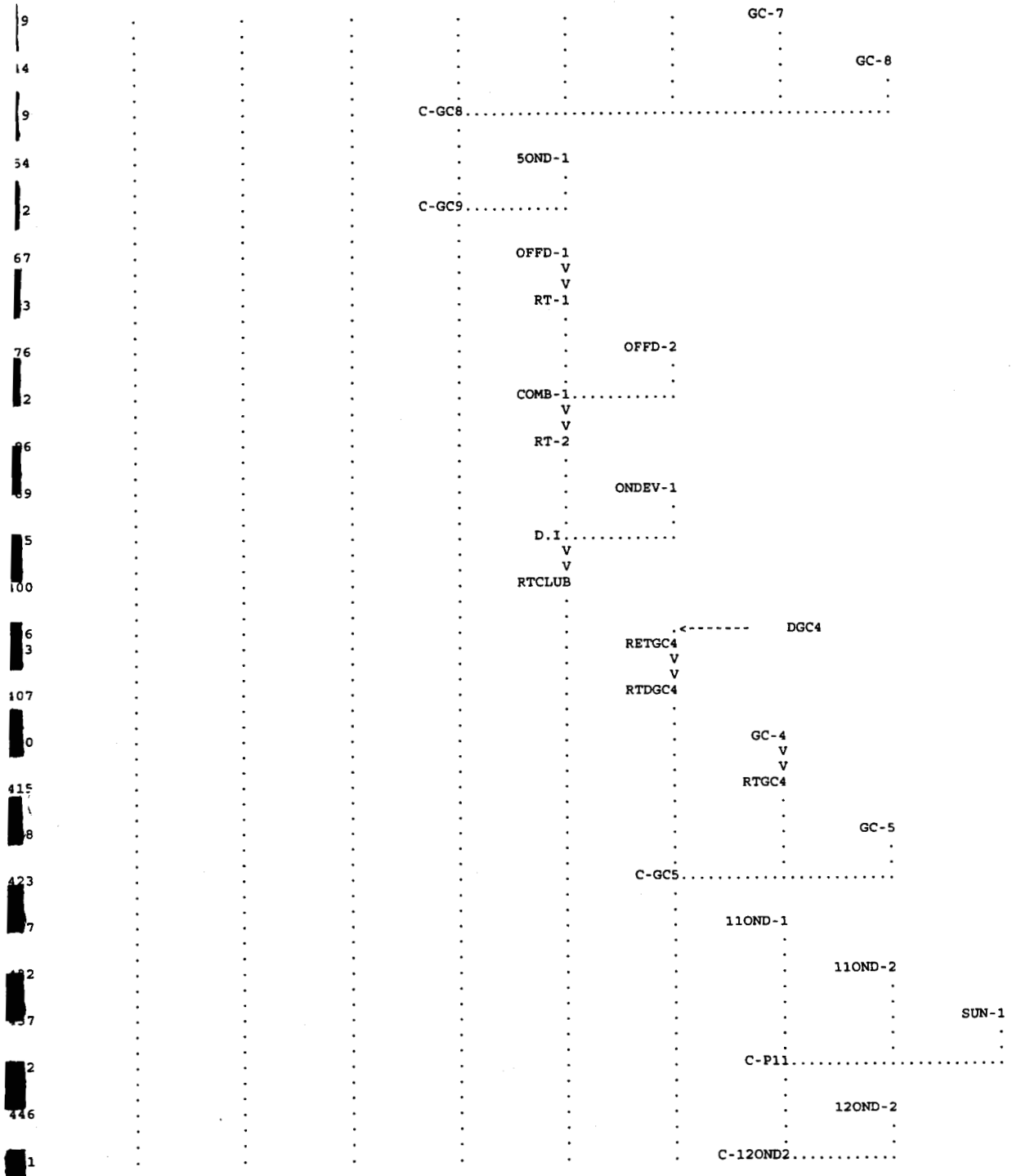
      437       KK   SUN-1
      438       KM   FUTURE SUNSET ROAD WHICH IS CONVEYED DOWN VIA ALATOIRE (sunset rd)
      439       BA  0.0044
      440       LS       0      98
      441       UD   0.093
                *
      442       KK   C-P11
      443       KM   TOTAL FROM PARCEL 11 AND OFFSITE SUNSET ROAD
      444       KM   DISCHARGED INTO C-1 CHANNEL
      445       HC       3
                *
      446       KK 12OND-2
      447       KM   ONSITE DEVELOPED BASIN (portion of parcel 12)
      448       BA  0.0133
      449       LS       0      87
      450       UD   0.120
                *
      451       KK  C-12OND2
      452       KM   TOTAL FROM C-P11 AND 12OND-2
      453       KM   FLOW IS COLLECTED IN STORM DRAIN LOCATED IN VIA ALATOIRE
      454       KM   DISCHARGES INTO THE C-1 CHANNEL
      455       KM   21' TYPE C w/ 7 GRATES (each side of street)
      456       HC       2
                *
      457       ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

I[illegible]T
[illegible]E (V) ROUTING (---->) DIVERSION OR PUMP FLOW


(.) CONNECTOR
(<---) RETURN OF DIVERTED OR PUMPED FLOW
18OND-16
PK-3
19OND-5
C-19OND5
D19OND4
D19OND5
19OND-18
19OND-17
19OND-1
C-19OMD1
19OND-15
19OND-2
19OND-3
C-19OND1
DUMMYC-1
LOOP-1
C-LOOP1
DLOOP5
DLOOP1
RTC-LOOP
LOOP-2
SC-2
C-LOOP2
DGC1
DC-LOOP2
17OND-1
RT17OND1
12OND-1
C-12OND1
RTC-12ON
6COND-1
RT6COND1
6COND-2
C-6COND2
DGC4
DC-6COND
14OND-1


14OND-2
DUMMYC-1
RTDUMMYC
14OND-3
14OND-4
C-14OND3
24OND-2
RT24OND2
13OND-1
LOOP-3
C-LOOP3
DLOOP5
RETDLOOP
SC-1
LOOP-5
DUMMYC-L
RTDUMMYC
23OND-7
C-23OND7
RTC-23ON
23OND-8
C-23OND8
RTC-23ON
LOOP-4
C-LOOP4A
DGC8
DC-LOOP4
24OND-1
C-LOOP4B
DGC8
RETDC-LO
DEVOFBA1
DEVONBA1
DEVONBA2
DEVONBA3
COM1
RTMAIN



) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY   1991                 *
*          VERSION 4.0.1E               *
*  Lahey F77L-EM/32 version 5.01        *
*       Dodson & Associates, Inc.       *
*  RUN DATE  12/10/01  TIME  16:09:13   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

File: looprd.DAT

PBS&J, Inc.

FUTURE DRAINAGE CONDITION RUN

```
*********************************
*********************************
*                               *
*    TUSCANY MASTER PLANNED     *
*          COMMUNITY            *
*                               *
*      LOOP  ROAD UPDATE        *
*        (OLIVIA PKWY)          *
*                               *
```

DECEMBER 2001

FILE : looprd.DAT

SDN #3

FUTURE CONDITION

30 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	3	MINUTES IN COMPUTATION INTERVAL
IDATE	1 0	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1 0	ENDING DATE
NDTIME	1457	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.05 HOURS
TOTAL TIME BASE 14.95 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION

NPLAN	1	NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 0.61

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

PERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 0.61
OGRAPH AT	18OND-16	0.00	1	FLOW	3.	2.
				TIME	3.55	3.55
OGRAPH AT	PK-3	0.00	1	FLOW	2.	1.
				TIME	3.55	3.55
YDROGRAPH AT	19OND-5	0.01	1	FLOW	8.	4.
				TIME	3.55	3.55
OMBINED AT	C-19OND5	0.01	1	FLOW	13.	6.
				TIME	3.55	3.55
RSION TO	D19OND4	0.01	1	FLOW	4.	2.
				TIME	3.55	3.55
YDROGRAPH AT	D19OND5	0.01	1	FLOW	10.	4.
				TIME	3.55	3.55
YDROGRAPH AT	19OND-18	0.00	1	FLOW	6.	3.
				TIME	3.55	3.55
OGRAPH AT	19OND-17	0.01	1	FLOW	10.	5.
				TIME	3.55	3.55
ROGRAPH AT	19OND-1	0.00	1	FLOW	6.	3.
				TIME	3.55	3.55
NED AT	C-19OMD1	0.02	1	FLOW	32.	14.
				TIME	3.55	3.55
OGRAPH AT	19OND-15	0.00	1	FLOW	4.	2.
				TIME	3.55	3.55
OGRAPH AT	19OND-2	0.00	1	FLOW	7.	3.
				TIME	3.55	3.55

GRAPH AT	19OND-3	0.00	1	FLOW	5.	2.
				TIME	3.55	3.55
COMBINED AT	C-19OND1	0.01	1	FLOW	15.	7.
				TIME	3.55	3.55
CO) AT	DUMMYC-1	0.03	1	FLOW	47.	21.
				TIME	3.55	3.55
GRAPH AT	LOOP-1	0.00	1	FLOW	9.	6.
				TIME	3.50	3.50
MBINED AT	C-LOOP1	0.04	1	FLOW	54.	26.
				TIME	3.50	3.55
ERSION TO	DLOOP5	0.04	1	FLOW	19.	9.
				TIME	3.50	3.55
GRAPH AT	DLOOP1	0.04	1	FLOW	35.	17.
				TIME	3.50	3.55
D TO	RTC-LOOP	0.04	1	FLOW	35.	17.
				TIME	3.50	3.55
ROGRAPH AT	LOOP-2	0.00	1	FLOW	7.	4.
				TIME	3.50	3.50
DROGRAPH AT	SC-2	0.00	1	FLOW	4.	2.
				TIME	3.50	3.50
MBINED AT	C-LOOP2	0.04	1	FLOW	46.	23.
				TIME	3.50	3.50
RSION TO	DGC1	0.04	1	FLOW	46.	23.
				TIME	3.50	3.50
DROGRAPH AT	DC-LOOP2	0.04	1	FLOW	0.	0.
				TIME	0.05	0.05
OGRAPH AT	17OND-1	0.01	1	FLOW	14.	6.
				TIME	3.55	3.60
ED TO	RT17OND1	0.01	1	FLOW	14.	6.
				TIME	3.55	3.60
DROGRAPH AT	12OND-1	0.00	1	FLOW	6.	3.
				TIME	3.55	3.55
COMBINED AT	C-12OND1	0.01	1	FLOW	20.	9.
				TIME	3.55	3.55
SD TO	RTC-12ON	0.01	1	FLOW	20.	9.
				TIME	3.55	3.55
DROGRAPH AT	6COND-1	0.00	1	FLOW	5.	2.
				TIME	3.55	3.55
OUTED TO	RT6COND1	0.00	1	FLOW	5.	2.
				TIME	3.55	3.55
OGRAPH AT	6COND-2	0.00	1	FLOW	5.	2.
				TIME	3.55	3.55
OMBINED AT	C-6COND2	0.02	1	FLOW	30.	14.
				TIME	3.55	3.55
IVERSION TO	DGC4	0.02	1	FLOW	30.	14.
				TIME	3.55	3.55
PH AT	DC-6COND	0.02	1	FLOW	0.	0.
				TIME	0.05	0.05
OGRAPH AT	14OND-1	0.00	1	FLOW	7.	3.
				TIME	3.55	3.55
HYDROGRAPH AT	14OND-2	0.00	1	FLOW	7.	3.
				TIME	3.55	3.55
COMBINED AT						

	DUMMYC-1	0.03	1	FLOW	14.	6.
				TIME	3.55	3.55
ED TO						
	RTDUMMYC	0.03	1	FLOW	14.	6.
				TIME	3.55	3.55
X AT						
	14OND-3	0.01	1	FLOW	18.	8.
				TIME	3.55	3.55
OGRAPH AT						
	14OND-4	0.01	1	FLOW	13.	6.
				TIME	3.55	3.55
COMBINED AT						
	C-14OND3	0.05	1	FLOW	45.	20.
				TIME	3.55	3.55
ROGRAPH AT						
	24OND-2	0.01	1	FLOW	21.	9.
				TIME	3.55	3.60
ED TO						
	RT24OND2	0.01	1	FLOW	21.	9.
				TIME	3.55	3.60
OGRAPH AT						
	13OND-1	0.00	1	FLOW	4.	2.
				TIME	3.50	3.50
ROGRAPH AT						
	LOOP-3	0.00	1	FLOW	6.	3.
				TIME	3.55	3.55
OMBINED AT						
	C-LOOP3	0.02	1	FLOW	30.	14.
				TIME	3.55	3.55
OGRAPH AT						
	RETDLOOP	0.00	1	FLOW	19.	9.
				TIME	3.50	3.55
DROGRAPH AT						
	SC-1	0.00	1	FLOW	3.	2.
				TIME	3.50	3.50
ROGRAPH AT						
	LOOP-5	0.00	1	FLOW	2.	1.
				TIME	3.50	3.50
ED AT						
	DUMMYC-L	0.00	1	FLOW	24.	12.
				TIME	3.50	3.50
UTED TO						
	RTDUMMYC	0.00	1	FLOW	24.	12.
				TIME	3.50	3.50
DROGRAPH AT						
	23OND-7	0.00	1	FLOW	7.	3.
				TIME	3.50	3.50
OMBINED AT						
	C-23OND7	0.01	1	FLOW	31.	15.
				TIME	3.50	3.50
ED TO						
	RTC-23ON	0.01	1	FLOW	31.	15.
				TIME	3.50	3.50
YDROGRAPH AT						
	23OND-8	0.01	1	FLOW	21.	10.
				TIME	3.55	3.55
OMBINED AT						
	C-23OND8	0.02	1	FLOW	51.	24.
				TIME	3.50	3.50
ED TO						
	RTC-23ON	0.02	1	FLOW	51.	24.
				TIME	3.50	3.50
YDROGRAPH AT						
	LOOP-4	0.00	1	FLOW	5.	3.
				TIME	3.50	3.50
COMBINED AT						
	C-LOOP4A	0.02	1	FLOW	56.	27.
				TIME	3.50	3.50
ON TO						
	DGC8	0.02	1	FLOW	28.	15.
				TIME	3.50	3.50
ROGRAPH AT						
	DC-LOOP4	0.02	1	FLOW	28.	12.
				TIME	3.50	3.50
HYDROGRAPH AT						
	24OND-1	0.01	1	FLOW	22.	10.
				TIME	3.55	3.55
COMBINED AT						
		0.04	1	FLOW	48.	21.

				TIME	3.55	3.55
ROGRAPH AT	RETDC-LO	0.00	1	FLOW	28.	15.
				TIME	3.50	3.50
OGRAPH AT	DEVOFBA1	0.00	1	FLOW	0.	0.
				TIME	3.50	4.80
OGRAPH AT	DEVONBA1	0.00	1	FLOW	0.	0.
				TIME	3.50	3.50
ROGRAPH AT	DEVONBA2	0.00	1	FLOW	1.	0.
				TIME	3.50	3.50
OGRAPH AT	DEVONBA3	0.00	1	FLOW	3.	2.
				TIME	3.50	3.50
OMBINED AT	COM1	0.00	1	FLOW	4.	2.
				TIME	3.50	3.50
UTED TO	RTMAIN	0.00	1	FLOW	4.	2.
				TIME	3.55	3.60
ROGRAPH AT	GC-7	0.03	1	FLOW	37.	13.
				TIME	3.55	3.60
OGRAPH AT	GC-8	0.03	1	FLOW	30.	11.
				TIME	3.55	3.60
COMBINED AT	C-GC8	0.10	1	FLOW	147.	62.
				TIME	3.55	3.55
DROGRAPH AT	5OND-1	0.01	1	FLOW	12.	6.
				TIME	3.50	3.55
OMBINED AT	C-GC9	0.11	1	FLOW	159.	68.
				TIME	3.55	3.55
H AT	OFFD-1	0.00	1	FLOW	2.	0.
				TIME	3.55	3.60
OUTED TO	RT-1	0.00	1	FLOW	2.	0.
				TIME	3.60	3.65
ROGRAPH AT	OFFD-2	0.00	1	FLOW	2.	0.
				TIME	3.60	3.60
COMBINED AT	COMB-1	0.00	1	FLOW	3.	1.
				TIME	3.60	3.60
OUTED TO	RT-2	0.00	1	FLOW	3.	1.
				TIME	3.60	3.60
YDROGRAPH AT	ONDEV-1	0.00	1	FLOW	5.	3.
				TIME	3.50	3.50
COMBINED AT	D.I.	0.01	1	FLOW	8.	4.
				TIME	3.50	3.50
TED TO	RTCLUB	0.01	1	FLOW	8.	4.
				TIME	3.60	3.60
YDROGRAPH AT	RETGC4	0.00	1	FLOW	30.	14.
				TIME	3.55	3.55
TED TO	RTDGC4	0.00	1	FLOW	29.	13.
				TIME	3.65	3.65
ROGRAPH AT	GC-4	0.02	1	FLOW	19.	7.
				TIME	3.55	3.60
ROUTED TO	RTGC4	0.02	1	FLOW	19.	7.
				TIME	3.65	3.70
HYDROGRAPH AT	GC-5	0.03	1	FLOW	40.	15.
				TIME	3.55	3.55
COMBINED AT	C-GC5	0.05	1	FLOW	79.	28.
				TIME	3.55	3.65

[redacted]OGRAPH AT 11OND-1 0.01 1 FLOW 13. 4.
TIME 3.60 3.60

[redacted]OGRAPH AT 11OND-2 0.01 1 FLOW 13. 4.
TIME 3.60 3.60

DRO[redacted]H AT SUN-1 0.00 1 FLOW 9. 6.
TIME 3.55 3.55

[redacted]OMBINED AT C-P11 0.03 1 FLOW 34. 14.
TIME 3.55 3.55

[redacted]OGRAPH AT 12OND-2 0.01 1 FLOW 20. 9.
TIME 3.55 3.55

COMBINED AT C-12OND2 0.04 1 FLOW 54. 23.
TIME 3.55 3.55

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.00									
	RTMAIN MANE	2.61	4.26	214.29	1.79	3.00	3.99	213.00	1.79

[redacted]NTINUITY SUMMARY (AC-FT) - INFLOW=0.2469E+00 EXCESS=0.0000E+00 OUTFLOW=0.2521E+00 BASIN STORAGE=0.3723E-04 PERCENT ERROR= -2.1

FOR PLAN = 1 RATIO= 0.61									
	RTMAIN MANE	3.00	2.36	215.30	1.00	3.00	2.26	216.00	1.00

[redacted]INUITY SUMMARY (AC-FT) - INFLOW=0.1349E+00 EXCESS=0.0000E+00 OUTFLOW=0.1403E+00 BASIN STORAGE=0.3382E-04 PERCENT ERROR= -4.0

FOR PLAN = 1 RATIO= 1.00									
	RT-1 MANE	1.35	1.68	215.57	0.92	3.00	1.67	216.00	0.92

[redacted]INUITY SUMMARY (AC-FT) - INFLOW=0.9342E-01 EXCESS=0.0000E+00 OUTFLOW=0.9359E-01 BASIN STORAGE=0.9625E-08 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.61									
	RT-1 MANE	1.79	0.49	219.11	0.29	3.00	0.49	219.00	0.29

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2939E-01 EXCESS=0.0000E+00 OUTFLOW=0.2941E-01 BASIN STORAGE=0.7464E-08 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00									
	RTCLUB MANE	2.15	7.71	215.01	1.59	3.00	7.69	216.00	1.59

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.5045E+00 EXCESS=0.0000E+00 OUTFLOW=0.5099E+00 BASIN STORAGE=0.4055E-04 PERCENT ERROR= -1.1

FOR PLAN = 1 RATIO= 0.61									
	RTCLUB MANE	2.90	3.59	217.47	0.78	3.00	3.50	216.00	0.77

[redacted]TINUITY SUMMARY (AC-FT) - INFLOW=0.2439E+00 EXCESS=0.0000E+00 OUTFLOW=0.2482E+00 BASIN STORAGE=0.4308E-04 PERCENT ERROR= -1.8

FOR PLAN = 1 RATIO= 1.00									
	RTDGC4 MANE	2.41	29.39	219.08	-1.00	3.00	29.39	219.00	-1.00

FOR PLAN = 1 RATIO= 0.61									
	RTDGC4 MANE	3.00	13.76	219.47	-1.00	3.00	13.40	219.00	-1.00

FOR PLAN = 1 RATIO= 1.00									
	RTGC4 MANE	2.24	18.70	218.69	1.16	3.00	18.60	219.00	1.16

[redacted]TINUITY SUMMARY (AC-FT) - INFLOW=0.1088E+01 EXCESS=0.0000E+00 OUTFLOW=0.1097E+01 BASIN STORAGE=0.8678E-04 PERCENT ERROR= -0.8

FOR PLAN = 1 RATIO= 0.61									
	RTGC4 MANE	3.00	6.73	221.48	0.42	3.00	6.63	222.00	0.42

[redacted]TINUITY SUMMARY (AC-FT) - INFLOW=0.3927E+00 EXCESS=0.0000E+00 OUTFLOW=0.3957E+00 BASIN STORAGE=0.8881E-04 PERCENT ERROR= -0.8

[redacted] NORMAL END OF HEC-1 ***

GC-4 BASIN VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

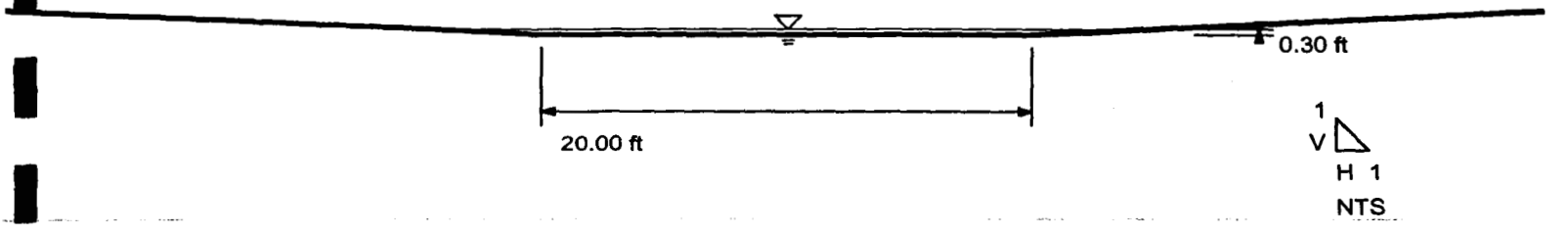
Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.015000	ft/ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	19.00	cfs

Results		
Depth	0.30	ft
Flow Area	7.96	ft^2
Wetted Perimeter	32.21	ft
Top Width	32.19	ft
Critical Depth	0.28	ft
Critical Slope	0.021521	ft/ft
Velocity	2.39	ft/s
Velocity Head	0.09	ft
Specific Energy	0.39	ft
Froude Number	0.85	
Flow is subcritical.		

GC-4 BASIN VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.030	
Channel Slope	0.015000	ft/ft
Depth	0.30	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	19.00	cfs



GC-5 BASIN VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

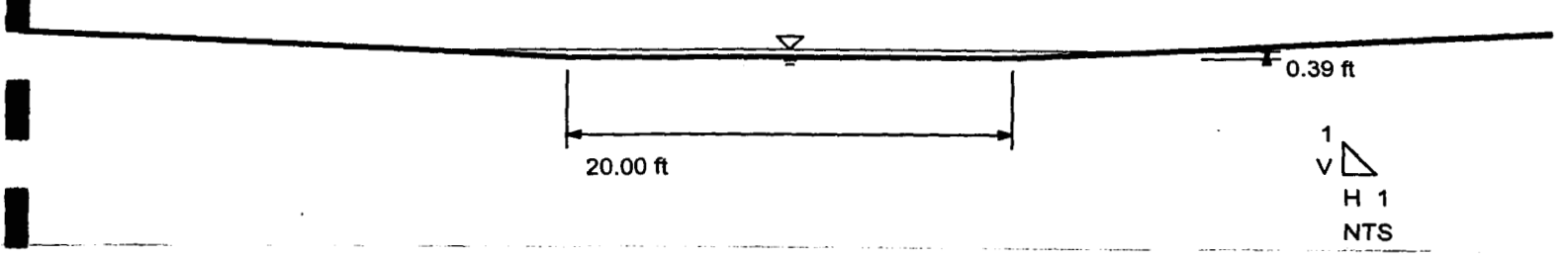
Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.026000	ft/ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	40.00	cfs

Results		
Depth	0.39	ft
Flow Area	11.00	ft²
Wetted Perimeter	35.80	ft
Top Width	35.78	ft
Critical Depth	0.43	ft
Critical Slope	0.018991	ft/ft
Velocity	3.64	ft/s
Velocity Head	0.21	ft
Specific Energy	0.60	ft
Froude Number	1.16	
Flow is supercritical.		

GC-5 BASIN VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.030	
Channel Slope	0.026000	ft/ft
Depth	0.39	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	40.00	cfs



GC-7 BASIN VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

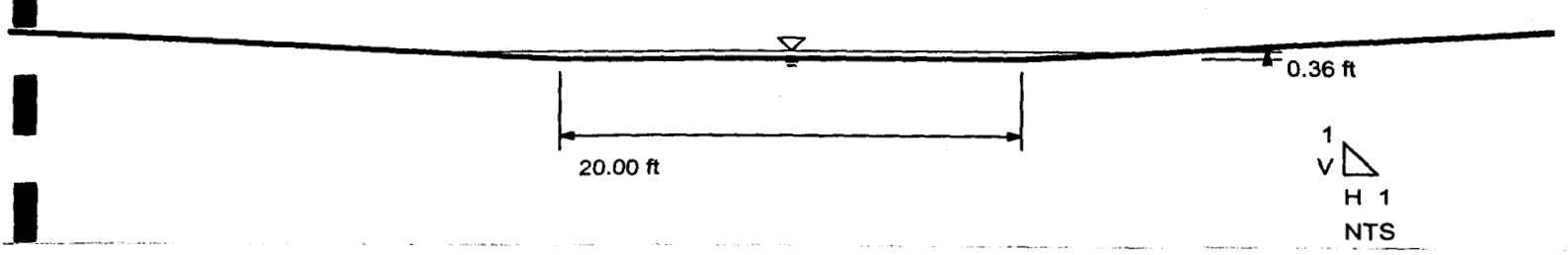
Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.031000	ft/ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	37.00	cfs

Results		
Depth	0.36	ft
Flow Area	9.80	ft^2
Wetted Perimeter	34.43	ft
Top Width	34.41	ft
Critical Depth	0.41	ft
Critical Slope	0.019233	ft/ft
Velocity	3.77	ft/s
Velocity Head	0.22	ft
Specific Energy	0.58	ft
Froude Number	1.25	
Flow is supercritical.		

GC-7 BASIN VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.030	
Channel Slope	0.031000	ft/ft
Depth	0.36	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	37.00	cfs



GC-8 BASIN VELOCITY ESTIMATION

Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-8
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

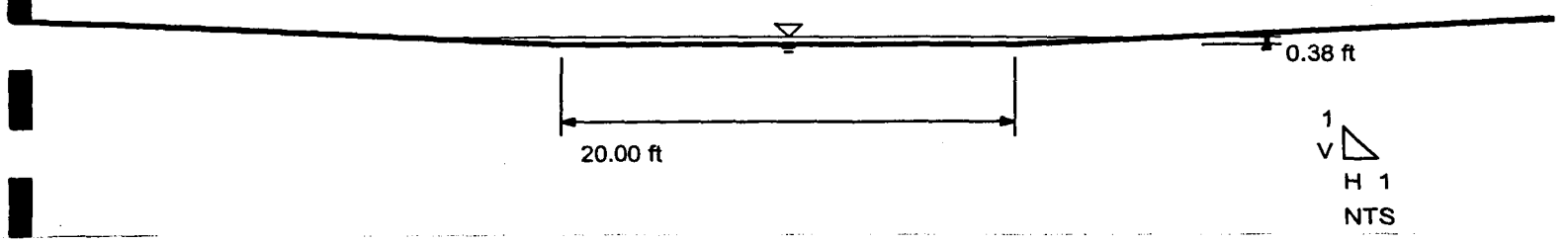
Input Data		
Mannings Coefficient	0.030	
Channel Slope	0.017000	ft/ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	30.00	cfs

Results		
Depth	0.38	ft
Flow Area	10.44	ft^2
Wetted Perimeter	35.16	ft
Top Width	35.14	ft
Critical Depth	0.36	ft
Critical Slope	0.019910	ft/ft
Velocity	2.87	ft/s
Velocity Head	0.13	ft
Specific Energy	0.51	ft
Froude Number	0.93	
Flow is subcritical.		

GC-8 BASIN VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\gcbsnvel.fm2
Worksheet	GC-8
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.030	
Channel Slope	0.017000	ft/ft
Depth	0.38	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	30.00	cfs



LOOP-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.016	
Channel Slope	3.1000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs

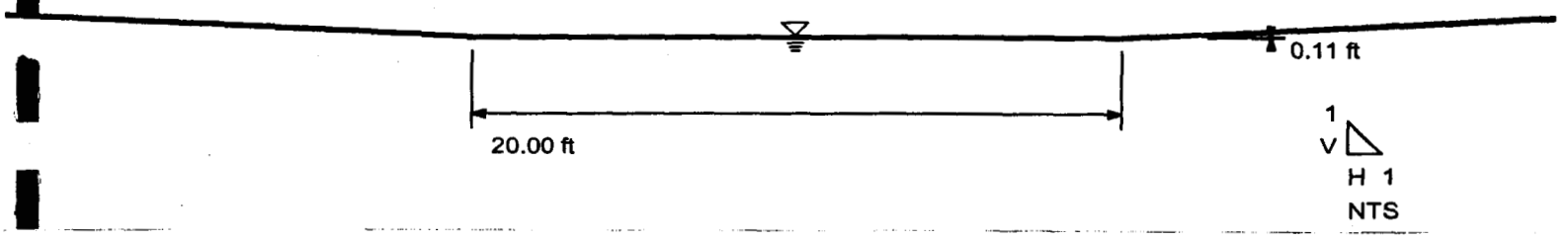
Results		
Depth	0.11	ft
Flow Area	2.51	ft^2
Wetted Perimeter	24.52	ft
Top Width	24.52	ft
Critical Depth	0.17	ft
Critical Slope	0.007002	ft/ft
Velocity	3.58	ft/s
Velocity Head	0.20	ft
Specific Energy	0.31	ft
Froude Number	1.97	
Flow is supercritical.		

LOOP-1 VELOCITY ESTIMATION

Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	3.1000	%
Depth	0.11	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs



LOOP-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

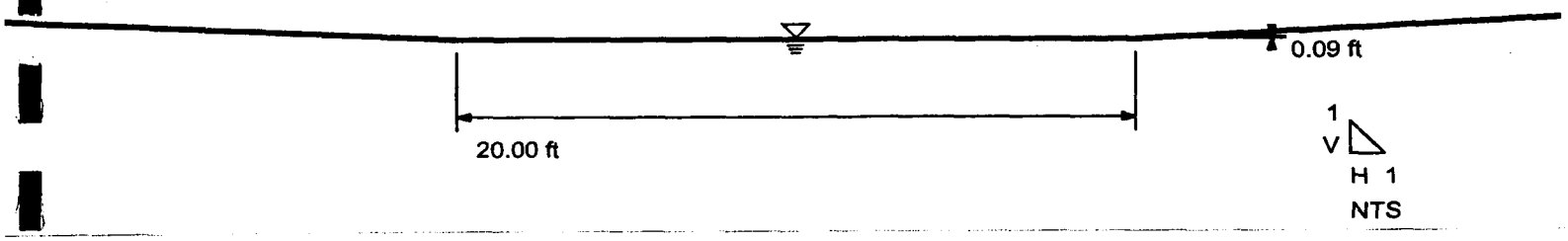
Input Data		
Mannings Coefficient	0.016	
Channel Slope	4.7000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.09	ft
Flow Area	1.87	ft^2
Wetted Perimeter	23.45	ft
Top Width	23.45	ft
Critical Depth	0.15	ft
Critical Slope	0.007342	ft/ft
Velocity	3.74	ft/s
Velocity Head	0.22	ft
Specific Energy	0.30	ft
Froude Number	2.33	
Flow is supercritical.		

LOOP-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	4.7000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



LOOP-3 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

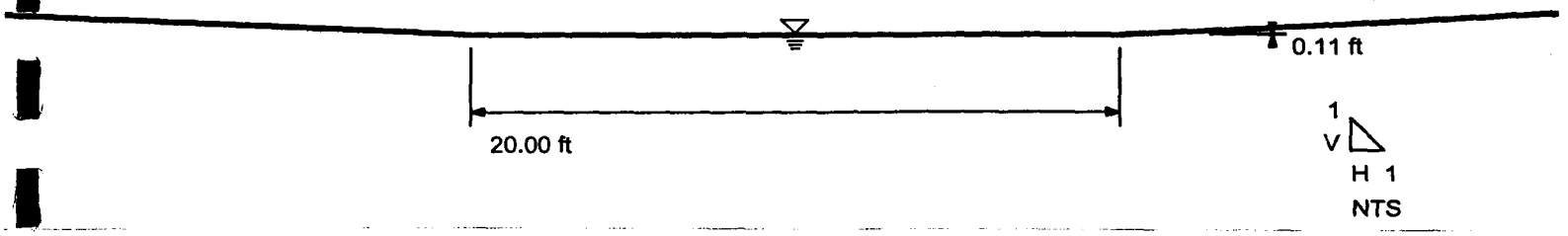
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.3000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs

Results		
Depth	0.11	ft
Flow Area	2.56	ft^2
Wetted Perimeter	24.60	ft
Top Width	24.59	ft
Critical Depth	0.13	ft
Critical Slope	0.007562	ft/ft
Velocity	2.34	ft/s
Velocity Head	0.09	ft
Specific Energy	0.20	ft
Froude Number	1.28	
Flow is supercritical.		

LOOP-3 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.3000	%
Depth	0.11	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs



LOOP-4 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

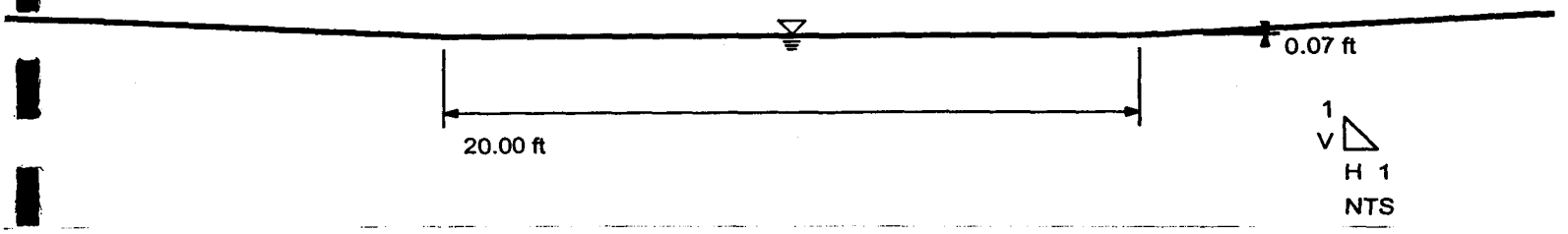
Input Data		
Mannings Coefficient	0.016	
Channel Slope	4.7000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs

Results		
Depth	0.07	ft
Flow Area	1.52	ft^2
Wetted Perimeter	22.83	ft
Top Width	22.83	ft
Critical Depth	0.12	ft
Critical Slope	0.007832	ft/ft
Velocity	3.30	ft/s
Velocity Head	0.17	ft
Specific Energy	0.24	ft
Froude Number	2.26	
Flow is supercritical.		

LOOP-4 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	4.7000	%
Depth	0.07	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs



LOOP-5 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

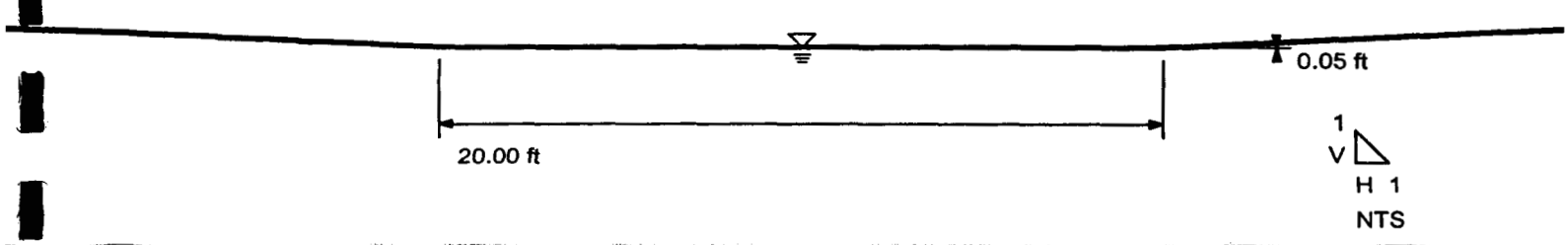
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.5000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs

Results		
Depth	0.05	ft
Flow Area	1.04	ft^2
Wetted Perimeter	21.99	ft
Top Width	21.98	ft
Critical Depth	0.07	ft
Critical Slope	0.009411	ft/ft
Velocity	1.92	ft/s
Velocity Head	0.06	ft
Specific Energy	0.11	ft
Froude Number	1.56	
Flow is supercritical.		

LOOP-5 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	LOOP-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.5000	%
Depth	0.05	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs



PK-3 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	PK-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

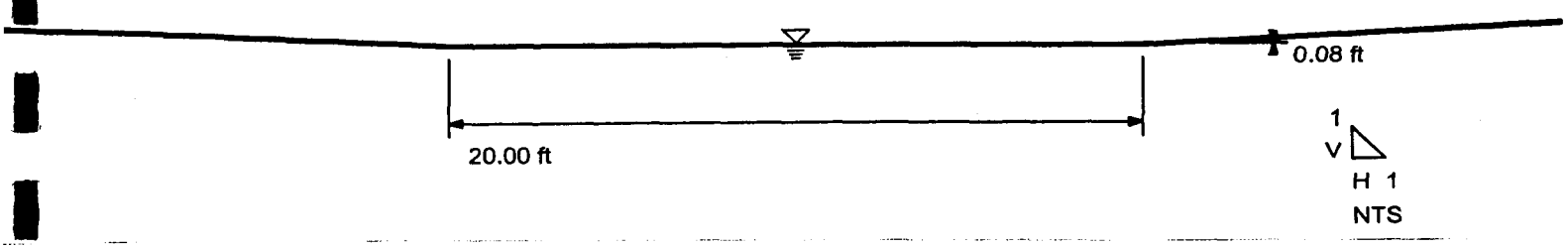
Input Data		
Mannings Coefficient	0.030	
Channel Slope	2.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs

Results		
Depth	0.08	ft
Flow Area	1.65	ft^2
Wetted Perimeter	23.08	ft
Top Width	23.07	ft
Critical Depth	0.07	ft
Critical Slope	0.033085	ft/ft
Velocity	1.21	ft/s
Velocity Head	0.02	ft
Specific Energy	0.10	ft
Froude Number	0.80	
Flow is subcritical.		

PK-3 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	PK-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.030	
Channel Slope	2.0000	%
Depth	0.08	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs



SC-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\scbsnvel.fm2
Worksheet	SC-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

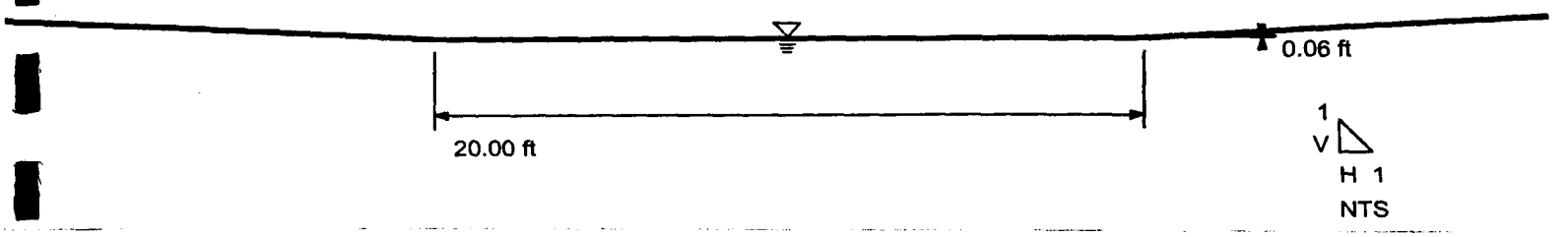
Input Data		
Mannings Coefficient	0.013	
Channel Slope	2.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs

Results		
Depth	0.06	ft
Flow Area	1.26	ft^2
Wetted Perimeter	22.39	ft
Top Width	22.38	ft
Critical Depth	0.09	ft
Critical Slope	0.005722	ft/ft
Velocity	2.38	ft/s
Velocity Head	0.09	ft
Specific Energy	0.15	ft
Froude Number	1.76	
Flow is supercritical.		

SC-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\scbsnvel.fm2
Worksheet	SC-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	2.0000	%
Depth	0.06	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs



SC-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\scbsnvel.fm2
Worksheet	SC-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

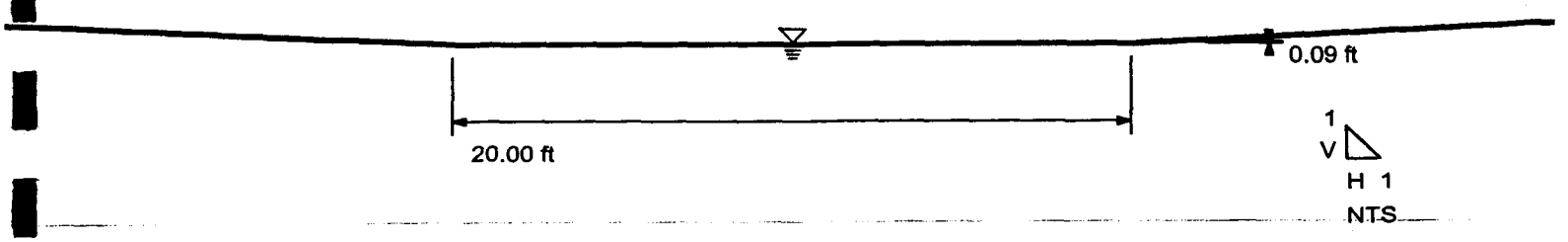
Input Data		
Mannings Coefficient	0.013	
Channel Slope	1.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs

Results		
Depth	0.09	ft
Flow Area	1.88	ft^2
Wetted Perimeter	23.47	ft
Top Width	23.46	ft
Critical Depth	0.10	ft
Critical Slope	0.005403	ft/ft
Velocity	2.13	ft/s
Velocity Head	0.07	ft
Specific Energy	0.16	ft
Froude Number	1.32	
Flow is supercritical.		

SC-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\scbsnvel.fm2
Worksheet	SC-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.0000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs



VELOCITY ESTIMATION FOR SUN-1
Worksheet for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION SUN-1 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.016	
Channel Slope	4.30	%
Left Side Slope	20.0	H : V
Right Side Slope	20.0	H : V
Bottom Width	20.0	ft
Discharge	9.0	cfs

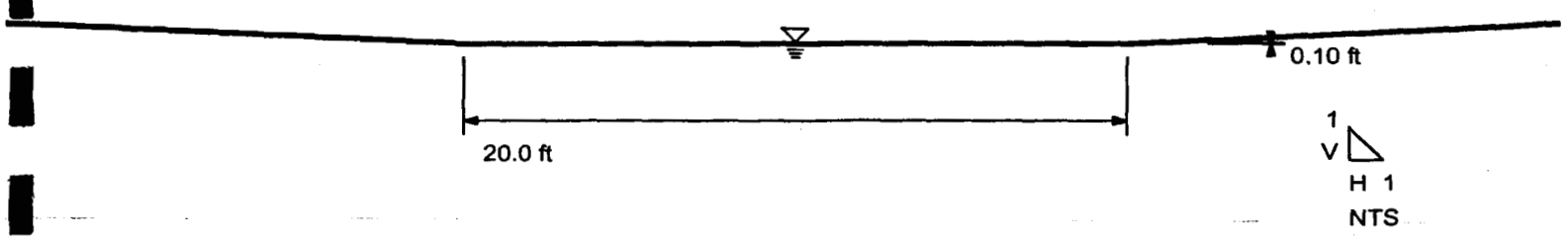
Results	
Depth	0.10 ft
Flow Area	2.26 ft²
Wetted Perimeter	24.11 ft
Top Width	24.10 ft
Critical Depth	0.17 ft
Critical Slope	0.70 %
Velocity	3.98 ft/s
Velocity Head	0.25 ft
Specific Energy	0.35 ft
Froude Number	2.29
Flow is supercritical.	

VELOCITY ESTIMATION FOR SUN-1

Cross Section for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION SUN-1 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	4.30	%
Depth	0.10	ft
Left Side Slope	20.0	H : V
Right Side Slope	20.0	H : V
Bottom Width	20.0	ft
Discharge	9.0	cfs



5OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p5vel.fm2
Worksheet	5OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

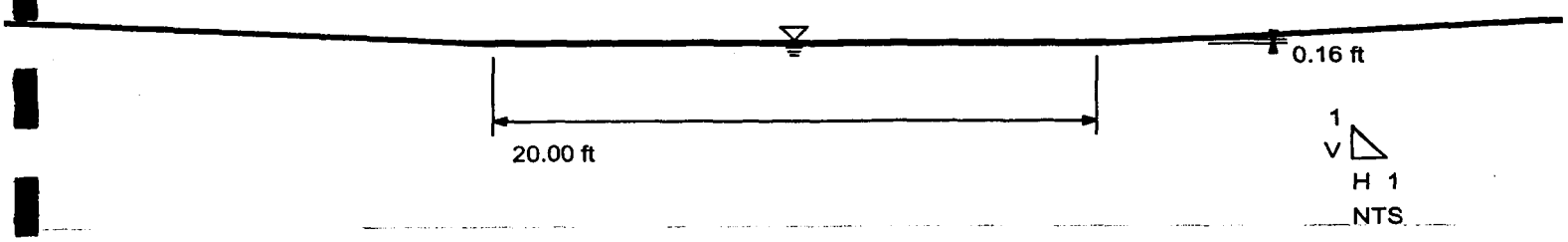
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	12.00	cfs

Results		
Depth	0.16	ft
Flow Area	3.82	ft²
Wetted Perimeter	26.58	ft
Top Width	26.57	ft
Critical Depth	0.21	ft
Critical Slope	0.004385	ft/ft
Velocity	3.14	ft/s
Velocity Head	0.15	ft
Specific Energy	0.32	ft
Froude Number	1.46	
Flow is supercritical.		

5OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p5vel.fm2
Worksheet	5OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.010000	ft/ft
Depth	0.16	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	12.00	cfs



6COND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	6COND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs

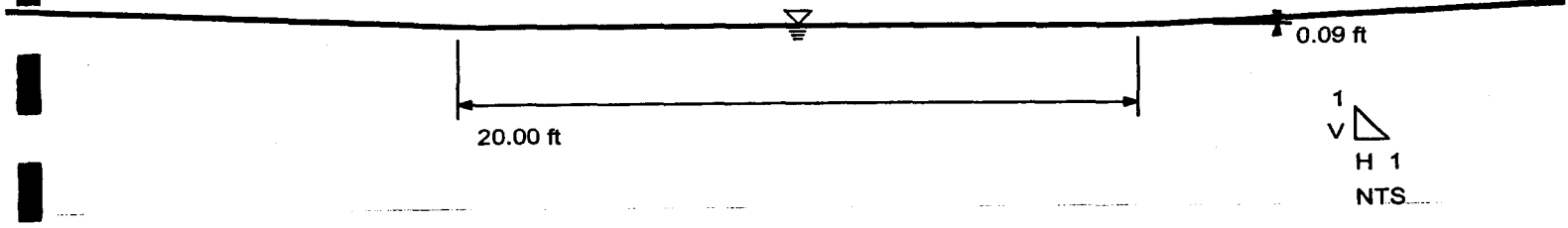
Results		
Depth	0.09	ft
Flow Area	1.99	ft^2
Wetted Perimeter	23.64	ft
Top Width	23.64	ft
Critical Depth	0.12	ft
Critical Slope	0.007832	ft/ft
Velocity	2.52	ft/s
Velocity Head	0.10	ft
Specific Energy	0.19	ft
Froude Number	1.53	
Flow is supercritical.		

6COND-1 VELOCITY ESTIMATION

Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	6COND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs



6COND-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	6COND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

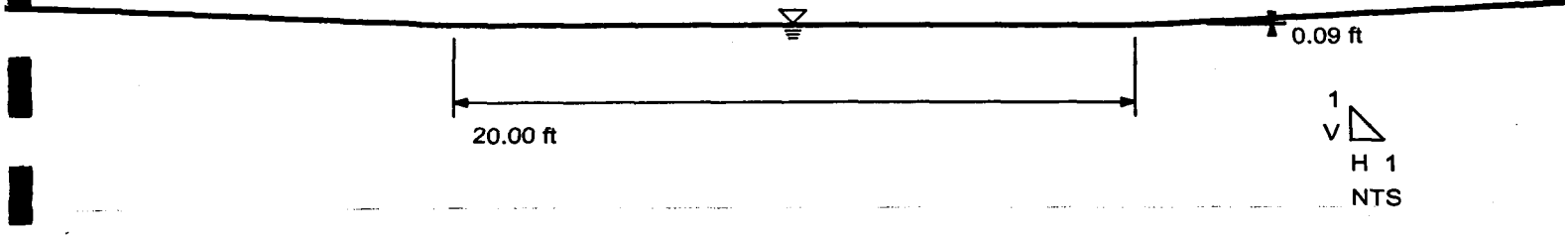
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.2000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs

Results		
Depth	0.09	ft
Flow Area	1.93	ft²
Wetted Perimeter	23.54	ft
Top Width	23.54	ft
Critical Depth	0.12	ft
Critical Slope	0.007832	ft/ft
Velocity	2.60	ft/s
Velocity Head	0.10	ft
Specific Energy	0.19	ft
Froude Number	1.60	
Flow is supercritical.		

6COND-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	6COND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.2000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs



VELOCITY ESTIMATION FOR 11OND-1
Worksheet for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION 11OND-1 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

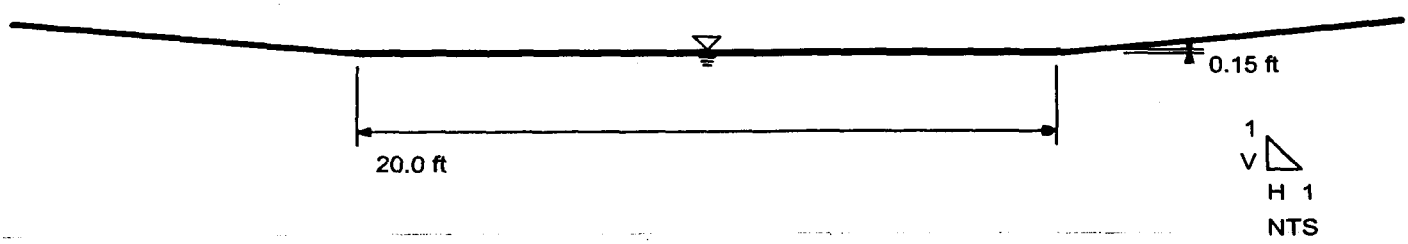
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.00	%
Left Side Slope	10.0	H : V
Right Side Slope	10.0	H : V
Bottom Width	20.0	ft
Discharge	12.0	cfs

Results	
Depth	0.15 ft
Flow Area	3.33 ft²
Wetted Perimeter	23.10 ft
Top Width	23.09 ft
Critical Depth	0.22 ft
Critical Slope	0.64 %
Velocity	3.61 ft/s
Velocity Head	0.20 ft
Specific Energy	0.36 ft
Froude Number	1.68
Flow is supercritical.	

VELOCITY ESTIMATION FOR 11OND-1
Cross Section for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION 11OND-1 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.00	%
Depth	0.15	ft
Left Side Slope	10.0	H : V
Right Side Slope	10.0	H : V
Bottom Width	20.0	ft
Discharge	12.0	cfs



VELOCITY ESTIMATION FOR 11OND-2
Worksheet for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION 11OND-2 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.00	%
Left Side Slope	10.0	H : V
Right Side Slope	10.0	H : V
Bottom Width	20.0	ft
Discharge	12.0	cfs

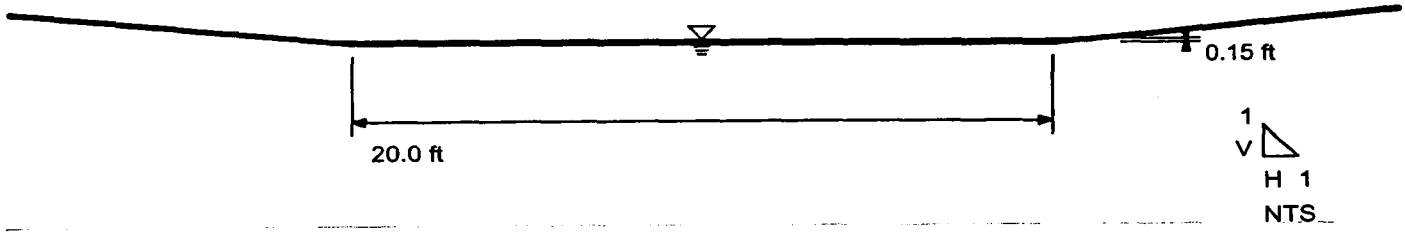
Results	
Depth	0.15 ft
Flow Area	3.33 ft²
Wetted Perimeter	23.10 ft
Top Width	23.09 ft
Critical Depth	0.22 ft
Critical Slope	0.64 %
Velocity	3.61 ft/s
Velocity Head	0.20 ft
Specific Energy	0.36 ft
Froude Number	1.68
Flow is supercritical.	

VELOCITY ESTIMATION FOR 11OND-2

Cross Section for Trapezoidal Channel

Project Description	
Project File	\\las19370142\c_patton\loopro~1\update\flowma~1\p11bsn~1.fm2
Worksheet	VELOCITY ESTIMATION 11OND-2 (P11)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.00	%
Depth	0.15	ft
Left Side Slope	10.0	H : V
Right Side Slope	10.0	H : V
Bottom Width	20.0	ft
Discharge	12.0	cfs



12OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	12OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

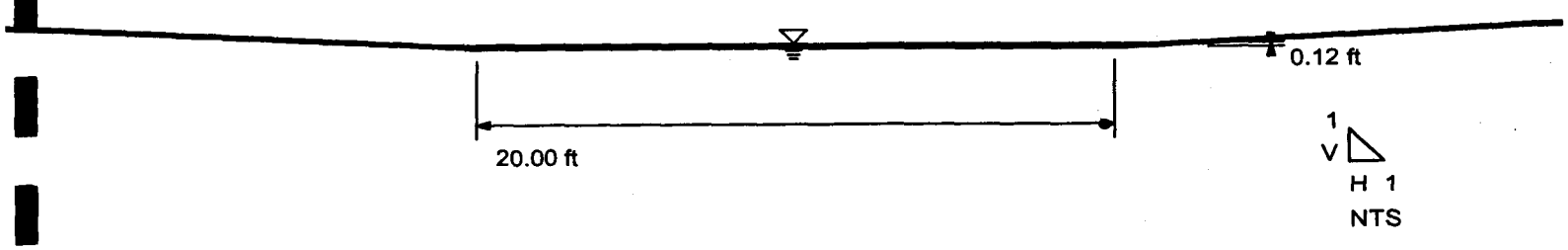
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.79	ft^2
Wetted Perimeter	24.96	ft
Top Width	24.96	ft
Critical Depth	0.13	ft
Critical Slope	0.007562	ft/ft
Velocity	2.15	ft/s
Velocity Head	0.07	ft
Specific Energy	0.20	ft
Froude Number	1.14	
Flow is supercritical.		

12OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	12OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0000	%
Depth	0.12	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs



12OND-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	12OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

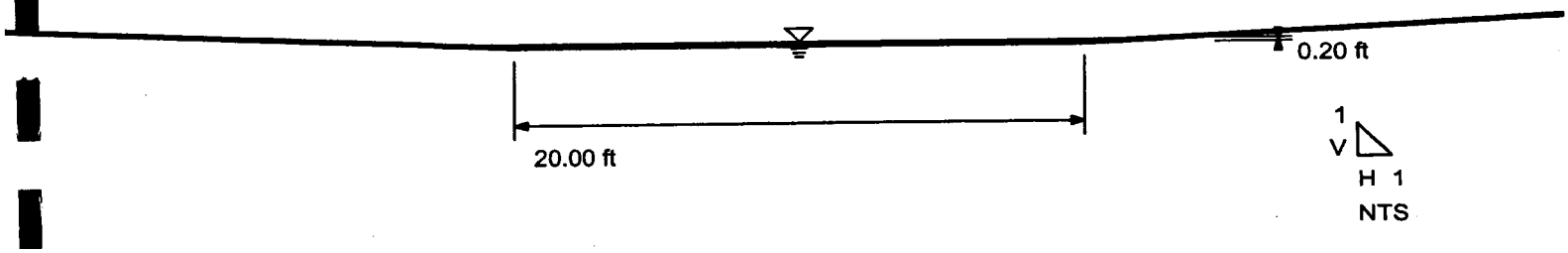
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	20.00	cfs

Results		
Depth	0.20	ft
Flow Area	4.89	ft^2
Wetted Perimeter	28.14	ft
Top Width	28.13	ft
Critical Depth	0.28	ft
Critical Slope	0.006067	ft/ft
Velocity	4.09	ft/s
Velocity Head	0.26	ft
Specific Energy	0.46	ft
Froude Number	1.73	
Flow is supercritical.		

12OND-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	12OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Depth	0.20	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	20.00	cfs



14OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

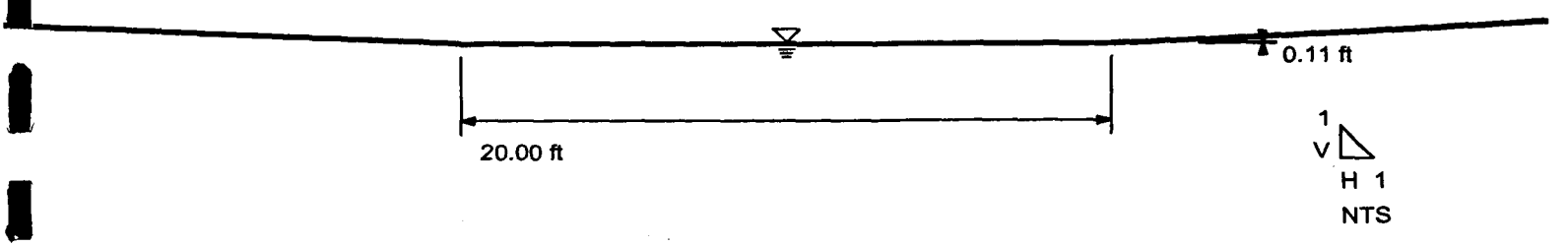
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.11	ft
Flow Area	2.46	ft²
Wetted Perimeter	24.44	ft
Top Width	24.43	ft
Critical Depth	0.15	ft
Critical Slope	0.007342	ft/ft
Velocity	2.84	ft/s
Velocity Head	0.13	ft
Specific Energy	0.24	ft
Froude Number	1.58	
Flow is supercritical.		

14OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.0000	%
Depth	0.11	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



14OND-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

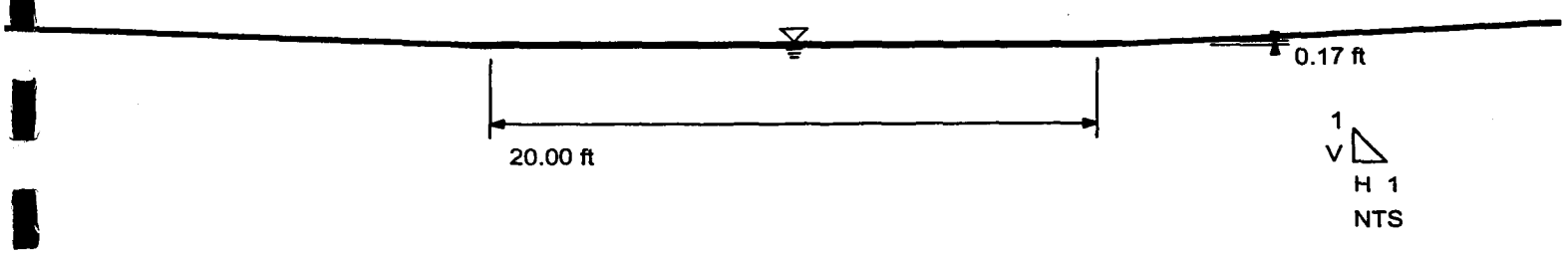
Input Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.17	ft
Flow Area	3.86	ft^2
Wetted Perimeter	26.63	ft
Top Width	26.63	ft
Critical Depth	0.15	ft
Critical Slope	0.007341	ft/ft
Velocity	1.81	ft/s
Velocity Head	0.05	ft
Specific Energy	0.22	ft
Froude Number	0.84	
Flow is subcritical.		

14OND-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Depth	0.17	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



14OND-3 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

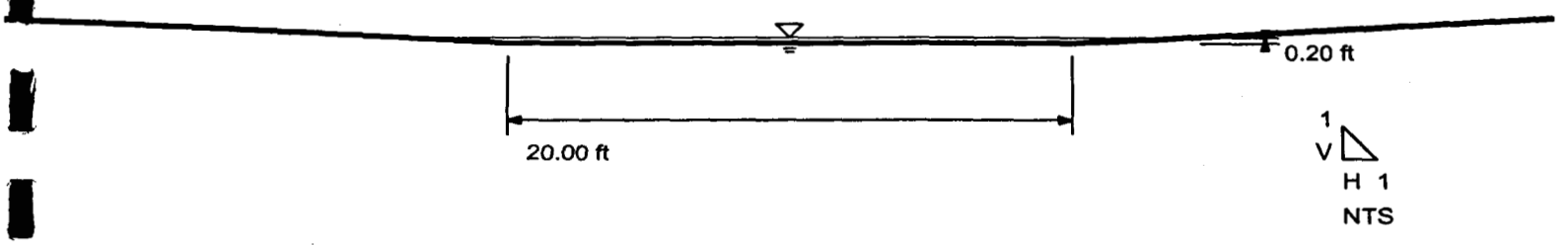
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.6000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	18.00	cfs

Results		
Depth	0.20	ft
Flow Area	4.91	ft^2
Wetted Perimeter	28.17	ft
Top Width	28.16	ft
Critical Depth	0.27	ft
Critical Slope	0.006179	ft/ft
Velocity	3.67	ft/s
Velocity Head	0.21	ft
Specific Energy	0.41	ft
Froude Number	1.55	
Flow is supercritical.		

14OND-3 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.6000	%
Depth	0.20	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	18.00	cfs



14OND-4 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

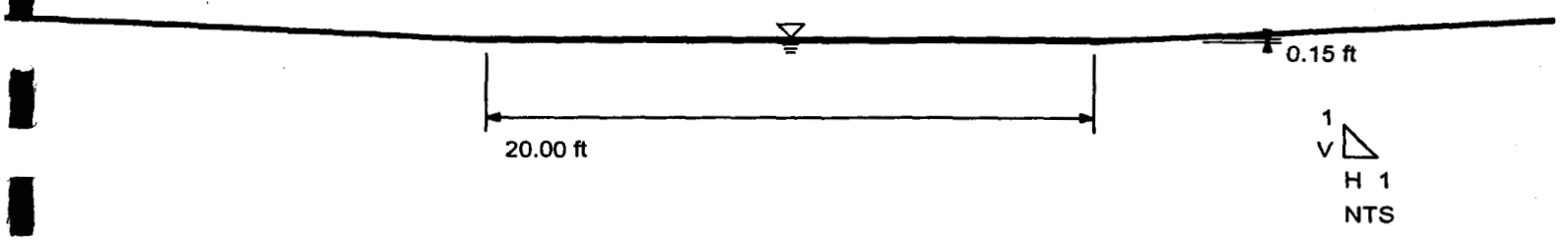
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.2000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	13.00	cfs

Results		
Depth	0.15	ft
Flow Area	3.57	ft^2
Wetted Perimeter	26.18	ft
Top Width	26.18	ft
Critical Depth	0.22	ft
Critical Slope	0.006547	ft/ft
Velocity	3.65	ft/s
Velocity Head	0.21	ft
Specific Energy	0.36	ft
Froude Number	1.74	
Flow is supercritical.		

14OND-4 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	14OND-4
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.2000	%
Depth	0.15	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	13.00	cfs



17OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	17OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

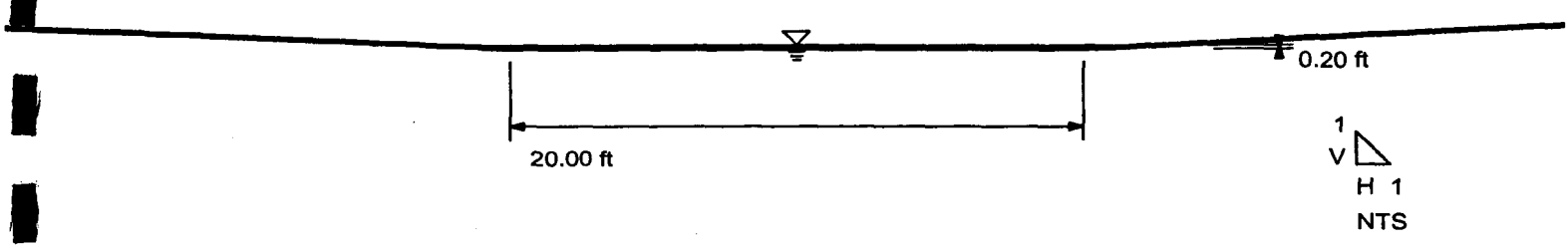
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	14.00	cfs

Results		
Depth	0.20	ft
Flow Area	4.86	ft^2
Wetted Perimeter	28.09	ft
Top Width	28.08	ft
Critical Depth	0.23	ft
Critical Slope	0.006461	ft/ft
Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	0.33	ft
Froude Number	1.22	
Flow is supercritical.		

17OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\loopbs~1.fm2
Worksheet	17OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0000	%
Depth	0.20	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	14.00	cfs



18OND-16 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	18OND-16
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

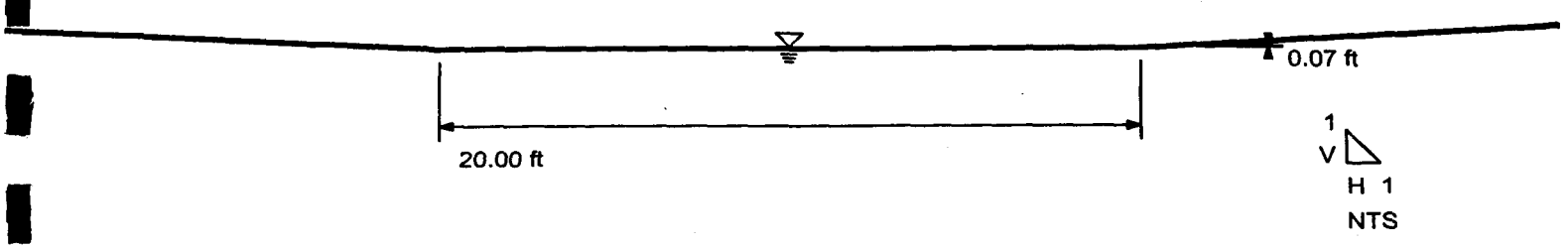
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.7000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs

Results		
Depth	0.07	ft
Flow Area	1.51	ft^2
Wetted Perimeter	22.83	ft
Top Width	22.83	ft
Critical Depth	0.09	ft
Critical Slope	0.008666	ft/ft
Velocity	1.98	ft/s
Velocity Head	0.06	ft
Specific Energy	0.13	ft
Froude Number	1.36	
Flow is supercritical.		

18OND-16 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	18OND-16
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.7000	%
Depth	0.07	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs



19OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

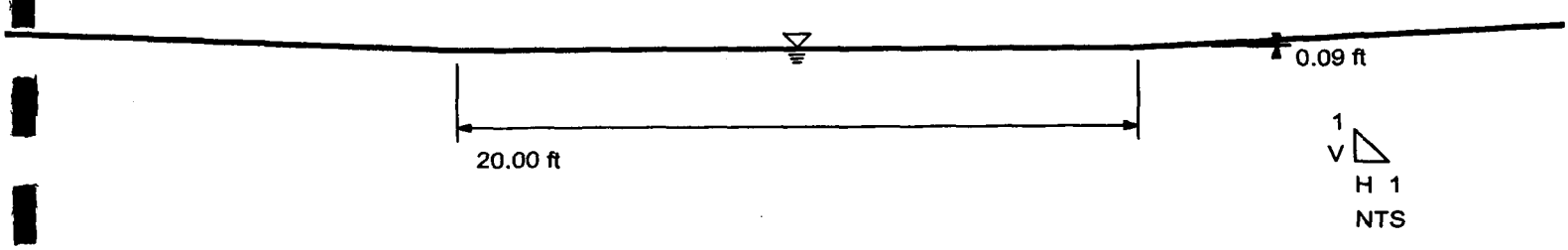
Input Data		
Mannings Coefficient	0.016	
Channel Slope	3.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs

Results		
Depth	0.09	ft
Flow Area	1.96	ft²
Wetted Perimeter	23.60	ft
Top Width	23.60	ft
Critical Depth	0.13	ft
Critical Slope	0.007561	ft/ft
Velocity	3.06	ft/s
Velocity Head	0.15	ft
Specific Energy	0.24	ft
Froude Number	1.87	
Flow is supercritical.		

19OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	3.0000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs



19OND-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

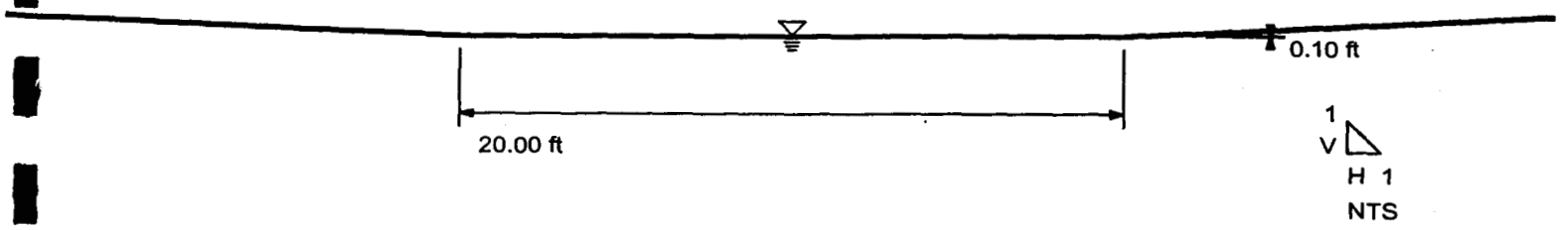
Input Data		
Mannings Coefficient	0.016	
Channel Slope	2.6000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.10	ft
Flow Area	2.26	ft^2
Wetted Perimeter	24.11	ft
Top Width	24.11	ft
Critical Depth	0.15	ft
Critical Slope	0.007341	ft/ft
Velocity	3.09	ft/s
Velocity Head	0.15	ft
Specific Energy	0.25	ft
Froude Number	1.78	
Flow is supercritical.		

19OND-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.6000	%
Depth	0.10	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



19OND-3 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

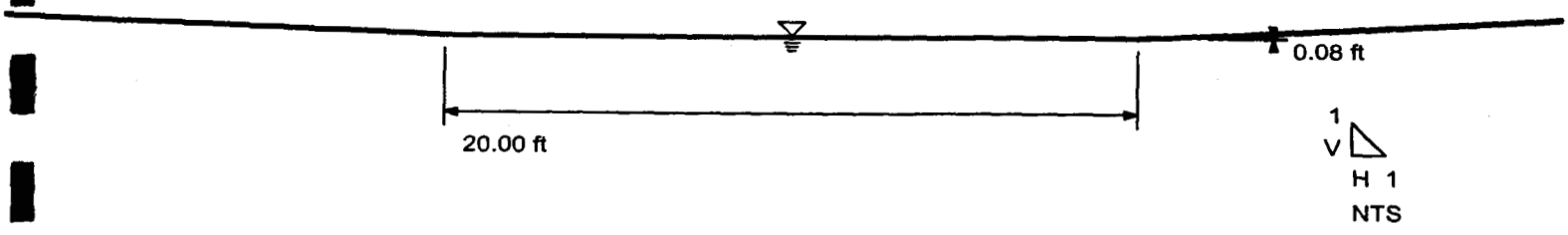
Input Data		
Mannings Coefficient	0.016	
Channel Slope	3.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs

Results		
Depth	0.08	ft
Flow Area	1.75	ft²
Wetted Perimeter	23.23	ft
Top Width	23.23	ft
Critical Depth	0.12	ft
Critical Slope	0.007831	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	0.21	ft
Froude Number	1.84	
Flow is supercritical.		

19OND-3 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-3
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	3.0000	%
Depth	0.08	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	5.00	cfs



19OND-5 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

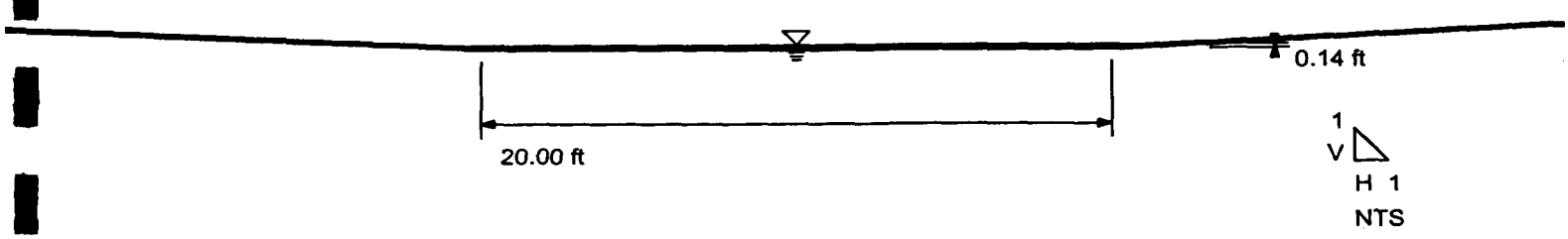
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.3000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	8.00	cfs

Results		
Depth	0.14	ft
Flow Area	3.08	ft^2
Wetted Perimeter	25.44	ft
Top Width	25.43	ft
Critical Depth	0.16	ft
Critical Slope	0.007158	ft/ft
Velocity	2.59	ft/s
Velocity Head	0.10	ft
Specific Energy	0.24	ft
Froude Number	1.31	
Flow is supercritical.		

19OND-5 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p18&19~1.fm2
Worksheet	19OND-5
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.3000	%
Depth	0.14	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	8.00	cfs



19OND-15 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-15
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

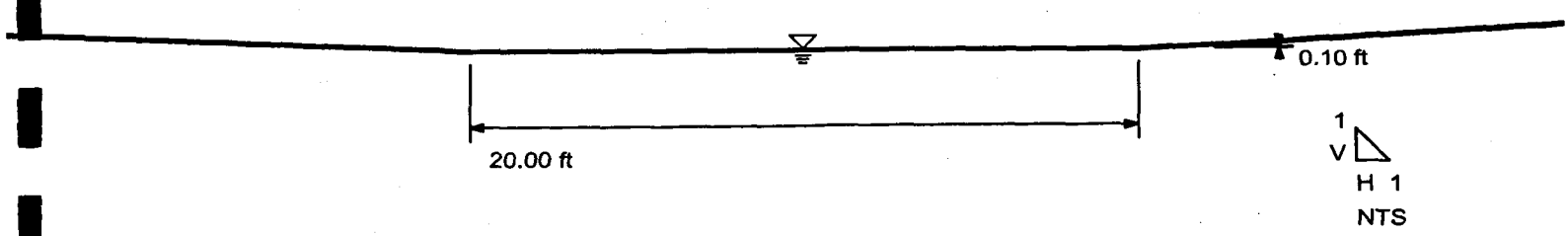
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.1000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs

Results		
Depth	0.10	ft
Flow Area	2.08	ft^2
Wetted Perimeter	23.81	ft
Top Width	23.81	ft
Critical Depth	0.10	ft
Critical Slope	0.008184	ft/ft
Velocity	1.92	ft/s
Velocity Head	0.06	ft
Specific Energy	0.15	ft
Froude Number	1.14	
Flow is supercritical.		

19OND-15 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-15
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.1000	%
Depth	0.10	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs



19OND-17 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-17
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

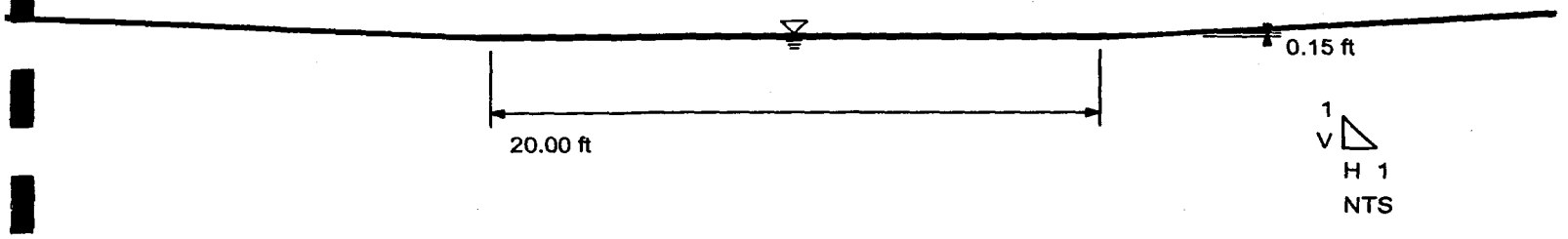
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.5000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	10.00	cfs

Results		
Depth	0.15	ft
Flow Area	3.40	ft^2
Wetted Perimeter	25.94	ft
Top Width	25.93	ft
Critical Depth	0.19	ft
Critical Slope	0.006868	ft/ft
Velocity	2.94	ft/s
Velocity Head	0.13	ft
Specific Energy	0.28	ft
Froude Number	1.43	
Flow is supercritical.		

19OND-17 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-17
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.5000	%
Depth	0.15	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	10.00	cfs



19OND-18 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-18
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

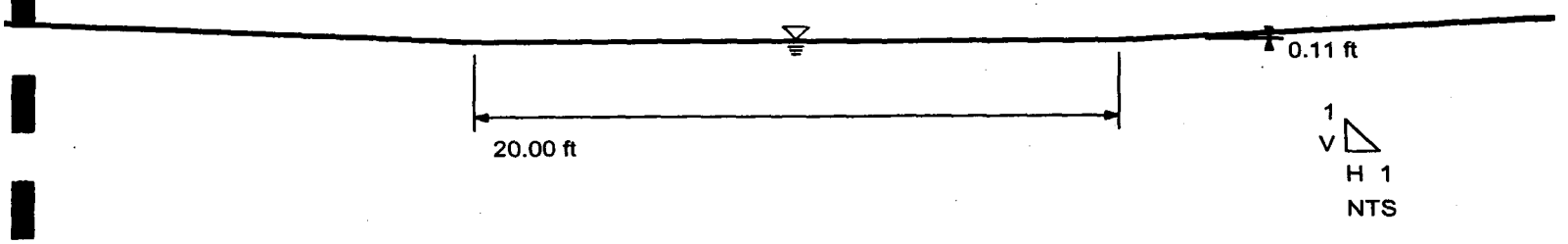
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.4000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs

Results		
Depth	0.11	ft
Flow Area	2.50	ft^2
Wetted Perimeter	24.50	ft
Top Width	24.50	ft
Critical Depth	0.13	ft
Critical Slope	0.007561	ft/ft
Velocity	2.40	ft/s
Velocity Head	0.09	ft
Specific Energy	0.20	ft
Froude Number	1.32	
Flow is supercritical.		

19OND-18 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:_patton\loopro~1\update\flowma~1\p18&19~1.fm2
Worksheet	19OND-18
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.4000	%
Depth	0.11	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs



23OND-7 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p22bsn~1.fm2
Worksheet	23OND-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

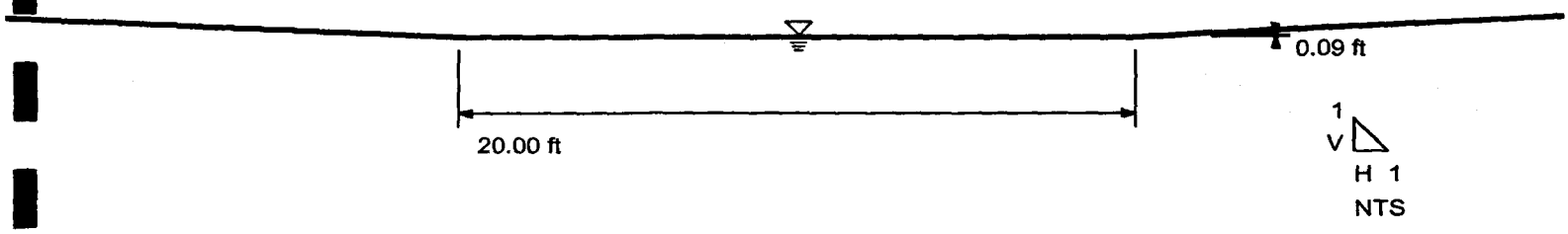
Input Data		
Mannings Coefficient	0.016	
Channel Slope	4.0000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.09	ft
Flow Area	1.97	ft^2
Wetted Perimeter	23.62	ft
Top Width	23.62	ft
Critical Depth	0.15	ft
Critical Slope	0.007343	ft/ft
Velocity	3.55	ft/s
Velocity Head	0.20	ft
Specific Energy	0.29	ft
Froude Number	2.16	
Flow is supercritical.		

23OND-7 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p22bsn~1.fm2
Worksheet	23OND-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	4.0000	%
Depth	0.09	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



23OND-8 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p22bsn~1.fm2
Worksheet	23OND-8
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

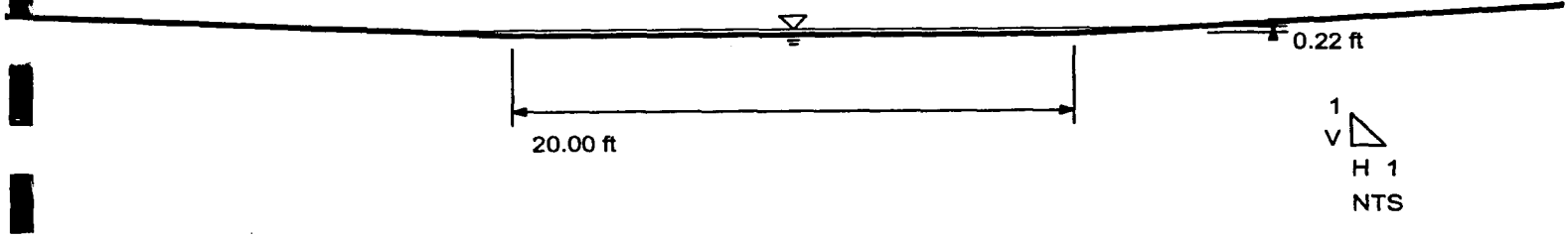
Input Data		
Mannings Coefficient	0.016	
Channel Slope	1.8000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	21.00	cfs

Results		
Depth	0.22	ft
Flow Area	5.23	ft^2
Wetted Perimeter	28.62	ft
Top Width	28.61	ft
Critical Depth	0.29	ft
Critical Slope	0.006016	ft/ft
Velocity	4.01	ft/s
Velocity Head	0.25	ft
Specific Energy	0.47	ft
Froude Number	1.65	
Flow is supercritical.		

23OND-8 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p22bsn~1.fm2
Worksheet	23OND-8
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.8000	%
Depth	0.22	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	21.00	cfs



24OND-1 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p24bsn~1.fm2
Worksheet	OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

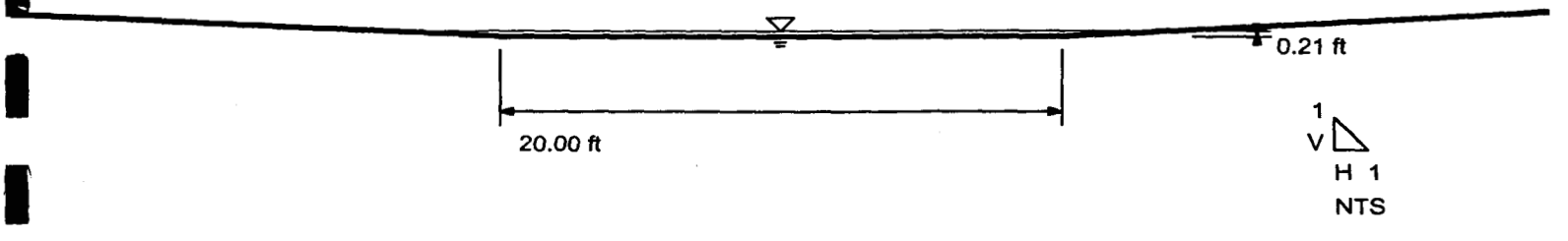
Input Data		
Mannings Coefficient	0.013	
Channel Slope	1.5000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	22.00	cfs

Results		
Depth	0.21	ft
Flow Area	4.99	ft^2
Wetted Perimeter	28.29	ft
Top Width	28.28	ft
Critical Depth	0.30	ft
Critical Slope	0.003940	ft/ft
Velocity	4.41	ft/s
Velocity Head	0.30	ft
Specific Energy	0.51	ft
Froude Number	1.85	
Flow is supercritical.		

24OND-1 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p24bsn~1.fm2
Worksheet	OND-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.5000	%
Depth	0.21	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	22.00	cfs



24OND-2 VELOCITY ESTIMATION
Worksheet for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p24bsn~1.fm2
Worksheet	24OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

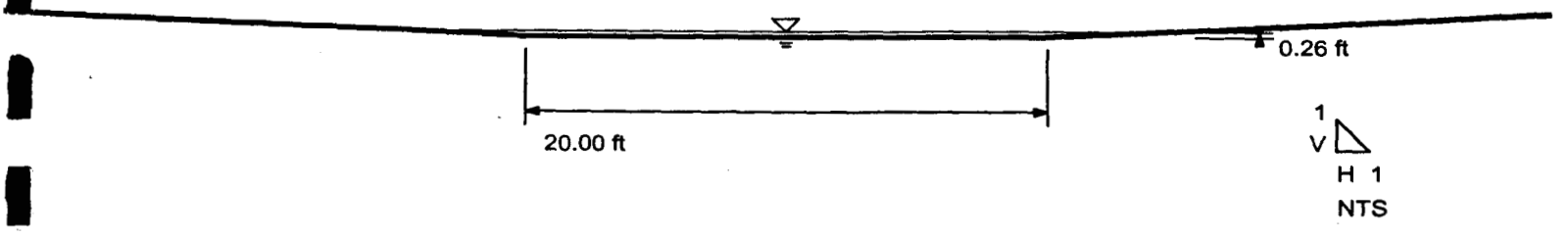
Input Data		
Mannings Coefficient	0.022	
Channel Slope	1.8000	%
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	21.00	cfs

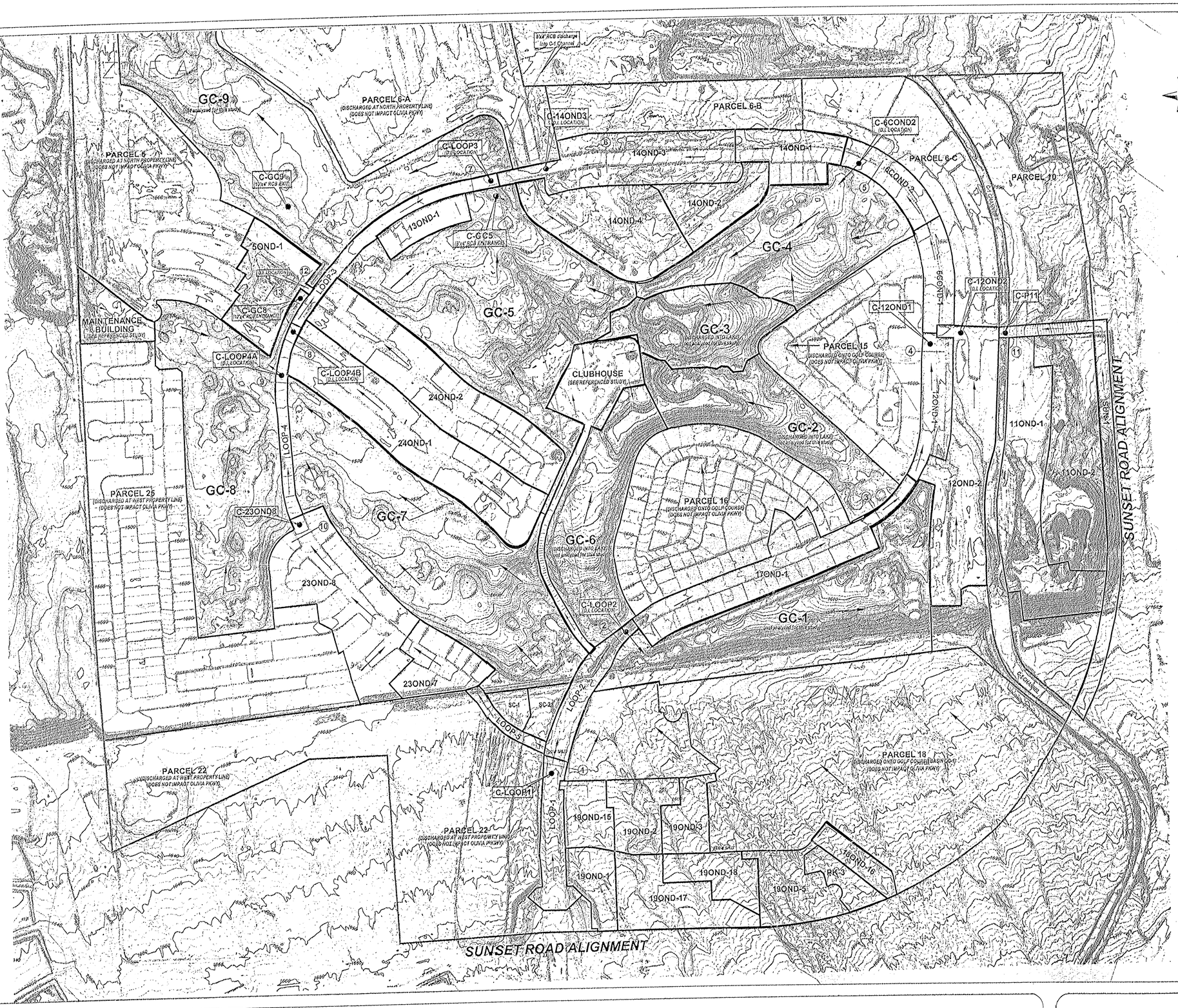
Results		
Depth	0.26	ft
Flow Area	6.48	ft²
Wetted Perimeter	30.32	ft
Top Width	30.31	ft
Critical Depth	0.29	ft
Critical Slope	0.011375	ft/ft
Velocity	3.24	ft/s
Velocity Head	0.16	ft
Specific Energy	0.42	ft
Froude Number	1.24	
Flow is supercritical.		

24OND-2 VELOCITY ESTIMATION
Cross Section for Trapezoidal Channel

Project Description	
Project File	c:\%chi-y~1\projects\loopro~2\flowma~1\p24bsn~1.fm2
Worksheet	24OND-2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.022	
Channel Slope	1.8000	%
Depth	0.26	ft
Left Side Slope	20.000000	H : V
Right Side Slope	20.000000	H : V
Bottom Width	20.00	ft
Discharge	21.00	cfs

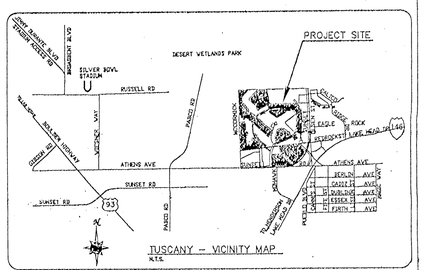




GRAPHIC SCALE

240 0 120 240 480 960

(IN FEET)
1 inch = 240 ft.



TUSCANY – VICINITY MAP
N.T.S.

BENCHMARK

CITY OF HENDERSON DESIGN MARK NO. 220 DATED 11/07/03
DESC: CITY OF HENDERSON BRASS CAP IN THE TOP OF THE CURB, ON THE SOUTHEAST CORNER OF THE INTERSECTION OF TOD MEDROCK STREET, ELEVATION IN METERS: 608.158 = 1997.303 FEET
EQUA. MARK '96
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
FOR COOK BOOK OF GEOHAZARDS DATED APRIL 1997.

BASIS OF BEARING

SOUTH 39°37'48" WEST – BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE1/4) OF SECTION 33, TOWNSHIP 21 SOUTH, RANGE 63 EAST, M.D.M., CITY OF HENDERSON, CLARK COUNTY, NEVADA, AS SHOWN ON THE MAP THEREOF IN FILE 37 OF SURVEYS, PAGE 06, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

LEGEND

- BASIN BOUNDARY
- FLOW DIRECTION
- (4) SECTION I.D.
- COMBINATION POINT

BASIN FLOW SUMMARY

Basin/Comb Pt. I.D.	Area (acres)	Q_{10} (cfs)	Q_{100} (cfs)	V_{100}* (cfs)
BASINS				
GC-4	11.4	7	19	2.39
GC-5	21.5	15	40	3.64
GC-7	11.1	13	37	3.27
GC-8	17.9	11	30	2.87
LOOP-1	3.5	6	9	3.58
LOOP-3	2.0	4	7	3.74
LOOP-4	1.8	3	6	3.24
LOOP-5	1.3	3	5	3.30
LOOP-6	0.6	1	2	1.92
FK-3	1.3	1	2	1.31
SC-1	0.7	2	3	2.39
SC-2	1.0	2	4	2.13
SUN-1	2.8	6	9	3.98
5OND-1	4.0	6	12	3.10
5COND-1	2.1	2	5	2.52
6COND-2	2.1	2	5	2.60
11OND-1	8.0	4	13	3.60
11OND-2	8.0	4	13	3.60
12OND-1	2.4	3	6	2.15
12OND-2	8.5	9	20	4.09
13OND-1	1.4	2	4	1.86
14OND-1	2.9	3	7	2.84
14OND-2	2.9	3	7	1.81
14OND-3	7.5	8	18	3.67
14OND-4	5.1	6	13	2.65
17OND-1	6.4	6	14	2.88
18OND-16	1.4	2	3	1.98
19OND-1	2.4	3	6	3.05
19OND-2	2.6	3	7	3.09
19OND-3	1.9	2	5	2.86
19OND-5	3.3	4	8	2.59
19OND-15	1.6	3	4	1.92
19OND-17	4.2	5	10	2.94
19OND-18	2.3	3	6	2.40
23OND-7	2.7	4	7	3.55
23OND-8	8.5	10	21	4.01
24OND-1	9.5	10	22	4.41
24OND-2	9.5	9	21	3.24
COMBINATION POINTS				
C-GC5	N/A	28	79	N/A
C-GC8	N/A	62	147	N/A
C-GC9	N/A	68	159	N/A
C-LOOP1	N/A	26	54	N/A
C-LOOP2	N/A	23	46	N/A
C-LOOP3	N/A	14	30	N/A
C-LOOP4A	N/A	27	56	N/A
C-LOOP4B	N/A	21	48	N/A
C-6COND2	N/A	14	30	N/A
C-P11	N/A	14	34	N/A
C-12OND1	N/A	9	20	N/A
C-12OND2	N/A	23	54	N/A
C-14OND3	N/A	20	45	N/A
C-23OND8	N/A	24	51	N/A

* Velocities are from Time Concentration calculations for 100-year flow

Street Flow Depth and Velocity Summary

TUSCANY - LOOP ROAD

Street Name	Section ID	Slope (%)	10-YEAR STORM EVENT Q_{10} (cfs)	V_{10} (fps)	D_{10} (ft)	$(DxV)_{10}$ (ft^2/s)	100-YEAR STORM EVENT Q_{100} (cfs)	V_{100} (fps)	D_{100} (ft)	$(DxV)_{100}$ (ft^2/s)	Street ROW (ft)	10-yr Dry Lane Met?
BUFFALO CONDITION												
Olivia Pkwy	1	0.53	26	1.04	0.57	1.11	54	2.34	0.66	1.54	134	N/A
Olivia Pkwy	2	4.72	23	6.32	0.46	2.91	46	6.69	0.56	3.75	62.5	N/A
Olivia Pkwy	3	1.00	6	2.70	0.39	1.05	14	3.05	0.49	1.49	62.5	N/A
Olivia Pkwy	4	0.71	9	2.45	0.46	1.13	20	2.65	0.58	1.54	62.5	N/A
Olivia Pkwy	5	2.33	14	4.35	0.44	1.91	30	4.65	0.55	2.56	62.5	N/A
Olivia Pkwy	6	1.64	14	3.72	0.41	1.53	30	4.03	0.52	2.10	70.6	N/A
Olivia Pkwy	7	0.79	14	2.13	0.53	1.13	30	2.84	0.60	1.70	70.6	N/A
Olivia Pkwy	8	1.80	21	4.13	0.45	1.86	48	4.60	0.57	2.62	62.5	N/A
Olivia Pkwy	9	1.80	26	4.30	0.48	2.06	56	4.78	0.59	2.82	62.5	N/A
Olivia Pkwy	10	1.80	24	4.25	0.47	2.00	51	4.48	0.59	2.64	70.6	N/A
Via Alatoire	11	1.80	14	3.85	0.40	1.54	34	4.30	0.53	2.28	71	N/A
Via Morelli	12	1.22	6	2.55	0.26	0.66	12	2.96	0.33	0.98	48	N/A
Channel Section*	13	1.00	---	---	---	---	147	5.39	3.02	---	---	N/A

* The channel is located between Parcel 5 and Oliva Pkwy and conveys flow to the 10'X4' RCB.

FIGURE 2: FUTURE CONDITION BASINS

PROJECT NAME: TUSCANY - LOOP ROAD UPDATE

PBS&J
901 N. Green Valley Pkwy
Suite 100
Henderson, Nevada 89074
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

Figure 2

Tuscany G.C. Clubhouse (PBS&J, 2001)

Job# 511197.00

October 22, 2001

Mark A. Sorensen, P.E.
PBS&J
901 North Green Valley Parkway
Suite 100
Henderson, NV 89014

Re: Palm City Golf Course Clubhouse
Permit Number: 2001001048

Dear Mr. Sorensen,

This letter provides comments on the above referenced drainage study dated October 17, 2001. The City of Henderson reviewed this study and based on the documents submitted, **the subject study is approved**. The following items are part of the approved study:

1. Clark County Regional Flood Control District concurrence is required.

2. Please include a copy of the Hydrology Study Permit with the improvement plans.

3. Installation of an 18-inch private storm drain, with an outlet onto the golf course.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by the above named engineering firm may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage.

Please let me know if you have any questions concerning these comments.

Sincerely,

John R. Manning, P.E.
Project Engineer II

Cc: Curt Chandler, Janie Nihipali, CCRFCD

TECHNICAL DRAINAGE STUDY UPDATE

FOR

PALM CITY (A.K.A TUSCANY)
GOLF COURSE CLUBHOUSE

CITY OF HENDERSON, NEVADA

Prepared for:

Commerce Associates, L.L.C.
5947 Harrison Drive.
Las Vegas, NV. 89120

Prepared by:

PBS&J
901 North Green Valley Parkway, Suite 100
Henderson, Nevada 89104

Reference Number 511197.00

August 27, 2001

PBS&J

DRAINAGE STUDY INFORMATION FORM

Name of Development: PALM CITY GOLF COURSE CLUBHOUSE Date: AUGUST. 30,2001

Location of Development: a) Descriptive (Cross Streets) North of Lake Mead Drive within Palm City Golf Course Community
b) Sect. 32 Twn. 21S Rng. 63E

Name of Owner: Commerce Associates, L.L.C. Assessors Parcel No: 160-32-210-005

Telephone No: (702) 248-4829 Facsimile No: (702) 248-4288

Address: 5947 Harrison Drive

Las Vegas, NV 89120

Contact Person Name: Mark Sorensen Telephone No: (702) 263-7275

Firm: P B S & J

Address: 901 N. Green valley Parkway, Suite 100

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map	X	Planned Unit Development		Other (Please specify below)
	Large Parcel Map		Building Permit		

1. Total Owned Land Area: At Site: 530 +/- acres Being Developed/Disturbed: 5.5 +/- acres

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? [YES*] NO

Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? YES* [NO]

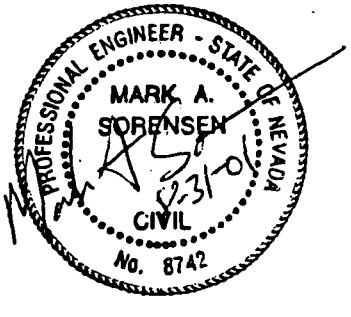
4. Proposed type of development (Residential, Commercial, Etc.)? Residential

5. Approximate upstream land area which drains to the subject site? 2.5 +/- acres

6. Has the site drainage been evaluated in the past? [YES] NO If yes, please identify documentation:
Master Technical Drainage Study for the Palm City Golf Course Community

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
Proposed drainage points are to the east and west of the site.

8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File No.

Revision	Date

PBS&J Job Number:

STANDARD FORM 1

FLOW SUMMARY TABLE

BASIN	Q10 (cfs)	Q100(cfs)
OFFD-1	0	2
OFFD-2	0	2
ONDEV-1	3	5
ONLAKE	3	5
ONHOL7	1	2
COMBINATION PT	**Q10 (cfs)**	**Q100(cfs)**
COMB-1	1	3
D.I.	3	8

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc.
Project No. :
File: CLUB.XLS

DEVELOPMENT : Tuscany Club House

CALCULATED BY : TMH

DATE: 8/23/01

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc = (min) (14)	Tlag= 0.6Tc/60 (hrs)	
ONDEV-1	98	0.904	1.50	0.0023	40	0.5	2.8	460	0.7	NA	2.09	3.7	6.5	500	12.8	6.5	0.065	
ONLAKE	98	0.904	1.20	0.0019	20	0.5	2.0	340	2.0	NA	3.00	1.9	3.9	360	12.0	3.9	0.039	
ONHOL7	98	0.904	0.60	0.0009	10	0.5	1.4	350	1.2	NA	1.87	3.1	4.5	360	12.0	4.5	0.045	

Tlag = 0.6Tc K = 0.0132 (CN) - 0.39

REFERENCE :

STANDARD FORM 4

```
**********                                                    **************************
**********
*                                                  *
*                                                  *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)              *    U.S. ARMY CORPS OF ENG
INEERS
*            SEPTEMBER 1990                        *    HYDROLOGIC ENGINEERING
CENTER
*             VERSION 4.0                          *         609 SECOND STREE
T
*                                                  *       DAVIS, CALIFORNIA 9
5616
*   RUN DATE  08/27/2001  TIME  08:41:29           *          (916) 756-1104
*                                                  *
*                                                  *
**********                                                    **************************
**********
```

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRU
CTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSI
ON

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

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

            1       ID          file: CLUBUPD.dat
            2       ID
            3       ID          Post, Buckley, Schuh & Jernigan, Inc.
            4       ID
            5       ID          ONSITE/LOCAL OFFSITE DEVELOPED CONDITIONS
            6       ID
            7       ID          **********************************
            8       ID          **********************************
            9       ID          *                                *
           10       ID          ***          PALM CITY           ***
           11       ID          ***   GOLF COURSE COMMUNITY      ***
           12       ID          ***           UPDATE             ***
           13       ID          ***         CLUB HOUSE           ***
           14       ID          *             MODEL              *
           15       ID          **********************************
           16       ID          **********************************
           17       ID
           18       ID          100-YEAR AND 10-YEAR STORM MODELS
           19       ID          6-HOUR RAINFALL STORM DISTRIBUTION
           20       ID          3 MINUTE COMPUTATION INTERVAL
           21       ID          STORM DISTRIBUTION NUMBER 3 (SDN3)
           22       ID
           23       ID          PRECIPITATION = 2.00*1.43 = 2.86
           24       ID
                    *DIAGRAM
*** FREE ***
           25       IT       3       0       0     300
           26       IO       5       0       0
           27       IN       5       0       0
           28       JR    PREC     1.0    0.57
                    *
           29       KK  OFFD-1
           30       KM   OFFSITE DEVELOPED BASIN OFFD-1
           31       BA  0.0019
           32       PB    2.86
           33       PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
           34       PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
           35       PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
           36       PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
           37       PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
           38       PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
```

```
          39          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
          40          PC    .998    .999   1.00
          41          LS       0      76
          42          UD   0.119
                      *

          43          KK    RT-1
          44          KM   ROUTE OFFD-1 THRU OFFD-2
          45          RK     630   0.019   0.022       0    TRAP      10      15
                      *
```



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

          46          KK  OFFD-2
          47          KM   OFFSITE DEVELOPED BASIN OFFD-2
          48          BA  0.0018
          49          LS       0      76
          50          UD   0.136
                      *

          51          KK  COMB-1
          52          KM   COMBINE RT-1 AND OFFD-2
          53          HC       2
                      *

          54          KK    RT-2
          55          KM   ROUTE COMB-1 THRU ONDEV-1
          56          RT     350   0.005   0.016       0    TRAP
                      *

          57          KK ONDEV-1
          58          KM   ON-SITE BASIN ONDEV-1
          59          BA  0.0023
          60          LS       0      98
          61          UD   0.065
                      *

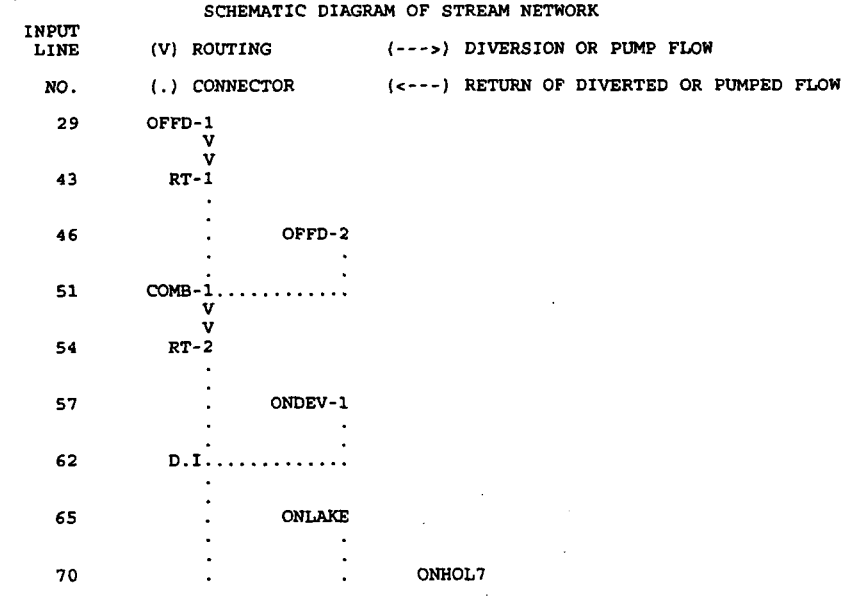
          62          KK    D.I.
          63          KM   COMBINE BASINS AT D.I.
          64          HC       2
                      *

          65          KK  ONLAKE
          66          KM   ONSITE BASIN THAT DISCHARGES INTO LAKE
          67          BA  0.0019
          68          LS       0      98
          69          UD   0.039
                      *

          70          KK  ONHOL7
          71          KM   ONSITE BASIN THAT DISCAHRGES ONTO HOLE 7
          72          BA  0.0009
          73          LS       0      98
          74          UD   0.045
                      *
          75          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
 ****************************************                                    **************************
 ************
 *                                      *                                   *
 *          *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                   *    U.S. ARMY CORPS OF ENG
INEERS     *
 *         SEPTEMBER 1990               *                                   *    HYDROLOGIC ENGINEERING
 CENTER    *
 *          VERSION 4.0                 *                                   *         609 SECOND STREE
T          *
 *                                      *                                   *       DAVIS, CALIFORNIA 9
5616       *
 *  RUN DATE  08/27/2001  TIME  08:41:29 *                                   *            (916) 756-1104
           *
 *                                      *                                   *
           *
 ****************************************                                    **************************
************
```

file: CLUBUPD.dat

Post, Buckley, Schuh & Jernigan, Inc.

ONSITE/LOCAL OFFSITE DEVELOPED CONDITIONS

```
**********************************
**********************************
*                                *
***          PALM CITY           ***
***   GOLF COURSE COMMUNITY      ***
***          UPDATE              ***
***         CLUB HOUSE           ***
*             MODEL              *
**********************************
**********************************
```

100-YEAR AND 10-YEAR STORM MODELS
6-HOUR RAINFALL STORM DISTRIBUTION
3 MINUTE COMPUTATION INTERVAL
STORM DISTRIBUTION NUMBER 3 (SDN3)

PRECIPITATION = 2.00*1.43 = 2.86

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

     IT           HYDROGRAPH TIME DATA
                      NMIN           3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1457  ENDING TIME
                     ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL      .05 HOURS
                       TOTAL TIME BASE    14.95 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .57
1
```

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2
				1.00	.57

YDROGRAPH AT	OFFD-1	.00	1	FLOW	2.	0.
				TIME	3.55	3.60
ROUTED TO	RT-1	.00	1	FLOW	2.	0.
•				TIME	3.60	3.65
HYDROGRAPH AT	OFFD-2	.00	1	FLOW	2.	0.
+				TIME	3.60	3.60
2 COMBINED AT	COMB-1	.00	1	FLOW	3.	1.
+				TIME	3.60	3.65
ROUTED TO	RT-2	.00	1	FLOW	3.	1.
+				TIME	3.60	3.65
HYDROGRAPH AT	ONDEV-1	.00	1	FLOW	5.	3.
+				TIME	3.50	3.50
2 COMBINED AT	D.I.	.01	1	FLOW	8.	3.
+				TIME	3.50	3.50
HYDROGRAPH AT	ONLAKE	.00	1	FLOW	5.	3.
+				TIME	3.50	3.50
HYDROGRAPH AT	ONHOL7	.00	1	FLOW	2.	1.
+				TIME	3.50	3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING

(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

						INTERPOLATED TO COMPUTATION INTERVAL			
ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.00									
RT-1	MANE	1.35	1.68	215.57	.92	3.00	1.67	216.00	.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9342E-01 EXCESS= .0000E+00 OUTFLOW= .9359E-01 BASIN STORAGE= .9625E-08 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .57									
RT-1	MANE	2.00	.39	220.16	.24	3.00	.39	219.00	.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2431E-01 EXCESS= .0000E+00 OUTFLOW= .2436E-01 BASIN STORAGE= .8836E-08 PERCENT ERROR= -.2

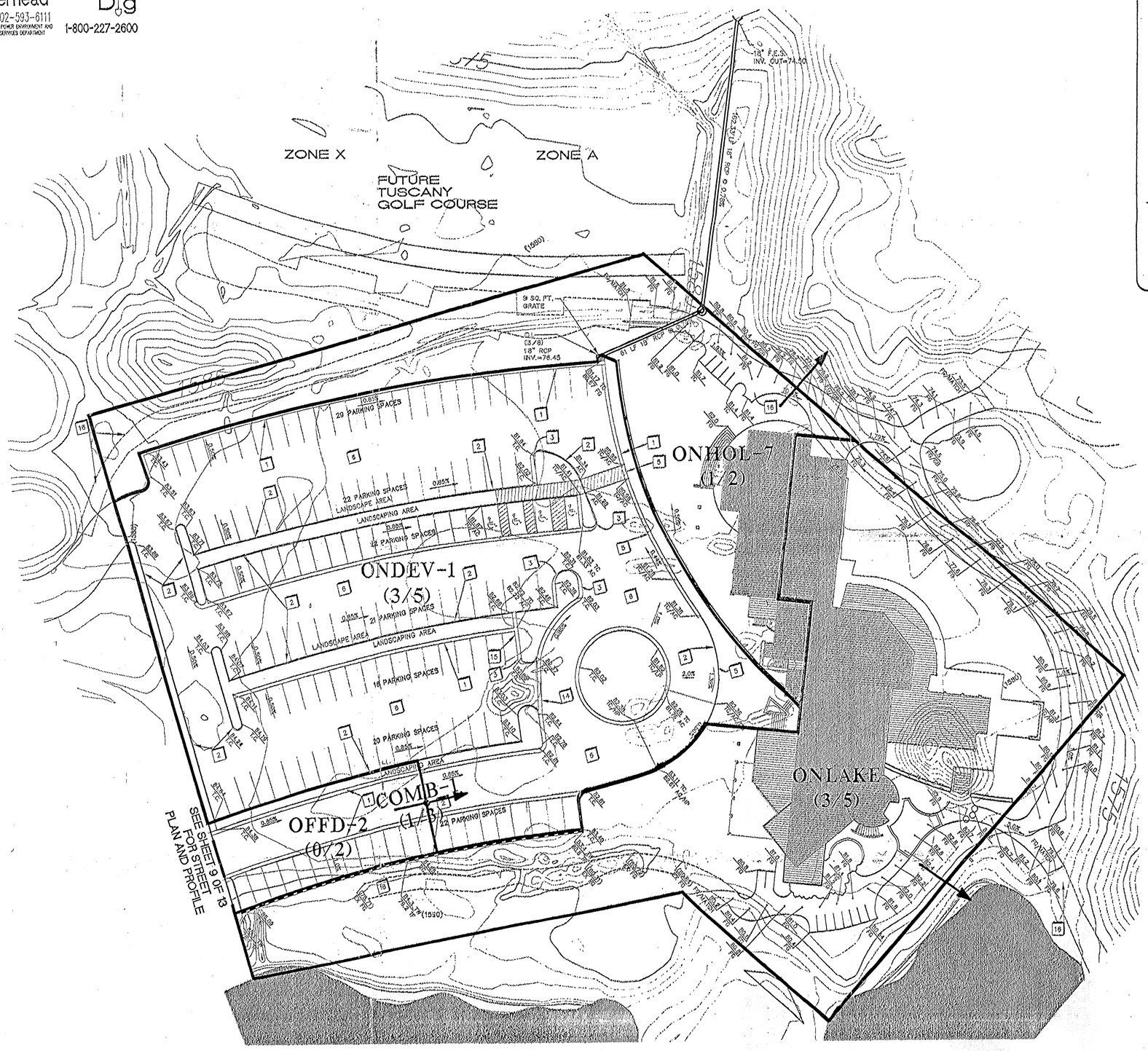
*** NORMAL END OF HEC-1 ***

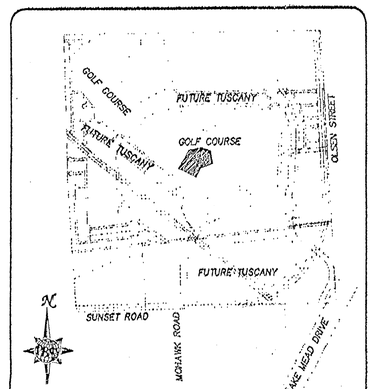
Avoid overhead power line contact. It's costly.

Call before you Overhead
1-702-593-6111
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600





KEY MAP

(1/2) — 10YR/100YR STORM EVENT (CFS)

LEGEND

- 100.00 / F.G. — ELEVATION DESCRIPTION
- 1.25% — RATE OF SLOPE / DIRECTION OF SLOPE
- FIRE HYDRANT
- S — SEWER MANHOLE
- MATCHLINE
- INTERDRAIN
- 1 FOOT EXISTING CONTOUR
- (1580) — 5 FOOT EXISTING CONTOUR
- PROPERTY LINE
- SEWER CLEAN OUT
- FLOOD ZONE

GENERAL NOTES:

1.) ADD 1500 TO PLAN ELEVATIONS
2.) ALL STATIONING IS CENTERLINE STATIONING UNLESS OTHERWISE NOTED.
3.) SEE SOILS REPORT

CONSTRUCTION NOTES:

1. CONSTRUCT "ROLL" TYPE CURB & GUTTER PER U.S.D.C.C.A. STANDARD DWG. NO. 217A.
2. CONSTRUCT "A" TYPE CURB PER U.S.D.C.C.A. STANDARD DWG. NO. 219.
3. CONSTRUCT 5' TRANSITION FROM "L" TYPE CURB TO "A" TYPE CURB.
4. CONSTRUCT 4' SIDEWALK PER U.S.D.C.C.A. STANDARD DWG. NO. 234.
5. CONSTRUCT DEPRESSED 0" CURB FACE SEE DETAIL E ON SHEET 3
6. INSTALL 3" A.C. PAVEMENT.
7. SEE SHEET 3 OF 14 FOR DEPRESSED CURB DETAIL.
8. INSTALL 8" x 8" x 8" TEE
9. INSTALL FIRE HYDRANT ASSEMBLY PER UDACS PLATE NO. 7
10. INSTALL 8" GATE VALVE
11. REMOVE 2" BLOW OFF AND JOIN TO 8" LINE
12. INSTALL SLEEVE PER STORM/ SEWER WATER CROSSING DETAIL ON SHEET 3 OF 13.
13. INSTALL 2" BLOW OFF ASSEMBLY
14. CONSTRUCT 2' VALLEY GUTTER PER DETAIL ON SHEET 3 OF 13.
15. CONSTRUCT CONCRETE FLUME PER DETAIL ON SHEET 3 OF 13.
16. CART PATH BY OTHERS

GRAPHIC SCALE

30' 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93
DESC: CITY OF HENDERSON BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET.
ELEVATION IN METERS: 508.195 = 1667.303 FEET
C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF HENDERSON.

LEE C. FARRIS P.E. No. 13891 — DATE 8/27/01

FLOOD ZONE INFORMATION

A PORTION OF THE SITE FALLS WITHIN THE FLOOD ZONE "A" AS PER FIRM COMMUNITY PANEL# 32003C2595D, DATED AUGUST 16, 1995.

PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS 13891 REGISTERED

8/27/01

ENGINEER'S SEAL

No.	REVISIONS	Date	Init.	Appr.	Date

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ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

TUSCANY
Village Golf Course Living

TUSCANY CLUBHOUSE DRAINAGE PLAN

Drawn by	Checked by	Date
		AUG 2001

Job Number	Scale	Pdc No.
511197	1" = 30'	1197CHR

Sheet Number 5 OF 13

DRAWING 119CHR05

DEVELOPED CONDITIONS						
OND-1	developed (streets/roads)	50% Dumps 50% Arizo	#605 #112, #117	D A	0.5*(98)+0.5*(98)	98
OND-2	developed (streets/roads)	100% Arizo	#112	A	1*(98)	98
OND-3	developed (open space-fair)	70% Arizo 30% Arizo	#117 #112	A A	0.7*(49)+0.3*(49)	49
OND-4	developed (open space-poor)	70% Dumps 30% Arizo	#605 #117	D A	0.7*(89)+0.3*(68)	83
OND-5	developed (open space-poor)	60% Arizo 40% Arizo	#117 #112	A A	0.6*(68)+0.4*(68)	68
OND-6	developed (open space-good)	100% Arizo	#117	A	1*(39)	39
OND-7	developed (grass-fair & roofs)	70% Arizo 30% Arizo	#112 #117	A A	0.8*(98)+0.2*(49)	88
OND-8	developed (open space-poor)	70% Arizo 30% Arizo	#117 #112	A A	0.7*(68)+0.3*(68)	68
OND-9	developed (parking lot/road)	50% Arizo 50% Arizo	#112 #117	A A	0.5*(98)+0.5*(98)	98
OND-10	developed (open space-poor)	100% Arizo	#117	A	1*(68)	68
OFFD-1	developed (Commercial/bus.)	60% Arizo 40% Akela	#117 #510	A D	0.6*(89)+0.4*(95)	91
OFFD-2	developed (road-dirt)	100% Arizo	#117	A	1*(72)	72
OFFD-3	developed (Paved Streets)	100% Arizo	#117	A	1*(98)	98
OFFD-4	developed (Paved Streets)	70% Arizo 30% Dumps	#117 #605	A D	0.7*(98)+0.3*(98)	98
OFFD-5	developed (road-dirt)	100% Arizo	#117	A	1*(72)	72
OFFD-6	developed (road-dirt)	100% Dumps	#605	D	1*(89)	89
OFFD-7	developed	93% Arizo 7% Akela	#117 #510	A D	0.93(89)+0.07(98)	90
OFFD-8	developed	89% Slickens 1% Caliza 3% Caliza, Pittman, and Arizo 7% Arizo	#600 89% #184 1% #182 3% #117 7%	D(100%) B(100%) A(15%) B(65%) C(20%) A(100%)	0.89(91)+ 0.01(84)+ 0.03((0.15(76)+0.65(84)+0.20(89)+ 0.07(76)	90
OFFD-9	developed	71% Slickens 22% Caliza 7% Arizo	#600 71% #184 22% #117 7%	D(100%) B(100%) A(100%)	0.71(91)+ 0.22(84)+ 0.07(76)	88
ATHEN1	developed	100% Arizo	#117 73% #112 27%	A(90%) B(5%) C(5%) A(85%) B(10%) D(5%)	0.73((0.90(98)+0.05(98)+0.05(98)) + 0.27((0.85(98)+0.10(98)+0.05(98)	98

ATHEN2	developed	5% Arizo 95% Caliza, Pittman, and Arizo	#112 5% #182 95%	A(85%) B(10%) D(5%) A(15%) B(65%) C(20%)	0.05((0.85(98)+0.10(98) +0.05(98) 0.95((0.15(98)+0.65(98) +0.20(98)	98
ATHEN3	developed	13% Slickens 22% Caliza 95% Caliza, Pittman, and Arizo	#600 13% #184 22% #182 65%	D(100%) B(100%) A(15%) B(65%) C(20%)	0.13(98)+ 0.22(98)+ 0.65((0.15(98)+0.65(98) +0.20(98)	98

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
See Table 602A					
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, burasage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

Drainage Area (Square Miles)	Six-Hour Depth-Area Reduction Factor
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

NOTES:
1. A graphical representation of these factors is presented in Figure 514.
2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
25	10.8	12.6	14.4	210	71.0	71.0	71.0
30	12.4	13.7	15.0	215	74.4	73.2	72.0
35	13.0	14.5	16.0	220	78.1	75.6	73.1
40	13.0	14.9	16.8	225	81.2	78.2	75.2
45	13.0	15.1	17.1	230	81.9	79.9	77.9
50	13.0	15.5	18.0	235	83.5	81.3	79.0
55	13.0	15.6	18.2	240	85.1	82.3	79.5
60	13.0	15.9	18.7	245	85.6	83.0	80.4
65	13.3	16.2	19.0	250	86.0	83.5	81.0
70	14.0	16.9	19.7	255	86.8	84.4	82.0
75	14.2	17.2	20.2	260	87.6	85.1	82.6
80	14.8	17.9	21.0	265	88.8	86.4	84.0
85	15.8	18.9	22.0	270	91.0	88.5	85.9
90	17.2	20.1	23.0	275	92.6	90.8	88.9
95	18.1	21.1	24.1	280	93.7	92.4	91.0
100	19.0	22.0	25.0	285	95.0	94.4	93.8
105	19.7	22.8	25.9	290	97.0	96.8	96.6
110	19.9	23.2	26.5	295	97.6	97.3	97.0
115	20.0	24.0	28.0	300	98.2	97.8	97.4
120	20.1	24.6	29.0	305	98.5	98.2	97.9
125	20.4	25.2	30.0	310	98.7	98.4	98.1
130	21.4	26.0	30.5	315	98.9	98.6	98.3
135	22.9	26.9	30.9	320	99.0	98.8	98.5
140	24.1	27.6	31.0	325	99.3	99.1	98.9
145	24.9	28.3	31.7	330	99.3	99.2	99.0
150	25.1	28.6	32.1	335	99.4	99.3	99.2
155	25.6	29.2	32.7	340	99.5	99.4	99.3
160	27.0	30.2	33.3	345	99.8	99.7	99.6
165	27.8	31.2	34.6	350	99.8	99.8	99.7
170	28.1	32.1	36.1	355	99.9	99.9	99.9
175	28.3	33.2	38.1	360	100.0	100.0	100.0
180	29.5	35.2	40.8				

Notes:
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values is presented on **Figure 515.**

Revision	Date

REFERENCE:

TABLE 503

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA (IN INCHES)

TIME	RECURRENCE INTERVAL 2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

2. The 24 hour values presented above are for use with TR-55 only.

3. Table 501 adjustments not required.

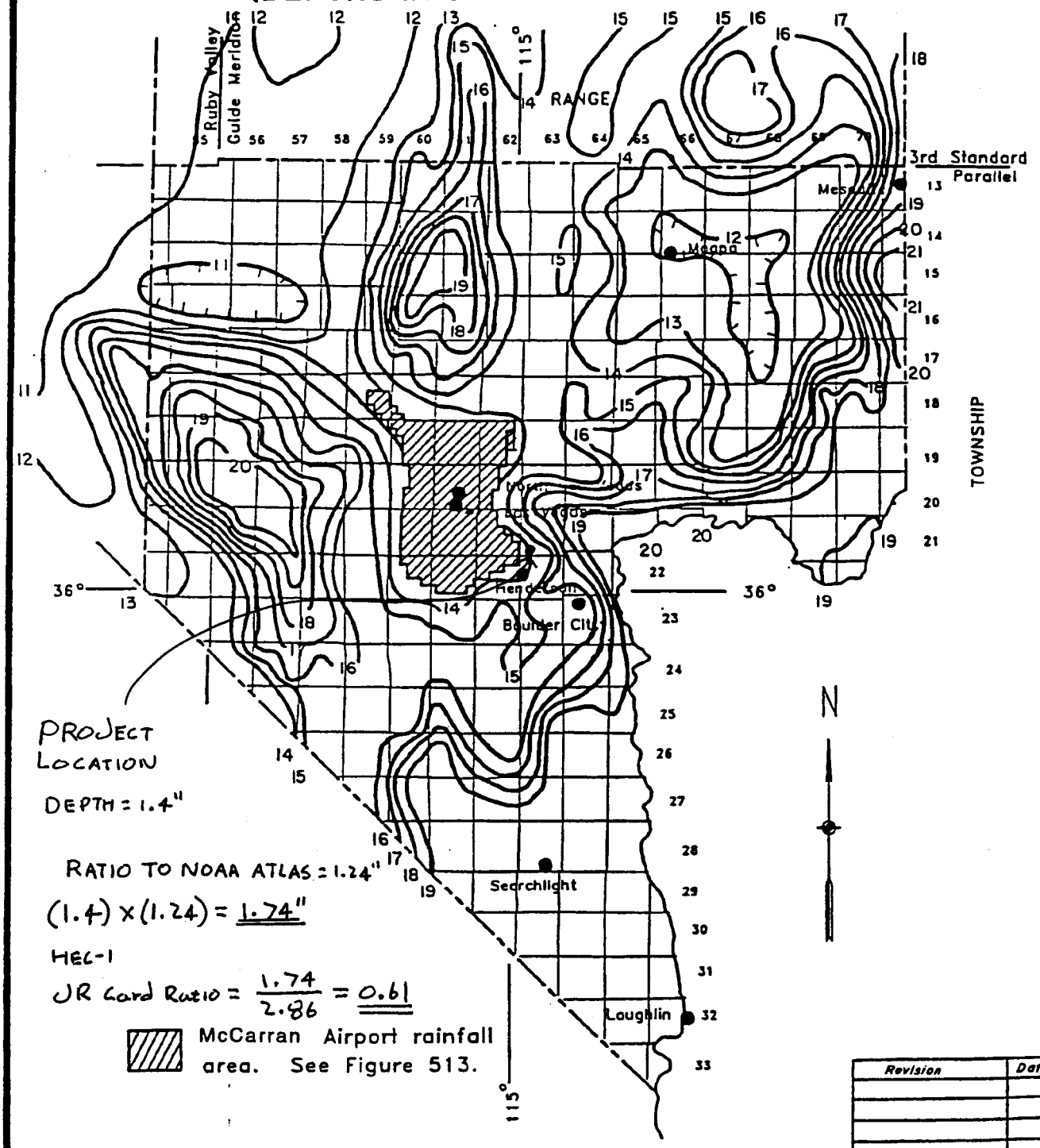
Revision	Date

WRC ENGINEERING

REFERENCE: USACE, Los Angeles District, 1988

TABLE 505

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

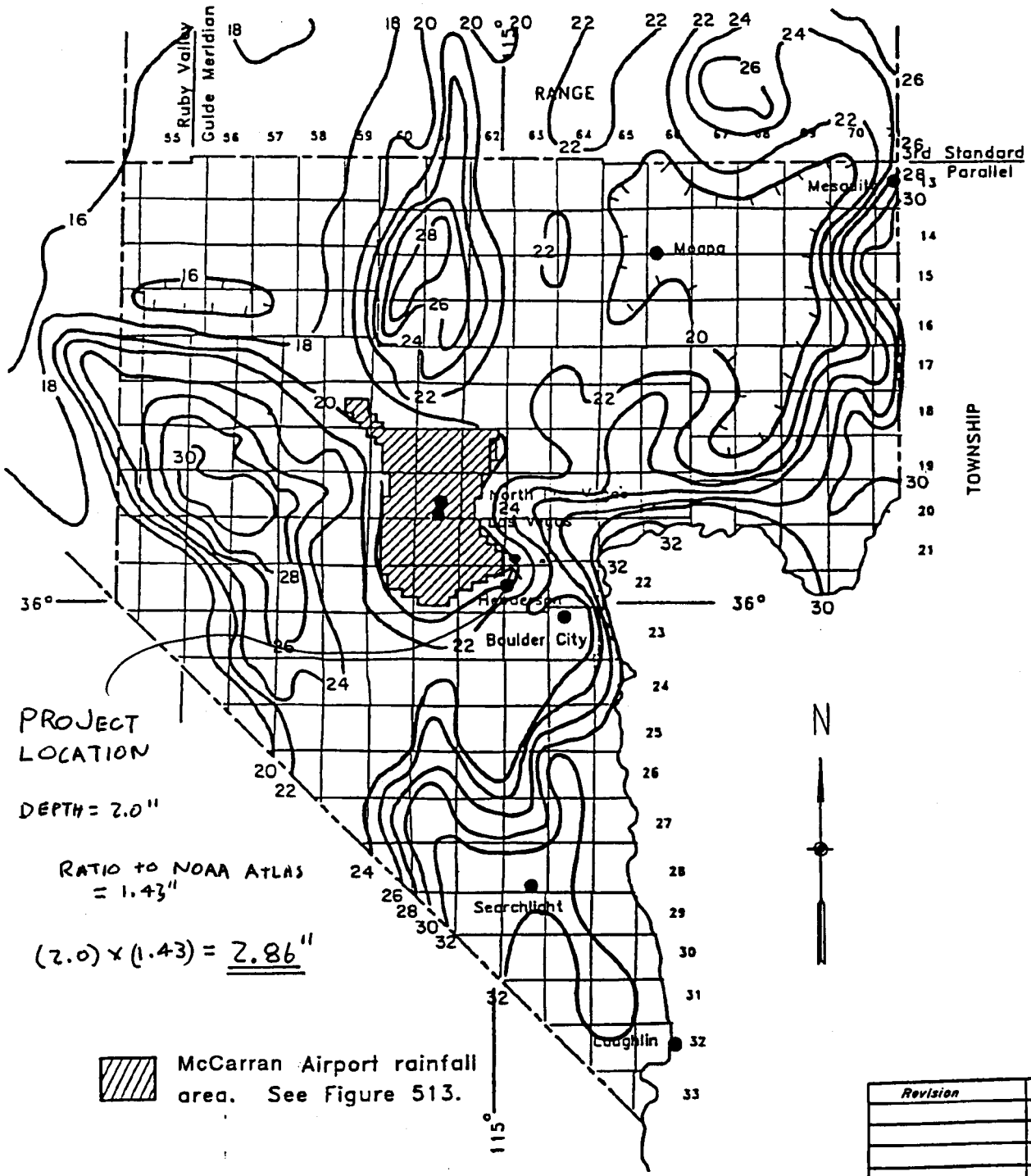
WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

RAINFALL DEPTH-DURATION-FREQUENCY 100-YEAR, 6-HOUR

(DEPTHS IN TENTHS OF INCHES)



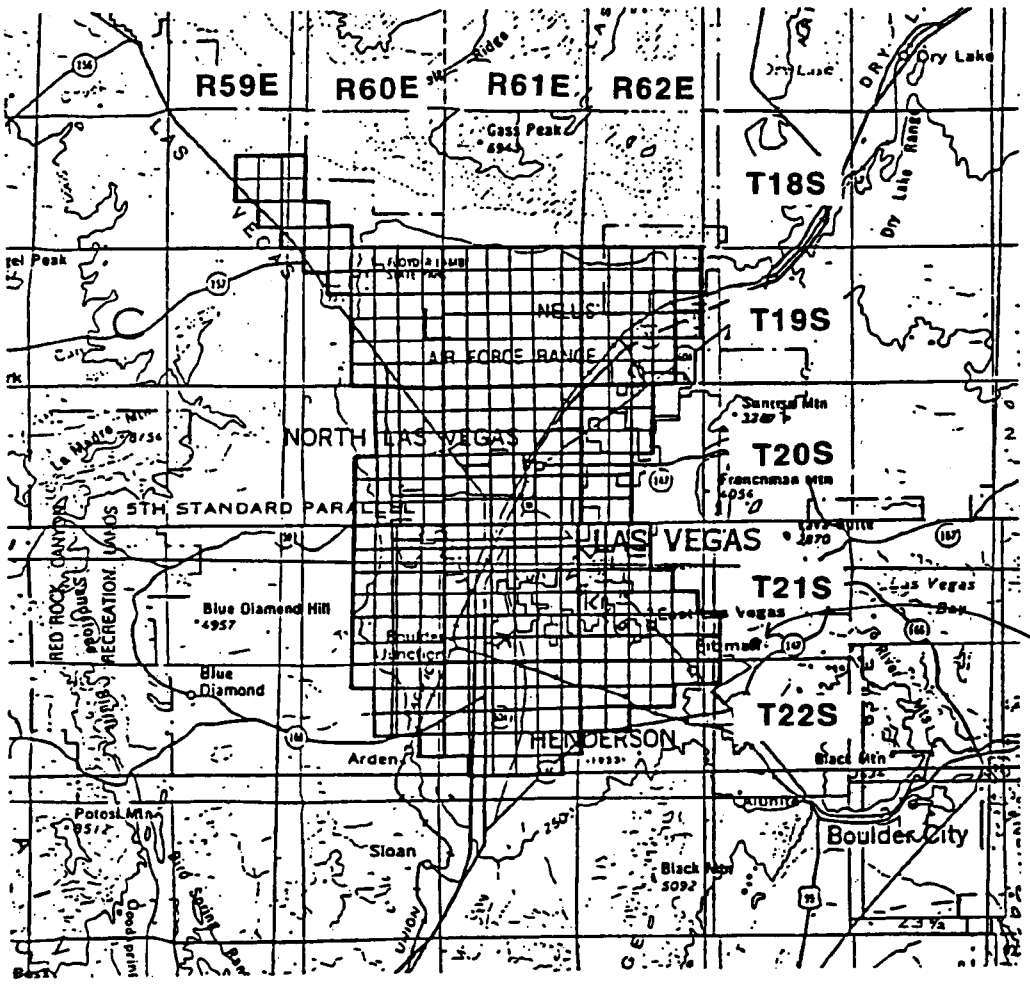
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:
1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

RUNOFF CURVE NUMBERS
(CULTIVATED AGRICULTURE LANDS[1])

Cover description			Curve numbers for hydrologic soil group—			
Cover type	Treatment[2]	Hydrologic condition[3]	A	B	C	D
Fallow	Bare soil	–	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1]Average runoff condition, and I_a = 0.2S.

[2]*Crop residue cover* applies only if residue is on at least 5% of the surface throughout the year.

[3]Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotations, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

ypically, about 85 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments. The surface layer is pink extremely stony loam about 4 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified material that averages very gravelly sand.

Included in this unit are about 5 percent Cave soils on erosional fan remnant shoulders and 5 percent Caliza soils on erosional fan remnant side slopes. Included areas make up about 10 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the rare periods of flooding and the desert pavement. Dikes and channels that have outlets for floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. The desert pavement interferes with the use of equipment.

The main limitations for septic tank absorption fields inadequate filtration of effluent and the stones and obles in the soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. The presence of stones may hamper excavation.

This unit is limited for roads because of the desert pavement. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are droughtiness, the content of pebbles throughout the soil, and the content of stones and cobbles in the surface layer. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

112—Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes. This very deep, excessively drained soil is in channels on fan piedmonts. It formed in alluvium derived dominantly from various kinds of rock.

Typically, 65 percent of the surface is covered with pebbles. The surface layer is pale brown very gravelly loamy sand about 2 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified gravelly sandy loam to extremely gravelly loamy sand, averaging very gravelly loamy sand.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 3 percent Aztec soils on nonburied fan remnants, 5 percent Cave soils on erosional fan remnants, and 2 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to occasional periods of very brief, high-velocity flooding from March through September.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is poorly suited to urban development. The main limitation for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for septic tank absorption fields are the hazard of flooding and inadequate filtration of effluent. Flooding can be controlled only by use of major flood control structures. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

This unit is limited for roads because of the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVw, irrigated, and VIIw, nonirrigated. It is in horticultural group 3.

113—Arizo very gravelly fine sandy loam, gypsiferous substratum, 2 to 8 percent slopes. This very deep, excessively drained soil is on inset fans on pediments underlain by weakly consolidated, gypsiferous sediment. It formed in alluvium derived dominantly from basalt and andesite overlying gypsiferous sediment.

Typically, 80 percent of the surface is covered with a desert pavement of rock fragments, mainly pebbles. The surface layer is light brown very gravelly fine sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown very gravelly loamy sand, and the lower part to a depth of 60 inches or more is light brown, highly gypsiferous loamy sand. Rock fragments cover 70 to 90 percent of the surface. Depth to the gypsiferous layer ranges from 40 to 60 inches.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 5 percent Rock outcrop as isolated low hills, and 5 percent Aztec soils on erosional

fan remnants. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid to a depth of 40 inches and is moderately rapid below this depth. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system.

The main limitation for septic tank absorption fields is the inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the soil. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

117—Arizo very gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, excessively drained soil is on alluvial fans and inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly fine sandy loam 6 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified very gravelly loamy sand and cobbly coarse sand.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants, 5 percent Pittman soils on erosional fan remnants, and 5 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur. The presence of stones and cobbles interferes with the preparation of building sites.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are the content of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

120—Bluepoint fine sandy loam, wet, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on alluvial flats. The natural drainage has been altered because excess irrigation has raised the water table. The soils formed in sandy alluvium derived from various kinds of rock.

Permeability of the Cave soil is moderate to the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the shallow depth to the hardpan in areas of the Cave soil. Excavation for building sites is limited by the hardpan.

The main limitation for septic tank absorption fields is the shallow depth to the hardpan in areas of the Cave soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

The Cave soil is limited for roads because of the shallow depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the shallow depth to the hardpan in areas of the Cave soil. The Cave soil is also moderately limited by the desert pavement and the low available water capacity of the Canutio soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Removing the desert ment is necessary for best results when landscaping, particularly in areas used for lawns. Because the soils are droughty, applications of irrigation water should be light and frequent. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Cave soil is in horticultural group 6.

505—Canutio-Akela complex, 15 to 50 percent slopes. This map unit is on hills.

This unit is 50 percent Canutio very cobbly sandy loam, 15 to 30 percent slopes, and 40 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on upper back slopes and shoulders. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils, 4 to 15 percent slopes, on pediment remnants and 5 percent Rock outcrop on side slopes and ridges. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, 50 percent of the surface is covered with pebbles and 25 percent is covered with cobbles. The surface layer is light brown very cobbly sandy loam about 10 inches thick. The underlying material to a depth of 43 inches is brown very gravelly sandy loam and extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the steepness of slope and the limited depth to bedrock in areas of the Akela soil. Roads should be designed to minimize cuts because of the limited depth to the bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

510—Akela-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on mountains.

This unit is 55 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes, and 35 percent Rock outcrop. The Akela soil is on side slopes, and Rock outcrop is exposed on ridges and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Canutio soils, 8 to 30 percent slopes, on side slopes. The percentage

SOIL 510- AKELA

varies from one area to another. About 500 acres, east of Henderson, is mostly an Akela soil that has slopes of 8 to 15 percent. About 40 acres of Rock outcrop, gypsum, shown by symbols, is in an area in the northeastern corner of sec. 33, T. 21 S., R. 63 E.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the areas of Rock outcrop, steepness of slopes, and shallow depth to bedrock. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Akela soil is in horticultural group 6.

540—Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on summits and side slopes of erosional fan remnants (fig. 1). It formed in alluvium derived from various kinds of rock that have a high content of lime.

Typically, 80 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed. Some pedons have an indurated, lime-cemented hardpan at a depth of 40 to 60 inches or more.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields generally function well in this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

542—Weiser-Aztec complex, 2 to 8 percent slopes. This map unit is on erosional fan remnants.

This unit is 55 percent Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, and 30 percent Aztec very gravelly fine sandy loam, 2 to 8 percent slopes. The Weiser soil is on summits and side slopes of the fan remnants, and the Aztec soil is on side slopes of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity of the Weiser soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

545—Weiser-Goodsprings complex, 2 to 4 percent slopes. This map unit is on erosional fan remnants.

This unit is 60 percent Weiser extremely gravelly fine sandy loam, 2 to 4 percent slopes, and 25 percent Goodsprings very gravelly fine sandy loam, 2 to 4 percent slopes. The Weiser and Goodsprings soils are on summits and shoulders of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 10 percent Skyhaven soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 90 percent of the surface layer is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Goodsprings soil is shallow and well drained. It formed in alluvium derived from various kinds of rock. Typically, 90 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material i pink gravelly fine sandy loam, the next 37 inches is pinkish white, strongly lime-cemented hardpan, and th lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hard ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very lo Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and fo recreation.

This unit is limited for roads because of the depth to the hardpan in areas of the Goodsprings soil. Roads should be designed to minimize cuts. Heavy equipmen is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Weiser soil is in horticultural group 2, and the Goodsprings soil is in horticultural group 6.

600—Slickens. Slickens consists of accumulations c fine-textured material such as that separated in ore-mill operations. It is largely freshly ground rock that commonly has undergone chemical treatment during th milling process. Slickens is commonly confined in specially constructed basins.

This map unit is in capability subclass VIIIs, nonirrigate

605—Dumps. Dumps consists of areas of smoothed or uneven accumulations of waste rock and general refuse.

This map unit is in capability subclass VIIIs, nonirrigated.

610—Pits, gravel. Pits, gravel, consists of open excavations from which soil material and gravel have been removed, exposing rock, a hardpan, or other material.

This map unit is in capability subclass VIIIs, nonirrigated.

615—Urban land. Urban land consists of areas covered by asphalt, concrete, and buildings or other urban structures.

This map unit is in capability subclass VIIIs, nonirrigated.

630—Badland. Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare" and "occasional" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
105*:											
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
107 Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
112 Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
113 Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	High.
117 Arizo	A	None	---	>6.0	---	>60	---	---	---	High	Low.
120 Bluepoint	A	Rare	---	4.0-6.0	Jun-Sep	>60	---	---	---	High	Moderate.
127, 128, 129 Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
132 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
133*:											
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Rock outcrop.											
134 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
140 Casaga	C	None	---	>6.0	---	>60	---	---	---	High	High.
150 Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
151 Cave	D	None	---	>6.0	---	>60	---	10-20	Thick	High	Low.
152, 155 Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
160 Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
181*:											
Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.

ee footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
419*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
430 Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.
440 Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
450 Cave Variant	D	None	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
502*:											
Canutio 55%	B	None	---	>6.0	---	>60	---	---	---	High	Low.
40%	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
5%	A										
505*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
510*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
542*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
600*. Silickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
6 ands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc = (min) (14)	Tlag= 0.6Tc/60 (hrs)	Q_{100}/Q_{10} (cfs)
OND-1	98	0.904	1.2	0.0019	10	1.0	1.1	900	0.6	NA	1.64	9.1	10.3	910	15.1	10.3	**0.103**	
OND-2	98	0.904	1.4	0.0022	10	1.0	1.1	900	0.5	NA	1.55	9.7	10.8	910	15.1	10.8	**0.108**	
OND-3	49	0.257	3.1	0.0048	30	1.0	8.3	150	1.0	NA	1.13	2.2	10.5	180	11.0	10.5	**0.105**	
OND-4	83	0.706	1.5	0.0023	10	1.0	2.2	150	0.5	NA	1.55	1.6	3.9	160	10.9	3.9	**0.050**	
OND-5	68	0.508	3.5	0.0055	30	1.0	5.8	500	1.0	NA	1.73	4.8	10.7	530	12.9	10.7	**0.107**	
OND-6	39	0.125	2.2	0.0034	30	1.0	9.6	250	1.0	NA	1.13	3.7	13.3	280	11.6	11.6	**0.116**	
OND-7	88	0.772	2.1	0.0033	10	1.0	1.9	150	1.0	NA	2.24	1.1	3.0	160	10.9	3.0	**0.050**	
OND-8	68	0.508	1.0	0.0016	10	1.0	3.4	50	1.0	NA	1.13	0.7	4.1	60	10.3	4.1	**0.050**	
OND-9	98	0.904	2.4	0.0038	10	1.0	1.1	450	2.5	NA	3.48	2.2	3.3	460	12.6	3.3	**0.050**	
OND-10	68	0.508	3.1	0.0048	30	1.0	5.8	250	1.3	NA	1.87	2.2	8.1	280	11.6	8.1	**0.081**	
OFFD-1	76	0.613	23.3	0.0364	100	1.0	8.8	1600	3.5	NA	6.01	4.4	13.2	1700	19.4	13.2	**0.132**	
OFFD-2	72	0.560	1.5	0.0023	10	1.0	3.1	100	2.0	NA	1.83	0.9	4.0	110	10.6	4.0	**0.050**	
OFFD-3	98	0.904	2.5	0.0039	10	1.0	1.1	1000	2.0	NA	3.24	5.1	6.3	1010	15.6	6.3	**0.063**	
OFFD-4	98	0.904	2.1	0.0033	10	1.0	1.1	1000	1.5	NA	2.70	6.2	7.3	1010	15.6	7.3	**0.073**	
OFFD-5	72	0.560	1.5	0.0023	10	1.0	3.1	100	1.5	NA	1.67	1.0	4.1	110	10.6	4.1	**0.050**	
OFFD-6	89	0.785	1.0	0.0016	10	1.0	1.8	100	1.5	NA	1.96	0.9	2.6	110	10.6	2.6	**0.050**	
OFFD-7	90	0.798	97.9	0.1530	500	1.0	12.2	3300	2.7	NA	17.46	3.2	15.3	3800	31.1	15.3	**0.153**	
OFFD-8	90	0.798	153.6	0.2400	500	1.0	12.2	4050	1.9	NA	2.69	25.1	37.2	4550	35.3	35.3	**0.353**	
OFFD-9	88	0.772	3.5	0.0055	50	1.0	4.2	1440	0.4	NA	1.14	21.1	25.2	1490	18.3	18.3	**0.183**	
ATHEN1-D	98	0.904	4.5	0.0070	50	1.0	2.5	2153	2.1	NA	3.61	9.9	12.4	2203	22.2	12.4	**0.124**	
ATHEN2-D	98	0.904	2.3	0.0036	50	1.0	2.5	1118	1.2	NA	2.52	7.4	9.9	1168	16.5	9.9	**0.099**	
ATHEN3-D	98	0.904	5.7	0.0089	50	1.0	2.5	2793	1.1	NA	3.06	15.2	17.7	2843	25.8	17.7	**0.177**	

Tc = Ti + Tt Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

Tlag = 0.6Tc K = 0.0132 (CN) - 0.39

*** The velocity in column 9 is based on approximate channel properties.**

REFERENCE :

STANDARD FORM 4

VELOCITY ESTIMATION FOR OND-1
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

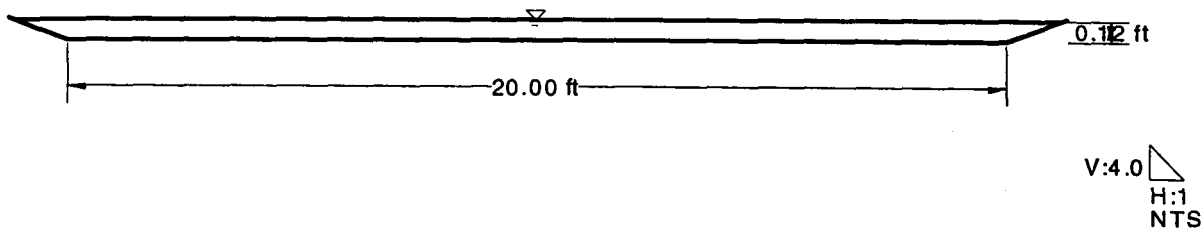
Input Data		
Mannings Coeffic	0.016	
Slope	006000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.4	ft²
Wetted Perim	22.31	ft
Top Width	22.30	ft
Critical Depth	0.11	ft
Critical Slope	0.008027	ft/ft
Velocity	1.64	ft/s
Velocity Head	0.04	ft
Specific Ener	0.16	ft
Froude Numb	0.88	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-1
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	006000	ft/ft
Depth	0.12	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs



VELOCITY ESTIMATION FOR OND-2
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

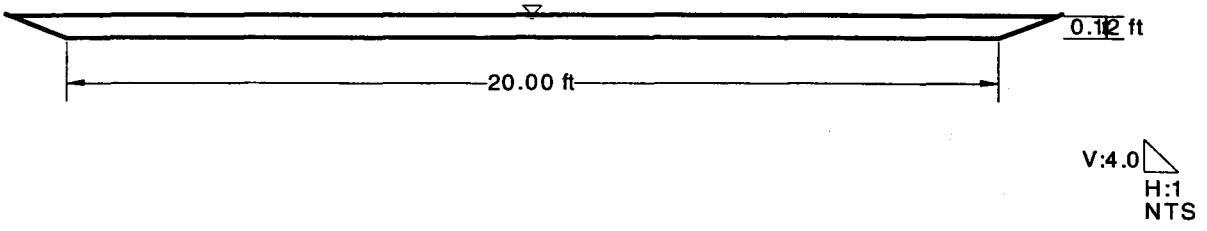
Input Data		
Mannings Coeffic	0.016	
Slope	005000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.6	ft²
Wetted Perim	22.44	ft
Top Width	22.43	ft
Critical Depth	0.11	ft
Critical Slope	0.008027	ft/ft
Velocity	1.55	ft/s
Velocity Head	0.04	ft
Specific Ener	0.16	ft
Froude Numb	0.81	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-2
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	005000	ft/ft
Depth	0.12	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs



VELOCITY ESTIMATION FOR OND-3
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

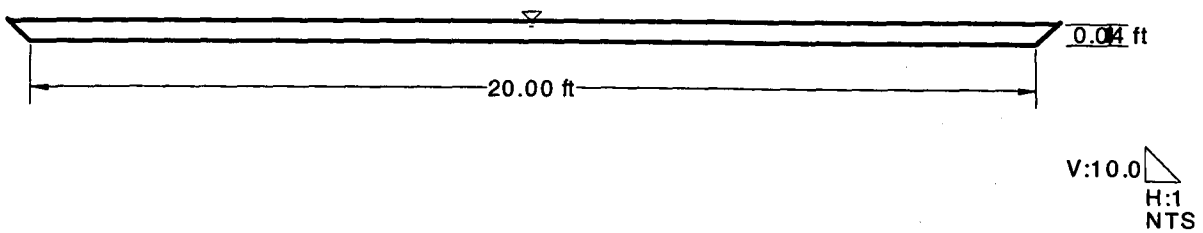
Input Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs

Results		
Depth	0.04	ft
Flow Area	0.9	ft²
Wetted Perim	20.87	ft
Top Width	20.87	ft
Critical Depth	0.04	ft
Critical Slope	0.010773	ft/ft
Velocity	1.13	ft/s
Velocity Head	0.02	ft
Specific Ener	0.06	ft
Froude Numb	0.97	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-3
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Depth	0.04	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs



VELOCITY ESTIMATION FOR OND-4
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

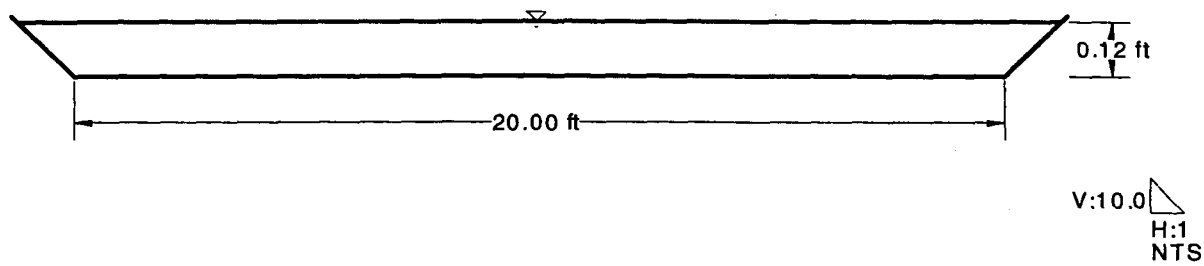
Input Data		
Mannings Coeffic	0.016	
Slope	005000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.6	ft²
Wetted Perim	22.44	ft
Top Width	22.43	ft
Critical Depth	0.11	ft
Critical Slope	0.008027	ft/ft
Velocity	1.55	ft/s
Velocity Head	0.04	ft
Specific Ener	0.16	ft
Froude Numb	0.81	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-4
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	005000	ft/ft
Depth	0.12	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	4.00	cfs



VELOCITY ESTIMATION FOR OND-5
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

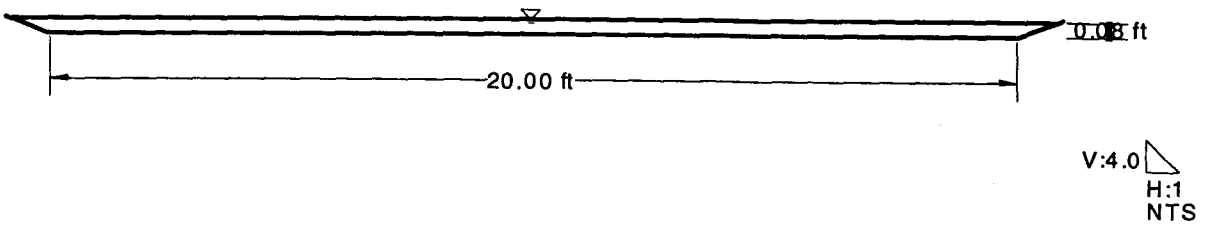
Input Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs

Results		
Depth	0.08	ft
Flow Area	1.7	ft²
Wetted Perim	21.68	ft
Top Width	21.67	ft
Critical Depth	0.09	ft
Critical Slope	0.008523	ft/ft
Velocity	1.73	ft/s
Velocity Head	0.05	ft
Specific Ener	0.13	ft
Froude Numb	1.07	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OND-5
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Depth	0.08	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs



VELOCITY ESTIMATION FOR OND-6
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

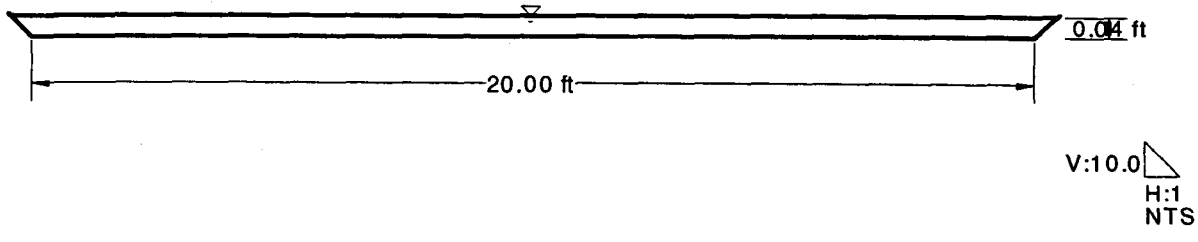
Input Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs

Results		
Depth	0.04	ft
Flow Area	0.9	ft²
Wetted Perim	20.87	ft
Top Width	20.87	ft
Critical Depth	0.04	ft
Critical Slope	0.010773	ft/ft
Velocity	1.13	ft/s
Velocity Head	0.02	ft
Specific Ener	0.06	ft
Froude Numb	0.97	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-6
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Depth	0.04	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs



VELOCITY ESTIMATION FOR OND-7
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

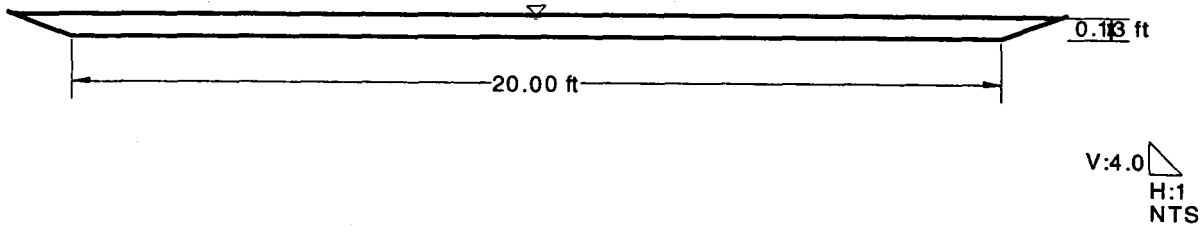
Input Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs

Results		
Depth	0.13	ft
Flow Area	2.7	ft²
Wetted Perim	22.53	ft
Top Width	22.52	ft
Critical Depth	0.14	ft
Critical Slope	0.007384	ft/ft
Velocity	2.24	ft/s
Velocity Head	0.08	ft
Specific Energ	0.20	ft
Froude Numb	1.15	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OND-7
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Depth	0.13	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	6.00	cfs



VELOCITY ESTIMATION FOR OND-8
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

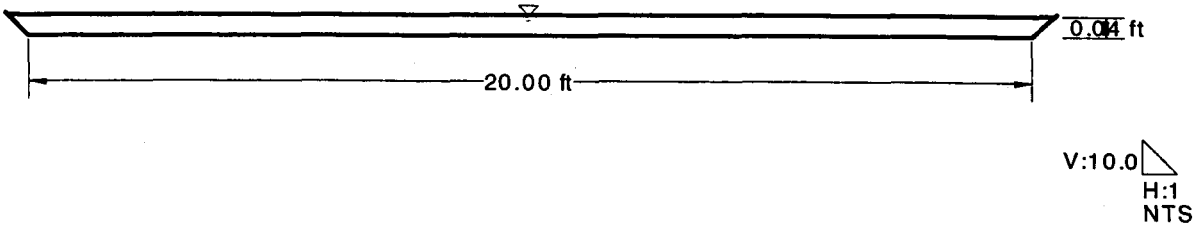
Input Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs

Results		
Depth	0.04	ft
Flow Area	0.9	ft²
Wetted Perim	20.87	ft
Top Width	20.87	ft
Critical Depth	0.04	ft
Critical Slope	0.010773	ft/ft
Velocity	1.13	ft/s
Velocity Head	0.02	ft
Specific Ener	0.06	ft
Froude Numb	0.97	
Flow Type	subcritical	

VELOCITY ESTIMATION FOR OND-8
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	010000	ft/ft
Depth	0.04	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	1.00	cfs



VELOCITY ESTIMATION FOR OND-9
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

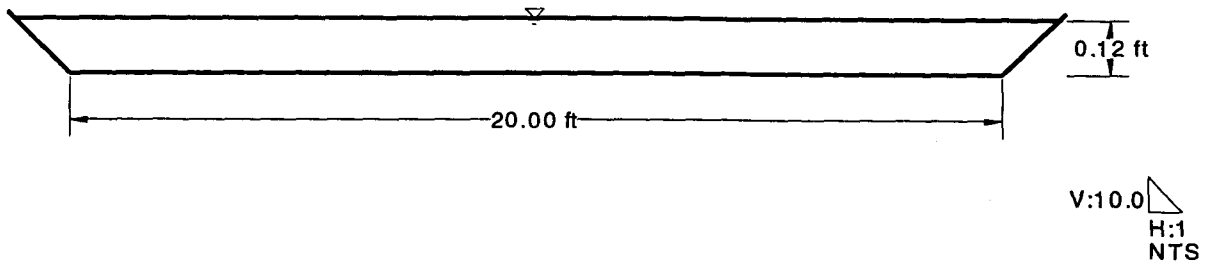
Input Data		
Mannings Coeffic	0.016	
Slope	025000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.6	ft²
Wetted Perim	22.45	ft
Top Width	22.44	ft
Critical Depth	0.18	ft
Critical Slope	0.006802	ft/ft
Velocity	3.48	ft/s
Velocity Head	0.19	ft
Specific Ener	0.31	ft
Froude Numb	1.81	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OND-9
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMAT
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	025000	ft/ft
Depth	0.12	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs



VELOCITY ESTIMATION FOR OND-10
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.016	
Slope	013000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs

Results		
Depth	0.08	ft
Flow Area	1.6	ft²
Wetted Perim	21.55	ft
Top Width	21.54	ft
Critical Depth	0.09	ft
Critical Slope	0.008525	ft/ft
Velocity	1.87	ft/s
Velocity Head	0.05	ft
Specific Energ	0.13	ft
Froude Numb	1.21	
Flow Type	supercritical	

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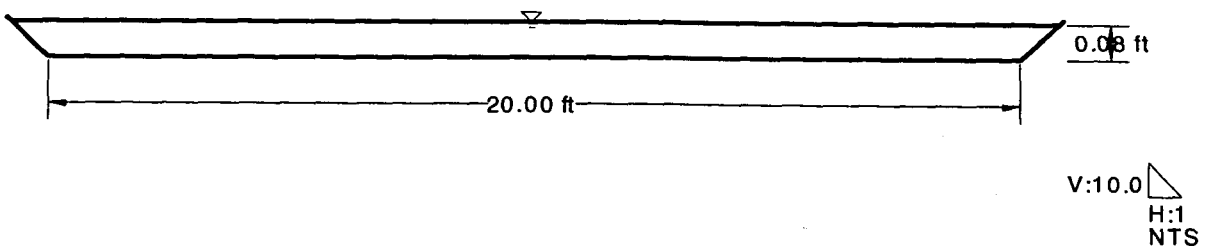
VELOCITY ESTIMATION FOR OND-10
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	013000	ft/ft
Depth	0.08	ft
Left Side.Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs



VELOCITY ESTIMATION FOR OFFD-1
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

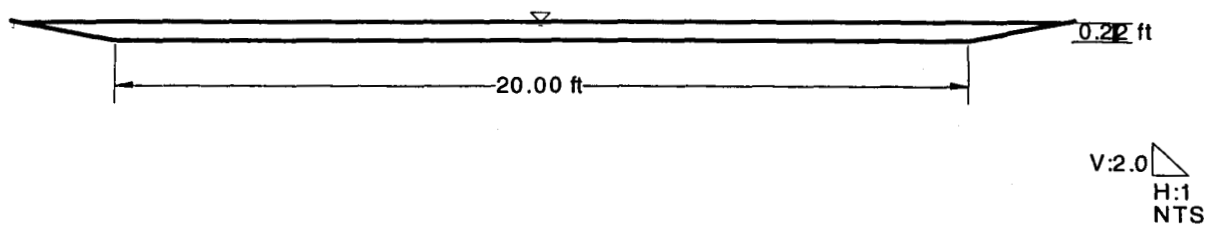
Input Data		
Mannings Coeffic	0.016	
Slope	035000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	30.00	cfs

Results		
Depth	0.22	ft
Flow Area	5.0	ft²
Wetted Perim	24.51	ft
Top Width	24.49	ft
Critical Depth	0.39	ft
Critical Slope	0.005400	ft/ft
Velocity	6.01	ft/s
Velocity Head	0.56	ft
Specific Ener	0.79	ft
Froude Numb	2.35	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OFFD-1
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	035000	ft/ft
Depth	0.22	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	30.00	cfs



VELOCITY ESTIMATION FOR OFFD-2
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

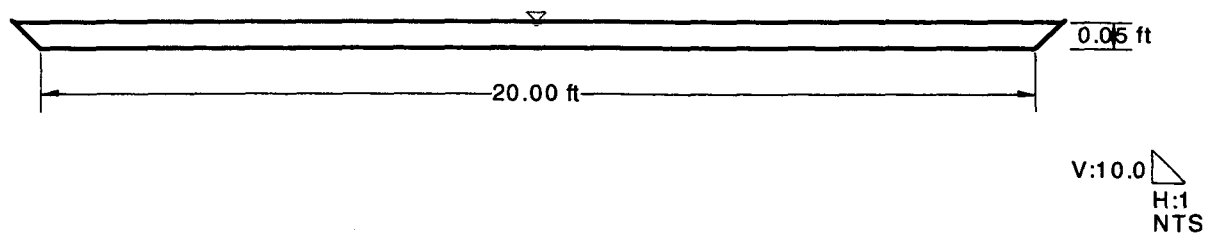
Input Data		
Mannings Coeffic	0.016	
Slope	020000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs

Results		
Depth	0.05	ft
Flow Area	1.1	ft²
Wetted Perim	21.07	ft
Top Width	21.07	ft
Critical Depth	0.07	ft
Critical Slope	0.009286	ft/ft
Velocity	1.83	ft/s
Velocity Head	0.05	ft
Specific Ener	0.11	ft
Froude Numb	1.41	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OFFD-2
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	020000	ft/ft
Depth	0.05	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs



VELOCITY ESTIMATION FOR OFFD-3
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.016	
Slope	020000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs

Results		
Depth	0.13	ft
Flow Area	2.8	ft²
Wetted Perim	22.62	ft
Top Width	22.61	ft
Critical Depth	0.18	ft
Critical Slope	0.006803	ft/ft
Velocity	3.24	ft/s
Velocity Head	0.16	ft
Specific Ener	0.29	ft
Froude Numb	1.63	
Flow Type	supercritical	

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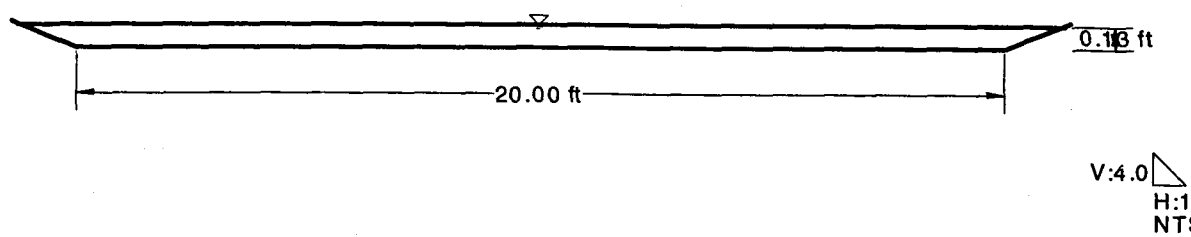
VELOCITY ESTIMATION FOR OFFD-3
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	020000	ft/ft
Depth	0.13	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	9.00	cfs



VELOCITY ESTIMATION FOR OFFD-4
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

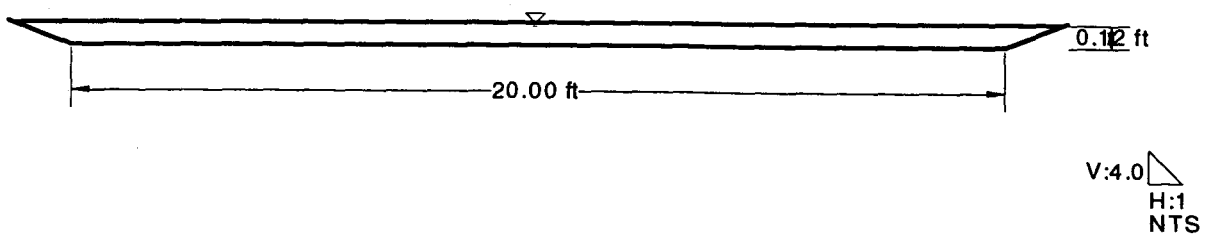
Input Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs

Results		
Depth	0.12	ft
Flow Area	2.6	ft²
Wetted Perim	22.46	ft
Top Width	22.45	ft
Critical Depth	0.15	ft
Critical Slope	0.007154	ft/ft
Velocity	2.70	ft/s
Velocity Head	0.11	ft
Specific Energ	0.24	ft
Froude Numb	1.40	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OFFD-4
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Depth	0.12	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	7.00	cfs



VELOCITY ESTIMATION FOR OFFD-5
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

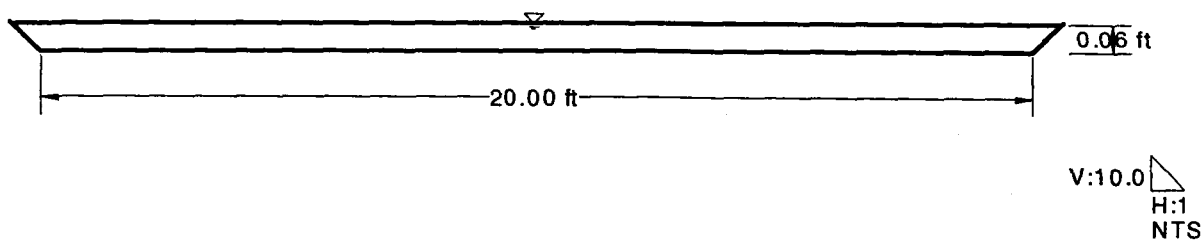
Input Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs

Results		
Depth	0.06	ft
Flow Area	1.2	ft²
Wetted Perim	21.17	ft
Top Width	21.16	ft
Critical Depth	0.07	ft
Critical Slope	0.009289	ft/ft
Velocity	1.67	ft/s
Velocity Head	0.04	ft
Specific Energ	0.10	ft
Froude Numb	1.24	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OFFD-5
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Depth	0.06	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	2.00	cfs



VELOCITY ESTIMATION FOR OFFD-6
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

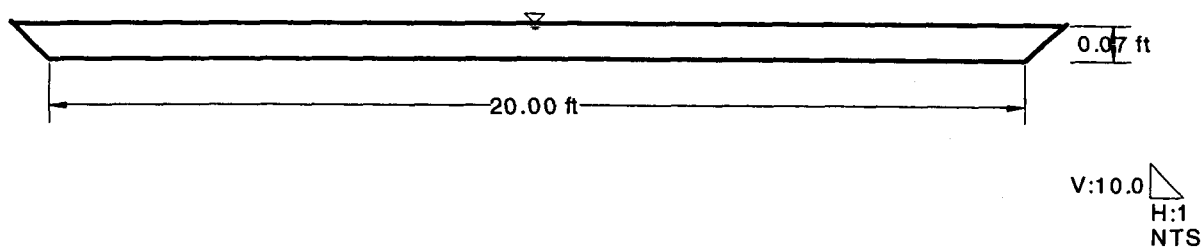
Input Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs

Results		
Depth	0.07	ft
Flow Area	1.5	ft²
Wetted Perim	21.49	ft
Top Width	21.48	ft
Critical Depth	0.09	ft
Critical Slope	0.008526	ft/ft
Velocity	1.96	ft/s
Velocity Head	0.06	ft
Specific Ener	0.13	ft
Froude Numb	1.29	
Flow Type	supercritical	

VELOCITY ESTIMATION FOR OFFD-6
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTIMATI
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.016	
Slope	015000	ft/ft
Depth	0.07	ft
Left Side Slope	10.00	H : V
Right Side Slope	10.00	H : V
Bottom Width	20.00	ft
Discharge	3.00	cfs



VELOCITY ESTIMATION: OFFD-7
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTMINATION OFFD-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

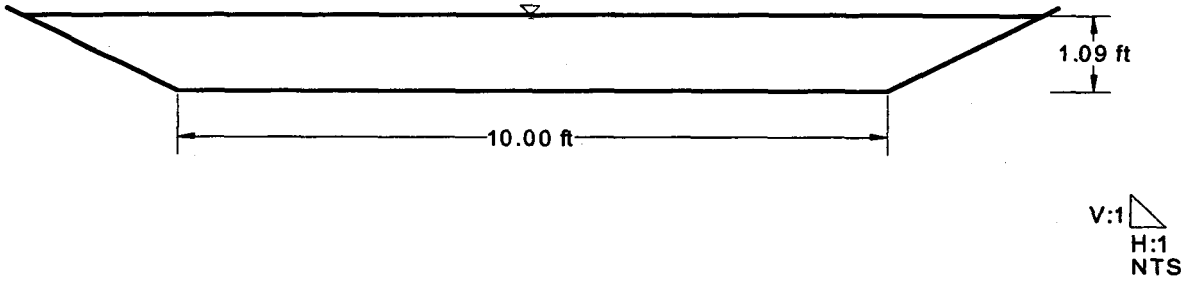
Input Data		
Mannings Coefficient	0.013	
Slope	2.7000	%
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	10.00	ft
Discharge	233.00	cfs

Results		
Depth	1.09	ft
Flow Area	13.3	ft²
Wetted Perimeter	14.90	ft
Top Width	14.38	ft
Critical Depth	2.20	ft
Critical Slope	0.2224	%
Velocity	17.46	ft/s
Velocity Head	4.74	ft
Specific Energy	5.83	ft
Froude Number	3.19	
Flow Type	Supercritical	

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	VELOCITY ESTMINATION OFFD-7
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Slope	2.7000	%
Depth	1.09	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	10.00	ft
Discharge	233.00	cfs



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VELOCITY CALCULATION: OFFD-8
Worksheet for Irregular Channel

Project Description	
Worksheet	DEV VEL OFFD-8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	1.9000	%
Discharge	9.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.32	ft
Elevation Range	0.00 to 2.00	
Flow Area	3.3	ft²
Wetted Perimeter	35.87	ft
Top Width	35.18	ft
Actual Depth	0.32	ft
Critical Elevation	0.35	ft
Critical Slope	0.7359	%
Velocity	2.69	ft/s
Velocity Head	0.11	ft
Specific Energy	0.43	ft
Froude Number	1.54	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
-0+18.50	-0+16.50	0.013
-0+16.50	0+16.50	0.016
0+16.50	0+18.50	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
-0+18.50	2.00
-0+18.50	0.50
-0+18.50	0.00
-0+16.50	0.15
-0+16.50	0.17
0+00.00	0.33
0+16.50	0.17
0+16.50	0.15

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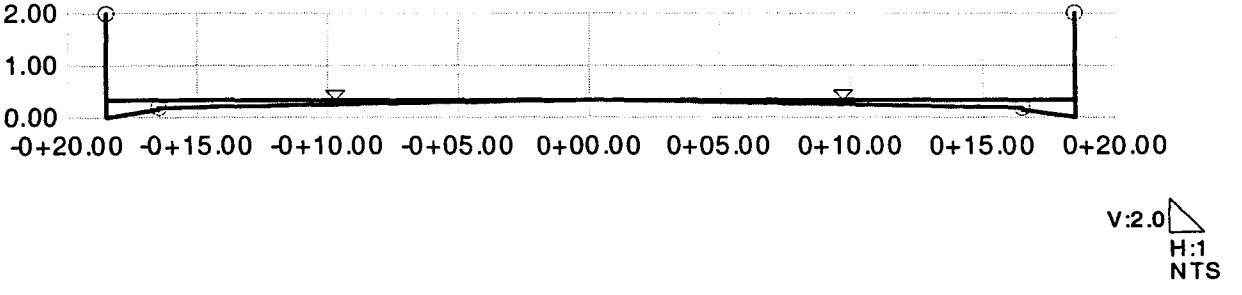
VELOCITY CALCULATION: OFFD-8
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+18.50	0.00
0+18.50	0.50
0+18.50	2.00

VELOCITY CALCULATION: OFFD-8
Cross Section for Irregular Channel

Project Description	
Worksheet	DEV VEL OFFD-8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	1.9000	%
Water Surface Elevation	0.32	ft
Elevation Range	0.00 to 2.00	
Discharge	9.00	cfs



PBS&J

COMP. BY: JRS
CHK.BY:
DATE: 5/14/04
SHEET NO.: 1 of 1
JOB NO.: 511197

Subject: VELOCITY CALCULATION FOR BASIN OFFD-8

RATIO USED TO CALCULATE NUMBER OF STREET IN DEVELOPED BASIN OFFD-8

RATIO BASED ON AREA AND NUMBER OF STREETS IN TUSCANY PARCEL 22.

INFO. FROM PARCEL 22 TUSCANY

AREA = 31 ac

NUMBER OF STREETS = 9

RATIO CALCULATION

$$\frac{\text{TUSCANY PARCEL 22 NUMBER OF STREETS}}{\text{AREA}} = \frac{\text{BASIN OFFD-8 X}}{\text{AREA}}$$

$$x = \frac{6}{31}(153.6)$$

$$x = 29.7$$

NUMBER OF STREETS = 29

TOTAL 100 YEAR FLOW (OFFD-8) = 270 CFS

FLOW TO EACH ROAD = $\frac{270}{29}$ = 9.3 CFS

VELOCITY CALCULATION: OFFD-9
Worksheet for Irregular Channel

Project Description	
Worksheet	DEV VEL OFFD-9
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.4000	%
Discharge	7.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	0.29	ft
Elevation Range	0.00 to 5.00	
Flow Area	6.1	ft²
Wetted Perimeter	22.01	ft
Top Width	21.93	ft
Actual Depth	0.29	ft
Critical Elevation	0.15	ft
Critical Slope	3.3616	%
Velocity	1.14	ft/s
Velocity Head	0.02	ft
Specific Energy	0.31	ft
Froude Number	0.38	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+53.00	0.035

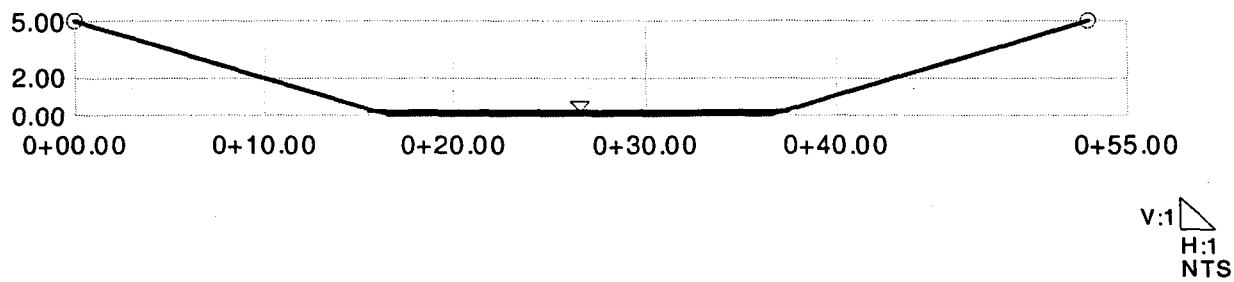
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	5.00
0+16.50	0.00
0+36.50	0.00
0+53.00	5.00

VELOCITY CALCULATION: OFFD-9
Cross Section for Irregular Channel

Project Description	
Worksheet	DEV VEL OFFD-9
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	0.4000	%
Water Surface Elevation	0.29	ft
Elevation Range	0.00 to 5.00	
Discharge	7.00	cfs



Velocity Estimation: ATHEN1-D
Worksheet for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN1-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	2.1000	%
Discharge	13.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.39	ft
Elevation Range	0.00 to 4.00	
Flow Area	3.6	ft²
Wetted Perimeter	26.38	ft
Top Width	25.50	ft
Actual Depth	0.39	ft
Critical Elevation	0.46	ft
Critical Slope	0.6851	%
Velocity	3.61	ft/s
Velocity Head	0.20	ft
Specific Energy	0.60	ft
Froude Number	1.69	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.015
0+07.00	0+94.00	0.016
0+94.00	1+02.00	0.015

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	4.00
0+00.00	0.60
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+44.00	0.91
0+44.00	1.41

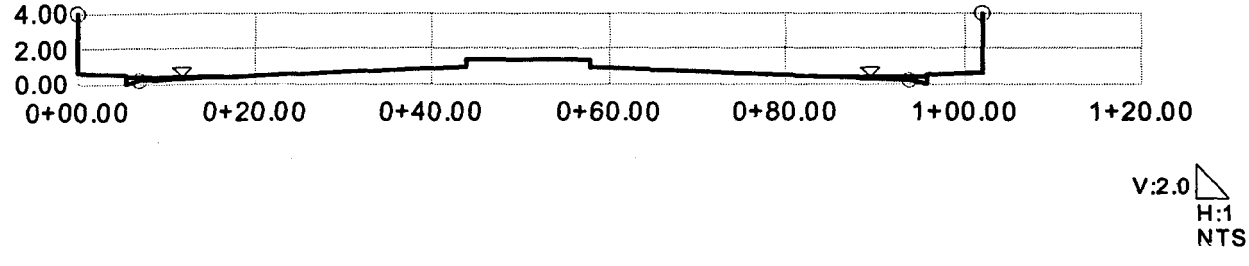
Velocity Estimation: ATHEN1-D
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+58.00	1.41
0+58.00	0.91
0+94.00	0.17
0+94.00	0.13
0+96.00	0.00
0+96.00	0.50
1+02.00	0.60
1+02.00	4.00

Velocity Estimation: ATHEN1-D
Cross Section for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN1-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	2.1000	%
Water Surface Elevation	0.39	ft
Elevation Range	0.00 to 4.00	
Discharge	13.00	cfs



Velocity Estimation: ATHEN2-D
Worksheet for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN2-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	1.2000	%
Discharge	7.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.36	ft
Elevation Range	0.00 to 4.00	
Flow Area	2.8	ft²
Wetted Perimeter	22.87	ft
Top Width	22.06	ft
Actual Depth	0.36	ft
Critical Elevation	0.38	ft
Critical Slope	0.7415	%
Velocity	2.52	ft/s
Velocity Head	0.10	ft
Specific Energy	0.46	ft
Froude Number	1.25	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.015
0+07.00	0+94.00	0.016
0+94.00	1+02.00	0.015

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	4.00
0+00.00	0.60
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+44.00	0.91
0+44.00	1.41

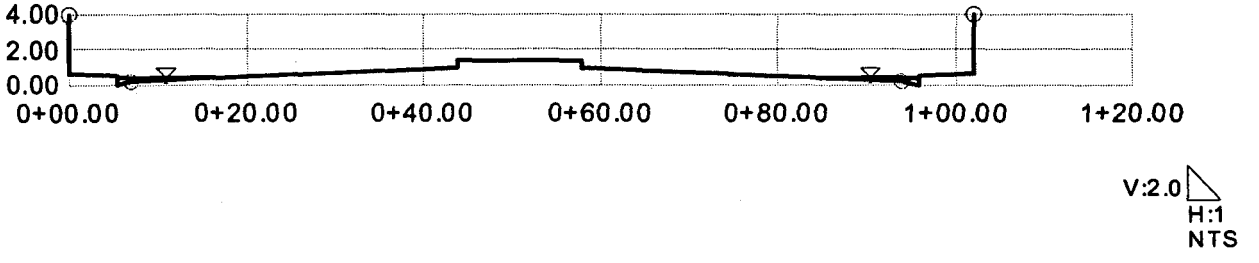
Velocity Estimation: ATHEN2-D
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+58.00	1.41
0+58.00	0.91
0+94.00	0.17
0+94.00	0.13
0+96.00	0.00
0+96.00	0.50
1+02.00	0.60
1+02.00	4.00

Velocity Estimation: ATHEN2-D
Cross Section for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN2-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	1.2000	%
Water Surface Elevation	0.36	ft
Elevation Range	0.00 to 4.00	
Discharge	7.00	cfs



Velocity Estimation: ATHEN3-D
Worksheet for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN3-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	1.1000	%
Discharge	16.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.015	
Water Surface Elevation	0.45	ft
Elevation Range	0.00 to 4.00	
Flow Area	5.2	ft²
Wetted Perimeter	32.14	ft
Top Width	31.14	ft
Actual Depth	0.45	ft
Critical Elevation	0.49	ft
Critical Slope	0.6105	%
Velocity	3.06	ft/s
Velocity Head	0.15	ft
Specific Energy	0.60	ft
Froude Number	1.32	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.015
0+07.00	0+94.00	0.016
0+94.00	1+02.00	0.015

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	4.00
0+00.00	0.60
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+44.00	0.91
0+44.00	1.41

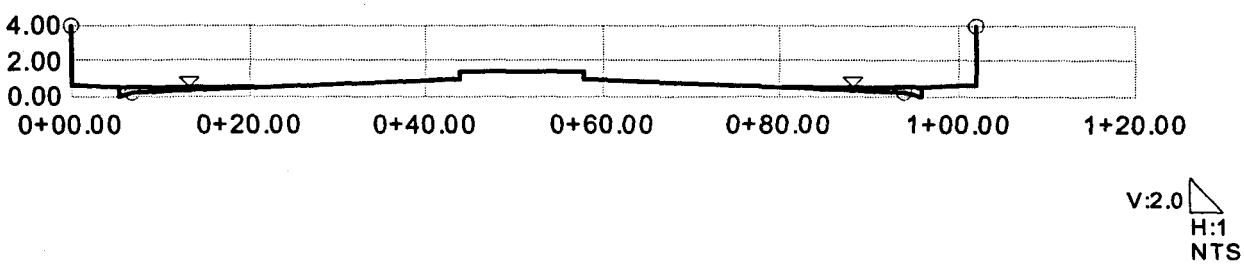
Velocity Estimation: ATHEN3-D
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+58.00	1.41
0+58.00	0.91
0+94.00	0.17
0+94.00	0.13
0+96.00	0.00
0+96.00	0.50
1+02.00	0.60
1+02.00	4.00

Velocity Estimation: ATHEN3-D
Cross Section for Irregular Channel

Project Description	
Worksheet	DEV VEL ATHEN3-D 100' FULL STREET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Slope	1.1000	%
Water Surface Elevation	0.45	ft
Elevation Range	0.00 to 4.00	
Discharge	16.00	cfs



Tuscany G.C. Maintenance Building (PBS&J, 2001)

November 19, 2001

Mark A. Sorensen, P.E.
PBS&J
901 N. Green Valley Pkwy, Ste 100
Henderson, NV 89014

Re: Tuscany Hills Golf Course Maint. Bldg.
Permit Number: 2001004711

Dear Mr. Sorensen:

This letter provides comments on the above referenced drainage study dated July 16, 2001, and Addendum No. 1 dated October 16, 2001. The City of Henderson reviewed this study and based on the documents submitted, **the subject study is approved.** The following items are part of the approved study:

1. Please include a copy of the Hydrology Study Permit with the improvement plans.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by the above named engineering firm may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage.

Please let me know if you have any questions concerning these comments.

Sincerely,

Jon H. Hayslip, P.E.
Project Engineer II

cc: Curt Chandler, Janie Nihipali

ADDENDUM NO. 1 TO THE TECHNICAL DRAINAGE STUDY FOR TUSCANY HILLS GOLF COURSE MAINTENANCE BUILDING

Prepared for:
Commerce Associates, L.L.C.
5947 Harrison Drive
Las Vegas, NV 89120

Prepared by:
PBS&J
901 North Green Valley Parkway Suite #100
Henderson, Nevada 89014

Reference Number 511197.00

October 16, 2001

PBS&J

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **Tuscanny Hills Golf Course Maintenace Building** Date: **October 16, 2001**

Location of Development: a) Descriptive **Western Side of Tuscanny Hills Golf Course**
b) Sect. 32 Twn. 21 S Rng. 63 E

Name of Owner: **Commerce Associates, L.L.C.** Assessors Parcel No: **160-32-310-001**

Telephone No: **(702)263-7275** Facsimile No: **(702) 263-7200**

Address: **5967 Harrison Drive, Unit B1**

Las Vegas, NV 89120

Contact Person Name: **Mark Sorensen** Telephone No: **(702) 263-7275**

Firm: **Post, Buckley, Schuh, & Jernigan, Inc.**

Address: **901 N. Green valley Parkway, Suite 100, Henderson, Nevada 89014**

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map	X	Planned Unit Development		Other (Please specify below)
	Large Parcel Map		Building Permit		

1. Total Owned Land Area: At Site: **1 +/- Acres** Being Developed/Disturbed: **1 +/- Acres**

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? YES [NO*]

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? YES [NO*]

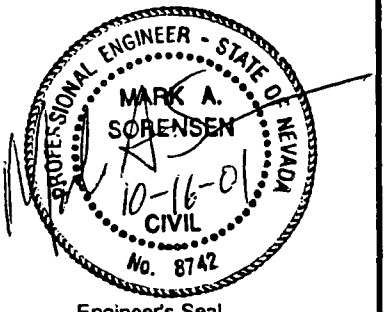
4. Proposed type of development (Residential, Commercial, Etc.)? **Commercial**

5. Approximate upstream land area which drains to the subject site? **8.8 acres**

6. Has the site drainage been evaluated in the past? [YES*] NO If yes, please identify documentation:
Master Technical Drainage Study For The Palm City Golf Course Community, PBS&J 6/98

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
Discharge from onsite basins will be at the southeast corner of the site and will discharge into Maintenance Access Road.

8. Briefly describe your proposed schedule for the subject project: **ASAP**



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File No.

Revision	Date

PBS&J Job Number: 511197 **STANDARD FORM 1**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc.
Project No. :
File: STDFRM4.XLS

DEVELOPMENT : Tuscany Hills Maintenance Bldg

CALCULATED BY : JAMES A. MONROE

FUTURE CONDITIONS

DATE: JULY 10, 2001

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc = (min) (14)	Tlag= 0.6Tc/60 (hrs)	
DEVOFFBA1	61	0.415	0.6	0.0010	13	7.7	2.2	72	7.7	NA	5.0	0.2	2.5	85	N/A	2.5	0.025	
DEVONBA1	98	0.904	0.1	0.0001	50	1.1	2.4	104	1.1	NA	1.5	1.2	3.6	154	N/A	3.6	0.036	
DEVONBA2	98	0.904	0.1	0.0002	65	0.4	3.9	132	0.4	NA	1.1	2.0	5.9	197	N/A	5.9	0.059	
DEVONBA3	98	0.904	0.8	0.0013	93	2.5	2.5	240	2.5	NA	2.9	1.4	3.9	333	N/A	3.9	0.039	

Tc = Ti + Tt Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

Tlag = 0.6Tc K = 0.0132 (CN) - 0.39

* The velocity in column 9 is based on approximate channel properties.

REFERENCE :

STANDARD FORM 4

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1*****************************************
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*                                       *                                       *

*
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *    U.S. ARMY CORPS OF
ENGINEERS      *
*            SEPTEMBER 1990             *                                       *    HYDROLOGIC ENGINEE
RING
CENTER     *
*             VERSION 4.0               *                                       *         609 SECOND S
TREET
     *
*                                       *                                       *       DAVIS, CALIFORN
IA 95616
     *
*  RUN DATE  10/02/2001  TIME  09:05:33 *                                       *           (916) 756-1
104
     *
*                                       *                                       *

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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X         XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE
1

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

             1      ID        File: DEV.DAT
             2      ID
             3      ID   Post, Buckley, Schuh & Jernigan, Inc.
             4      ID
             5      ID    OFFSITE DRAINAGE CONDITIONS RUN
             6      ID
             7      ID   *********************************
             8      ID   *********************************
             9      ID   *                               *
            10      ID   *     MAINTENANCE BLDG          *
            11      ID   *                               *
            12      ID   *                               *
            13      ID   *          07/10/01             *
            14      ID   *                               *
            15      ID   *   FILE :  DEV.DAT             *
            16      ID   *                               *
            17      ID   *                               *
            18      ID   *                               *
            19      ID   *                               *
            20      ID   *          DEVELOPED            *
            21      ID   *         CONDITIONS            *
            22      ID   *********************************
            23      ID   *********************************
            24      ID
                    *DIAGRAM
*** FREE ***
            25      IT       3       0       0     300
            26      IO       5       0       0
            27      IN       5       0       0
            28      JR    PREC    1.00    0.98    0.61
                    *

            29      KKDEVOFBA1
```

```
             30           KM   DEVELOPED OFFSITE BASIN 1
             31           BA  0.0010
             32           PB    2.86
             33           PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
             34           PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
             35           PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
             36           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
             37           PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
             38           PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
             39           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
             40           PC    .998    .999   1.00
             41           LS       0      61
             42           UD   0.025
                          *

             43           KKDEVONBA1
             44           KM   DEVELOPED ONSITE BASIN 1
             45           BA 0.00011
             46           LS       0      98
             47           UD   0.036
                          *
1                                                  HEC-1 INPUT                                                 PAGE
  2

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

             48           KKDEVONBA2
             49           KM   DEVELOPED ONSITE BASIN 2
             50           BA0.000232       8
             51           LS       0      98
             52           UD   0.059
                          *

             53           KKDEVONBA3
             54           KM   DEVELOPED ONSITE BASIN 3
             55           BA  0.0013
             56           LS       0      98
             57           UD   0.039
                          *

             58           KK    COM1
             59           KM   COMBINATION OF FLOWS FROM OFFSITE BA1 & ONSITE BA1
             60           HC       3
                          *
             61           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    29    DEVOFBA1
                .
                .
    43          .    DEVONBA1
                .          .
                .          .
    48          .          .    DEVONBA2
                .          .          .
                .          .          .
    53          .          .          .    DEVONBA3
                .          .          .          .
                .          .          .          .
    58          .       COM1.......................

  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*****************************************
 *                                       *                                       *

     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *   U.S. ARMY CORPS OF

ENGINEERS      *
 *          SEPTEMBER 1990               *                                       *   HYDROLOGIC ENGINEE

RING
CENTER     *
 *           VERSION 4.0                 *                                       *         609 SECOND S

TREET
     *
 *                                       *                                       *       DAVIS, CALIFORN

IA 95616
     *
 *  RUN DATE  10/02/2001  TIME  09:05:33 *                                       *            (916) 756-1

104
     *
 *                                       *                                       *
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 *
 ****************************************
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File: DEV.DAT

Post, Buckley, Schuh & Jernigan, Inc.

OFFSITE DRAINAGE CONDITIONS RUN

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**********************************
**********************************
*                                *
*     MAINTENANCE BLDG           *
*                                *
*                                *
*          07/10/01              *
*                                *
*   FILE :  DEV.DAT              *
*                                *
*                                *
*                                *
*                                *
*          DEVELOPED             *
*         CONDITIONS             *
**********************************
**********************************
```

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           3  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME         0000  STARTING TIME
                          NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1    0  ENDING DATE
                      NDTIME         1457  ENDING TIME
                       ICENT           19  CENTURY MARK

                    COMPUTATION INTERVAL     .05 HOURS
                         TOTAL TIME BASE   14.95 HOURS

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

     JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

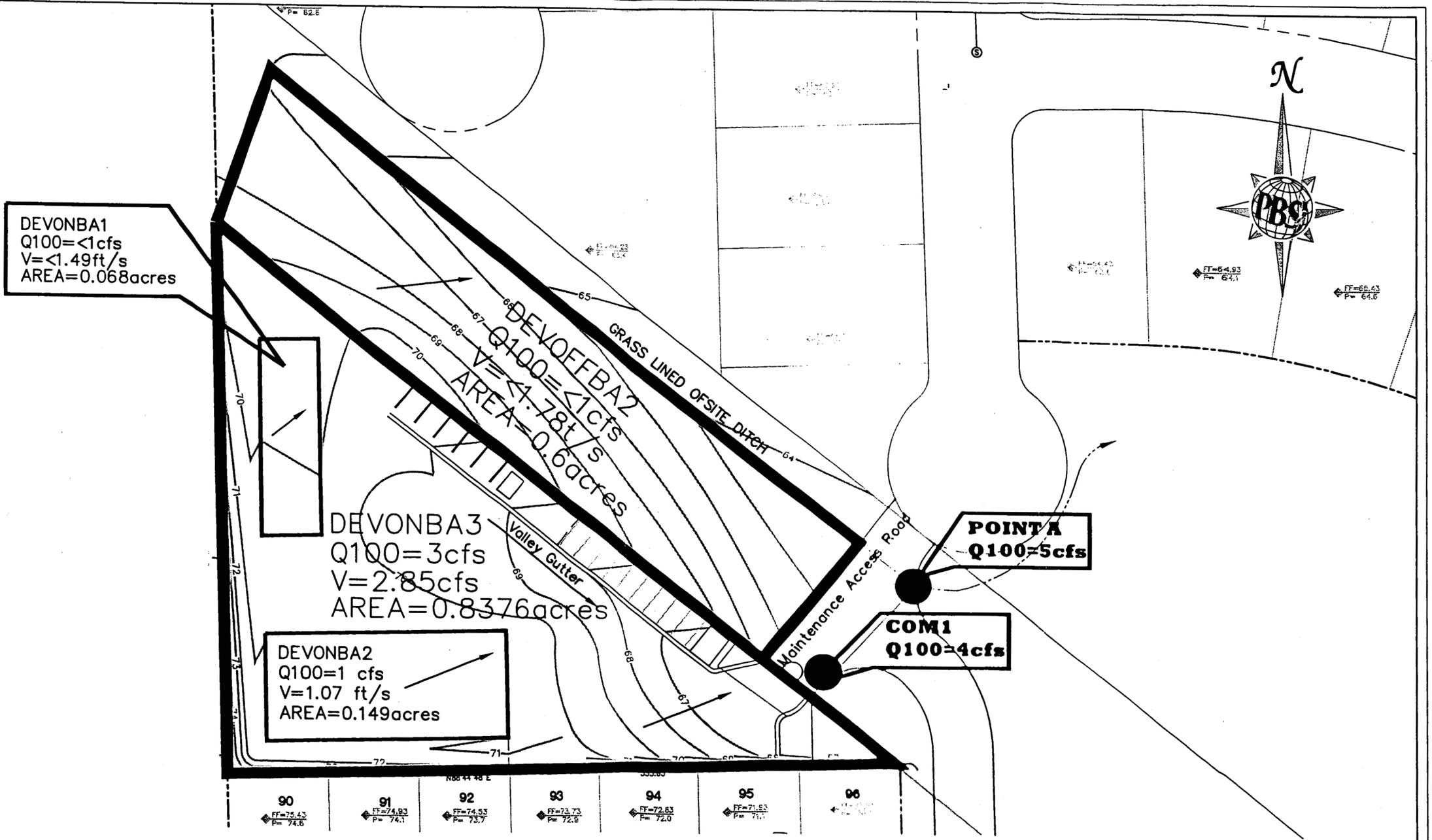
     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .98       .61
1
```

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .98	RATIO 3 .61
HYDROGRAPH AT	DEVOFBA1	.00	1	FLOW	0.	0.	0.
				TIME	3.50	3.50	4.80
HYDROGRAPH AT	DEVONBA1	.00	1	FLOW	0.	0.	0.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT	DEVONBA2	.00	1	FLOW	1.	1.	0.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT	DEVONBA3	.00	1	FLOW	3.	3.	2.

				TIME	3.50	3.50	3.50
3 COMBINED AT							
	COM1	.00	1	FLOW	4.	4.	2.
				TIME	3.50	3.50	3.50

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



GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

1 inch = 50 ft.

FIGURE 6
DEVELOPED ONSITE & OFFSITE BASINS

PBSJ
901 N. Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

TECHNICAL DRAINAGE STUDY

FOR

PROVENANCE

MOHAWK DRIVE AND SUNSET ROAD

March 16, 2001

Prepared for

The LandWell Company
875 West Warm Springs Road
Henderson, Nevada 89015

Project No. 0138.0105

Prepared by

DRAFT

PENTACORE

2.0 DRAINAGE DESCRIPTION

2.1 General Description

This report will analyze and address the existing condition, interim condition, and the ultimate future conditions that impact the Mohawk Drive and Sunset Road alignments. The "Ultimate Future" flow condition is that which will result from the total build out of the future Provenance's Sunset/Olsen phase. The interim condition is when the two roadways are constructed, yet the surrounding area is undeveloped. The design concept for this submittal's purpose anticipates the collection the "Ultimate Future" 100-year storm flow event by the proposed drainage facilities at Mohawk Drive and Sunset Road.

The improvements associated with Mohawk Drive, proposes the construction of a storm drain sewer system extending from the intersection with Sunset Road South to Lake Mead Drive. The storm sewer system will route the overall, existing and proposed, storm water runoff contribution from Mohawk Drive and Sunset Road to a proposed open channel that will convey flows West to the Pabco Channel. A City of Henderson approved conceptual analysis for the overall area has been submitted to the City of Henderson, with technical reference material included in the Appendix of this submittal.

The off-site storm water flows for the purpose of this submittal are the 100-year flows that were developed in the "Conceptual Drainage Study for the Future Provenance Master Plan." The overall off-site tributary watershed area is delineated on the approved "*Provenance Master Plan Area - Offsite Basins Figure 5*," and shown in the appendix.

Interim Condition

The interim condition, is when the Mohawk Drive and Sunset Road roadways are built and the surrounding area is still undeveloped.

Mohawk Drive will need to convey a 100-year flow rate of 123-cfs (89 cfs from basin O1 and 34 cfs from basin OF-1). Mohawk Drive will convey the 100-year flow at a depth of 0.75 ft and a velocity of 5.86 fps for a DxV of 4.4. A 10-year flow rate of 43 cfs will also need to be conveyed in Mohawk Drive. The 10-year capacity of Mohawk Drive that will meet the 10-year dry lane criteria is 29 cfs. Mohawk Drive will have drop inlets that will convey storm flows underground, so as to meet the 10-year dry lane criteria. Mohawk Drive will also be impacted by the flows draining under Lake Mead Drive and onto the Provenance site. A temporary detention basin is proposed to control this runoff. The temporary detention basin will collect overland flows, flows being conveyed in the existing berm/swale, and culvert flows under Lake Mead Drive. The temporary detention basin will outlet into a 30-inch RCP that will carry the flows to a proposed channel that will convey the flows back into the existing berm/swale and into the C-1 channel,

Sunset Road will need to convey a 100-year flow rate of 63 cfs from basin O2. Sunset Road will convey the 100-year flow at a depth of 0.72 ft and at a velocity of 3.40 fps for a DxV of 2.4. A 10–year flow rate of 17 cfs can be conveyed on Sunset Road and meet the 10-year dry lane criteria.

Mohawk Drive and Sunset Road will convey flows to a proposed temporary swale at the intersection of the two roadways. The temporary swale will convey the entire interim 100-year flow rate West to the Pabco Channel.

2.3 FEMA Flood Hazard Zone

The Mohawk Drive and Sunset Road project is outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Clark County, Nevada. The site is found on Community Panel Nos. 32003 C 2605D. Mohawk Drive and Sunset Road lies within a "Zone A" described as an area determined to be within the 100-year floodplain (See Figure 3) and "Zone X" described as an area outside the 500-year floodplain. No Base Flood Elevations (BFE's) have been determined by FEMA and no BFE's will be established with this study.

2.4 Regional Flood Control Master Plan Update

The proposed development of Mohawk Drive and Sunset Road is in compliance with the Clark County Regional Flood Control District (CCRFCD) Master Plan Update (See Reference 5). Sunset Road borders the C-1 Channel (C1CH 0142) which is a CCRFCD facility at this time.

2.5 Proposed Drainage Description

This submittal is based on earlier hydrologic determination associated with the "Conceptual Drainage Study for the Future Provenance Master Plan." This report addresses the improvements associated with the construction of Mohawk Drive and Sunset Road. The existing condition is that which results from current drainage characteristics and the ultimate condition is that which would result from the future build out of the Provenance Sunset-Olsen phase of development.

The design concept for this report's purpose assumes (1) that all existing flow conditions will be mitigated without any adverse impact to downstream property, (2) the operation of the proposed inlets will collect existing flows and the "Ultimate" 10-year flow so Mohawk Drive and Sunset Road can meet dry lane criteria, (3) the proposed storm drain sewer system is designed to collect and convey the "Ultimate" 100-year flow, and (4) the operation of the

proposed drainage facilities (detention pond and rock lined channels) will be constructed upstream of the Mohawk Drive and Sunset Road project.

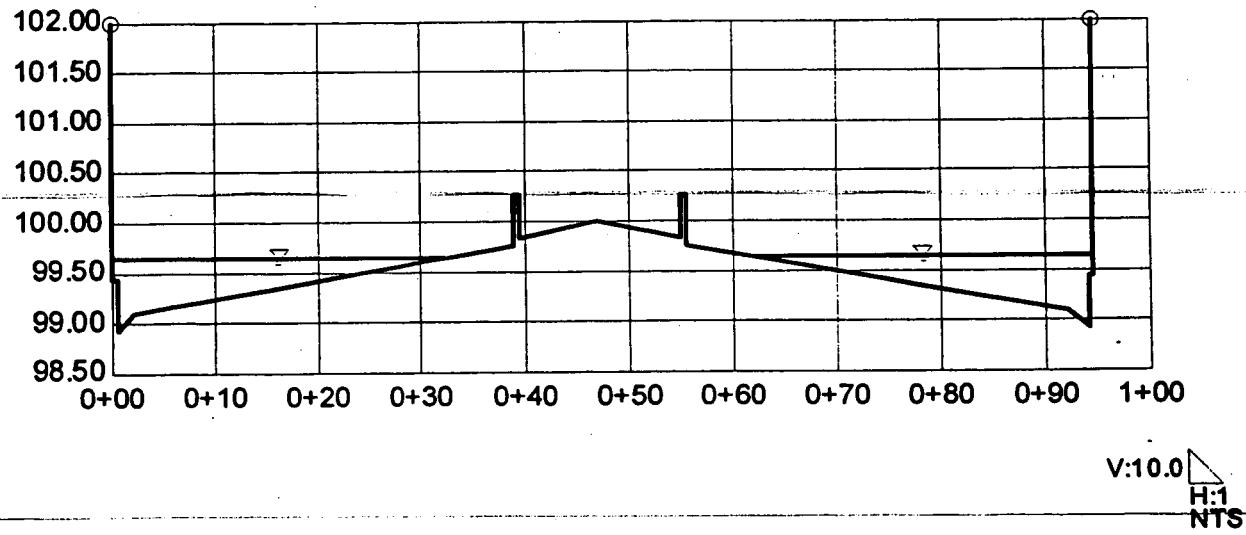
2.6 Previous Drainage Studies

The storm flow analysis for this submittal utilizes the information from the approved "Conceptual Drainage Study for the Future Provenance Master Plan" (Reference 7). The storm flow analysis is referenced and included in the Appendix of this submittal.

Cross Section of Sunset Road
Cross Section for Irregular Channel

Project Description	
Worksheet	SUNSET ROAD
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.8200	%
Water Surface Elevation	99.64	ft
Elevation Range	98.93 to 102.00	
Discharge	63.00	cfs



SUNSET ROAD
Worksheet for Irregular Channel

Project Description	
Worksheet	SUNSET ROAD
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.8200	%
Discharge	63.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.017	
Water Surface Elevation	99.64	ft
Elevation Range	98.93 to 102.00	
Flow Area	18.5	ft²
Wetted Perimeter	65.89	ft
Top Width	64.46	ft
Actual Depth	0.71	ft
Critical Elevation	99.66	ft
Critical Slope	0.6471	%
Velocity	3.40	ft/s
Velocity Head	0.18	ft
Specific Energy	99.82	ft
Froude Number	1.12	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+95	0.017

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	102.00
0+00	99.43
0+01	99.43
0+01	98.93
0+02	99.10
0+39	99.76
0+39	100.26
0+40	100.26
0+40	99.84

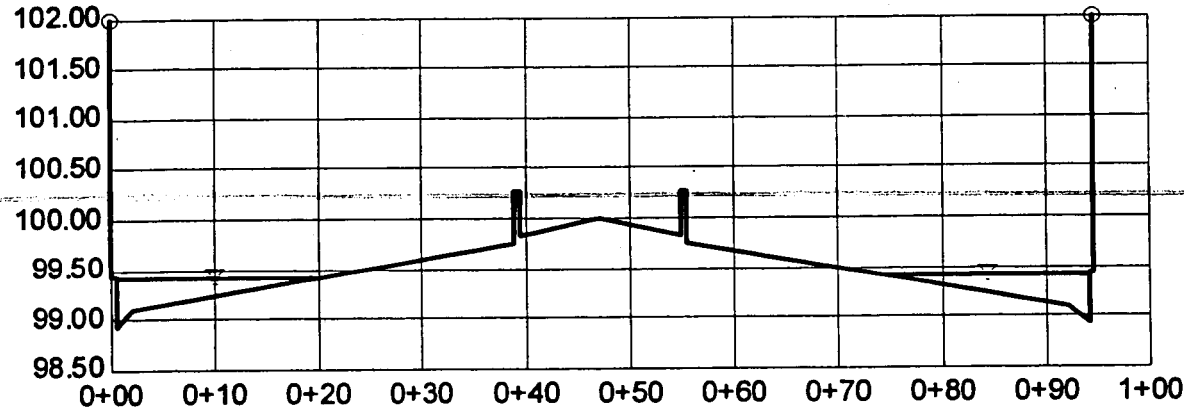
SUNSET ROAD
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+47	100.00
0+55	99.84
0+55	100.26
0+56	100.26
0+56	99.76
0+92	99.10
0+94	98.93
0+94	99.43
0+95	99.43
0+95	102.00

Cross Section of Sunset Road 10-Yr Dry Lane
Cross Section for Irregular Channel

Project Description	
Worksheet	SUNSET ROAD 10-YEAR DRY LANE
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.017
Slope	0.8200 %
Water Surface Elevation	99.41 ft
Elevation Range	98.93 to 102.00
Discharge	17.00 cfs



SUNSET ROAD 10-YR DRY LANE
Worksheet for Irregular Channel

Project Description	
Worksheet	SUNSET ROAD 10-YEAR DRY LANE
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	0.8200 %
Discharge	17.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.017
Water Surface Elevation	99.41 ft
Elevation Range	98.93 to 102.00
Flow Area	6.9 ft²
Wetted Perimeter	39.43 ft
Top Width	38.45 ft
Actual Depth	0.48 ft
Critical Elevation	99.42 ft
Critical Slope	0.7698 %
Velocity	2.47 ft/s
Velocity Head	0.09 ft
Specific Energy	99.51 ft
Froude Number	1.03
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+95	0.017

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	102.00
0+00	99.43
0+01	99.43
0+01	98.93
0+02	99.10
0+39	99.76
0+39	100.26
0+40	100.26
0+40	99.84

SUNSET ROAD 10-YR DRY LANE
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+47	100.00
0+55	99.84
0+55	100.26
0+56	100.26
0+56	99.76
0+92	99.10
0+94	98.93
0+94	99.43
0+95	99.43
0+95	102.00

Hydraflow Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								...e ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	149.6	0.0	MH	0.00	0.00	0.00	0.0	1651.21	0.71	1652.27	54	Cir	0.013	1.00	1664.50	Outlet Pipe (Acros
2	1	536.9	15.0	MH	0.10	0.00	0.00	0.0	1652.47	2.02	1663.30	54	Cir	0.013	0.50	1671.20	2
3	2	412.7	0.0	MH	0.00	0.00	0.00	0.0	1663.80	1.32	1669.24	48	Cir	0.013	0.15	1678.20	3
4	3	358.8	-5.0	MH	0.00	0.00	0.00	0.0	1669.44	1.14	1673.54	48	Cir	0.013	1.00	1683.30	4
5	4	40.0	50.0	MH	0.00	0.00	0.00	0.0	1673.74	5.13	1675.79	48	Cir	0.013	1.00	1683.50	5
6	5	30.0	30.0	MH	63.00	0.00	0.00	0.0	1675.99	1.70	1676.50	48	Cir	0.013	0.10	1684.00	6
7	5	30.0	90.0	MH	0.10	0.00	0.00	0.0	1678.29	1.03	1678.60	18	Cir	0.013	1.00	1683.50	7
8	5	30.0	-15.0	MH	0.10	0.00	0.00	0.0	1678.29	1.70	1678.80	18	Cir	0.013	1.00	1684.00	8
9	4	42.5	0.0	MH	0.00	0.00	0.00	0.0	1675.54	1.08	1676.00	24	Cir	0.013	1.00	1683.50	9
10	9	32.8	15.0	MH	0.10	0.00	0.00	0.0	1676.50	1.52	1677.00	18	Cir	0.013	1.00	1683.50	10
11	9	120.0	-60.0	MH	0.10	0.00	0.00	0.0	1676.50	0.83	1677.50	18	Cir	0.013	1.00	1683.50	11
12	1	108.8	-60.0	MH	0.10	0.00	0.00	0.0	1654.77	1.25	1656.13	24	Cir	0.013	1.00	1664.50	12
13	1	9.0	75.0	MH	0.10	0.00	0.00	0.0	1654.77	17.56	1656.35	24	Cir	0.013	1.00	1664.50	13

Project File: Sunset Storm Drain (2).stm | I-D-F File: SAMPLE.IDF | Total number of lines: 13 | Date: 02-10-2001

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	Outlet Pipe (Acros	63.70	54 c	149.6	1651.21	1652.27	0.709	1655.71	1655.77	0.36	End
2	2	63.50	54 c	536.9	1652.47	1663.30	2.017	1656.97	1665.59	0.48	1
3	3	63.40	48 c	412.7	1663.80	1669.24	1.318	1667.80	1671.60	0.16	2
4	4	63.40	48 c	358.8	1669.44	1673.54	1.143	1673.44	1675.90	1.06	3
5	5	63.20	48 c	40.0	1673.74	1675.79	5.125	1677.74	1678.14	1.05	4
6	6	63.00	48 c	30.0	1675.99	1676.50	1.700	1679.99	1679.98	0.05	5
7	7	0.10	18 c	30.0	1678.29	1678.60	1.033	1679.79	1679.79	0.00	5
8	8	0.10	18 c	30.0	1678.29	1678.80	1.700	1679.79	1679.79	0.00	5
9	9	0.20	24 c	42.5	1675.54	1676.00	1.081	1677.54	1677.54	0.00	4
10	10	0.10	18 c	32.8	1676.50	1677.00	1.522	1678.00	1678.00	0.00	9
11	11	0.10	18 c	120.0	1676.50	1677.50	0.833	1678.00	1678.00	0.00	9
12	12	0.10	24 c	108.8	1654.77	1656.13	1.251	1656.77	1656.77	0.00	1
13	13	0.10	24 c	9.0	1654.77	1656.35	17.555	1656.77	1656.77	0.00	1

Project File: Sunset Storm Drain (2) | stml-D-F File: SAMPLE.IDF | Total No. Lines: 13 | Run Date: 02-10-2001

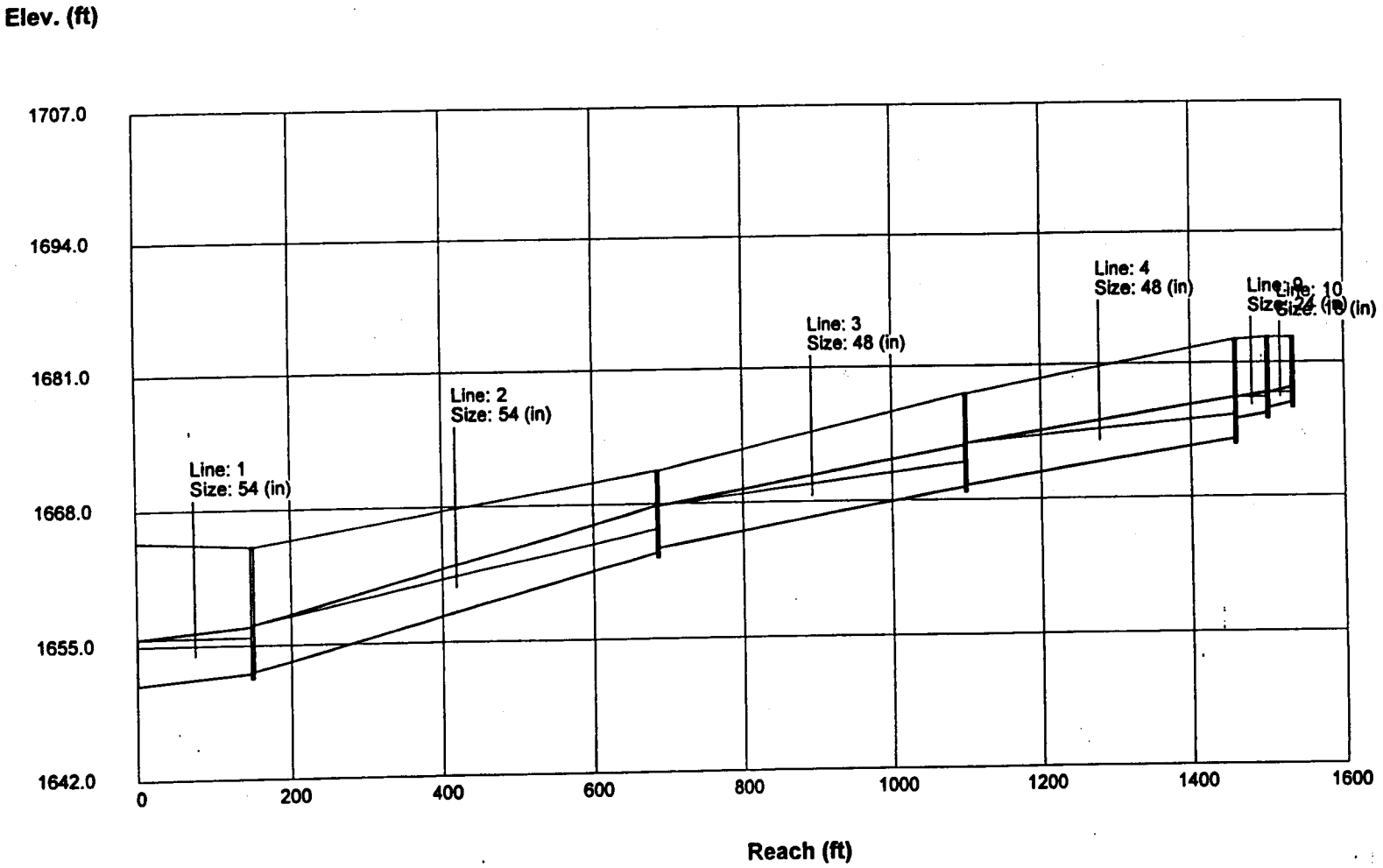
NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
	(in)	(cfs)									(ft)											(K)	(ft)
1	54	63.70	1651.21	1655.71	4.50	15.90	4.01	0.25	1655.96	0.105	150	1652.27	1655.77	3.50	13.26	4.80	0.36	1656.13	0.117	0.111	0.166	1.00	0.36
2	54	63.50	1652.47	1656.97	4.50*	15.90	3.99	0.25	1657.22	0.104	537	1663.30	1665.59	2.29**	8.11	7.83	0.95	1666.54	0.395	0.250	N/A	0.50	0.48
3	48	63.40	1663.80	1667.80	4.00*	12.56	5.05	0.40	1668.20	0.195	413	1669.24	1671.60	2.36**	7.70	8.24	1.06	1672.65	0.457	0.326	N/A	0.15	0.16
4	48	63.40	1669.44	1673.44	4.00*	12.56	5.05	0.40	1673.84	0.195	359	1673.54	1675.90	2.36**	7.70	8.24	1.06	1676.95	0.457	0.326	N/A	1.00	1.06
5	48	63.20	1673.74	1677.74	4.00*	12.56	5.03	0.39	1678.13	0.194	40.0	1675.79	1678.14	2.35**	7.68	8.23	1.05	1679.19	0.457	0.325	N/A	1.00	1.05
6	48	63.00	1675.99	1679.99	4.00*	12.56	5.01	0.39	1680.38	0.192	30.0	1676.50	1679.98	3.48	11.59	5.43	0.46	1680.43	0.176	0.184	0.055	0.10	0.05
7	18	0.10	1678.29	1679.79	1.50*	1.77	0.06	0.00	1679.79	0.000	30.0	1678.60	1679.79	1.19	1.51	0.07	0.00	1679.79	0.000	0.000	0.000	1.00	0.00
8	18	0.10	1678.29	1679.79	1.50*	1.77	0.06	0.00	1679.79	0.000	30.0	1678.80	1679.79	0.99	1.24	0.08	0.00	1679.79	0.000	0.000	0.000	1.00	0.00
9	24	0.20	1675.54	1677.54	2.00*	3.14	0.06	0.00	1677.54	0.000	42.5	1676.00	1677.54	1.54	2.59	0.08	0.00	1677.54	0.000	0.000	0.000	1.00	0.00
10	18	0.10	1676.50	1678.00	1.50*	1.77	0.06	0.00	1678.00	0.000	32.8	1677.00	1678.00	1.00	1.25	0.08	0.00	1678.00	0.000	0.000	0.000	1.00	0.00
11	18	0.10	1676.50	1678.00	1.50*	1.77	0.06	0.00	1678.00	0.000	120	1677.50	1678.00	0.50	0.51	0.19	0.00	1678.00	0.002	0.001	0.001	1.00	0.00
12	24	0.10	1654.77	1656.77	2.00*	3.14	0.03	0.00	1656.77	0.000	109	1656.13	1656.77	0.64	0.87	0.12	0.00	1656.77	0.000	0.000	0.000	1.00	0.00
13	24	0.10	1654.77	1656.77	2.00*	3.14	0.03	0.00	1656.77	0.000	9.0	1656.35	1656.77	0.42	0.48	0.21	0.00	1656.77	0.002	0.001	0.000	1.00	0.00

Project File: Sunset Storm Drain (2).stm | I-D-F File: SAMPLE.IDF | Total number of lines: 13 | Run Date: 02-10-2001

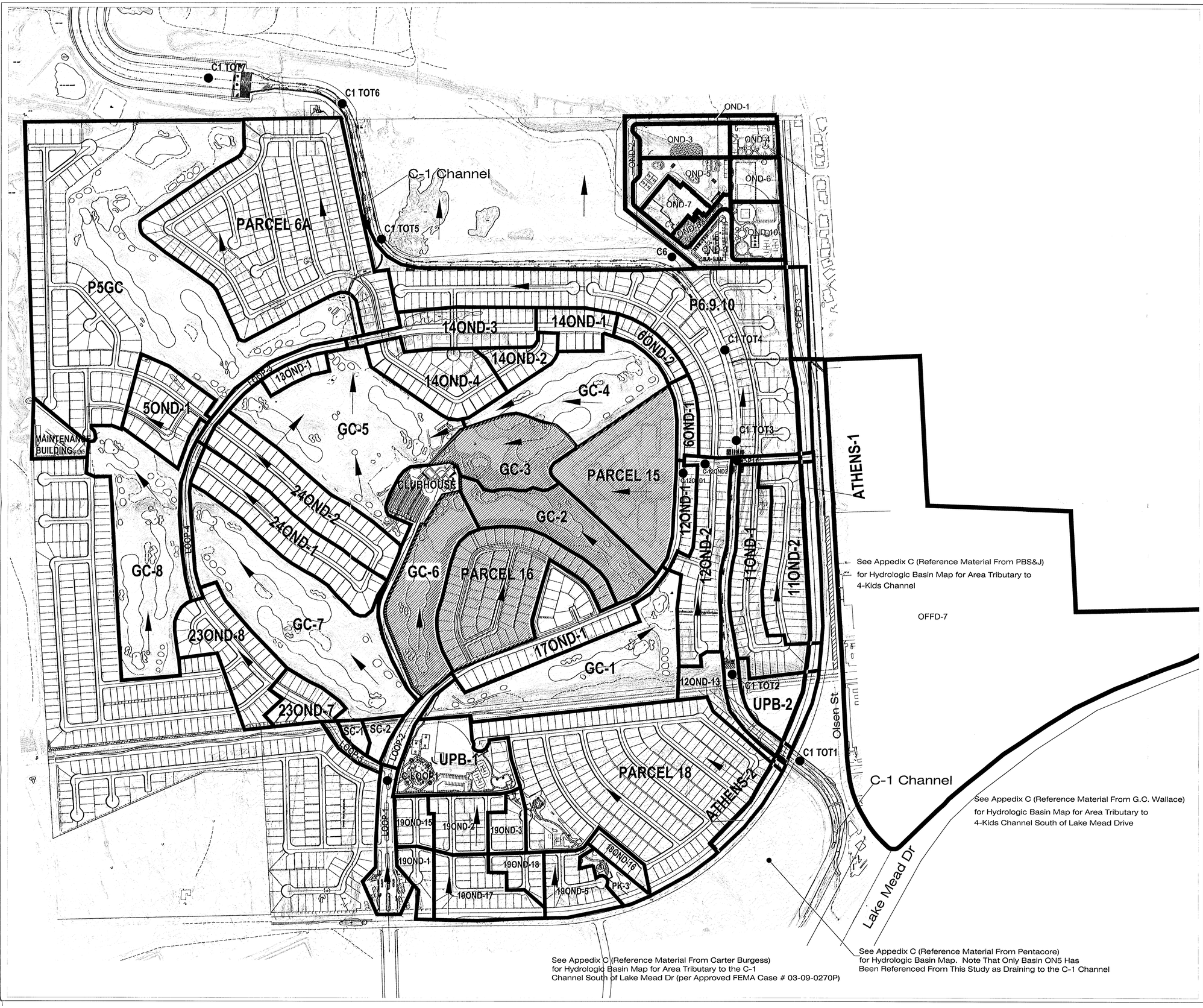
NOTES: Initial tailwater elevation = 1655.71 (ft), * Crown depth assumed., ** Critical depth assumed.


Elev. (ft)
1707.0
1694.0
1681.0
1668.0
1655.0
1642.0
0
200
400
600
800
1000
1200
1400
1600
Reach (ft)
Line: 1
Size: 54 (in)
Line: 2
Size: 54 (in)
Line: 3
Size: 48 (in)
Line: 4
Size: 48 (in)
Line: 10
Size: 24 (in)

Hydrologic Figures

C1 – Onsite Tuscany Subbasin Exhibit

C2 – A-Basin Exhibit



Legend

- Flow Direction Arrow
- Area Drains To Golf Course Lake
- Basin Delineation for TMPC Onsite Based on Future Conditions
- Basins Referenced From Previous PBS&J Hydrology
- C1-TOT — Concentration Point

Note

See Appendix C for the HEC-1 results

N

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300ft.

C-1 Channel LOMR

FIGURE C1:
Onsite Tuscany Subbasin Exhibit

Project No. 511649.00 July 2004

PBS&J
2270 Corporate Circle
Suite 100 Henderson,
Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200
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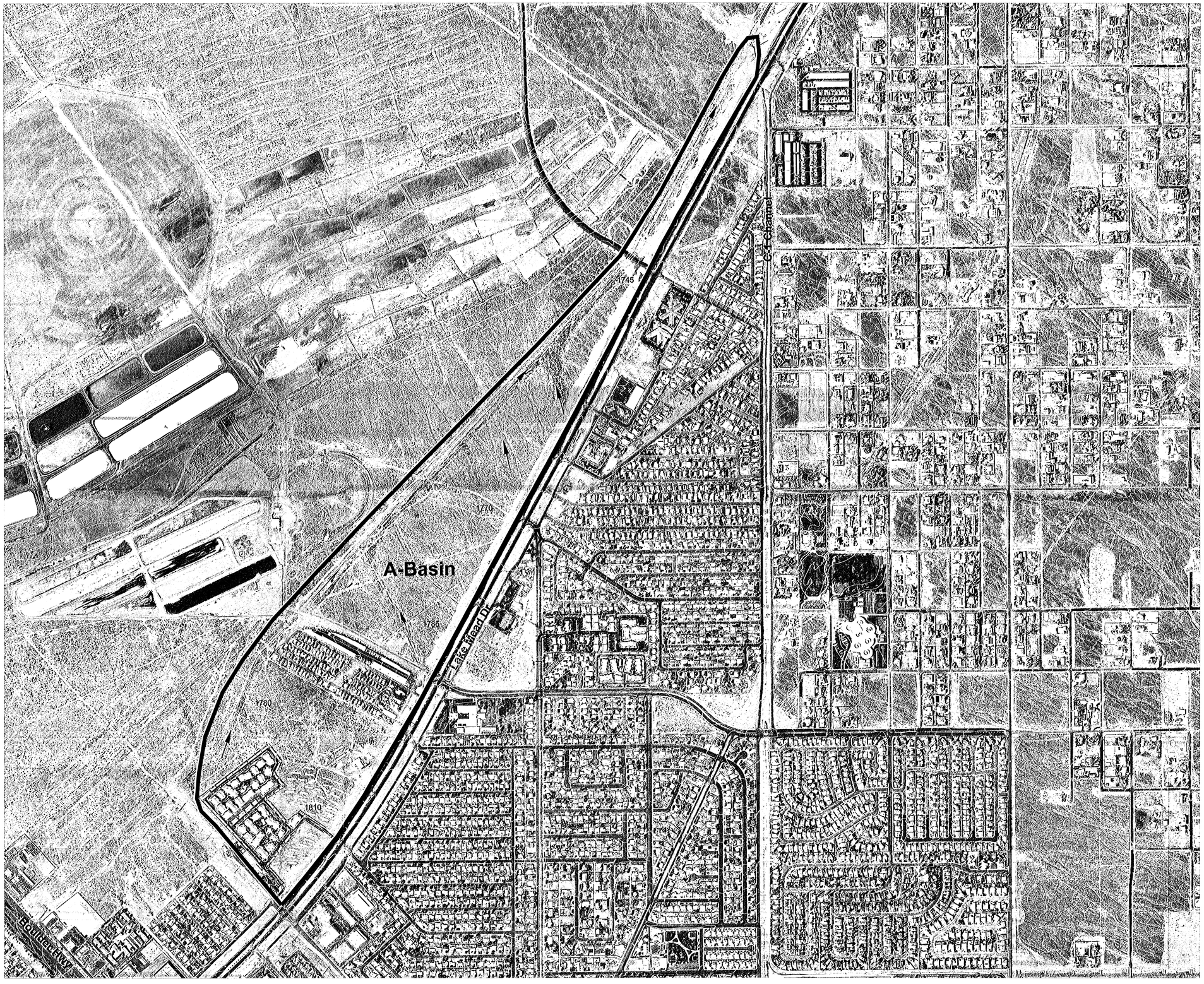
FIGURE C1



Legend

A-Basin Basin Name

Flow Direction Arrow

Note

See Appendix C for HEC-1 Results

N

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500ft.

FIGURE C2: A-Basin Exhibit
C-1 Channel LOMR

Project No. 511197.00 July 2004

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FIGURE C2

APPENDIX D
Hydraulics

4-Kids Channel and Natural Wash Capacity Calculations

4KIDS CROSS SECTION A
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	3.2000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	1,662.12	ft
Elevation Range	1,661.11 to 1,664.68	
Flow Area	134.0	ft²
Wetted Perimeter	298.04	ft
Top Width	298.00	ft
Actual Depth	1.01	ft
Critical Elevation	1,662.18	ft
Critical Slope	2.2812	%
Velocity	4.46	ft/s
Velocity Head	0.31	ft
Specific Energy	1,662.43	ft
Froude Number	1.17	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

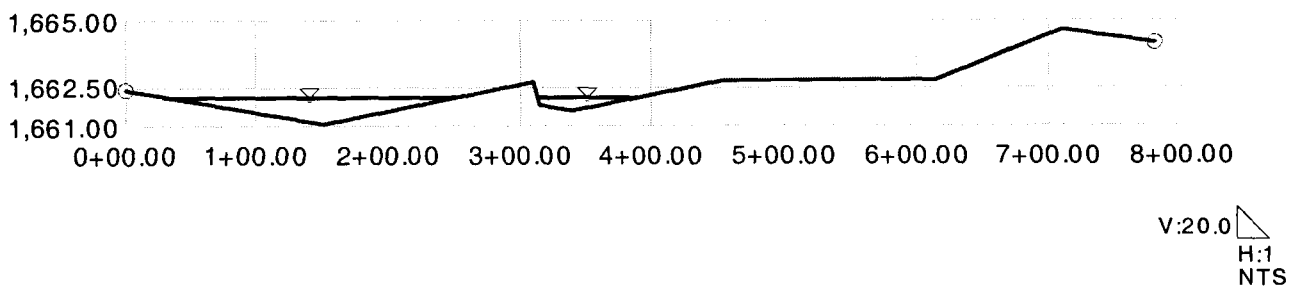
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	7+80.00	0.035

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	1,662.37
1+50.00	1,661.11
3+10.00	1,662.70
3+15.00	1,661.85
3+40.00	1,661.62
4+55.00	1,662.77
6+15.00	1,662.77
7+10.00	1,664.68
7+80.00	1,664.12

4KIDS CROSS SECTION A
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	3.2000	%
Water Surface Elevation	1,662.12	ft
Elevation Range	1,661.11 to 1,664.68	
Discharge	597.00	cfs



4KIDS CROSS SECTION B
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	3.2000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	1,651.99	ft
Elevation Range	1,650.63 to 1,653.24	
Flow Area	101.6	ft²
Wetted Perimeter	149.44	ft
Top Width	149.42	ft
Actual Depth	1.36	ft
Critical Elevation	1,652.12	ft
Critical Slope	1.9695	%
Velocity	5.87	ft/s
Velocity Head	0.54	ft
Specific Energy	1,652.53	ft
Froude Number	1.26	
Flow Type	Supercritical	

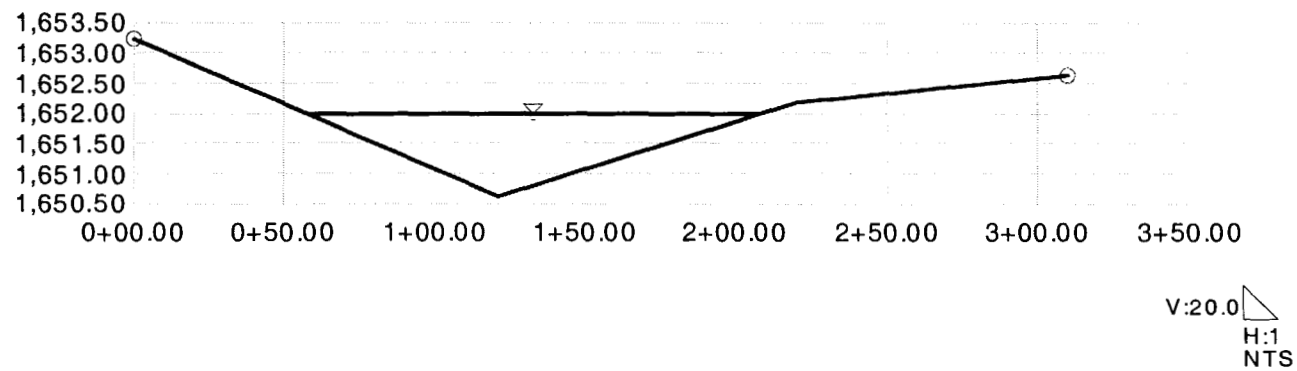
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	3+10.00	0.035

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	1,653.24
1+21.00	1,650.63
2+20.00	1,652.19
3+10.00	1,652.64

4KIDS CROSS SECTION B
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	3.2000	%
Water Surface Elevation	1,651.99	ft
Elevation Range	1,650.63 to 1,653.24	
Discharge	597.00	cfs



4KIDS CROSS SECTION C
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	3.2000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	1,646.31	ft
Elevation Range	1,644.53 to 1,648.26	
Flow Area	85.0	ft²
Wetted Perimeter	95.44	ft
Top Width	95.37	ft
Actual Depth	1.78	ft
Critical Elevation	1,646.51	ft
Critical Slope	1.7904	%
Velocity	7.03	ft/s
Velocity Head	0.77	ft
Specific Energy	1,647.07	ft
Froude Number	1.31	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	3+60.00	0.035

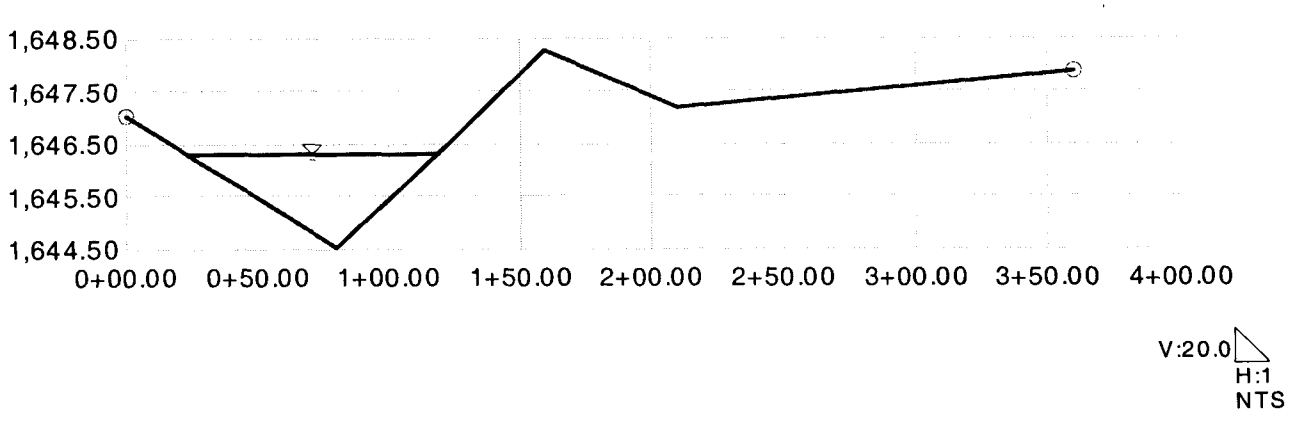
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	1,647.04
0+80.00	1,644.53
1+10.00	1,645.89
1+60.00	1,648.26
2+10.00	1,647.18
3+60.00	1,647.87

4KIDS CROSS SECTION C
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	3.2000	%
Water Surface Elevation	1,646.31	ft
Elevation Range	1,644.53 to 1,648.26	
Discharge	597.00	cfs



4KIDS CROSS SECTION D
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	3.2000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	1,643.05	ft
Elevation Range	1,639.13 to 1,650.88	
Flow Area	51.6	ft²
Wetted Perimeter	27.46	ft
Top Width	26.31	ft
Actual Depth	3.92	ft
Critical Elevation	1,643.69	ft
Critical Slope	1.4356	%
Velocity	11.57	ft/s
Velocity Head	2.08	ft
Specific Energy	1,645.13	ft
Froude Number	1.46	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	1+10.00	0.035

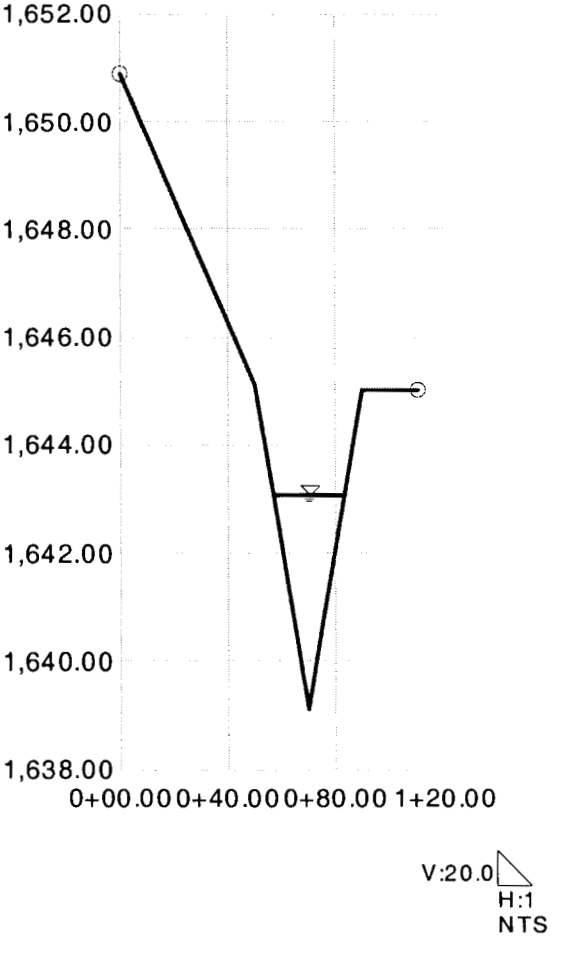
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	1,650.88
0+50.00	1,645.15
0+70.00	1,639.13
0+90.00	1,645.04
1+10.00	1,645.01

4KIDS CROSS SECTION D
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	3.2000	%
Water Surface Elevation	1,643.05	ft
Elevation Range	1,639.13 to 1,650.88	
Discharge	597.00	cfs



4KIDS CROSS SECTION E
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	3.2000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.035	
Water Surface Elevation	1,639.83	ft
Elevation Range	1,636.14 to 1,652.23	
Flow Area	44.3	ft²
Wetted Perimeter	18.70	ft
Top Width	13.00	ft
Actual Depth	3.69	ft
Critical Elevation	1,640.48	ft
Critical Slope	1.9420	%
Velocity	13.49	ft/s
Velocity Head	2.83	ft
Specific Energy	1,642.66	ft
Froude Number	1.29	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	1+25.00	0.035

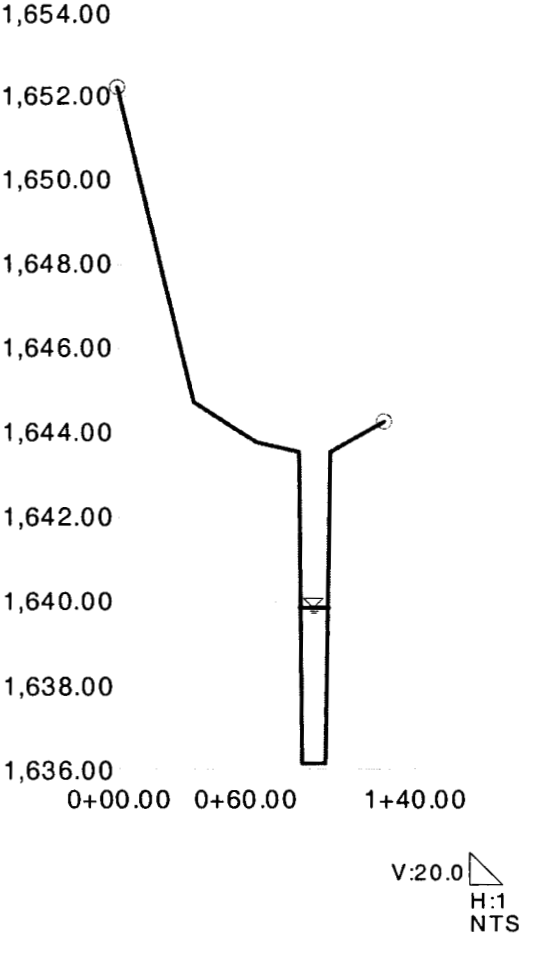
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	1,652.23
0+35.00	1,644.70
0+65.00	1,643.75
0+85.00	1,643.51
0+86.00	1,636.14
0+97.00	1,636.14
1+00.00	1,643.51
1+25.00	1,644.24

4KIDS CROSS SECTION E
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Slope	3.2000	%
Water Surface Elevation	1,639.83	ft
Elevation Range	1,636.14 to 1,652.23	
Discharge	597.00	cfs



4KIDS CROSS SECTION F
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	1.5000 %
Discharge	597.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.024
Water Surface Elevation	32.05 ft
Elevation Range	29.93 to 35.56
Flow Area	53.1 ft²
Wetted Perimeter	29.25 ft
Top Width	25.00 ft
Actual Depth	2.12 ft
Critical Elevation	32.54 ft
Critical Slope	0.7913 %
Velocity	11.24 ft/s
Velocity Head	1.96 ft
Specific Energy	34.02 ft
Froude Number	1.36
Flow Type	Supercritical

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+00.00	0.035
0+00.00	0+25.00	0.022
0+25.00	0+25.00	0.035

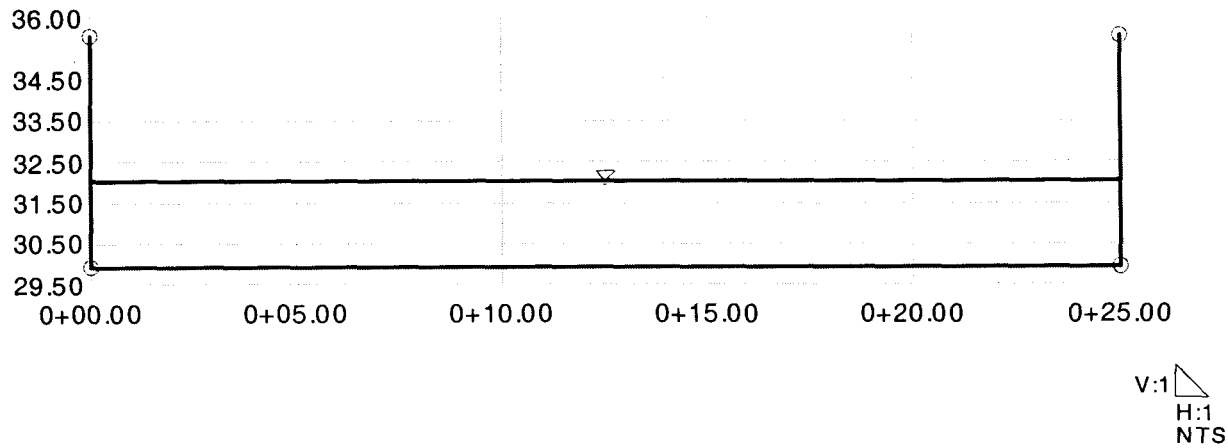
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	35.56
0+00.00	29.93
0+25.00	29.93
0+25.00	35.56

4KIDS CROSS SECTION F
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.024	
Slope	1.5000	%
Water Surface Elevation	32.05	ft
Elevation Range	29.93 to 35.56	
Discharge	597.00	cfs



4KIDS CROSS SECTION G
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION G
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	1.5000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.024	
Water Surface Elevation	29.32	ft
Elevation Range	27.20 to 32.28	
Flow Area	53.1	ft²
Wetted Perimeter	29.25	ft
Top Width	25.00	ft
Actual Depth	2.12	ft
Critical Elevation	29.81	ft
Critical Slope	0.7913	%
Velocity	11.24	ft/s
Velocity Head	1.96	ft
Specific Energy	31.29	ft
Froude Number	1.36	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+00.00	0.035
0+00.00	0+25.00	0.022
0+25.00	0+25.00	0.035

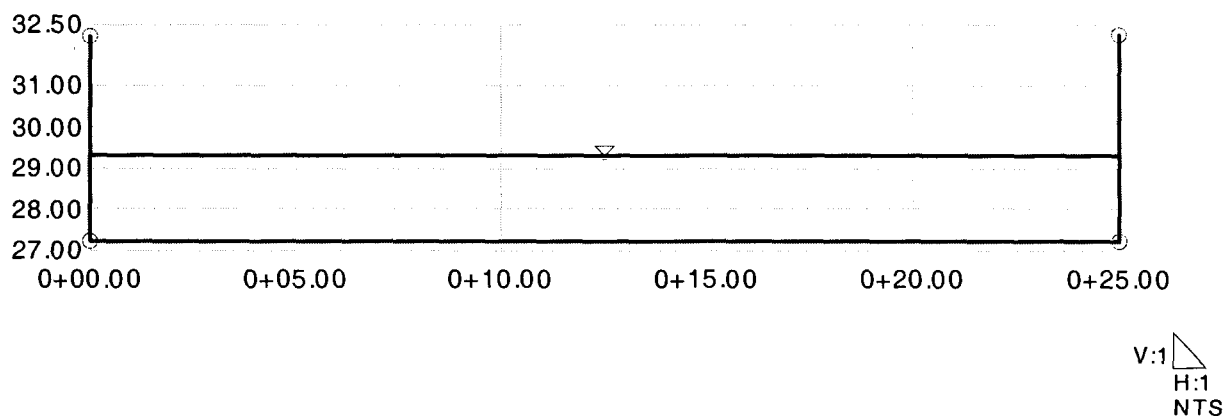
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	32.23
0+00.00	27.20
0+25.00	27.20
0+25.00	32.28

4KIDS CROSS SECTION G
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION G
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.024	
Slope	1.5000	%
Water Surface Elevation	29.32	ft
Elevation Range	27.20 to 32.28	
Discharge	597.00	cfs



4KIDS CROSS SECTION H
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION H
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	1.5000 %
Discharge	597.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.024
Water Surface Elevation	15.22 ft
Elevation Range	13.10 to 16.86
Flow Area	53.1 ft²
Wetted Perimeter	29.25 ft
Top Width	25.00 ft
Actual Depth	2.12 ft
Critical Elevation	15.71 ft
Critical Slope	0.7913 %
Velocity	11.24 ft/s
Velocity Head	1.96 ft
Specific Energy	17.19 ft
Froude Number	1.36
Flow Type	Supercritical

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+00.00	0.035
0+00.00	0+25.00	0.022
0+25.00	0+25.00	0.035

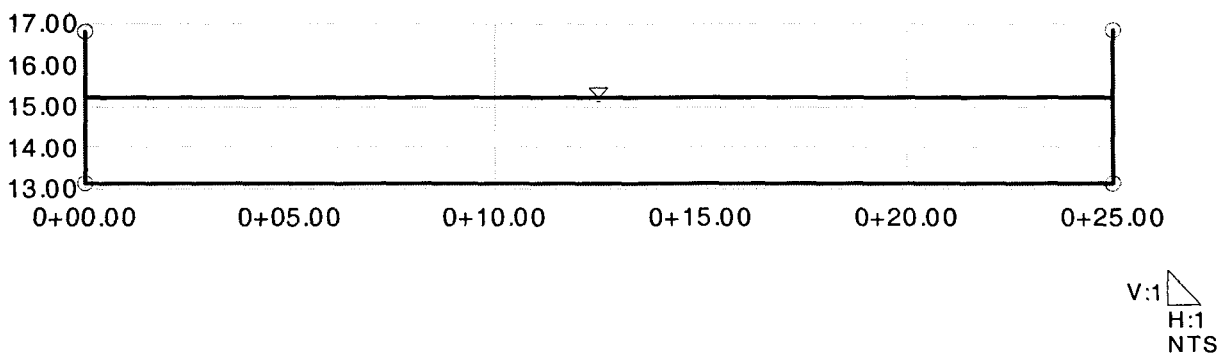
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	16.81
0+00.00	13.10
0+25.00	13.10
0+25.00	16.86

4KIDS CROSS SECTION H
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION H
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.024	
Slope	1.5000	%
Water Surface Elevation	15.22	ft
Elevation Range	13.10 to 16.86	
Discharge	597.00	cfs



4KIDS CROSS SECTION I
Worksheet for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION I
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	1.5000	%
Discharge	597.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.033	
Water Surface Elevation	1,612.34	ft
Elevation Range	1,609.50 to 1,617.05	
Flow Area	62.5	ft²
Wetted Perimeter	27.68	ft
Top Width	22.00	ft
Actual Depth	2.84	ft
Critical Elevation	1,612.34	ft
Critical Slope	1.5050	%
Velocity	9.55	ft/s
Velocity Head	1.42	ft
Specific Energy	1,613.76	ft
Froude Number	1.00	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+41.00	0.035
0+41.00	0+41.00	0.022
0+41.00	0+63.00	0.035
0+63.00	1+85.00	0.025

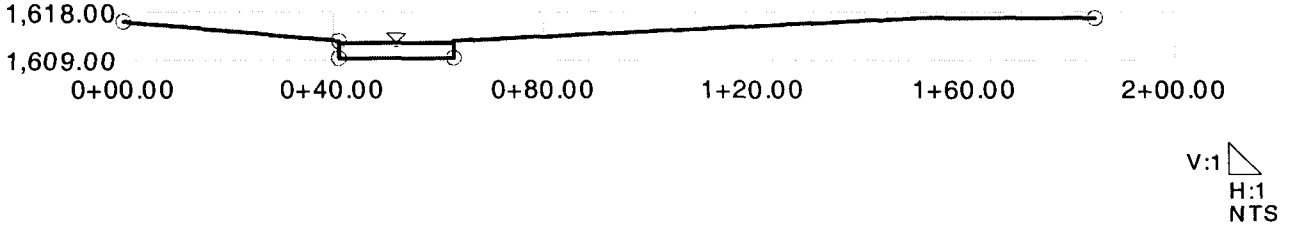
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	1,616.18
0+41.00	1,612.73
0+41.00	1,609.50
0+63.00	1,609.50
0+63.00	1,612.74
1+52.00	1,617.05
1+85.00	1,617.00

4KIDS CROSS SECTION I
Cross Section for Irregular Channel

Project Description	
Worksheet	4KIDS SECTION I
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.033	
Slope	1.5000	%
Water Surface Elevation	1,612.34	ft
Elevation Range	1,609.50 to 1,617.05	
Discharge	597.00	cfs



RCB Normal Depth Capacity Calculations for the 4-Kids & C-1 Channel

1. *12'x4' RCB at upstream end of channel*
2. *10'x5' & 8'x5' RCB's between 4-Kids & C-1 Channels*
3. *8'x4' RCB connected to C-1 Channel at apprx. STA 13+75*
4. *8'x4' RCB connected to C-1 Channel at apprx. STA 58+00*

12'x4' CULVERT CAPACITY CALCULATION @ 4-KIDS (upstream end)
Worksheet for Rectangular Channel

Project Description	
Worksheet	4-KIDS CULVERT (12x4)
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Slope	2.0000	%
Bottom Width	12.00	ft
Discharge	597.00	cfs

Results		
Depth	2.23	ft
Flow Area	26.7	ft^2
Wetted Perimeter	16.45	ft
Top Width	12.00	ft
Critical Depth	4.25	ft
Critical Slope	0.3105	%
Velocity	22.34	ft/s
Velocity Head	7.75	ft
Specific Energy	9.98	ft
Froude Number	2.64	
Flow Type	Supercritical	

12'x4' CULVERT CAPACITY CALCULATION @ 4-KIDS (upstream end)
Worksheet for Rectangular Channel

Project Description	
Worksheet	4-KIDS CULVERT (12x4)
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Slope	2.0000	%
Bottom Width	12.00	ft
Discharge	597.00	cfs

Results		
Depth	2.23	ft
Flow Area	26.7	ft^2
Wetted Perimeter	16.45	ft
Top Width	12.00	ft
Critical Depth	4.25	ft
Critical Slope	0.3105	%
Velocity	22.34	ft/s
Velocity Head	7.75	ft
Specific Energy	9.98	ft
Froude Number	2.64	
Flow Type	Supercritical	

10'x5' CULVERT CAPACITY CALCULATION @ 4-KIDS (downstream end)
Worksheet for Rectangular Channel

Project Description	
Worksheet	4-KIDS CULVERT (10x5)
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

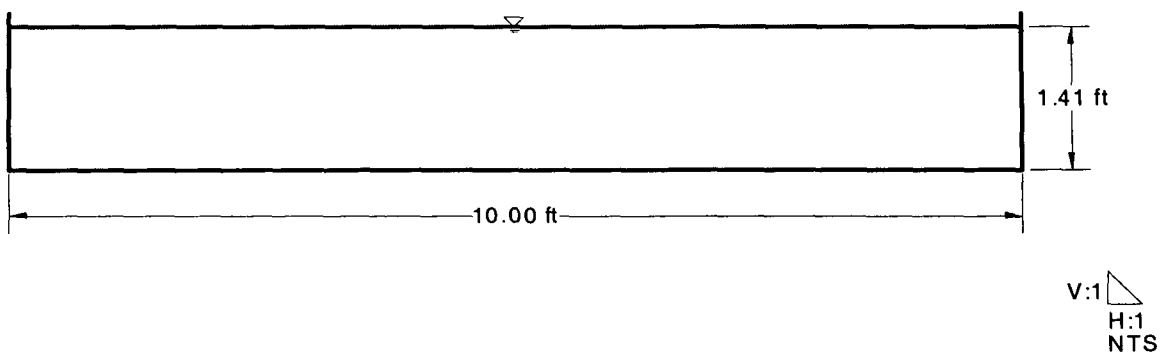
Input Data		
Mannings Coefficient	0.013	
Slope	12.0000	%
Bottom Width	10.00	ft
Discharge	597.00	cfs

Results		
Depth	1.41	ft
Flow Area	14.1	ft^2
Wetted Perimeter	12.83	ft
Top Width	10.00	ft
Critical Depth	4.80	ft
Critical Slope	0.3582	%
Velocity	42.24	ft/s
Velocity Head	27.73	ft
Specific Energy	29.14	ft
Froude Number	6.26	
Flow Type	Supercritical	

10'x5' CULVERT CAPACITY CALCULATION @ 4-KIDS (downstream end)
Cross Section for Rectangular Channel

Project Description	
Worksheet	4-KIDS CULVERT (10x5)
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Slope	12.0000	%
Depth	1.41	ft
Bottom Width	10.00	ft
Discharge	597.00	cfs



4-KIDS 8'x5' CULVERT
Rating Table for Rectangular Channel

Project Description	
Worksheet	4-KIDS 8x5 CULVERT
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.013
Bottom Width	8.00 ft
Discharge	597.00 cfs

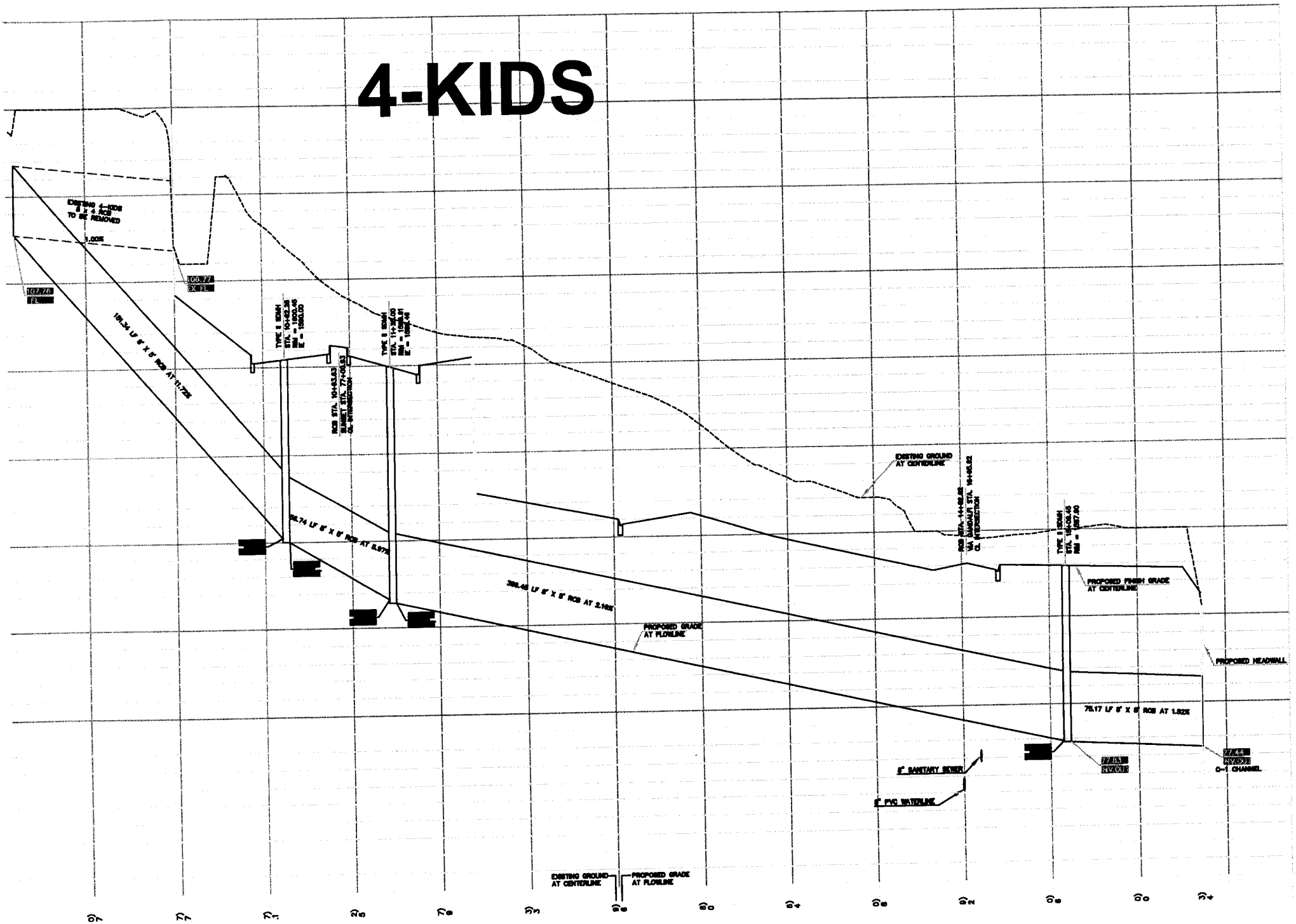
Attribute	Minimum	Maximum	Increment
Slope (%)	1.0000	12.0000	0.5000

Slope (%)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
1.0000	4.08	18.27	32.7	16.17	8.00
1.5000	3.51	21.25	28.1	15.02	8.00
2.0000	3.16	23.61	25.3	14.32	8.00
2.5000	2.91	25.60	23.3	13.83	8.00
3.0000	2.73	27.34	21.8	13.46	8.00
3.5000	2.58	28.88	20.7	13.17	8.00
4.0000	2.46	30.28	19.7	12.93	8.00
4.5000	2.36	31.57	18.9	12.73	8.00
5.0000	2.28	32.76	18.2	12.56	8.00
5.5000	2.20	33.87	17.6	12.41	8.00
6.0000	2.14	34.92	17.1	12.27	8.00
6.5000	2.08	35.91	16.6	12.16	8.00
7.0000	2.03	36.84	16.2	12.05	8.00
7.5000	1.98	37.73	15.8	11.96	8.00
8.0000	1.93	38.58	15.5	11.87	8.00
8.5000	1.89	39.40	15.2	11.79	8.00
9.0000	1.86	40.18	14.9	11.71	8.00
9.5000	1.82	40.93	14.6	11.65	8.00
10.0000	1.79	41.66	14.3	11.58	8.00
10.5000	1.76	42.36	14.1	11.52	8.00
11.0000	1.73	43.04	13.9	11.47	8.00
11.5000	1.71	43.69	13.7	11.42	8.00
12.0000	1.68	44.33	13.5	11.37	8.00

4-Kids culvert has several grade breaks and the slope ranges between 1.5% and 12%.

See attached culvert plan & profile

4-KIDS


Existing 4'x4' RCB TO BE REMOVED
3.00%
TYPE S SDMH
TYPE S SDMH
RCB STA. 10+53.43 SKIRT STA. 77+05.83 CL INTERSECTION
189.34 LF 6' X 5' RCB AT 10.72%
98.74 LF 6' X 5' RCB AT 5.97%
386.48 LF 6' X 5' RCB AT 2.16%
EXISTING GROUND AT CENTERLINE
RCB STA. 14+82.85 VIA DANJUR STA. 16+05.52 CL INTERSECTION
TYPE S SDMH
PROPOSED FINISH GRADE AT CENTERLINE
PROPOSED GRADE AT FLOWLINE
PROPOSED HEADWALL
75.17 LF 6' X 6' RCB AT 1.82%
8" SANITARY SEWER
8" PVC WATERLINE
EXISTING GROUND AT CENTERLINE
PROPOSED GRADE AT FLOWLINE
D-1 CHANNEL

8'x4' CULVERT CAPACITY CALCULATION @ C-1 CHANNEL (STA 13+75)
Worksheet for Rectangular Channel

Project Description	
Worksheet	C-1 CHANNEL CULVERT (8'x4')
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

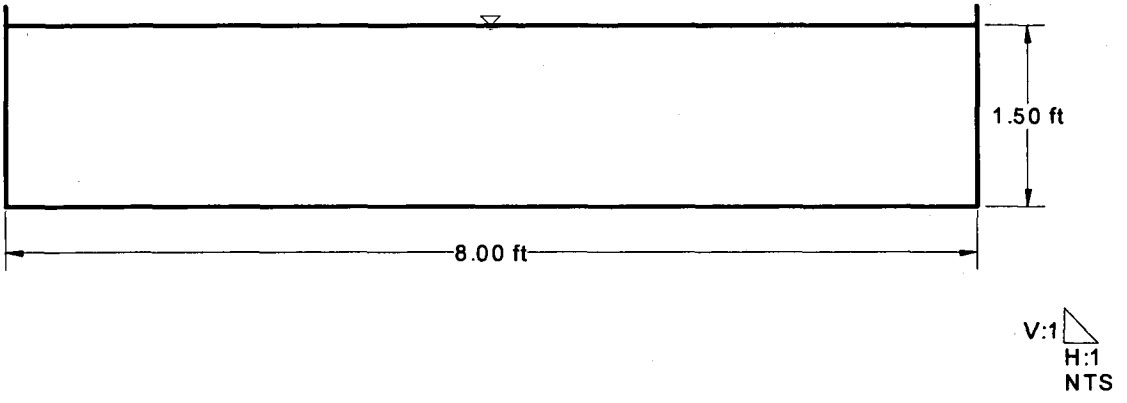
Input Data		
Mannings Coefficient	0.013	
Slope	0.7500	%
Bottom Width	8.00	ft
Discharge	126.00	cfs

Results		
Depth	1.50	ft
Flow Area	12.0	ft²
Wetted Perimeter	11.00	ft
Top Width	8.00	ft
Critical Depth	1.98	ft
Critical Slope	0.3352	%
Velocity	10.49	ft/s
Velocity Head	1.71	ft
Specific Energy	3.21	ft
Froude Number	1.51	
Flow Type	Supercritical	

8'x4' CULVERT CAPACITY CALCULATION @ C-1 CHANNEL (STA 13+75)
Cross Section for Rectangular Channel

Project Description	
Worksheet	C-1 CHANNEL CULVERT (8'x4')
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Slope	0.7500	%
Depth	1.50	ft
Bottom Width	8.00	ft
Discharge	126.00	cfs



8'x4' CULVERT CAPACITY CALCULATION @ C-1 CHANNEL (STA 58+00)
Worksheet for Rectangular Channel

Project Description	
Worksheet	C-1 CHANNEL CULVERT (8'x4') - a
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

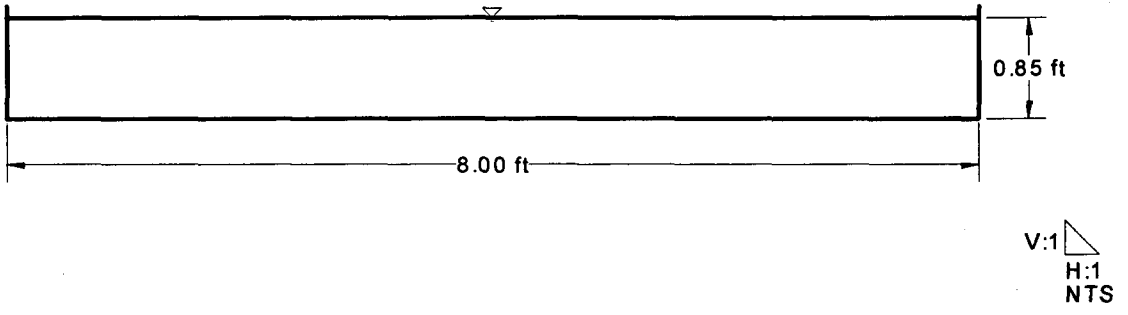
Input Data		
Mannings Coefficient	0.013	
Slope	1.5000	%
Bottom Width	8.00	ft
Discharge	75.00	cfs

Results		
Depth	0.85	ft
Flow Area	6.8	ft^2
Wetted Perimeter	9.70	ft
Top Width	8.00	ft
Critical Depth	1.40	ft
Critical Slope	0.3284	%
Velocity	11.04	ft/s
Velocity Head	1.89	ft
Specific Energy	2.74	ft
Froude Number	2.11	
Flow Type	Supercritical	

8'x4' CULVERT CAPACITY CALCULATION @ C-1 CHANNEL (STA 58+00)
Cross Section for Rectangular Channel

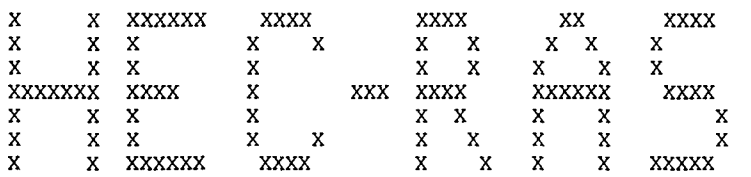
Project Description	
Worksheet	C-1 CHANNEL CULVERT (8'x4') - a
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Slope	1.5000	%
Depth	0.85	ft
Bottom Width	8.00	ft
Discharge	75.00	cfs



C-1 Channel HEC-RAS Model

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



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PROJECT DATA
Project Title: C-1 Channel LOMR
Project File : c1.prj
Run Date and Time: 7/1/2004 10:25:48 AM

Project in English units

Project Description:
C-1 Channel LOMR 07/01/04

****

PLAN DATA

Plan Title: C-1 Channel Final
Plan File : L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.p02

Geometry Title: C-1 Channel Final
Geometry File : L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01

Flow Title : C-1 Channel Final
Flow File : L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01

Plan Summary Information:
Number of: Cross Sections = 177 Mulitple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 1 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 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: Mixed Flow

****

FLOW DATA

Flow Title: C-1 Channel Final
Flow File : L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01

Flow Data (cfs)

River	Reach	RS	PF 1
C-1 Channel	1	8	6019
C-1 Channel	1	-21.	6019
C-1 Channel	1	-1320.	6045
C-1 Channel	1	-2347.4	6045
C-1 Channel	1	-3084.2	6208
C-1 Channel	1	-5700.	6228
C-1 Channel	1	-6650.	6228
C-1 Channel	1	-8229.8	6255

River	Reach	Profile	Upstream	Downstream
C-1 Channel	1	PF 1	Normal S = 0.0316	Critical

GEOMETRY DATA

Geometry Title: C-1 Channel Final
Geometry File : L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 8

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-17	1735.37	-7	1726.25	7	1726.25	17	1735.37

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-17	.015	-17	.015	17	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-17	17	55.33	55.33	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1763.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	31.32	Wt. n-Val.		0.015	
W.S. Elev (ft)	1732.63	Reach Len. (ft)	55.33	55.33	55.33
Crit W.S. (ft)	1738.82	Flow Area (sq ft)		134.02	
E.G. Slope (ft/ft)	0.031651	Area (sq ft)		134.02	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	44.91	Avg. Vel. (ft/s)		44.91	
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)		4.79	
Conv. Total (cfs)	33832.2	Conv. (cfs)		33832.2	
Length Wtd. (ft)	55.33	Wetted Per. (ft)		32.94	
Min Ch El (ft)	1726.25	Shear (lb/sq ft)		8.04	
Alpha	1.00	Stream Power (lb/ft s)		361.03	
Frctn Loss (ft)		Cum Volume (acre-ft)		86.43	
C & E Loss (ft)		Cum SA (acres)		17.08	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 7

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-15	1733.55	-10	1724.61	10	1724.61	15	1733.55

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-15	.015	-15	.015	15	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-15	15	94.26	94.26	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1762.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	31.78	Wt. n-Val.		0.015	
W.S. Elev (ft)	1730.34	Reach Len. (ft)	94.26	94.26	94.26
Crit W.S. (ft)	1736.85	Flow Area (sq ft)		133.04	
E.G. Slope (ft/ft)	0.032688	Area (sq ft)		133.04	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	26.41	Top Width (ft)		26.41	

* Max Chl Dpth (ft)	*	5.73	* Hydr. Depth (ft)	*		*	5.04	*	
* Conv. Total (cfs)	*	33291.1	* Conv. (cfs)	*		*	33291.1	*	
* Length Wtd. (ft)	*	94.26	* Wetted Per. (ft)	*		*	33.14	*	
* Min Ch El (ft)	*	1724.61	* Shear (lb/sq ft)	*		*	8.19	*	
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	370.68	*	
* Frctn Loss (ft)	*	1.78	* Cum Volume (acre-ft)	*		*	86.26	*	
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*		*	17.04	*	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 6

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12.29	1732.7	-12.29	1721.7	12.29	1721.7	12.29	1732.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-12.29	.015	-12.29	.015	12.29	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-12.29	12.29	270.97	270.97	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	*	1758.90	* Element	*	Left OB	*	Channel	*	Right OB
* Vel Head (ft)	*	31.79	* Wt. n-Val.	*		*	0.015	*	
* W.S. Elev (ft)	*	1727.11	* Reach Len. (ft)	*	270.97	*	270.97	*	270.97
* Crit W.S. (ft)	*	1734.00	* Flow Area (sq ft)	*		*	133.03	*	
* E.G. Slope (ft/ft)	*	0.035715	* Area (sq ft)	*		*	133.03	*	
* Q Total (cfs)	*	6019.00	* Flow (cfs)	*		*	6019.00	*	
* Top Width (ft)	*	24.58	* Top Width (ft)	*		*	24.58	*	
* Vel Total (ft/s)	*	45.25	* Avg. Vel. (ft/s)	*		*	45.25	*	
* Max Chl Dpth (ft)	*	5.41	* Hydr. Depth (ft)	*		*	5.41	*	
* Conv. Total (cfs)	*	31849.3	* Conv. (cfs)	*		*	31849.3	*	
* Length Wtd. (ft)	*	270.97	* Wetted Per. (ft)	*		*	35.40	*	
* Min Ch El (ft)	*	1721.70	* Shear (lb/sq ft)	*		*	8.38	*	
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	379.07	*	
* Frctn Loss (ft)	*	3.22	* Cum Volume (acre-ft)	*		*	85.97	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*		*	16.99	*	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CULVERT

RIVER: C-1 Channel
REACH: 1 RS: 5.5

INPUT
Description:
Distance from Upstream XS = .05
Deck/Roadway Width = 270.87
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-12.29	1734.92	0	12.29	1734.39	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12.29	1732.7	-12.29	1721.7	12.29	1721.7	12.29	1732.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-12.29	.015	-12.29	.015	12.29	.015

```
       -12.29   12.29             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
  -12.29 1732.59       0   12.29  1732.1       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
***************************************************************
  -12.29 1725.13  -12.29 1713.13   12.29 1713.13   12.29 1725.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -12.29    .015  -12.29    .015   12.29    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
       -12.29   12.29             .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         = 1734.92
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      10      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .05  270.87     .015     .015        0                  .7                1
Number of Barrels =  2
Upstream   Elevation =  1721.7
Centerline Stations
    Sta.    Sta.
   -6.29    6.29
Downstream Elevation =  1713.13
Centerline Stations
    Sta.    Sta.
   -6.29    6.29

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #1
**********************************************************************
* Q Culv Group (cfs)     * 5096.10  * Culv Full Len (ft)     *  270.87  *
* # Barrels              *       2  * Culv Vel US (ft/s)     *   34.29  *
* Q Barrel (cfs)         * 2548.05  * Culv Vel DS (ft/s)     *   35.29  *
* E.G. US. (ft)          * 1758.90  * Culv Inv El Up (ft)    * 1721.70  *
* W.S. US. (ft)          * 1758.90  * Culv Inv El Dn (ft)    * 1713.13  *
* E.G. DS (ft)           * 1731.58  * Culv Frctn Ls (ft)     *    7.67  *
* W.S. DS (ft)           * 1725.41  * Culv Exit Loss (ft)    *    6.90  *
* Delta EG (ft)          *   27.32  * Culv Entr Loss (ft)    *   12.75  *
* Delta WS (ft)          *   33.49  * Q Weir (cfs)           *          *
* E.G. IC (ft)           *          * Weir Sta Lft (ft)      *  -12.29  *
* E.G. OC (ft)           *          * Weir Sta Rgt (ft)      *   12.29  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     * 1727.89  * Weir Max Depth (ft)    *    6.20  *
* Culv WS Outlet (ft)    * 1719.15  * Weir Avg Depth (ft)    *    5.93  *
* Culv Nml Depth (ft)    *    5.84  * Weir Flow Area (sq ft) *  145.76  *
* Culv Crt Depth (ft)    *   10.00  * Min El Weir Flow (ft)  * 1734.92  *
**********************************************************************

Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the
         downstream cross section.  The program used the solution with the least error.
Note:    Culvert critical depth exceeds the height of the culvert.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: 5

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
  -12.29 1725.13  -12.29 1713.13   12.29 1713.13   12.29 1725.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -12.29    .015  -12.29    .015   12.29    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       -12.29   12.29            16.01   16.01   16.01            .3       .5

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1744.86  * Element              *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   25.72  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1719.15  * Reach Len. (ft)      *   16.01  *   16.01  *   16.01  *
* Crit W.S. (ft)        * 1725.41  * Flow Area (sq ft)    *          *  147.91  *          *
* E.G. Slope (ft/ft)    *0.026232  * Area (sq ft)         *          *  147.91  *          *
* Q Total (cfs)         * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)        *   24.58  * Top Width (ft)       *          *   24.58  *          *
* Vel Total (ft/s)      *   40.69  * Avg. Vel. (ft/s)     *          *   40.69  *          *
* Max Chl Dpth (ft)     *    6.02  * Hydr. Depth (ft)     *          *    6.02  *          *
* Conv. Total (cfs)     * 37163.0  * Conv. (cfs)          *          * 37163.0  *          *
* Length Wtd. (ft)      *   16.01  * Wetted Per. (ft)     *          *   36.61  *          *
* Min Ch El (ft)        * 1713.13  * Shear (lb/sq ft)     *          *    6.62  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *  269.21  *          *
* Frctn Loss (ft)       *          * Cum Volume (acre-ft)  *          *   85.09  *          *
* C & E Loss (ft)       *          * Cum SA (acres)        *          *   16.83  *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: 4

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************
     -14 1725.32     -14 1712.32      14 1712.32      14 1725.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
     -14    .015     -14    .015      14    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -14      14            47.91   47.91   47.91            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1744.15  * Element              *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   26.64  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1717.51  * Reach Len. (ft)      *   47.91  *   47.91  *   47.91  *
* Crit W.S. (ft)        * 1723.58  * Flow Area (sq ft)    *          *  145.33  *          *
* E.G. Slope (ft/ft)    *0.029618  * Area (sq ft)         *          *  145.33  *          *
* Q Total (cfs)         * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)        *   28.00  * Top Width (ft)       *          *   28.00  *          *
* Vel Total (ft/s)      *   41.42  * Avg. Vel. (ft/s)     *          *   41.42  *          *
* Max Chl Dpth (ft)     *    5.19  * Hydr. Depth (ft)     *          *    5.19  *          *
* Conv. Total (cfs)     * 34974.2  * Conv. (cfs)          *          * 34974.2  *          *
* Length Wtd. (ft)      *   47.91  * Wetted Per. (ft)     *          *   38.38  *          *
* Min Ch El (ft)        * 1712.32  * Shear (lb/sq ft)     *          *    7.00  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *  289.97  *          *
* Frctn Loss (ft)       *    0.45  * Cum Volume (acre-ft)  *          *   85.04  *          *
* C & E Loss (ft)       *    0.28  * Cum SA (acres)        *          *   16.82  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: 3

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-17	.015	-17	.015	17	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
-17	17	26.77	26.77	26.77	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1741.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	31.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	1710.21	Reach Len. (ft)	26.77	26.77	26.77
Crit W.S. (ft)	1716.17	Flow Area (sq ft)		133.19	
E.G. Slope (ft/ft)	*0.044438	Area (sq ft)		133.19	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	34.00	Top Width (ft)		34.00	
Vel Total (ft/s)	45.19	Avg. Vel. (ft/s)		45.19	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.92	
Conv. Total (cfs)	28552.6	Conv. (cfs)		28552.6	
Length Wtd. (ft)	26.77	Wetted Per. (ft)		41.83	
Min Ch El (ft)	1706.29	Shear (lb/sq ft)		8.83	
Alpha	1.00	Stream Power (lb/ft s)		399.15	
Frctn Loss (ft)	1.72	Cum Volume (acre-ft)		84.89	
C & E Loss (ft)	0.51	Cum SA (acres)		16.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 2.5

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-19	1724.29	-19	1699.95	19	1699.95	19	1724.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-19	.015	-19	.015	19	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
-19	19		7	7	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1740.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	36.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1703.20	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	1709.15	Flow Area (sq ft)		123.63	
E.G. Slope (ft/ft)	*0.061866	Area (sq ft)		123.63	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	38.00	Top Width (ft)		38.00	
Vel Total (ft/s)	48.69	Avg. Vel. (ft/s)		48.69	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	24199.1	Conv. (cfs)		24199.1	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		44.51	
Min Ch El (ft)	1699.95	Shear (lb/sq ft)		10.73	
Alpha	1.00	Stream Power (lb/ft s)		522.33	
Frctn Loss (ft)	1.39	Cum Volume (acre-ft)		84.81	
C & E Loss (ft)	0.51	Cum SA (acres)		16.77	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 2.25*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-19.5	1723.96	-19.5	1698.29	19.5	1698.29	19.5	1723.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-19.5	.015	-19.5	.015	19.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.5	19.5	7	7	.1	.3

Blocked Obstructions num= 8

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-17.65	-15.3	1699.95	-12.95	-10.6	1699.95	-8.25	-5.9	1699.95
-3.55	-1.2	1699.95	1.15	3.5	1699.95	5.85	8.2	1699.95
10.55	12.9	1699.95	15.25	17.6	1699.95			

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1739.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	37.14	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.25	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	1708.13	Flow Area (sq ft)		123.08	
E.G. Slope (ft/ft)	0.122506	Area (sq ft)		123.08	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	48.91	Avg. Vel. (ft/s)		48.91	
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	17196.7	Conv. (cfs)		17196.7	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		73.47	
Min Ch El (ft)	1698.29	Shear (lb/sq ft)		12.81	
Alpha	1.00	Stream Power (lb/ft s)		626.56	
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		84.79	
C & E Loss (ft)	0.03	Cum SA (acres)		16.76	

arning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 2

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	1723.63	-20	1696.63	20	1696.63	20	1723.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-20	.015	-20	.015	20	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	20	18	18	.1	.3

Blocked Obstructions num= 8

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-17.65	-15.3	1699.95	-12.95	-10.6	1699.95	-8.25	-5.9	1699.95
-3.55	-1.2	1699.95	1.15	3.5	1699.95	5.85	8.2	1699.95
10.55	12.9	1699.95	15.25	17.6	1699.95			

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1738.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	37.04	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.27	Reach Len. (ft)	18.00	18.00	18.00
Crit W.S. (ft)	1707.08	Flow Area (sq ft)		123.24	
E.G. Slope (ft/ft)	0.189859	Area (sq ft)		123.24	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	48.84	Avg. Vel. (ft/s)		48.84	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	13813.7	Conv. (cfs)		13813.7	
Length Wtd. (ft)	18.00	Wetted Per. (ft)		102.40	

Alpha	1.00	Stream Power (lb/ft s)		696.69				
Frctn Loss (ft)	1.05	Cum Volume (acre-ft)		84.77				
C & E Loss (ft)	0.03	Cum SA (acres)		16.75				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 1.75

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	1723.63	-20	1696.63	20	1696.63	20	1723.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-20	.015	-20	.015	20	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	20	23	23	.1	.3

Blocked Obstructions num= 9

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-20	-17.65	1699.95	-15.3	-12.95	1699.95	-10.6	-8.25	1699.95
-5.9	-3.55	1699.95	-1.2	1.15	1699.95	3.5	5.85	1699.95
8.2	10.55	1699.95	12.9	15.25	1699.95	17.65	20	1699.95

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1733.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	32.28	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.69	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	1707.26	Flow Area (sq ft)		132.01	
E.G. Slope (ft/ft)	0.139680	Area (sq ft)		132.01	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	45.60	Avg. Vel. (ft/s)		45.60	
Max Chl Dpth (ft)	5.06	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	16104.9	Conv. (cfs)		16104.9	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		96.59	
Min Ch El (ft)	1696.63	Shear (lb/sq ft)		11.92	
Alpha	1.00	Stream Power (lb/ft s)		543.40	
Frctn Loss (ft)	2.91	Cum Volume (acre-ft)		84.72	
C & E Loss (ft)	1.43	Cum SA (acres)		16.74	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 1.5

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	1723.63	-20	1696.63	20	1696.63	20	1723.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-20	.015	-20	.015	20	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	20	28	28	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-20	20	1697.2

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1731.87	Element	Left OB	Channel	Right OB	
Vel Head (ft)	31.31	Wt. n-Val.		0.015		
W.S. Elev (ft)	1700.55	Reach Len. (ft)	28.00	28.00	28.00	
Crit W.S. (ft)	1706.08	Flow Area (sq ft)		134.03		
E.G. Slope (ft/ft)	*0.050386	Area (sq ft)		134.03		
Q Total (cfs)	6019.00	Flow (cfs)		6019.00		
Top Width (ft)	40.00	Top Width (ft)		40.00		
Vel Total (ft/s)	44.91	Avg. Vel. (ft/s)		44.91		
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		3.35		
Conv. Total (cfs)	26814.5	Conv. (cfs)		26814.5		
Length Wtd. (ft)	28.00	Wetted Per. (ft)		46.70		
Min Ch El (ft)	1697.20	Shear (lb/sq ft)		9.03		
Alpha	1.00	Stream Power (lb/ft s)		405.41		
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)		84.65		
C & E Loss (ft)	0.29	Cum SA (acres)		16.72		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: 1

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	1723.63	-20	1696.63	20	1696.63	20	1723.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-20	.015	-20	.015	20	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20	20	26	26	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1730.13	Element	Left OB	Channel	Right OB	
Vel Head (ft)	30.08	Wt. n-Val.		0.015		
W.S. Elev (ft)	1700.05	Reach Len. (ft)	26.00	26.00	26.00	
Crit W.S. (ft)	1705.51	Flow Area (sq ft)		136.76		
E.G. Slope (ft/ft)	*0.047300	Area (sq ft)		136.76		
Q Total (cfs)	6019.00	Flow (cfs)		6019.00		
Top Width (ft)	40.00	Top Width (ft)		40.00		
Vel Total (ft/s)	44.01	Avg. Vel. (ft/s)		44.01		
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		3.42		
Conv. Total (cfs)	27675.3	Conv. (cfs)		27675.3		
Length Wtd. (ft)	26.00	Wetted Per. (ft)		46.84		
Min Ch El (ft)	1696.63	Shear (lb/sq ft)		8.62		
Alpha	1.00	Stream Power (lb/ft s)		379.48		
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)		84.56		
C & E Loss (ft)	0.37	Cum SA (acres)		16.69		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

IVER: C-1 Channel
EACH: 1 RS: -2.

INPUT
Description:
Station Elevation Data num= 158

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-79.66	1706	-78.47	1706.8	-78.15	1707	-76.81	1707.9	-76.66	1708

-70.83	1711.95	-70.69	1712.05	-69.64	1712.86	-69.47	1712.99	-68.22	1713.88
-68.06	1714	-66.81	1714.93	-66.69	1715	-66.62	1715.06	-65.3	1716
-64.92	1716.23	-64.81	1716.37	-63.85	1717	-62.89	1717.78	-62.49	1718
-62.04	1718.23	-61.01	1718.43	-58.07	1718.56	-57.46	1718.59	-56.48	1718.62
-56.01	1718.56	-55.74	1718.55	-53.11	1718	-51.37	1717.64	-48.19	1717
-46.61	1716.69	-46.25	1716.59	-45.22	1716.26	-45.06	1716.2	-44.73	1716
-44.03	1715.53	-43.08	1715	-42.17	1714.5	-41.35	1714	-40.51	1713.53
-39.87	1713.09	-39.72	1713	-38.15	1712.08	-38.01	1712	-36.41	1711.07
-36.29	1711	-36.19	1710.94	-34.55	1710	-34.1	1709.76	-32.81	1709
-31.79	1708.22	-31.45	1708	-31.14	1707.75	-30.27	1707	-29.53	1706.41
-29.09	1706	-28.27	1705.31	-28.16	1705.21	-27.95	1705	-27.01	1704.04
-26.84	1703.83	-25.88	1703	-25.57	1702.75	-24.78	1702	-24.06	1701.42
-23.59	1701	-23.01	1700.48	-22.47	1700	-21.87	1699.59	-21.15	1699
-20.89	1698.92	-18.76	1698	-13.91	1697.64	12.47	1697	15.21	1697
15.35	1697.68	15.44	1698	15.51	1698.35	15.65	1699	15.73	1699.34
15.86	1700	15.94	1700.34	16.14	1701	16.34	1701.83	16.49	1702.9
16.5	1703.04	16.71	1704	16.93	1705.04	17.14	1706	17.53	1706.41
18.32	1707	18.76	1707.29	19.9	1708	21.31	1708.93	21.45	1709
22.82	1709.88	23.04	1710	24.3	1710.89	24.57	1711	25.33	1711.32
25.68	1711.37	26.63	1711.97	26.83	1712.16	27.65	1713	27.71	1713.05
28.52	1714	29.14	1714.71	29.39	1715	30.13	1715.84	30.28	1716
30.44	1716.16	31.19	1717	31.42	1717.23	32.11	1718	32.43	1718.32
33.05	1719	33.83	1719.79	34.05	1720	34.41	1720.36	35.03	1721
35.41	1721.41	36.05	1722	38.04	1722.29	41.56	1722.28	44.95	1722.44
48.79	1722.56	51.32	1722.61	52.09	1722.62	59.28	1722.56	59.91	1722.57
60.66	1722.54	61.9	1722.54	62.47	1722.53	63.12	1722.52	63.57	1722.51
64.37	1722.49	64.76	1722.49	66.82	1722.44	67.56	1722.44	70.07	1722.42
72.61	1722.44	74.2	1722.46	74.98	1722.48	77.88	1722.52	78.54	1722.53
84.06	1722.64	85.3	1722.68	85.73	1722.69	86.13	1722.7	94.12	1722.92
94.91	1722.95	96.74	1723	100	1723.07				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-79.66	.03	-58.07	.028	36.05	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-58.07	36.05	250	250	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1726.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	25.55	Wt. n-Val.		0.028	
W.S. Elev (ft)	1701.37	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	1706.60	Flow Area (sq ft)		148.38	
E.G. Slope (ft/ft)	0.118294	Area (sq ft)		148.38	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	40.23	Top Width (ft)		40.23	
Vel Total (ft/s)	40.57	Avg. Vel. (ft/s)		40.57	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.69	
Conv. Total (cfs)	17500.2	Conv. (cfs)		17500.2	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		44.78	
Min Ch El (ft)	1697.00	Shear (lb/sq ft)		24.47	
Alpha	1.00	Stream Power (lb/ft s)		992.63	
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)		84.47	
C & E Loss (ft)	1.36	Cum SA (acres)		16.67	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -4.5

INPUT
Description:
Station Elevation Data num= 134

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1713	-96.14	1713	-95.67	1713.01	-77.59	1713.63	-74.04	1713.74
-71.31	1713.83	-70.01	1713.88	-68.61	1713.92	-66.34	1714	-54.84	1714.68
-50.63	1715	-48.05	1715.26	-42.61	1716	-40.58	1716.84	-40.16	1717
-39.55	1717.24	-37.54	1718	-36.66	1718.34	-35.21	1719	-32.64	1719.99
-32.54	1719.99	-19.31	1719	-19.18	1718.61	-18.99	1718	-18.87	1717.62
-18.67	1717	-18.55	1716.62	-18.36	1716	-18.23	1715.53	-18.04	1715
-17.93	1714.62	-17.73	1714	-17.61	1713.62	-17.41	1713	-17.29	1712.62

-16.42	1709.8	-16.15	1709	-16.05	1708.68	-15.83	1708	-15.73	1707.68
-15.52	1707	-15.42	1706.68	-15.2	1706	-14.96	1705.22	-14.9	1705
-14.63	1704.19	-14.55	1704	-14.25	1703.02	-13.96	1702.09	-13.93	1702
-13.62	1701	-13.32	1700.05	-13.3	1700	-13.18	1699.62	-12.95	1699
-12.92	1698.84	-12.62	1698	-12.37	1697.06	-12.34	1697	-12.33	1696.95
-11.98	1696	-2.6	1696	0	1696.13	6.1	1696.42	14.33	1697
14.59	1697.35	15.08	1698	15.38	1698.39	15.83	1699	16.29	1699.63
16.54	1700	17.04	1700.67	17.28	1701	17.78	1701.67	18.02	1702
18.34	1702.38	18.8	1703	19.26	1703.63	19.54	1704	19.84	1704.39
20.32	1705	20.75	1705.62	21.07	1706	21.52	1706.53	21.87	1707
22.3	1707.55	22.65	1708	22.97	1708.46	23.45	1709	23.98	1709.68
24.21	1710	24.76	1710.7	24.98	1711	25.62	1711.79	25.78	1712
26.62	1712.3	27.39	1712.57	28.48	1713	30.4	1713.62	31.62	1714
32.21	1714.32	33.26	1715	34.09	1715.75	34.49	1716	35.01	1716.45
35.61	1717	38.99	1717	42.01	1717.88	42.07	1718	43.65	1718
46.06	1718.09	46.17	1718.09	47.81	1718.14	59.71	1718.37	61.28	1718.39
62.48	1718.39	63.6	1718.4	64.96	1718.43	68.54	1718.52	71.65	1718.56
73.57	1718.61	75.45	1718.65	76.64	1718.67	86.8	1718.9	89.72	1719
89.89	1719	94	1719.16	95.15	1719.2	100	1719.39		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-32.64	.028	35.61	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-32.64	35.61	349.96	349.96	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1712.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.65	Wt. n-Val.		0.028	
W.S. Elev (ft)	1705.14	Reach Len. (ft)	349.96	349.96	349.96
Crit W.S. (ft)	1707.26	Flow Area (sq ft)		271.10	
E.G. Slope (ft/ft)	0.016500	Area (sq ft)		271.10	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	35.36	Top Width (ft)		35.36	
Vel Total (ft/s)	22.20	Avg. Vel. (ft/s)		22.20	
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)		7.67	
Conv. Total (cfs)	46857.2	Conv. (cfs)		46857.2	
Length Wtd. (ft)	349.96	Wetted Per. (ft)		46.12	
Min Ch El (ft)	1696.00	Shear (lb/sq ft)		6.05	
Alpha	1.00	Stream Power (lb/ft s)		134.43	
Frctn Loss (ft)	8.75	Cum Volume (acre-ft)		83.27	
C & E Loss (ft)	5.37	Cum SA (acres)		16.45	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -8.

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1707.58	-98.37	1707.63	-97.58	1707.64	-94.92	1707.72	-94.21	1707.73
-93.56	1707.75	-85.97	1707.96	-84.78	1708	-83.07	1708.14	-81.3	1708.31
-80.3	1708.43	-78.48	1709	-76.47	1709.7	-75.68	1710	-73.23	1710.88
-72.27	1711.23	-70.05	1712	-68.05	1712.73	-67.36	1713	-66.48	1713.17
-66.32	1713.28	-65.37	1713.63	-64.24	1714	-36.91	1714	-36.75	1713.92
-34.88	1713	-33.41	1712.21	-33	1712	-32.21	1711.6	-30.98	1711
-30.24	1710.61	-29.04	1710	-28.1	1709.52	-27.1	1709	-26.03	1708.44
-25.21	1708	-24.8	1707.53	-24.11	1707	-23.64	1706.48	-23.13	1706
-22.75	1705.5	-22.32	1705	-21.43	1704	-21.34	1703.9	-20.56	1703
-19.81	1702.14	-19.69	1702	-18.98	1701.17	-18.83	1701	-18.51	1700.6
-18	1700	-17.92	1699.9	-17.15	1699	-17.02	1698.86	-16.31	1698
-15.57	1697.19	-15.44	1697	-15.22	1696.76	-14.63	1696	-13.76	1695.02
-12.99	1694	-12.35	1693.25	-12.16	1693	-11.98	1692.8	-11.37	1692
-11.05	1691.42	-10.82	1691	-10.07	1690.32	-9.75	1690	-8.69	1689.02
-7.52	1688	-6.69	1687.4	-6.19	1687	6.94	1687	7.54	1687.25
9.55	1688	9.93	1688.15	12.15	1689	12.69	1689.41	13.71	1690
13.99	1690.38	14.58	1691	14.82	1691.32	15.34	1692	15.8	1692.64
16.11	1693	16.37	1693.47	16.73	1694	16.99	1694.39	17.56	1695

20.29	1698.96	20.72	1699.68	20.95	1700	21.41	1700.75	21.53	1701
21.68	1701.43	21.97	1702	22.38	1702.76	22.48	1703	22.87	1703.67
23.07	1704	23.56	1704.69	23.65	1705	23.97	1705.68	24.13	1706
24.57	1706.72	24.68	1707	25.07	1707.69	25.22	1708	25.58	1708.63
25.76	1709	26.2	1709.78	26.32	1710	26.55	1710.38	27.09	1710.74
27.68	1711	38.27	1711	63.26	1711.6	90.23	1712.43	90.29	1712.43
100	1713.03								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-36.91	.028	27.68	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.91	27.68	250.03	250.03	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1706.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.59	Wt. n-Val.		0.028	
W.S. Elev (ft)	1696.50	Reach Len. (ft)	250.03	250.03	250.03
Crit W.S. (ft)	1699.50	Flow Area (sq ft)		242.15	
E.G. Slope (ft/ft)	0.021059	Area (sq ft)		242.15	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	33.56	Top Width (ft)		33.56	
Vel Total (ft/s)	24.86	Avg. Vel. (ft/s)		24.86	
Max Chl Dpth (ft)	9.50	Hydr. Depth (ft)		7.22	
Conv. Total (cfs)	41477.3	Conv. (cfs)		41477.3	
Length Wtd. (ft)	250.03	Wetted Per. (ft)		41.76	
Min Ch El (ft)	1687.00	Shear (lb/sq ft)		7.62	
Alpha	1.00	Stream Power (lb/ft s)		189.49	
Frctn Loss (ft)	6.50	Cum Volume (acre-ft)		81.21	
C & E Loss (ft)	0.19	Cum SA (acres)		16.17	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -10.5

INPUT
Description:
Station Elevation Data num= 133

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1702.02	-96.68	1702.2	-92.71	1702.28	-78.25	1702.69	-68.13	1703
-67.48	1703.85	-67.44	1703.93	-67.36	1704	-66.63	1705	-66.3	1705.46
-65.9	1706	-64.67	1706.8	-64.53	1707	-63.16	1707.58	-62.13	1708
-61.23	1708.32	-59.61	1709	-57.04	1710	-30.48	1710	-28.62	1709.04
-28.55	1709	-26.35	1707.9	-24.64	1707	-24.62	1706.95	-24.22	1706.26
-24.04	1706	-23.56	1705.19	-23.45	1705	-23.02	1704.19	-22.92	1704
-22.4	1703.14	-22.32	1703	-21.8	1702.14	-21.72	1702	-21.63	1701.84
-21.12	1701	-20.71	1700.35	-20.45	1700	-20.23	1699.61	-19.84	1699
-19.76	1698.85	-19.25	1698	-18.8	1697.12	-18.73	1697	-18.59	1696.82
-17.95	1696	-17.51	1695.14	-17.43	1695	-17.28	1694.72	-16.85	1694
-16.51	1693.53	-16.17	1693	-15.89	1692.47	-15.65	1692	-15.36	1691.6
-14.99	1691	-14.77	1690.61	-14.46	1690	-13.97	1689.22	-13.85	1689
-13.47	1688.39	-13.26	1688	-12.89	1687.4	-12.66	1687	-12.17	1686.25
-11.99	1686	-11.43	1685.05	-11.4	1685	-11.34	1684.89	-10.89	1684.09
-10.82	1684	-8.91	1683.84	-8.06	1683.78	-5.71	1683.56	-.57	1683
4.37	1683	5.21	1683.5	5.9	1683.93	5.99	1684	6.23	1684.18
7.39	1685	7.57	1685.1	9.11	1685.91	9.28	1686	9.95	1686.56
10.37	1687	10.8	1687.99	11.72	1689	11.85	1689.13	12.42	1690
12.79	1690.65	13.15	1691	13.35	1691.24	13.88	1692	14.38	1692.65
14.6	1693	14.64	1693.08	15.27	1694	15.34	1694.1	15.79	1695
16.22	1695.63	16.52	1695.83	16.59	1696	17.1	1696.75	17.28	1697
17.94	1697.93	17.98	1698	18.01	1698.07	18.62	1699	18.89	1699.4
19.22	1700	19.83	1700.97	20.65	1701.99	20.79	1702.11	21.71	1703
22.44	1703.69	22.75	1704	22.82	1704.05	22.92	1704.15	23.7	1705
26.3	1705.21	28.87	1705.24	40.97	1705.58	50.2	1705.62	69.2	1705.77
70.34	1705.77	75.63	1705.74	91.54	1705.91	92.07	1705.91	97.85	1705.93
98.18	1705.94	98.78	1705.93	100	1705.93				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-30.48	.028	23.7	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.48	23.7	250	250	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1701.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.06	Wt. n-Val.		0.028	
W.S. Elev (ft)	1695.27	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	1696.29	Flow Area (sq ft)		304.80	
E.G. Slope (ft/ft)	0.011028	Area (sq ft)		304.80	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	33.55	Top Width (ft)		33.55	
Vel Total (ft/s)	19.75	Avg. Vel. (ft/s)		19.75	
Max Chl Dpth (ft)	12.27	Hydr. Depth (ft)		9.08	
Conv. Total (cfs)	57317.3	Conv. (cfs)		57317.3	
Length Wtd. (ft)	250.00	Wetted Per. (ft)		45.69	
Min Ch El (ft)	1683.00	Shear (lb/sq ft)		4.59	
Alpha	1.00	Stream Power (lb/ft s)		90.69	
Frctn Loss (ft)	3.71	Cum Volume (acre-ft)		79.64	
C & E Loss (ft)	1.06	Cum SA (acres)		15.98	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -13.

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1696	-95.11	1696	-91.76	1696.03	-91.3	1696.11	-89.6	1696
-89.4	1696	-88.5	1696.01	-87.73	1696.09	-85.83	1697	-84.24	1697.77
-83.42	1698.18	-81.85	1699	-80.23	1699.75	-79.74	1700	-79.48	1700.13
-77.81	1701	-76.39	1701.7	-75.81	1702	-46.58	1702	-45.73	1702.18
-45.05	1702.21	-37.9	1703	-33.44	1703	-32.53	1703	-30.11	1702.41
-29.67	1702.42	-29.36	1702.38	-29.15	1702.31	-28.61	1702	-28.14	1701.72
-27.11	1701	-26.18	1700.4	-25.59	1700	-24.85	1699.51	-24.05	1699
-22.55	1698.07	-22.43	1698	-22.31	1697.91	-22.14	1697.81	-20.97	1697
-20.18	1696.51	-19.5	1696	-18.89	1695.44	-18.31	1695	-17.7	1694.34
-17.45	1694	-16.92	1693.19	-16.79	1693	-16.42	1692.45	-16.15	1692
-16.03	1691.81	-15.58	1691	-14.87	1690.16	-14.75	1690	-14.65	1689.83
-14.17	1689	-13.77	1688.41	-13.47	1688	-12.86	1687.17	-12.74	1687
-12.43	1686.58	-12.07	1686	-11.82	1685.66	-11.36	1685	-10.87	1684.32
-10.65	1684	-10.2	1683.4	-9.95	1683	-9.88	1682.87	-9.69	1682.49
-9.49	1682	-9.28	1681.79	-8.69	1681	2.4	1681	5.03	1681.63
6.18	1682	8.9	1682.37	12.11	1682.66	15.65	1683	16.49	1683.44
18.19	1684	18.35	1684.43	18.6	1685	18.66	1685.15	19.01	1686
19.07	1686.14	19.54	1687	20.08	1687.41	20.8	1688	22.54	1688.79
22.98	1689	24.38	1689.66	24.99	1690	25.47	1690.85	25.56	1691
25.6	1691.09	26.11	1692	26.27	1692.38	26.68	1693	26.99	1693.56
27.32	1694	27.55	1694.25	28.13	1695	28.84	1695.95	28.88	1696
28.93	1696.07	30.54	1697.92	30.6	1698	30.69	1698.1	31.47	1699
31.74	1699.39	32.31	1700	32.83	1700.4	33.57	1701	34.36	1701.55
34.93	1702	36.69	1702.21	46.92	1702.68	61.78	1702.53	68.42	1702.49
71.67	1702.46	81.09	1702.43	83.9	1702.44	87.36	1702.47	91.72	1702.54
93.54	1702.55	98.48	1702.66	100	1702.71				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-33.44	.028	36.69	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.44	36.69	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1697.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.44	Wt. n-Val.		0.028	
W.S. Elev (ft)	1690.38	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	1692.51	Flow Area (sq ft)		274.93	
E.G. Slope (ft/ft)	0.016888	Area (sq ft)		274.93	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	40.26	Top Width (ft)		40.26	
Vel Total (ft/s)	21.89	Avg. Vel. (ft/s)		21.89	

* Conv. Total (cfs)	* 46316.3	* Conv. (cfs)	*	* 46316.3	*
* Length Wtd. (ft)	* 300.00	* Wetted Per. (ft)	*	* 48.61	*
* Min Ch El (ft)	* 1681.00	* Shear (lb/sq ft)	*	* 5.96	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 130.55	*
* Frctn Loss (ft)	* 3.37	* Cum Volume (acre-ft)	*	* 77.97	*
* C & E Loss (ft)	* 0.14	* Cum SA (acres)	*	* 15.77	*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -16.

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1695.45	-99.85	1695.43	-99.04	1695.37	-98.66	1695.33	-92.74	1695
-92	1694.98	-91.5	1694.96	-79.97	1694.57	-78.22	1694.52	-75.93	1694.45
-68.16	1695	-68.1	1695	-66.75	1696	-66.16	1696	-65.41	1696.91
-65.28	1697	-65.19	1697	-64.61	1696.59	-63.72	1696	-62.5	1695.22
-62.18	1695	-61.89	1694.8	-60.71	1694	-59.59	1693.28	-59.14	1693
-58.79	1692.77	-57.7	1692	-57.49	1691.87	-56.06	1691	-55.9	1690.89
-55.45	1690.58	-54.5	1690	-53.02	1689.07	-52.88	1689	-52.75	1688.92
-51.13	1688	-50.07	1687.32	-49.52	1687	-47.82	1686.04	-47.75	1686
-47.65	1685.94	-46.08	1685	-44.95	1684.4	-44.23	1684	-42.95	1683.26
-42.43	1683	-41.3	1682.38	-40.59	1682	-38.8	1681.07	-38.68	1681
-38.49	1681	-30.98	1680.1	-30.92	1680.11	-30.62	1680	0	1679.02
.72	1679	3.66	1678.76	14.2	1679	24.26	1679	27.68	1679.73
28.8	1680	29.12	1680.25	29.97	1681	30.86	1681.6	31.37	1682
32.6	1682.92	32.78	1683.08	33.93	1684	34.52	1684.5	35.13	1685
35.82	1685.52	36.38	1686	37.31	1686.71	37.71	1687	38.2	1687.41
39.2	1688	39.47	1688.04	43.01	1689	44.4	1689.62	45.23	1690
46.2	1690.46	47.45	1691	49.39	1691.53	49.92	1691.53	50.27	1691.52
59.75	1691.36	61.22	1691.28	62.8	1691.24	65.8	1691.15	70.09	1691.11
73.24	1691.1	73.61	1691.09	77.95	1691	92.52	1691	96.49	1691.11
100	1691.13								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-65.41	.028	49.39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-65.41	49.39	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1690.91	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 7.64	* Wt. n-Val.	*	* 0.028	* *
* W.S. Elev (ft)	* 1683.27	* Reach Len. (ft)	* 100.00	* 100.00	* 100.00 *
* Crit W.S. (ft)	* 1685.56	* Flow Area (sq ft)	*	* 271.42	* *
* E.G. Slope (ft/ft)	*0.033055	* Area (sq ft)	*	* 271.42	* *
* Q Total (cfs)	* 6019.00	* Flow (cfs)	*	* 6019.00	* *
* Top Width (ft)	* 75.99	* Top Width (ft)	*	* 75.99	* *
* Vel Total (ft/s)	* 22.18	* Avg. Vel. (ft/s)	*	* 22.18	* *
* Max Chl Dpth (ft)	* 4.51	* Hydr. Depth (ft)	*	* 3.57	* *
* Conv. Total (cfs)	* 33105.8	* Conv. (cfs)	*	* 33105.8	* *
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 77.90	* *
* Min Ch El (ft)	* 1678.76	* Shear (lb/sq ft)	*	* 7.19	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 159.46	* *
* Frctn Loss (ft)	* 6.89	* Cum Volume (acre-ft)	*	* 76.09	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 15.37	* *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -17.

INPUT
Description:

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1692.35	-98.95	1692.81	-98.54	1693	-97.58	1693	-97.04	1692.95
-87.7	1692	-84.5	1691.87	-73.87	1691.49	-64.6	1691.61	-64.3	1691.58
-64.09	1691.6	-63.96	1691.66	-63.47	1692	-61.11	1692	-60.15	1691.27
-59.78	1691	-58.41	1690.07	-58.3	1690	-58.17	1689.92	-56.66	1689
-55.85	1688.56	-54.89	1688	-53.58	1687.24	-53.2	1687	-52.72	1686.7
-51.68	1686	-50.47	1685.34	-49.93	1685	-48.99	1684.37	-48.26	1684
-46.77	1683.14	-46.58	1683	-46.13	1682.76	-44.82	1682	-44.29	1681.72
-43.17	1681	-42.65	1680.66	-41.27	1680	-40.85	1679.74	-40.62	1679.67
-38.82	1679.28	-38.46	1679.19	-37.42	1679	-35.15	1678.64	-31.61	1678
-29.51	1677.75	-28.84	1677.63	-25.92	1677.02	-25.83	1677	-23.83	1676
-22.77	1675	-22.64	1674.84	-22.07	1674	-21.36	1673.25	-21.18	1673
-20.57	1672.37	-20.26	1672	-19.55	1671.16	-19.42	1671	-19.26	1670.84
-18.68	1670	-17.56	1669.21	-17.1	1669.18	-16.26	1669.31	-14.57	1669.15
-10.79	1669.27	-10.36	1669.25	7.84	1669.83	11.17	1670	11.68	1670.58
12.05	1671	12.64	1671.68	12.99	1672	17.46	1672.46	21.2	1672.83
22.03	1672.9	22.34	1672.93	22.68	1673	22.94	1673.13	24.73	1674
25.69	1674.48	26.86	1675	27.61	1675.38	28.89	1676	30.45	1676.72
32.36	1676.46	36.11	1677	37.19	1677.41	38.36	1678	40.27	1678.8
40.78	1679	42.49	1679.7	43.21	1680	44.96	1680.79	45.41	1681
46.1	1681.25	47.89	1682	49.48	1682.7	50.12	1683	51.19	1683.41
52.75	1684	53.89	1684.55	54.83	1685	57.02	1685.86	57.33	1686
59.3	1686.15	63.84	1686.53	73.48	1687	100	1687		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-61.11	.028	63.84	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-61.11	63.84	400	400	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1686.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.62	Wt. n-Val.		0.028	
W.S. Elev (ft)	1675.21	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)	1678.78	Flow Area (sq ft)		220.01	
E.G. Slope (ft/ft)	0.041291	Area (sq ft)		220.01	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	50.25	Top Width (ft)		50.25	
Vel Total (ft/s)	27.36	Avg. Vel. (ft/s)		27.36	
Max Chl Dpth (ft)	6.05	Hydr. Depth (ft)		4.38	
Conv. Total (cfs)	29620.9	Conv. (cfs)		29620.9	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		54.45	
Min Ch El (ft)	1669.15	Shear (lb/sq ft)		10.42	
Alpha	1.00	Stream Power (lb/ft s)		284.97	
Frctn Loss (ft)	3.68	Cum Volume (acre-ft)		75.53	
C & E Loss (ft)	0.40	Cum SA (acres)		15.22	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -21.

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1681.49	-99.9	1681.52	-98.32	1682	-85.91	1682	-78.7	1682.35
-77.21	1682.32	-70.22	1682	-68.66	1681.79	-63.51	1681.12	-63.31	1681.09
-63.07	1681	-62.88	1680.92	-61.89	1680.49	-60.81	1680	-60.44	1679.82
-58.58	1679	-57.15	1678.32	-56.48	1678	-55.29	1677.35	-54.49	1677
-53.18	1676.35	-52.46	1676	-51.67	1675.59	-50.52	1675	-48.98	1674.27
-48.45	1674	-46.88	1673.19	-46.5	1673	-44.63	1672.05	-44.54	1672
-44.46	1671.96	-42.45	1671	-41.74	1670.63	-40.44	1670	-38.46	1669.1
-38.25	1669	-29.53	1668.14	-28.05	1668	-27.71	1667.87	-25.4	1667
-24.93	1666.82	-22.75	1666	20.46	1666	22.84	1666.59	24.24	1667
26.97	1667.83	27.35	1668	28.38	1668.11	30.44	1668.3	35.39	1669
36.65	1669.57	37.55	1670	38.68	1670.55	39.6	1671	40.72	1671.52
42.8	1672.48	43.87	1673	44.78	1673.43	46.03	1674	47.7	1674.81
48.09	1675	49.35	1675.58	50.27	1676	96.13	1676	99.26	1676.1
100	1676.13								

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-78.7	.028	50.27	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-78.7	50.27	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1675.73	Element	Left OB	Channel	Right OB	
Vel Head (ft)	4.16	Wt. n-Val.		0.028		
W.S. Elev (ft)	1671.58	Reach Len. (ft)	200.00	200.00	200.00	
Crit W.S. (ft)	1672.67	Flow Area (sq ft)		367.95		
E.G. Slope (ft/ft)	0.013773	Area (sq ft)		367.95		
Q Total (cfs)	6019.00	Flow (cfs)		6019.00		
Top Width (ft)	84.50	Top Width (ft)		84.50		
Vel Total (ft/s)	16.36	Avg. Vel. (ft/s)		16.36		
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		4.35		
Conv. Total (cfs)	51288.2	Conv. (cfs)		51288.2		
Length Wtd. (ft)	200.00	Wetted Per. (ft)		86.44		
Min Ch El (ft)	1666.00	Shear (lb/sq ft)		3.66		
Alpha	1.00	Stream Power (lb/ft s)		59.87		
Frctn Loss (ft)	8.85	Cum Volume (acre-ft)		72.83		
C & E Loss (ft)	2.24	Cum SA (acres)		14.61		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -23.

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1674.89	-98.18	1675	-96.9	1675.42	-95.15	1676	-92.67	1676.79
-92.06	1677	-91.55	1677.17	-88.89	1678	-78.77	1678.42	-60.57	1678.3
-59.41	1678.32	-57.1	1678	-55.79	1677.71	-54.26	1677	-53.1	1676.37
-52.44	1676	-50.62	1675.09	-50.46	1675	-50.26	1674.9	-48.65	1674
-48.25	1673.79	-46.74	1673	-45.81	1672.53	-44.87	1672	-43.6	1671.28
-43.06	1671	-42.02	1670.5	-41.03	1670	-40.41	1669.7	-37.74	1668.4
-37	1668	-35.8	1667.48	-34.78	1667	-32.67	1666.04	-32.6	1666
-32.36	1665.89	-30.24	1665	-26.72	1664.59	-21.87	1664	28.83	1664
36.07	1664.64	38.77	1664.86	39.2	1664.88	40.48	1665	41.16	1665.28
41.77	1665.48	43.22	1666	45.31	1666.79	45.96	1667	48.47	1667.96
48.59	1668	48.7	1668.04	49.39	1668.3	51.08	1669	52.61	1669.63
53.55	1670	54.56	1670.44	55.97	1671	58.22	1671.32	59	1671.34
64.05	1671.75	65.14	1671.76	68.26	1671.73	71.03	1671.74	75.05	1671.69
77.34	1671.69	80.86	1671.63	81.9	1671.63	82.99	1671.62	84.27	1671.59
86.12	1671.54	88.36	1671.49	100	1671.01				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-60.57	.028	64.05	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-60.57	64.05	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1672.92	Element	Left OB	Channel	Right OB	
Vel Head (ft)	4.01	Wt. n-Val.		0.028		
W.S. Elev (ft)	1668.91	Reach Len. (ft)	100.00	100.00	100.00	
Crit W.S. (ft)	1669.98	Flow Area (sq ft)		374.56		
E.G. Slope (ft/ft)	0.013962	Area (sq ft)		374.56		
Q Total (cfs)	6019.00	Flow (cfs)		6019.00		
Top Width (ft)	89.63	Top Width (ft)		89.63		
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)		16.07		
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		4.18		
Conv. Total (cfs)	50938.4	Conv. (cfs)		50938.4		
Length Wtd. (ft)	100.00	Wetted Per. (ft)		91.30		
Min Ch El (ft)	1664.00	Shear (lb/sq ft)		3.58		
Alpha	1.00	Stream Power (lb/ft s)		57.46		

* C & E Loss (ft)	* 0.04	* Cum SA (acres)	*	*	14.21	*	*

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

ROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -24.

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	1670.55	-92.01	1670.36	-91.68	1670.35	-90.3	1671	-89.13	1671.56
-88.23	1672	-87.26	1672.46	-86.22	1673	-85.13	1673.48	-84	1674
-81.42	1674.59	-80.86	1674.62	-78.78	1674.69	-66.09	1675	-59.11	1675
-56.53	1675	-52.84	1675	-52.57	1675	-52.01	1675	-51.45	1674.67
-50.53	1674	-49.21	1673.19	-48.93	1673	-48.19	1672.54	-47.35	1672
-46.3	1671.32	-45.82	1671	-44.38	1670.07	-44.28	1670	-43.98	1669.81
-42.83	1669.06	-42.74	1669	-42.28	1668.94	-42.25	1668.94	-41.19	1668.86
-31.56	1668	-17	1663.34	-9.39	1661	-8.86	1661	-7.23	1661
-4.34	1661	0	1661	15.87	1661	16.92	1661	17.38	1661
18.25	1661	18.93	1661	20.78	1661	24.19	1661	24.25	1661
24.29	1661	25.09	1661	31.4	1662.87	36.21	1664.19	37.68	1664.6
38.63	1664.88	43.46	1666.24	44.23	1666.42	47.48	1667.82	51.19	1668
56.36	1668.46	58.87	1668.72	61.05	1668.98	61.18	1669	80.06	1669
92.25	1669	100	1669						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.03	-52.84	.028	61.18	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-52.84	61.18	300	300	300	.1	.3

ROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1671.64	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 4.02	* Wt. n-Val.	*	* 0.028	* *
* W.S. Elev (ft)	* 1667.62	* Reach Len. (ft)	* 300.00	* 300.00	* 300.00 *
* Crit W.S. (ft)	* 1668.91	* Flow Area (sq ft)	*	* 373.97	* *
* E.G. Slope (ft/ft)	*0.011652	* Area (sq ft)	*	* 373.97	* *
* Q Total (cfs)	* 6019.00	* Flow (cfs)	*	* 6019.00	* *
* Top Width (ft)	* 77.39	* Top Width (ft)	*	* 77.39	* *
* Vel Total (ft/s)	* 16.09	* Avg. Vel. (ft/s)	*	* 16.09	* *
* Max Chl Dpth (ft)	* 6.62	* Hydr. Depth (ft)	*	* 4.83	* *
* Conv. Total (cfs)	* 55759.1	* Conv. (cfs)	*	* 55759.1	* *
* Length Wtd. (ft)	* 300.00	* Wetted Per. (ft)	*	* 79.41	* *
* Min Ch El (ft)	* 1661.00	* Shear (lb/sq ft)	*	* 3.43	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 55.14	* *
* Frctn Loss (ft)	* 1.27	* Cum Volume (acre-ft)	*	* 70.27	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 14.01	* *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -27.

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-87.58	1666	-85.63	1666.78	-85.04	1667	-84.17	1667.33	-82.41	1668
-78.05	1668	-75.04	1668	-73.83	1667.44	-72.79	1667	-71.63	1666.51
-70.53	1666	-69.62	1665.61	-68.26	1665	-67.11	1664.54	-66.35	1664.25
-65.85	1664	-65.2	1663.71	-63.61	1663	-62.43	1662.47	-61.2	1662
-60.36	1661.62	-58.93	1661	-57.18	1660.22	-56.49	1660	-55.37	1660
-54.85	1660	-54.38	1660	-53.91	1660	-50.22	1659.49	-46.3	1659
-44.11	1659	-42.63	1659	-42.41	1659	-42.12	1659	-34.17	1659
0	1659.23	12.5	1659.31	13.1	1659.3	37.65	1659.72	37.78	1659.73
38.02	1659.76	39.05	1659.83	39.35	1659.82	39.85	1659.84	40.03	1659.84
43.09	1660	45.58	1660	47.62	1660.75	48.49	1661	50.59	1661.79

57.45	1664.55	58.58	1665	60.14	1665.68	60.79	1666	61.26	1666.21
62.64	1667	63.31	1667.48	64.27	1668	77.19	1668	79.09	1668
79.16	1668	82.02	1667.05	82.08	1667.03	82.2	1667	82.24	1666.99
82.31	1666.96	85.06	1666	86.09	1665.63	88.15	1665	88.26	1665
90.74	1665	92.32	1665	93.28	1665.25	93.61	1665.31	94.82	1665.55
96.49	1665.7	97.57	1665.82	100	1665.83				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-87.58	.03	-75.04	.028	64.27	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-75.04	64.27	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1666.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.27	Wt. n-Val.		0.028	
W.S. Elev (ft)	1662.70	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1663.97	Flow Area (sq ft)		362.87	
E.G. Slope (ft/ft)	0.021590	Area (sq ft)		362.87	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	115.85	Top Width (ft)		115.85	
Vel Total (ft/s)	16.59	Avg. Vel. (ft/s)		16.59	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	40963.4	Conv. (cfs)		40963.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		116.96	
Min Ch El (ft)	1659.00	Shear (lb/sq ft)		4.18	
Alpha	1.00	Stream Power (lb/ft s)		69.37	
Frctn Loss (ft)	4.65	Cum Volume (acre-ft)		67.73	
C & E Loss (ft)	0.02	Cum SA (acres)		13.35	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -27.5

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-87.93	1666.8	-87.47	1667	-86.71	1667	-85.83	1667	-79.53	1667.33
-78.62	1667.59	-78.2	1667.66	-77.66	1667.82	-77.05	1668	-71.99	1668.76
-69.99	1669	-67.93	1669	-65.65	1669	-62.98	1669	-54.97	1662.51
-53.33	1661.63	-51.42	1659	-50.43	1659	-49.24	1659	-48.92	1659
-45.03	1659	-40.88	1659	-40.29	1659	-38.44	1659	-37.73	1659
-37.44	1659	-36.94	1659	-11.52	1659	-10.26	1659	-2.49	1659
-1.13	1659	-.99	1659	0	1659	6.03	1659	6.09	1659
20.56	1659	20.65	1659	32.36	1659	32.56	1659	41.8	1659
45.82	1658.7	50.3	1663.71	53.52	1669	54.89	1669	55.85	1669
57.99	1669	63.97	1669	66.12	1668.89	66.93	1668.77	68.93	1668.42
69.64	1668.32	71.22	1668	75.53	1667.49	79.69	1667		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-87.93	.03	-62.98	.015	53.52	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-62.98	53.52	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1666.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.		0.015	
W.S. Elev (ft)	1663.30	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1663.84	Flow Area (sq ft)		436.67	
E.G. Slope (ft/ft)	0.003073	Area (sq ft)		436.67	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	105.89	Top Width (ft)		105.89	
Vel Total (ft/s)	13.78	Avg. Vel. (ft/s)		13.78	
Max Chl Dpth (ft)	4.60	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	108581.5	Conv. (cfs)		108581.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		109.80	
Min Ch El (ft)	1658.70	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.52	

```
* C & E Loss (ft)        *    0.40  * Cum SA (acres)         *          *   13.22  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -28.

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -100 1644.69  -99.03 1644.86  -98.71  1644.9  -97.85    1645  -95.25 1645.33
  -88.54 1645.91   -87.7 1645.97  -87.36    1646  -74.93 1646.99  -74.86    1647
  -69.87  1647.4  -66.65 1647.67  -64.24  1647.8  -63.99 1645.11  -60.66    1648
  -57.58 1648.17  -56.03 1637.64  -55.73 1635.96   39.96 1635.96    43.6  1645.9
   44.87 1646.35   47.57 1649.18   61.12 1649.17   65.58 1649.04   65.97 1649.03
   66.68    1649   75.96 1648.63   79.61 1648.49   82.27 1648.44   90.27 1648.37
   96.84 1648.54     100 1648.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    -100     .03  -57.58    .015   47.57     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -57.58   47.57               50      50      50             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1663.50  * Element               •  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   26.01  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)         * 1637.49  * Reach Len. (ft)       *   50.00  *   50.00  •   50.00  •
  Crit W.S. (ft)         * 1640.89  * Flow Area (sq ft)     *          *  147.06  *          *
  E.G. Slope (ft/ft)     *0.100551  * Area (sq ft)          *          *  147.06  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   96.52  * Top Width (ft)       *          *   96.52  •          *
* Vel Total (ft/s)       *   40.93  * Avg. Vel. (ft/s)     *          *   40.93  *          *
* Max Chl Dpth (ft)      *    1.53  * Hydr. Depth (ft)     *          *    1.52  *          *
* Conv. Total (cfs)      * 18981.5  * Conv. (cfs)          *          * 18981.5  *          *
• Length Wtd. (ft)       *   50.00  * Wetted Per. (ft)     *          *   98.87  *          *
* Min Ch El (ft)         * 1635.96  * Shear (lb/sq ft)     *          *    9.34  •          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  382.14  *          *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)  *          *   66.93  *          *
* C & E Loss (ft)        *    2.31  * Cum SA (acres)        *          *   13.11  •          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -28.5

INPUT
Description:
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -100 1623.06   -97.9 1623.03  -97.46    1623  -95.58 1622.87  -90.91  1622.4
  -87.58    1622  -84.84 1621.68  -80.29 1621.21   -79.1  1621.1   -77.2    1621
  -72.32 1620.72  -70.96 1620.66  -62.68 1620.39  -57.73 1613.49  -56.85    1611
   40.54    1611   43.48 1621.97   43.51    1622   50.07 1622.41   55.19 1622.69
   58.05 1622.79    65.5    1623   75.56 1623.32   79.86 1623.57    82.2 1623.71
   85.69    1624   89.42 1624.25   97.42    1625   99.82 1625.21     100 1625.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    -100     .03  -62.68    .015   43.48     .03
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -62.68   43.48              10      10      10            .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1654.58  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   42.41  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1612.18  * Reach Len. (ft)       *   10.00  *   10.00  *   10.00  *
* Crit W.S. (ft)         * 1615.88  * Flow Area (sq ft)     *          *  115.18  *          *
* E.G. Slope (ft/ft)     *0.230068  * Area (sq ft)          *          *  115.18  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   98.12  * Top Width (ft)       *          *   98.12  *          *
* Vel Total (ft/s)       *   52.26  * Avg. Vel. (ft/s)     *          *   52.26  *          *
* Max Chl Dpth (ft)      *    1.18  * Hydr. Depth (ft)     *          *    1.17  *          *
* Conv. Total (cfs)      * 12548.6  * Conv. (cfs)          *          * 12548.6  *          *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)     *          *   99.86  *          *
* Min Ch El (ft)         * 1611.00  * Shear (lb/sq ft)     *          *   16.57  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  865.73  *          *
* Frctn Loss (ft)        *    7.29  * Cum Volume (acre-ft)  *          *   66.78  *          *
* C & E Loss (ft)        *    1.64  * Cum SA (acres)        *          *   12.99  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -999.5

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    1610       0  1594.5      50 1594.49     100  1594.5     100    1610

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .015       0    .015      100    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     100              9.56    9.47    9.56            .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1650.47  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   54.96  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1595.51  * Reach Len. (ft)       *    9.56  *    9.47  *    9.56  *
* Crit W.S. (ft)         * 1599.31  * Flow Area (sq ft)     *          *  101.17  *          *
* E.G. Slope (ft/ft)     *0.364685  * Area (sq ft)          *          *  101.17  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *  100.00  * Top Width (ft)       *          *  100.00  *          *
* Vel Total (ft/s)       *   59.49  * Avg. Vel. (ft/s)     *          *   59.49  *          *
* Max Chl Dpth (ft)      *    1.02  * Hydr. Depth (ft)     *          *    1.01  *          *
* Conv. Total (cfs)      *  9967.0  * Conv. (cfs)          *          *  9967.0  *          *
* Length Wtd. (ft)       *    9.47  * Wetted Per. (ft)     *          *  102.01  *          *
* Min Ch El (ft)         * 1594.49  * Shear (lb/sq ft)     *          *   22.58  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        * 1343.32  *          *
* Frctn Loss (ft)        *    2.86  * Cum Volume (acre-ft)  *          *   66.76  *          *
* C & E Loss (ft)        *    1.26  * Cum SA (acres)        *          *   12.97  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1009.*

INPUT
Description:
Station Elevation Data    num=       5
```

```
*****************************************************************************
       0 1609.95       0 1594.47   48.42 1594.44   96.84 1594.47   96.84 1609.95

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   96.84    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   96.84             9.56    9.47    9.56             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1645.96  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   50.41  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1595.55  * Reach Len. (ft)       *    9.56  *     9.47 *     9.56 *
* Crit W.S. (ft)         * 1599.37  * Flow Area (sq ft)     *          *   105.64 *          *
* E.G. Slope (ft/ft)     *0.303398  * Area (sq ft)          *          *   105.64 *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)            *          * 6019.00 *          *
* Top Width (ft)         *   96.84  * Top Width (ft)        *          *   96.84 *          *
* Vel Total (ft/s)       *   56.98  * Avg. Vel. (ft/s)      *          *   56.98 *          *
* Max Chl Dpth (ft)      *    1.11  * Hydr. Depth (ft)      *          *    1.09 *          *
* Conv. Total (cfs)      * 10927.4  * Conv. (cfs)           *          * 10927.4 *          *
* Length Wtd. (ft)       *    9.47  * Wetted Per. (ft)      *          *   98.99 *          *
* Min Ch El (ft)         * 1594.44  * Shear (lb/sq ft)      *          *   20.21 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          * 1151.68 *          *
* Frctn Loss (ft)        *    3.14  * Cum Volume (acre-ft)  *          *   66.74 *          *
* C & E Loss (ft)        *    1.36  * Cum SA (acres)        *          *   12.95 *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1018.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0 1609.89       0 1594.45   46.84  1594.4   93.68 1594.45   93.68 1609.89

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   93.68    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   93.68             9.56    9.47    9.56             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1642.19  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   46.59  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1595.60  * Reach Len. (ft)       *    9.56  *     9.47 *     9.56 *
* Crit W.S. (ft)         * 1599.46  * Flow Area (sq ft)     *          *   109.88 *          *
* E.G. Slope (ft/ft)     *0.255319  * Area (sq ft)          *          *   109.88 *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)            *          * 6019.00 *          *
* Top Width (ft)         *   93.68  * Top Width (ft)        *          *   93.68 *          *
* Vel Total (ft/s)       *   54.78  * Avg. Vel. (ft/s)      *          *   54.78 *          *
* Max Chl Dpth (ft)      *    1.20  * Hydr. Depth (ft)      *          *    1.17 *          *
* Conv. Total (cfs)      * 11912.0  * Conv. (cfs)           *          * 11912.0 *          *
* Length Wtd. (ft)       *    9.47  * Wetted Per. (ft)      *          *   95.98 *          *
* Min Ch El (ft)         * 1594.40  * Shear (lb/sq ft)      *          *   18.25 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *  999.63 *          *
* Frctn Loss (ft)        *    2.63  * Cum Volume (acre-ft)  *          *   66.71 *          *
* C & E Loss (ft)        *    1.15  * Cum SA (acres)        *          *   12.93 *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION
```

REACH: 1 RS: -1027.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.84	0	1594.42	45.26	1594.35	90.53	1594.42	90.53	1609.84

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	90.53	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	90.53	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1639.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	43.36	Wt. n-Val.		0.015	
W.S. Elev (ft)	1595.64	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1599.54	Flow Area (sq ft)		113.90	
E.G. Slope (ft/ft)	*0.217081	Area (sq ft)		113.90	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	90.53	Top Width (ft)		90.53	
Vel Total (ft/s)	52.84	Avg. Vel. (ft/s)		52.84	
Max Chl Dpth (ft)	1.29	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	12918.5	Conv. (cfs)		12918.5	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		92.98	
Min Ch El (ft)	1594.35	Shear (lb/sq ft)		16.60	
Alpha	1.00	Stream Power (lb/ft s)		877.34	
Frctn Loss (ft)	2.23	Cum Volume (acre-ft)		66.69	
C & E Loss (ft)	0.97	Cum SA (acres)		12.91	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1037.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.79	0	1594.39	43.68	1594.3	87.37	1594.39	87.37	1609.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	87.37	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	87.37	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1636.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	40.59	Wt. n-Val.		0.015	
W.S. Elev (ft)	1595.69	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1599.62	Flow Area (sq ft)		117.73	
E.G. Slope (ft/ft)	*0.186121	Area (sq ft)		117.73	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	87.37	Top Width (ft)		87.37	
Vel Total (ft/s)	51.13	Avg. Vel. (ft/s)		51.13	
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	13951.7	Conv. (cfs)		13951.7	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		89.98	
Min Ch El (ft)	1594.30	Shear (lb/sq ft)		15.20	
Alpha	1.00	Stream Power (lb/ft s)		777.30	
Frctn Loss (ft)	1.90	Cum Volume (acre-ft)		66.66	
C & E Loss (ft)	0.83	Cum SA (acres)		12.89	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1046.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.74	0	1594.37	42.11	1594.26	84.21	1594.37	84.21	1609.74

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	84.21	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	84.21	9.56	9.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1633.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	38.16	Wt. n-Val.		0.015	
W.S. Elev (ft)	1595.76	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1599.72	Flow Area (sq ft)		121.42	
E.G. Slope (ft/ft)	*0.160533	Area (sq ft)		121.42	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	84.21	Top Width (ft)		84.21	
Vel Total (ft/s)	49.57	Avg. Vel. (ft/s)		49.57	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	15022.5	Conv. (cfs)		15022.5	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		86.98	
Min Ch El (ft)	1594.26	Shear (lb/sq ft)		13.99	
Alpha	1.00	Stream Power (lb/ft s)		693.49	
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)		66.64	
C & E Loss (ft)	0.73	Cum SA (acres)		12.87	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1056.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.68	0	1594.34	40.53	1594.21	81.05	1594.34	81.05	1609.68

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	81.05	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	81.05	9.56	9.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1631.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	36.05	Wt. n-Val.		0.015	
W.S. Elev (ft)	1595.82	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1599.83	Flow Area (sq ft)		124.91	
E.G. Slope (ft/ft)	*0.139399	Area (sq ft)		124.91	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	81.05	Top Width (ft)		81.05	
Vel Total (ft/s)	48.19	Avg. Vel. (ft/s)		48.19	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	16121.1	Conv. (cfs)		16121.1	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		84.00	
Min Ch El (ft)	1594.21	Shear (lb/sq ft)		12.94	
Alpha	1.00	Stream Power (lb/ft s)		623.57	

```
* C & E Loss (ft)        *    0.63  * Cum SA (acres)         *          *   12.85  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -1065.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.63       0 1594.32   38.95 1594.16   77.89 1594.32   77.89 1609.63

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015   77.89    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   77.89             9.56    9.47    9.56             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1630.08  * Element               *  Left OB *  Channel * Right OB *
• Vel Head (ft)          *   34.19  * Wt. n-Val.            *          •   0.015  *          •
* W.S. Elev (ft)         * 1595.89  • Reach Len. (ft)       *    9.56  *    9.47  *    9.56  *
* Crit W.S. (ft)         • 1599.94  * Flow Area (sq ft)     *          *  128.26  *          *
* E.G. Slope (ft/ft)     *0.121632  * Area (sq ft)          •          *  128.26  *          *
• Q Total (cfs)          * 6019.00  * Flow (cfs)            *          * 6019.00  *          *
* Top Width (ft)         •   77.89  • Top Width (ft)       *          *   77.89  •          *
• Vel Total (ft/s)       *   46.93  * Avg. Vel. (ft/s)      *          *   46.93  *          *
* Max Chl Dpth (ft)      *    1.73  * Hydr. Depth (ft)      •          *    1.65  *          *
* Conv. Total (cfs)      • 17258.4  * Conv. (cfs)           *          * 17258.4  •          *
* Length Wtd. (ft)       *    9.47  • Wetted Per. (ft)      *          *   81.02  *          *
* Min Ch El (ft)         * 1594.16  * Shear (lb/sq ft)      *          *   12.02  *          *
• Alpha                  •    1.00  * Stream Power (lb/ft s) *          *  564.09  *          *
* Frctn Loss (ft)        •    1.23  * Cum Volume (acre-ft)   *          *   66.58  *          *
• C & E Loss (ft)        *    0.56  * Cum SA (acres)         •          *   12.84  •          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -1075.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.58       0 1594.29   37.37 1594.12   74.74 1594.29   74.74 1609.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015   74.74    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   74.74             9.56    9.47    9.56             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
• E.G. Elev (ft)         * 1628.51  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   32.54  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)         * 1595.96  * Reach Len. (ft)       *    9.56  *    9.47  *    9.56  *
* Crit W.S. (ft)         • 1600.06  * Flow Area (sq ft)     *          *  131.47  *          *
* E.G. Slope (ft/ft)     *0.106632  * Area (sq ft)          *          *  131.47  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)            *          * 6019.00  *          *
* Top Width (ft)         *   74.74  • Top Width (ft)       *          *   74.74  *          *
```

* Max Chl Dpth (ft)	* 1.84	* Hydr. Depth (ft)	*	* 1.76	*	*
* Conv. Total (cfs)	* 18432.4	* Conv. (cfs)	*	* 18432.4	*	*
* Length Wtd. (ft)	* 9.47	* Wetted Per. (ft)	*	* 78.09	*	*
* Min Ch El (ft)	* 1594.12	* Shear (lb/sq ft)	*	* 11.21	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 513.11	*	*
* Frctn Loss (ft)	* 1.08	* Cum Volume (acre-ft)	*	* 66.56	*	*
C & E Loss (ft)	* 0.49	* Cum SA (acres)	*	* 12.82	*	*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1084.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.53	0	1594.26	35.79	1594.07	71.58	1594.26	71.58	1609.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	71.58	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	71.58	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1627.12	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 31.08	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1596.05	* Reach Len. (ft)	* 9.56	* 9.47	* 9.56 *
Crit W.S. (ft)	* 1600.18	* Flow Area (sq ft)	*	* 134.54	* *
* E.G. Slope (ft/ft)	*0.093822	* Area (sq ft)	*	* 134.54	* *
* Q Total (cfs)	* 6019.00	* Flow (cfs)	*	* 6019.00	* *
* Top Width (ft)	* 71.58	* Top Width (ft)	*	* 71.58	* *
* Vel Total (ft/s)	* 44.74	* Avg. Vel. (ft/s)	*	* 44.74	* *
* Max Chl Dpth (ft)	* 1.97	* Hydr. Depth (ft)	*	* 1.88	* *
* Conv. Total (cfs)	* 19650.4	* Conv. (cfs)	*	* 19650.4	* *
* Length Wtd. (ft)	* 9.47	* Wetted Per. (ft)	*	* 75.15	* *
* Min Ch El (ft)	* 1594.07	* Shear (lb/sq ft)	*	* 10.49	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 469.13	* *
* Frctn Loss (ft)	* 0.95	* Cum Volume (acre-ft)	*	* 66.53	* *
* C & E Loss (ft)	* 0.44	* Cum SA (acres)	*	* 12.80	* *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1094.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.47	0	1594.24	34.21	1594.02	68.42	1594.24	68.42	1609.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	68.42	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	68.42	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1625.89	* Element	* Left OB	* Channel	* Right OB *

* W.S. Elev (ft)	* 1596.14	* Reach Len. (ft)	*	9.56	*	9.47	*	9.56	*		
* Crit W.S. (ft)	* 1600.33	* Flow Area (sq ft)	*		*	137.51	*		*		
* E.G. Slope (ft/ft)	*0.082736	* Area (sq ft)	*		*	137.51	*		*		
* Q Total (cfs)	* 6019.00	* Flow (cfs)	*		*	6019.00	*		*		
* Top Width (ft)	* 68.42	* Top Width (ft)	*		*	68.42	*		*		
* Vel Total (ft/s)	* 43.77	* Avg. Vel. (ft/s)	*		*	43.77	*		*		
* Max Chl Dpth (ft)	* 2.12	* Hydr. Depth (ft)	*		*	2.01	*		*		
* Conv. Total (cfs)	* 20925.5	* Conv. (cfs)	*		*	20925.5	*		*		
* Length Wtd. (ft)	* 9.47	* Wetted Per. (ft)	*		*	72.22	*		*		
* Min Ch El (ft)	* 1594.02	* Shear (lb/sq ft)	*		*	9.83	*		*		
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		*	430.48	*		*		
* Frctn Loss (ft)	* 0.83	* Cum Volume (acre-ft)	*		*	66.50	*		*		
* C & E Loss (ft)	* 0.40	* Cum SA (acres)	*		*	12.79	*		*		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1103.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.42	0	1594.21	32.63	1593.97	65.26	1594.21	65.26	1609.42

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	65.26	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	65.26	9.56	9.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1624.80	* Element	*	Left OB	*	Channel	*	Right OB	*		
* Vel Head (ft)	* 28.56	* Wt. n-Val.	*		*	0.015	*		*		
* W.S. Elev (ft)	* 1596.24	* Reach Len. (ft)	*	9.56	*	9.47	*	9.56	*		
* Crit W.S. (ft)	* 1600.51	* Flow Area (sq ft)	*		*	140.36	*		*		
* E.G. Slope (ft/ft)	*0.073162	* Area (sq ft)	*		*	140.36	*		*		
* Q Total (cfs)	* 6019.00	* Flow (cfs)	*		*	6019.00	*		*		
* Top Width (ft)	* 65.26	* Top Width (ft)	*		*	65.26	*		*		
* Vel Total (ft/s)	* 42.88	* Avg. Vel. (ft/s)	*		*	42.88	*		*		
* Max Chl Dpth (ft)	* 2.27	* Hydr. Depth (ft)	*		*	2.15	*		*		
* Conv. Total (cfs)	* 22252.7	* Conv. (cfs)	*		*	22252.7	*		*		
* Length Wtd. (ft)	* 9.47	* Wetted Per. (ft)	*		*	69.32	*		*		
* Min Ch El (ft)	* 1593.97	* Shear (lb/sq ft)	*		*	9.25	*		*		
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		*	396.57	*		*		
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*		*	66.47	*		*		
* C & E Loss (ft)	* 0.36	* Cum SA (acres)	*		*	12.77	*		*		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1113.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.37	0	1594.18	31.05	1593.93	62.11	1594.18	62.11	1609.37

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	62.11	.015

0	62.11	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1623.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	27.45	Wt. n-Val.		0.015	
W.S. Elev (ft)	1596.36	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1600.68	Flow Area (sq ft)		143.14	
E.G. Slope (ft/ft)	*0.064790	Area (sq ft)		143.14	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	62.11	Top Width (ft)		62.11	
Vel Total (ft/s)	42.05	Avg. Vel. (ft/s)		42.05	
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)		2.30	
Conv. Total (cfs)	23646.7	Conv. (cfs)		23646.7	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		66.47	
Min Ch El (ft)	1593.93	Shear (lb/sq ft)		8.71	
Alpha	1.00	Stream Power (lb/ft s)		366.26	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		66.44	
C & E Loss (ft)	0.33	Cum SA (acres)		12.76	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1122.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.32	0	1594.16	29.47	1593.88	58.95	1594.16	58.95	1609.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	58.95	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	58.95	9.56	9.47	9.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1622.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	26.44	Wt. n-Val.		0.015	
W.S. Elev (ft)	1596.50	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1600.88	Flow Area (sq ft)		145.87	
E.G. Slope (ft/ft)	*0.057387	Area (sq ft)		145.87	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	58.95	Top Width (ft)		58.95	
Vel Total (ft/s)	41.26	Avg. Vel. (ft/s)		41.26	
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	25125.6	Conv. (cfs)		25125.6	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		63.62	
Min Ch El (ft)	1593.88	Shear (lb/sq ft)		8.21	
Alpha	1.00	Stream Power (lb/ft s)		338.95	
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		66.40	
C & E Loss (ft)	0.31	Cum SA (acres)		12.75	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1132.*

INPUT
escription:
tation Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609.26	0	1594.13	27.89	1593.83	55.79	1594.13	55.79	1609.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   55.79             9.56    9.47    9.56            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)        * 1622.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   25.50  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1596.64  * Reach Len. (ft)      *    9.56  *     9.47  *    9.56  *
* Crit W.S. (ft)        * 1601.10  * Flow Area (sq ft)    *          *  148.54  *          *
* E.G. Slope (ft/ft)    *0.050872  * Area (sq ft)         *          *  148.54  *          *
* Q Total (cfs)         * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)        *   55.79  * Top Width (ft)       *          *   55.79  *          *
* Vel Total (ft/s)      *   40.52  * Avg. Vel. (ft/s)     *          *   40.52  *          *
* Max Chl Dpth (ft)     *    2.81  * Hydr. Depth (ft)     *          *    2.66  *          *
* Conv. Total (cfs)     * 26686.1  * Conv. (cfs)          *          * 26686.1  *          *
* Length Wtd. (ft)      *    9.47  * Wetted Per. (ft)     *          *   60.82  *          *
* Min Ch El (ft)        * 1593.83  * Shear (lb/sq ft)     *          *    7.76  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *  314.31  *          *
* Frctn Loss (ft)       *    0.51  * Cum Volume (acre-ft)  *          *   66.37  *          *
* C & E Loss (ft)       *    0.28  * Cum SA (acres)        *          *   12.73  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1141.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.21       0 1594.11   26.32 1593.79   52.63 1594.11   52.63 1609.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015   52.63    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.63             9.56    9.47    9.56            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)        * 1621.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   24.60  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1596.82  * Reach Len. (ft)      *    9.56  *     9.47  *    9.56  *
* Crit W.S. (ft)        * 1601.35  * Flow Area (sq ft)    *          *  151.21  *          *
* E.G. Slope (ft/ft)    *0.045060  * Area (sq ft)         *          *  151.21  *          *
* Q Total (cfs)         * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)        *   52.63  * Top Width (ft)       *          *   52.63  *          *
* Vel Total (ft/s)      *   39.81  * Avg. Vel. (ft/s)     *          *   39.81  *          *
* Max Chl Dpth (ft)     *    3.03  * Hydr. Depth (ft)     *          *    2.87  *          *
* Conv. Total (cfs)     * 28354.8  * Conv. (cfs)          *          * 28354.8  *          *
* Length Wtd. (ft)      *    9.47  * Wetted Per. (ft)     *          *   58.06  *          *
* Min Ch El (ft)        * 1593.79  * Shear (lb/sq ft)     *          *    7.33  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *  291.63  *          *
* Frctn Loss (ft)       *    0.45  * Cum Volume (acre-ft)  *          *   66.34  *          *
* C & E Loss (ft)       *    0.27  * Cum SA (acres)        *          *   12.72  *          *
*********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1151.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.16       0 1594.08   24.74 1593.74   49.47 1594.08   49.47 1609.16

Manning's n Values        num=       3
```

```
*********************************************
       0    .015       0    .015   49.47    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   49.47             9.56    9.47    9.56            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1620.77  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   23.75  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1597.02  * Reach Len. (ft)       *    9.56  *     9.47 *    9.56  *
* Crit W.S. (ft)         * 1601.63  * Flow Area (sq ft)     *          *  153.91  *          *
* E.G. Slope (ft/ft)     *0.039861  * Area (sq ft)          *          *  153.91  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   49.47  * Top Width (ft)       *          *   49.47  *          *
* Vel Total (ft/s)       *   39.11  * Avg. Vel. (ft/s)     *          *   39.11  *          *
* Max Chl Dpth (ft)      *    3.28  * Hydr. Depth (ft)     *          *    3.11  *          *
* Conv. Total (cfs)      * 30147.6  * Conv. (cfs)          *          * 30147.6  *          *
* Length Wtd. (ft)       *    9.47  * Wetted Per. (ft)     *          *   55.36  *          *
* Min Ch El (ft)         * 1593.74  * Shear (lb/sq ft)     *          *    6.92  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  270.57  *          *
* Frctn Loss (ft)        *    0.40  * Cum Volume (acre-ft) *          *   66.31  *          *
* C & E Loss (ft)        *    0.26  * Cum SA (acres)       *          *   12.71  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -1160.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.11       0 1594.05   23.16 1593.69   46.32 1594.05   46.32 1609.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   46.32    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   46.32             9.56    9.47    9.56            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1620.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   22.91  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1597.25  * Reach Len. (ft)       *    9.56  *     9.47 *    9.56  *
* Crit W.S. (ft)         * 1601.93  * Flow Area (sq ft)     *          *  156.70  *          *
* E.G. Slope (ft/ft)     *0.035189  * Area (sq ft)          *          *  156.70  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   46.32  * Top Width (ft)       *          *   46.32  *          *
* Vel Total (ft/s)       *   38.41  * Avg. Vel. (ft/s)     *          *   38.41  *          *
* Max Chl Dpth (ft)      *    3.56  * Hydr. Depth (ft)     *          *    3.38  *          *
* Conv. Total (cfs)      * 32086.3  * Conv. (cfs)          *          * 32086.3  *          *
* Length Wtd. (ft)       *    9.47  * Wetted Per. (ft)     *          *   52.73  *          *
* Min Ch El (ft)         * 1593.69  * Shear (lb/sq ft)     *          *    6.53  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  250.76  *          *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft) *          *   66.27  *          *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)       *          *   12.70  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -1170.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1609.05       0 1594.03   21.58 1593.65   43.16 1594.03   43.16 1609.05
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	43.16	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
0	43.16		9.56	9.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1619.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	22.06	Wt. n-Val.		0.015	
W.S. Elev (ft)	1597.54	Reach Len. (ft)	9.56	9.47	9.56
Crit W.S. (ft)	1602.29	Flow Area (sq ft)		159.71	
E.G. Slope (ft/ft)	*0.030923	Area (sq ft)		159.71	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	43.16	Top Width (ft)		43.16	
Vel Total (ft/s)	37.69	Avg. Vel. (ft/s)		37.69	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.70	
Conv. Total (cfs)	34228.4	Conv. (cfs)		34228.4	
Length Wtd. (ft)	9.47	Wetted Per. (ft)		50.19	
Min Ch El (ft)	1593.65	Shear (lb/sq ft)		6.14	
Alpha	1.00	Stream Power (lb/ft s)		231.53	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)		66.24	
C & E Loss (ft)	0.26	Cum SA (acres)		12.69	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1179.5

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1609	0	1594	20	1593.6	40	1594	40	1609

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
0	40		24.92	24.92	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1619.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	21.19	Wt. n-Val.		0.015	
W.S. Elev (ft)	1597.87	Reach Len. (ft)	24.92	24.92	24.92
Crit W.S. (ft)	1602.69	Flow Area (sq ft)		162.94	
E.G. Slope (ft/ft)	*0.027073	Area (sq ft)		162.94	
Q Total (cfs)	6019.00	Flow (cfs)		6019.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	36.94	Avg. Vel. (ft/s)		36.94	
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	36581.3	Conv. (cfs)		36581.3	
Length Wtd. (ft)	24.92	Wetted Per. (ft)		47.75	
Min Ch El (ft)	1593.60	Shear (lb/sq ft)		5.77	
Alpha	1.00	Stream Power (lb/ft s)		213.03	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		66.20	
C & E Loss (ft)	0.26	Cum SA (acres)		12.68	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1204.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0 1609.33       0 1593.88      20 1593.48      40 1593.88      40 1609.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      40             95.35   95.35   95.35            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1618.14  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   20.30  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1597.84  * Reach Len. (ft)       *   95.35  *   95.35  *   95.35  *
* Crit W.S. (ft)         * 1602.57  * Flow Area (sq ft)     *          *  166.46  *          *
* E.G. Slope (ft/ft)     *0.025335  * Area (sq ft)          *          *  166.46  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)       *   36.16  * Avg. Vel. (ft/s)     *          *   36.16  *          *
* Max Chl Dpth (ft)      *    4.36  * Hydr. Depth (ft)     *          *    4.16  *          *
* Conv. Total (cfs)      * 37815.2  * Conv. (cfs)          *          * 37815.2  *          *
* Length Wtd. (ft)       *   95.35  * Wetted Per. (ft)     *          *   47.93  *          *
* Min Ch El (ft)         * 1593.48  * Shear (lb/sq ft)     *          *    5.49  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  198.62  *          *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)  *          *   66.11  *          *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)        *          *   12.66  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1299.8

INPUT
Description:
 tation Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  1603.4       0  1593.4      20    1593      40  1593.4      40  1603.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      40             20.2    20.2    20.2            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1615.15  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   17.46  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1597.69  * Reach Len. (ft)       *   20.20  *   20.20  *   20.20  *
* Crit W.S. (ft)         * 1602.10  * Flow Area (sq ft)     *          *  179.49  *          *
* E.G. Slope (ft/ft)     *0.020064  * Area (sq ft)          *          *  179.49  *          *
* Q Total (cfs)          * 6019.00  * Flow (cfs)           *          * 6019.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)       *   33.53  * Avg. Vel. (ft/s)     *          *   33.53  *          *
* Max Chl Dpth (ft)      *    4.69  * Hydr. Depth (ft)     *          *    4.49  *          *
* Conv. Total (cfs)      * 42493.0  * Conv. (cfs)          *          * 42493.0  *          *
* Length Wtd. (ft)       *   20.20  * Wetted Per. (ft)     *          *   48.58  *          *
* Min Ch El (ft)         * 1593.00  * Shear (lb/sq ft)     *          *    4.63  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  155.19  *          *
* Frctn Loss (ft)        *    2.14  * Cum Volume (acre-ft)  *          *   65.73  *          *
* C & E Loss (ft)        *    0.85  * Cum SA (acres)        *          *   12.57  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
 arning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -1320.
```

Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1603.3	0	1593.2	20	1592.8	40	1593.2	40	1603.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	184.4	180	175.6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1614.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1597.56	Reach Len. (ft)	184.40	180.00	175.60
Crit W.S. (ft)	1601.92	Flow Area (sq ft)		182.27	
E.G. Slope (ft/ft)	*0.019302	Area (sq ft)		182.27	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	33.17	Avg. Vel. (ft/s)		33.17	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		4.56	
Conv. Total (cfs)	43511.0	Conv. (cfs)		43511.0	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		48.72	
Min Ch El (ft)	1592.80	Shear (lb/sq ft)		4.51	
Alpha	1.00	Stream Power (lb/ft s)		149.51	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		65.65	
C & E Loss (ft)	0.11	Cum SA (acres)		12.55	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1500.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1601.5	0	1591.4	20	1591	40	1591.4	40	1601.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	225.6	230	224.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1610.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1596.11	Reach Len. (ft)	225.60	230.00	224.40
Crit W.S. (ft)	1600.11	Flow Area (sq ft)		196.23	
E.G. Slope (ft/ft)	*0.015380	Area (sq ft)		196.23	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	30.81	Avg. Vel. (ft/s)		30.81	
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	48744.3	Conv. (cfs)		48744.3	
Length Wtd. (ft)	230.00	Wetted Per. (ft)		49.42	
Min Ch El (ft)	1591.00	Shear (lb/sq ft)		3.81	
Alpha	1.00	Stream Power (lb/ft s)		117.45	
Frctn Loss (ft)	3.09	Cum Volume (acre-ft)		64.87	
C & E Loss (ft)	0.70	Cum SA (acres)		12.39	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1729.8

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1599.21	0	1589.11	20	1588.71	40	1589.11	40	1599.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	68.8	70.2	71.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1607.11	Element			
Vel Head (ft)	12.97	Wt. n-Val.		0.015	
W.S. Elev (ft)	1594.14	Reach Len. (ft)	68.80	70.20	71.40
Crit W.S. (ft)	1597.82	Flow Area (sq ft)		209.14	
E.G. Slope (ft/ft)	0.012654	Area (sq ft)		209.14	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	28.90	Avg. Vel. (ft/s)		28.90	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		5.23	
Conv. Total (cfs)	53738.6	Conv. (cfs)		53738.6	
Length Wtd. (ft)	70.20	Wetted Per. (ft)		50.07	
Min Ch El (ft)	1588.71	Shear (lb/sq ft)		3.30	
Alpha	1.00	Stream Power (lb/ft s)		95.38	
Frctn Loss (ft)	3.20	Cum Volume (acre-ft)		63.79	
C & E Loss (ft)	0.53	Cum SA (acres)		12.18	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1800.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1598.7	0	1588.6	20	1588.2	40	1588.6	40	1598.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	105.4	107.8	109.6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1606.05	Element			
Vel Head (ft)	12.27	Wt. n-Val.		0.015	
W.S. Elev (ft)	1593.78	Reach Len. (ft)	105.40	107.80	109.60
Crit W.S. (ft)	1597.31	Flow Area (sq ft)		215.00	
E.G. Slope (ft/ft)	0.011631	Area (sq ft)		215.00	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	28.12	Avg. Vel. (ft/s)		28.12	
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		5.38	
Conv. Total (cfs)	56052.7	Conv. (cfs)		56052.7	
Length Wtd. (ft)	107.80	Wetted Per. (ft)		50.36	
Min Ch El (ft)	1588.20	Shear (lb/sq ft)		3.10	
Alpha	1.00	Stream Power (lb/ft s)		87.16	
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)		63.45	
C & E Loss (ft)	0.21	Cum SA (acres)		12.11	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -1908.1

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1597.42	0	1587.32	20	1586.92	40	1587.32	40	1597.42

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	91.82	91.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1604.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.29	Wt. n-Val.		0.015	
W.S. Elev (ft)	1592.49	Reach Len. (ft)	91.82	91.82	91.82
Crit W.S. (ft)	1596.03	Flow Area (sq ft)		214.83	
E.G. Slope (ft/ft)	*0.011659	Area (sq ft)		214.83	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	28.14	Avg. Vel. (ft/s)		28.14	
Max Chl Dpth (ft)	5.57	Hydr. Depth (ft)		5.37	
Conv. Total (cfs)	55983.8	Conv. (cfs)		55983.8	
Length Wtd. (ft)	91.82	Wetted Per. (ft)		50.35	
Min Ch El (ft)	1586.92	Shear (lb/sq ft)		3.11	
Alpha	1.00	Stream Power (lb/ft s)		87.39	
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)		62.92	
C & E Loss (ft)	0.00	Cum SA (acres)		12.01	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2000.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.7	0	1586.6	20	1586.2	40	1586.6	40	1596.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1603.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.65	Wt. n-Val.		0.015	
W.S. Elev (ft)	1591.92	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	1595.31	Flow Area (sq ft)		220.74	
E.G. Slope (ft/ft)	*0.010734	Area (sq ft)		220.74	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	27.39	Avg. Vel. (ft/s)		27.39	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		5.52	
Conv. Total (cfs)	58346.4	Conv. (cfs)		58346.4	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		50.64	
Min Ch El (ft)	1586.20	Shear (lb/sq ft)		2.92	
Alpha	1.00	Stream Power (lb/ft s)		79.99	
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)		62.46	
C & E Loss (ft)	0.19	Cum SA (acres)		11.93	

additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2200.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1594.5	0	1584.4	20	1584	40	1584.4	40	1594.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	147.5	147.5	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1601.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.70	Wt. n-Val.		0.015	
W.S. Elev (ft)	1589.71	Reach Len. (ft)	147.50	147.50	147.50
Crit W.S. (ft)	1593.11	Flow Area (sq ft)		220.24	
E.G. Slope (ft/ft)	0.010808	Area (sq ft)		220.24	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	27.45	Avg. Vel. (ft/s)		27.45	
Max Chl Dpth (ft)	5.71	Hydr. Depth (ft)		5.51	
Conv. Total (cfs)	58146.2	Conv. (cfs)		58146.2	
Length Wtd. (ft)	147.50	Wetted Per. (ft)		50.62	
Min Ch El (ft)	1584.00	Shear (lb/sq ft)		2.94	
Alpha	1.00	Stream Power (lb/ft s)		80.58	
Frctn Loss (ft)	2.15	Cum Volume (acre-ft)		61.45	
C & E Loss (ft)	0.01	Cum SA (acres)		11.74	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2347.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1593.03	0	1582.94	20.5	1582.53	41	1582.94	41	1593.03

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	41	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	41	77	77	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1599.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.67	Wt. n-Val.		0.015	
W.S. Elev (ft)	1588.11	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1591.48	Flow Area (sq ft)		220.49	
E.G. Slope (ft/ft)	0.010976	Area (sq ft)		220.49	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	41.00	Top Width (ft)		41.00	
Vel Total (ft/s)	27.42	Avg. Vel. (ft/s)		27.42	
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		5.38	
Conv. Total (cfs)	57699.3	Conv. (cfs)		57699.3	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		51.35	
Min Ch El (ft)	1582.53	Shear (lb/sq ft)		2.94	
Alpha	1.00	Stream Power (lb/ft s)		80.66	

```
• C & E Loss (ft)        *    0.01  • Cum SA (acres)         *          *   11.61  *          •
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

BRIDGE


RIVER: C-1 Channel
REACH: 1                  RS: -2359.4

INPUT
Description:
Distance from Upstream XS =      12
Deck/Roadway Width        =      52
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
       0 1595.98 1594.48    20.5  1596.5    1595      41 1597.13 1595.63

Upstream Bridge Cross Section Data
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0 1593.03       0 1582.94    20.5 1582.53      41 1582.94      41 1593.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015      41    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0      41             .3       .5

Downstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
   12.33 1595.98 1594.48   33.33  1596.5    1595   53.83 1597.13 1595.63

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0  1597.6   12.83  1597.6   12.83 1582.17   33.33 1581.76   53.83 1582.17
   53.83  1597.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   53.83    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0   53.83             .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 Piers =  1

Pier Data
Pier Station     Upstream=    20.5    Downstream=   33.33
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
  1.1667 1582.41  1.1667 1598.04
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
  1.1667 1581.89  1.1667 1598.04

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
```

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	1599.78	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1588.11	E.G. Elev (ft)	1599.03	1598.36
Q Total (cfs)	6045.00	W.S. Elev (ft)	1588.60	1587.79
Q Bridge (cfs)	6045.00	Crit W.S. (ft)	1591.70	1590.94
Q Weir (cfs)		Max Chl Dpth (ft)	6.05	6.02
Weir Sta Lft (ft)		Vel Total (ft/s)	25.92	26.09
Weir Sta Rgt (ft)		Flow Area (sq ft)	233.19	231.68
Weir Submerg		Froude # Chl	1.89	1.91
Weir Max Depth (ft)		Specif Force (cu ft)	5549.45	5572.36
Min El Weir Flow (ft)	1596.00	Hydr Depth (ft)	5.85	5.82
Min El Prs (ft)	1595.63	W.P. Total (ft)	63.26	63.11
Delta EG (ft)	1.58	Conv. Total (cfs)	55124.2	54617.9
Delta WS (ft)	0.50	Top Width (ft)	39.83	39.83
BR Open Area (sq ft)	489.44	Frctn Loss (ft)	0.14	0.63
BR Open Vel (ft/s)	26.09	C & E Loss (ft)	0.62	0.04
Coef of Q		Shear Total (lb/sq ft)	2.77	2.81
Br Sel Method	Energy only	Power Total (lb/ft s)	71.74	73.26

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2424.4

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1597.6	12.83	1597.6	12.83	1582.17	33.33	1581.76	53.83	1582.17
53.83	1597.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	53.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	53.83	6.18	6.18	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1598.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.60	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.61	Reach Len. (ft)	6.18	6.18	6.18
Crit W.S. (ft)	1590.74	Flow Area (sq ft)		231.37	
E.G. Slope (ft/ft)	0.009477	Area (sq ft)		231.37	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	41.00	Top Width (ft)		41.00	
Vel Total (ft/s)	26.13	Avg. Vel. (ft/s)		26.13	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		5.64	
Conv. Total (cfs)	62094.4	Conv. (cfs)		62094.4	
Length Wtd. (ft)	6.18	Wetted Per. (ft)		51.88	
Min Ch El (ft)	1581.76	Shear (lb/sq ft)		2.64	
Alpha	1.00	Stream Power (lb/ft s)		68.94	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		60.29	
C & E Loss (ft)	0.01	Cum SA (acres)		11.54	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2430.6

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1597.2	0	1596.98	12.83	1596.98	12.831582.098		32.831581.698	
52.831582.098		52.83	1597.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.04	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.84	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.80	Flow Area (sq ft)		237.73	
E.G. Slope (ft/ft)	*0.008572	Area (sq ft)		237.73	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.43	Avg. Vel. (ft/s)		25.43	
Max Chl Dpth (ft)	6.14	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	65292.3	Conv. (cfs)		65292.3	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.49	
Min Ch El (ft)	1581.70	Shear (lb/sq ft)		2.47	
Alpha	1.00	Stream Power (lb/ft s)		62.82	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		60.26	
C & E Loss (ft)	0.28	Cum SA (acres)		11.53	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2440.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1597.11	0	1596.01	12.83	1596.01	12.83	1582	32.83	1581.6
52.83	1582	52.83	1597.11						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.06	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.74	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.71	Flow Area (sq ft)		237.47	
E.G. Slope (ft/ft)	*0.008599	Area (sq ft)		237.47	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.46	Avg. Vel. (ft/s)		25.46	
Max Chl Dpth (ft)	6.14	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	65186.8	Conv. (cfs)		65186.8	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.48	
Min Ch El (ft)	1581.60	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		63.04	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		60.21	
C & E Loss (ft)	0.00	Cum SA (acres)		11.52	

CROSS SECTION

RIVER: C-1 Channel

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1597.01	0	1595.04	12.83	1595.04	12.83	1581.91	32.83	1581.51
52.83	1581.91	52.83	1597.01						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.64	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.62	Flow Area (sq ft)		237.20	
E.G. Slope (ft/ft)	0.008629	Area (sq ft)		237.20	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.48	Avg. Vel. (ft/s)		25.48	
Max Chl Dpth (ft)	6.13	Hydr. Depth (ft)		5.93	
Conv. Total (cfs)	65075.3	Conv. (cfs)		65075.3	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.47	
Min Ch El (ft)	1581.51	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		63.27	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		60.16	
C & E Loss (ft)	0.00	Cum SA (acres)		11.51	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2458.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.92	0	1594.07	12.83	1594.07	12.83	1581.82	32.83	1581.42
52.83	1581.82	52.83	1596.92						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.11	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.54	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.53	Flow Area (sq ft)		236.94	
E.G. Slope (ft/ft)	0.008658	Area (sq ft)		236.94	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.51	Avg. Vel. (ft/s)		25.51	
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)		5.92	
Conv. Total (cfs)	64964.8	Conv. (cfs)		64964.8	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.46	
Min Ch El (ft)	1581.42	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)		63.50	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		60.11	
C & E Loss (ft)	0.00	Cum SA (acres)		11.51	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2468.*

Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.82	0	1593.1	12.83	1593.1	12.83	1581.72	32.83	1581.32
52.83	1581.72	52.83	1596.82						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.13	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.44	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.43	Flow Area (sq ft)		236.67	
E.G. Slope (ft/ft)	0.008688	Area (sq ft)		236.67	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.54	Avg. Vel. (ft/s)		25.54	
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)		5.92	
Conv. Total (cfs)	64854.5	Conv. (cfs)		64854.5	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.44	
Min Ch El (ft)	1581.32	Shear (lb/sq ft)		2.50	
Alpha	1.00	Stream Power (lb/ft s)		63.74	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		60.06	
C & E Loss (ft)	0.00	Cum SA (acres)		11.50	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2477.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.73	0	1592.13	12.83	1592.13	12.83	1581.63	32.83	1581.23
52.83	1581.63	52.83	1596.73						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	52.83	9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1597.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.15	Wt. n-Val.		0.015	
W.S. Elev (ft)	1587.34	Reach Len. (ft)	9.39	9.39	9.39
Crit W.S. (ft)	1590.34	Flow Area (sq ft)		236.43	
E.G. Slope (ft/ft)	0.008715	Area (sq ft)		236.43	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.57	Avg. Vel. (ft/s)		25.57	
Max Chl Dpth (ft)	6.11	Hydr. Depth (ft)		5.91	
Conv. Total (cfs)	64753.3	Conv. (cfs)		64753.3	
Length Wtd. (ft)	9.39	Wetted Per. (ft)		51.43	
Min Ch El (ft)	1581.23	Shear (lb/sq ft)		2.50	
Alpha	1.00	Stream Power (lb/ft s)		63.95	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		60.01	
C & E Loss (ft)	0.00	Cum SA (acres)		11.49	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2486.*

INPUT
Description:

```
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 1596.64        0 1591.16   12.83 1591.16   12.83 1581.53   32.83 1581.13
   52.83 1581.53   52.83 1596.64

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .015        0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         * 1597.41  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   10.17  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1587.23  * Reach Len. (ft)      *    9.39  *     9.39  *    9.39  *
* Crit W.S. (ft)         * 1590.24  * Flow Area (sq ft)    *          *   236.17  *          *
* E.G. Slope (ft/ft)     *0.008744  * Area (sq ft)         *          *   236.17  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          *  6045.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *    40.00  *          *
* Vel Total (ft/s)       *   25.60  * Avg. Vel. (ft/s)     *          *    25.60  *          *
* Max Chl Dpth (ft)      *    6.10  * Hydr. Depth (ft)     *          *     5.90  *          *
* Conv. Total (cfs)      * 64646.1  * Conv. (cfs)          *          * 64646.1  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *    51.42  *          *
* Min Ch El (ft)         * 1581.13  * Shear (lb/sq ft)     *          *     2.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *    64.18  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)  *          *    59.95  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    11.48  *          *
*************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -2496.*

INPUT
Description:
tation Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 1596.54        0 1590.19   12.83 1590.19   12.83 1581.44   32.83 1581.04
   52.83 1581.44   52.83 1596.54

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .015        0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         * 1597.33  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   10.19  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1587.14  * Reach Len. (ft)      *    9.39  *     9.39  *    9.39  *
* Crit W.S. (ft)         * 1590.81  * Flow Area (sq ft)    *          *   235.94  *          *
* E.G. Slope (ft/ft)     *0.008769  * Area (sq ft)         *          *   235.94  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          *  6045.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *    40.00  *          *
* Vel Total (ft/s)       *   25.62  * Avg. Vel. (ft/s)     *          *    25.62  *          *
* Max Chl Dpth (ft)      *    6.10  * Hydr. Depth (ft)     *          *     5.90  *          *
* Conv. Total (cfs)      * 64551.9  * Conv. (cfs)          *          * 64551.9  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *    51.41  *          *
* Min Ch El (ft)         * 1581.04  * Shear (lb/sq ft)     *          *     2.51  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *    64.38  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)  *          *    59.90  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    11.47  *          *
*************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -2505.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
```

```
      0 1596.45       0 1589.22   12.83 1589.22   12.83 1581.35   32.83 1580.95
   52.83 1581.35   52.83 1596.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1597.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   10.21  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1587.04  * Reach Len. (ft)      *    9.39  *     9.39  *    9.39  *
* Crit W.S. (ft)        * 1590.51  * Flow Area (sq ft)    *          *   235.73  *          *
* E.G. Slope (ft/ft)    *0.008794  * Area (sq ft)         *          *   235.73  *          *
* Q Total (cfs)         * 6045.00  * Flow (cfs)           *          *  6045.00  *          *
* Top Width (ft)        *   40.00  * Top Width (ft)       *          *    40.00  *          *
* Vel Total (ft/s)      *   25.64  * Avg. Vel. (ft/s)     *          *    25.64  *          *
* Max Chl Dpth (ft)     *    6.09  * Hydr. Depth (ft)     *          *     5.89  *          *
* Conv. Total (cfs)     * 64462.0  * Conv. (cfs)          *          *  64462.0  *          *
* Length Wtd. (ft)      *    9.39  * Wetted Per. (ft)     *          *    51.39  *          *
* Min Ch El (ft)        * 1580.95  * Shear (lb/sq ft)     *          *     2.52  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *    64.57  *          *
* Frctn Loss (ft)       *    0.08  * Cum Volume (acre-ft) *          *    59.85  *          *
* C & E Loss (ft)       *    0.00  * Cum SA (acres)       *          *    11.46  *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -2515.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1596.35       0 1588.26   12.83 1588.26   12.83 1581.25   32.83 1580.85
   52.83 1581.25   52.83 1596.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1597.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   10.23  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1586.94  * Reach Len. (ft)      *    9.39  *     9.39  *    9.39  *
* Crit W.S. (ft)        * 1590.21  * Flow Area (sq ft)    *          *   235.48  *          *
* E.G. Slope (ft/ft)    *0.008822  * Area (sq ft)         *          *   235.48  *          *
* Q Total (cfs)         * 6045.00  * Flow (cfs)           *          *  6045.00  *          *
* Top Width (ft)        *   40.00  * Top Width (ft)       *          *    40.00  *          *
* Vel Total (ft/s)      *   25.67  * Avg. Vel. (ft/s)     *          *    25.67  *          *
* Max Chl Dpth (ft)     *    6.09  * Hydr. Depth (ft)     *          *     5.89  *          *
* Conv. Total (cfs)     * 64361.0  * Conv. (cfs)          *          *  64361.0  *          *
* Length Wtd. (ft)      *    9.39  * Wetted Per. (ft)     *          *    51.38  *          *
* Min Ch El (ft)        * 1580.85  * Shear (lb/sq ft)     *          *     2.52  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *    64.79  *          *
* Frctn Loss (ft)       *    0.08  * Cum Volume (acre-ft) *          *    59.80  *          *
* C & E Loss (ft)       *    0.00  * Cum SA (acres)       *          *    11.45  *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -2524.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1596.26       0 1587.29   12.83 1587.29   12.83 1581.16   32.83 1580.76
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

ank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
0	52.83		9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1597.09	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 10.25	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1586.84	* Reach Len. (ft)	* 9.39	* 9.39	* 9.39 *
* Crit W.S. (ft)	* 1589.88	* Flow Area (sq ft)	*	* 235.28	* *
* E.G. Slope (ft/ft)	*0.008844	* Area (sq ft)	*	* 235.28	* *
* Q Total (cfs)	* 6045.00	* Flow (cfs)	*	* 6045.00	* *
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	* *
* Vel Total (ft/s)	* 25.69	* Avg. Vel. (ft/s)	*	* 25.69	* *
* Max Chl Dpth (ft)	* 6.08	* Hydr. Depth (ft)	*	* 5.88	* *
* Conv. Total (cfs)	* 64278.2	* Conv. (cfs)	*	* 64278.2	* *
* Length Wtd. (ft)	* 9.39	* Wetted Per. (ft)	*	* 51.37	* *
* Min Ch El (ft)	* 1580.76	* Shear (lb/sq ft)	*	* 2.53	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 64.97	* *
* Frctn Loss (ft)	* 0.08	* Cum Volume (acre-ft)	*	* 59.75	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 11.44	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2533.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.16	0	1586.32	12.83	1586.32	12.83	1581.06	32.83	1580.66
52.83	1581.06	52.83	1596.16						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	52.83	.015

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

0	52.83		9.39	9.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1596.98	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 10.37	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1586.61	* Reach Len. (ft)	* 9.39	* 9.39	* 9.39 *
* Crit W.S. (ft)	* 1589.56	* Flow Area (sq ft)	*	* 233.92	* *
* E.G. Slope (ft/ft)	*0.012074	* Area (sq ft)	*	* 233.92	* *
* Q Total (cfs)	* 6045.00	* Flow (cfs)	*	* 6045.00	* *
* Top Width (ft)	* 52.83	* Top Width (ft)	*	* 52.83	* *
* Vel Total (ft/s)	* 25.84	* Avg. Vel. (ft/s)	*	* 25.84	* *
* Max Chl Dpth (ft)	* 5.95	* Hydr. Depth (ft)	*	* 4.43	* *
* Conv. Total (cfs)	* 55013.9	* Conv. (cfs)	*	* 55013.9	* *
* Length Wtd. (ft)	* 9.39	* Wetted Per. (ft)	*	* 63.95	* *
* Min Ch El (ft)	* 1580.66	* Shear (lb/sq ft)	*	* 2.76	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 71.26	* *
* Frctn Loss (ft)	* 0.10	* Cum Volume (acre-ft)	*	* 59.70	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 11.43	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2543.*

.NPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1596.07	0	1585.35	12.83	1585.35	12.83	1580.97	32.83	1580.57
52.83	1580.97	52.83	1596.07						

```
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1596.85  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   10.58  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)         * 1586.27  * Reach Len. (ft)       *    9.39  *    9.39  *    9.39  *
* Crit W.S. (ft)         * 1589.26  * Flow Area (sq ft)     *          *  231.59  *          *
* E.G. Slope (ft/ft)     *0.012350  * Area (sq ft)          *          *  231.59  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          * 6045.00  *          *
* Top Width (ft)         *   52.83  * Top Width (ft)       *          *   52.83  *          *
* Vel Total (ft/s)       *   26.10  * Avg. Vel. (ft/s)     *          *   26.10  *          *
* Max Chl Dpth (ft)      *    5.70  * Hydr. Depth (ft)     *          *    4.38  *          *
* Conv. Total (cfs)      * 54395.9  * Conv. (cfs)          *          * 54395.9  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *   63.43  *          *
* Min Ch El (ft)         * 1580.57  * Shear (lb/sq ft)     *          *    2.81  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   73.48  *          *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft) *          *   59.65  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)       *          *   11.42  *          *
*****************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2552.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 1595.98        0 1584.38   12.83 1584.38   12.83 1580.88   32.83 1580.48
   52.83 1580.88    52.83 1595.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1596.71  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   10.78  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)         * 1585.92  * Reach Len. (ft)       *    9.39  *    9.39  *    9.39  *
* Crit W.S. (ft)         * 1588.96  * Flow Area (sq ft)     *          *  229.37  *          *
* E.G. Slope (ft/ft)     *0.012615  * Area (sq ft)          *          *  229.37  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          * 6045.00  *          *
* Top Width (ft)         *   52.83  * Top Width (ft)       *          *   52.83  *          *
* Vel Total (ft/s)       *   26.35  * Avg. Vel. (ft/s)     *          *   26.35  *          *
* Max Chl Dpth (ft)      *    5.44  * Hydr. Depth (ft)     *          *    4.34  *          *
* Conv. Total (cfs)      * 53821.7  * Conv. (cfs)          *          * 53821.7  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *   62.92  *          *
* Min Ch El (ft)         * 1580.48  * Shear (lb/sq ft)     *          *    2.87  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   75.66  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft) *          *   59.60  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)       *          *   11.41  *          *
*****************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2562.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 1595.88        0 1583.41   12.83 1583.41   12.83 1580.78   32.83 1580.38
   52.83 1580.78    52.83 1595.88

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

```
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1596.56  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   10.99  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1585.57  * Reach Len. (ft)       *     9.39 *     9.39 *     9.39 *
* Crit W.S. (ft)         * 1588.65  * Flow Area (sq ft)     *          *  227.18  *          *
* E.G. Slope (ft/ft)     *0.012886  * Area (sq ft)          *          *  227.18  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          * 6045.00  *          *
* Top Width (ft)         *   52.83  * Top Width (ft)       *          *   52.83  *          *
* Vel Total (ft/s)       *   26.61  * Avg. Vel. (ft/s)     *          *   26.61  *          *
* Max Chl Dpth (ft)      *    5.19  * Hydr. Depth (ft)     *          *    4.30  *          *
* Conv. Total (cfs)      * 53252.2  * Conv. (cfs)          *          * 53252.2  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *   62.41  *          *
* Min Ch El (ft)         * 1580.38  * Shear (lb/sq ft)     *          *    2.93  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   77.92  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)  *          *   59.55  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *   11.40  *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2571.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1595.79       0 1582.44   12.83 1582.44   12.83 1580.69   32.83 1580.29
   52.83 1580.69   52.83 1595.79

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1596.42  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   11.19  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1585.23  * Reach Len. (ft)       *     9.39 *     9.39 *     9.39 *
* Crit W.S. (ft)         * 1588.34  * Flow Area (sq ft)     *          *  225.18  *          *
* E.G. Slope (ft/ft)     *0.013130  * Area (sq ft)          *          *  225.18  *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)           *          * 6045.00  *          *
* Top Width (ft)         *   52.83  * Top Width (ft)       *          *   52.83  *          *
* Vel Total (ft/s)       *   26.85  * Avg. Vel. (ft/s)     *          *   26.85  *          *
* Max Chl Dpth (ft)      *    4.94  * Hydr. Depth (ft)     *          *    4.26  *          *
* Conv. Total (cfs)      * 52755.7  * Conv. (cfs)          *          * 52755.7  *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)     *          *   61.91  *          *
* Min Ch El (ft)         * 1580.29  * Shear (lb/sq ft)     *          *    2.98  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   80.04  *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)  *          *   59.50  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *   11.39  *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2580.*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1595.69       0 1581.47   12.83 1581.47   12.83 1580.59   32.83 1580.19
   52.83 1580.59   52.83 1595.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015   52.83    .015
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             9.39    9.39    9.39             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1596.27  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   11.39  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1584.88  * Reach Len. (ft)       *    9.39  *     9.39 *    9.39  *
* Crit W.S. (ft)         * 1588.04  * Flow Area (sq ft)     *          *   223.19 *          *
* E.G. Slope (ft/ft)     *0.013379  * Area (sq ft)          *          *   223.19 *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)            *          * 6045.00 *          *
* Top Width (ft)         *   52.83  * Top Width (ft)        *          *   52.83 *          *
* Vel Total (ft/s)       *   27.09  * Avg. Vel. (ft/s)      *          *   27.09 *          *
* Max Chl Dpth (ft)      *    4.69  * Hydr. Depth (ft)      *          *    4.22 *          *
* Conv. Total (cfs)      * 52261.1  * Conv. (cfs)           *          * 52261.1 *          *
* Length Wtd. (ft)       *    9.39  * Wetted Per. (ft)      *          *   61.41 *          *
* Min Ch El (ft)         * 1580.19  * Shear (lb/sq ft)      *          *    3.04 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   82.22 *          *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)  *          *   59.45 *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *   11.38 *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2590.2

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  1595.6       0  1580.5   12.83  1580.5   32.83  1580.1   52.83  1580.5
   52.83  1595.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015   52.83    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   52.83             8.82    8.82    8.82             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 1596.12  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   11.58  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1584.54  * Reach Len. (ft)       *    8.82  *     8.82 *    8.82  *
* Crit W.S. (ft)         * 1587.73  * Flow Area (sq ft)     *          *   221.39 *          *
* E.G. Slope (ft/ft)     *0.013597  * Area (sq ft)          *          *   221.39 *          *
* Q Total (cfs)          * 6045.00  * Flow (cfs)            *          * 6045.00 *          *
* Top Width (ft)         *   52.83  * Top Width (ft)        *          *   52.83 *          *
* Vel Total (ft/s)       *   27.30  * Avg. Vel. (ft/s)      *          *   27.30 *          *
* Max Chl Dpth (ft)      *    4.44  * Hydr. Depth (ft)      *          *    4.19 *          *
* Conv. Total (cfs)      * 51841.8  * Conv. (cfs)           *          * 51841.8 *          *
* Length Wtd. (ft)       *    8.82  * Wetted Per. (ft)      *          *   60.92 *          *
* Min Ch El (ft)         * 1580.10  * Shear (lb/sq ft)      *          *    3.08 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   84.23 *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)  *          *   59.41 *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *   11.37 *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -2599.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1595.51       0 1580.41   12.11 1580.39      31 1580.01      51 1580.41
      51 1595.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015      51    .015

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

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1595.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.25	Wt. n-Val.		0.015	
W.S. Elev (ft)	1584.66	Reach Len. (ft)	8.82	8.82	8.82
Crit W.S. (ft)	1587.83	Flow Area (sq ft)		224.61	
E.G. Slope (ft/ft)	0.012558	Area (sq ft)		224.61	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	51.00	Top Width (ft)		51.00	
Vel Total (ft/s)	26.91	Avg. Vel. (ft/s)		26.91	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		4.40	
Conv. Total (cfs)	53943.8	Conv. (cfs)		53943.8	
Length Wtd. (ft)	8.82	Wetted Per. (ft)		59.50	
Min Ch El (ft)	1580.01	Shear (lb/sq ft)		2.96	
Alpha	1.00	Stream Power (lb/ft s)		79.65	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		59.36	
C & E Loss (ft)	0.10	Cum SA (acres)		11.36	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2607.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1595.43	0	1580.33	11.4	1580.28	29.16	1579.93	49.16	1580.33
49.16	1595.43								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	49.16	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	49.16	8.82	8.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1595.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.88	Wt. n-Val.		0.015	
W.S. Elev (ft)	1584.81	Reach Len. (ft)	8.82	8.82	8.82
Crit W.S. (ft)	1587.93	Flow Area (sq ft)		228.35	
E.G. Slope (ft/ft)	0.011519	Area (sq ft)		228.35	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	49.16	Top Width (ft)		49.16	
Vel Total (ft/s)	26.47	Avg. Vel. (ft/s)		26.47	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	56323.5	Conv. (cfs)		56323.5	
Length Wtd. (ft)	8.82	Wetted Per. (ft)		58.12	
Min Ch El (ft)	1579.93	Shear (lb/sq ft)		2.83	
Alpha	1.00	Stream Power (lb/ft s)		74.79	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		59.32	
C & E Loss (ft)	0.11	Cum SA (acres)		11.35	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2616.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1595.34	0	1580.24	10.68	1580.17	27.33	1579.84	47.33	1580.24
47.33	1595.34								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	47.33	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	47.33	8.82	8.82	.1	.3

E.G. Elev (ft)	1595.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.50	Wt. n-Val.		0.015	
W.S. Elev (ft)	1584.98	Reach Len. (ft)	8.82	8.82	8.82
Crit W.S. (ft)	1588.03	Flow Area (sq ft)		232.43	
E.G. Slope (ft/ft)	*0.010534	Area (sq ft)		232.43	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	47.33	Top Width (ft)		47.33	
Vel Total (ft/s)	26.01	Avg. Vel. (ft/s)		26.01	
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	58898.8	Conv. (cfs)		58898.8	
Length Wtd. (ft)	8.82	Wetted Per. (ft)		56.81	
Min Ch El (ft)	1579.84	Shear (lb/sq ft)		2.69	
Alpha	1.00	Stream Power (lb/ft s)		69.98	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		59.27	
C & E Loss (ft)	0.11	Cum SA (acres)		11.34	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2625.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1595.25	0	1580.15	9.96	1580.06	25.5	1579.75	45.5	1580.15
45.5	1595.25								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	45.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	45.5	8.82	8.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1595.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1585.18	Reach Len. (ft)	8.82	8.82	8.82
Crit W.S. (ft)	1588.15	Flow Area (sq ft)		237.22	
E.G. Slope (ft/ft)	*0.009557	Area (sq ft)		237.22	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	45.50	Top Width (ft)		45.50	
Vel Total (ft/s)	25.48	Avg. Vel. (ft/s)		25.48	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		5.21	
Conv. Total (cfs)	61836.1	Conv. (cfs)		61836.1	
Length Wtd. (ft)	8.82	Wetted Per. (ft)		55.57	
Min Ch El (ft)	1579.75	Shear (lb/sq ft)		2.55	
Alpha	1.00	Stream Power (lb/ft s)		64.90	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		59.22	
C & E Loss (ft)	0.13	Cum SA (acres)		11.33	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2634.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1595.16	0	1580.06	9.25	1579.95	23.67	1579.66	43.67	1580.06
43.67	1595.16								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	43.67	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	43.67	8.82	8.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

Vel Head (ft)	9.61	Wt. n-Val.			0.015			
W.S. Elev (ft)	1585.44	Reach Len. (ft)		8.82	8.82		8.82	
Crit W.S. (ft)	1588.28	Flow Area (sq ft)			243.05			
E.G. Slope (ft/ft)	0.008574	Area (sq ft)			243.05			
Q Total (cfs)	6045.00	Flow (cfs)			6045.00			
Top Width (ft)	43.67	Top Width (ft)			43.67			
Vel Total (ft/s)	24.87	Avg. Vel. (ft/s)			24.87			
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)			5.57			
Conv. Total (cfs)	65284.4	Conv. (cfs)			65284.4			
Length Wtd. (ft)	8.82	Wetted Per. (ft)			54.43			
Min Ch El (ft)	1579.66	Shear (lb/sq ft)			2.39			
Alpha	1.00	Stream Power (lb/ft s)			59.44			
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)			59.17			
C & E Loss (ft)	0.14	Cum SA (acres)			11.32			

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2642.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1595.08	0	1579.98	8.53	1579.84	21.83	1579.58	41.83	1579.98
41.83	1595.08								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	41.83	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	41.83	8.82	8.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1594.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.02	Wt. n-Val.		0.015	
W.S. Elev (ft)	1585.78	Reach Len. (ft)	8.82	8.82	8.82
Crit W.S. (ft)	1588.44	Flow Area (sq ft)		250.87	
E.G. Slope (ft/ft)	0.007527	Area (sq ft)		250.87	
Q Total (cfs)	6045.00	Flow (cfs)		6045.00	
Top Width (ft)	41.83	Top Width (ft)		41.83	
Vel Total (ft/s)	24.10	Avg. Vel. (ft/s)		24.10	
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)		6.00	
Conv. Total (cfs)	69674.2	Conv. (cfs)		69674.2	
Length Wtd. (ft)	8.82	Wetted Per. (ft)		53.44	
Min Ch El (ft)	1579.58	Shear (lb/sq ft)		2.21	
Alpha	1.00	Stream Power (lb/ft s)		53.16	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		59.12	
C & E Loss (ft)	0.18	Cum SA (acres)		11.31	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2651.6

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1594.99	0	1579.89	20	1579.49	40	1579.89	40	1594.99

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	52.93	52.93	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* Vel Head (ft)	*	8.29	* Wt. n-Val.	*		*	0.015	*		*
* W.S. Elev (ft)	*	1586.23	* Reach Len. (ft)	*	52.93	*	52.93	*	52.93	*
* Crit W.S. (ft)	*	1588.60	* Flow Area (sq ft)	*		*	261.66	*		*
* E.G. Slope (ft/ft)	*	0.006420	* Area (sq ft)	*		*	261.66	*		*
* Q Total (cfs)	*	6045.00	* Flow (cfs)	*		*	6045.00	*		*
* Top Width (ft)	*	40.00	* Top Width (ft)	*		*	40.00	*		*
* Vel Total (ft/s)	*	23.10	* Avg. Vel. (ft/s)	*		*	23.10	*		*
* Max Chl Dpth (ft)	*	6.74	* Hydr. Depth (ft)	*		*	6.54	*		*
* Conv. Total (cfs)	*	75446.0	* Conv. (cfs)	*		*	75446.0	*		*
* Length Wtd. (ft)	*	52.93	* Wetted Per. (ft)	*		*	52.69	*		*
* Min Ch El (ft)	*	1579.49	* Shear (lb/sq ft)	*		*	1.99	*		*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	45.98	*		*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*		*	59.07	*		*
* C & E Loss (ft)	*	0.22	* Cum SA (acres)	*		*	11.30	*		*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -2704.6

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1589.46	0	1579.36	20	1578.96	40	1579.36	40	1589.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	379.55	379.55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1594.15	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 8.54	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1585.60	* Reach Len. (ft)	* 379.55	* 379.55	* 379.55	*
* Crit W.S. (ft)	* 1588.07	* Flow Area (sq ft)	*	* 257.72	*	*
* E.G. Slope (ft/ft)	* 0.006719	* Area (sq ft)	*	* 257.72	*	*
* Q Total (cfs)	* 6045.00	* Flow (cfs)	*	* 6045.00	*	*
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	*	*
* Vel Total (ft/s)	* 23.46	* Avg. Vel. (ft/s)	*	* 23.46	*	*
* Max Chl Dpth (ft)	* 6.64	* Hydr. Depth (ft)	*	* 6.44	*	*
* Conv. Total (cfs)	* 73745.9	* Conv. (cfs)	*	* 73745.9	*	*
* Length Wtd. (ft)	* 379.55	* Wetted Per. (ft)	*	* 52.49	*	*
* Min Ch El (ft)	* 1578.96	* Shear (lb/sq ft)	*	* 2.06	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 48.31	*	*
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	*	* 58.76	*	*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 11.25	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3084.2

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1585.66	0	1575.56	20	1575.16	40	1575.56	40	1585.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	20.22	20.22	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1591.26	* Element	* Left OB	* Channel	* Right OB *

W.S. Elev (ft)	1581.57	Reach Len. (ft)	20.22	20.22	20.22
Crit W.S. (ft)	1584.43	Flow Area (sq ft)		248.53	
E.G. Slope (ft/ft)	0.007905	Area (sq ft)		248.53	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	24.98	Avg. Vel. (ft/s)		24.98	
Max Chl Dpth (ft)	6.41	Hydr. Depth (ft)		6.21	
Conv. Total (cfs)	69823.6	Conv. (cfs)		69823.6	
Length Wtd. (ft)	20.22	Wetted Per. (ft)		52.03	
Min Ch El (ft)	1575.16	Shear (lb/sq ft)		2.36	
Alpha	1.00	Stream Power (lb/ft s)		58.88	
Frctn Loss (ft)	2.76	Cum Volume (acre-ft)		56.55	
C & E Loss (ft)	0.11	Cum SA (acres)		10.90	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3104.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1585.46	0	1575.36	20	1574.96	40	1575.36	40	1585.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1591.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1581.36	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1584.23	Flow Area (sq ft)		247.88	
E.G. Slope (ft/ft)	0.007967	Area (sq ft)		247.88	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.04	Avg. Vel. (ft/s)		25.04	
Max Chl Dpth (ft)	6.40	Hydr. Depth (ft)		6.20	
Conv. Total (cfs)	69550.8	Conv. (cfs)		69550.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		52.00	
Min Ch El (ft)	1574.96	Shear (lb/sq ft)		2.37	
Alpha	1.00	Stream Power (lb/ft s)		59.38	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		56.43	
C & E Loss (ft)	0.01	Cum SA (acres)		10.89	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3154.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1584.96	0	1574.86	20	1574.46	40	1574.86	40	1584.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

Vel Head (ft)	9.86	Wt. n-Val.		0.015				
W.S. Elev (ft)	1580.82	Reach Len. (ft)	50.00	50.00	50.00			
Crit W.S. (ft)	1583.73	Flow Area (sq ft)		246.42				
E.G. Slope (ft/ft)	0.008111	Area (sq ft)		246.42				
Q Total (cfs)	6208.00	Flow (cfs)		6208.00				
Top Width (ft)	40.00	Top Width (ft)		40.00				
Vel Total (ft/s)	25.19	Avg. Vel. (ft/s)		25.19				
Max Chl Dpth (ft)	6.36	Hydr. Depth (ft)		6.16				
Conv. Total (cfs)	68931.8	Conv. (cfs)		68931.8				
Length Wtd. (ft)	50.00	Wetted Per. (ft)		51.93				
Min Ch El (ft)	1574.46	Shear (lb/sq ft)		2.40				
Alpha	1.00	Stream Power (lb/ft s)		60.53				
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		56.15				
C & E Loss (ft)	0.01	Cum SA (acres)		10.84				

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3204.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1584.46	0	1574.36	20	1573.96	40	1574.36	40	1584.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1590.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.96	Wt. n-Val.		0.015	
W.S. Elev (ft)	1580.29	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1583.23	Flow Area (sq ft)		245.08	
E.G. Slope (ft/ft)	0.008246	Area (sq ft)		245.08	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.33	Avg. Vel. (ft/s)		25.33	
Max Chl Dpth (ft)	6.33	Hydr. Depth (ft)		6.13	
Conv. Total (cfs)	68365.9	Conv. (cfs)		68365.9	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		51.86	
Min Ch El (ft)	1573.96	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)		61.62	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		55.87	
C & E Loss (ft)	0.01	Cum SA (acres)		10.79	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3304.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1583.46	0	1573.36	20	1572.96	40	1573.36	40	1583.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1589.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.17	Wt. n-Val.		0.015	
W.S. Elev (ft)	1579.23	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1582.23	Flow Area (sq ft)		242.61	

Q Total (cfs)	6208.00	Flow (cfs)		6208.00			
Top Width (ft)	40.00	Top Width (ft)		40.00			
Vel Total (ft/s)	25.59	Avg. Vel. (ft/s)		25.59			
Max Chl Dpth (ft)	6.27	Hydr. Depth (ft)		6.07			
Conv. Total (cfs)	67328.0	Conv. (cfs)		67328.0			
Length Wtd. (ft)	100.00	Wetted Per. (ft)		51.74			
Min Ch El (ft)	1572.96	Shear (lb/sq ft)		2.49			
Alpha	1.00	Stream Power (lb/ft s)		63.69			
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)		55.31			
C & E Loss (ft)	0.02	Cum SA (acres)		10.70			

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3404.4

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1582.46	0	1572.36	20	1571.96	40	1572.36	40	1582.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	95.55	95.55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1588.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.35	Wt. n-Val.		0.015	
W.S. Elev (ft)	1578.17	Reach Len. (ft)	95.55	95.55	95.55
Crit W.S. (ft)	1581.23	Flow Area (sq ft)		240.48	
E.G. Slope (ft/ft)	0.008731	Area (sq ft)		240.48	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.82	Avg. Vel. (ft/s)		25.82	
Max Chl Dpth (ft)	6.21	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	66437.4	Conv. (cfs)		66437.4	
Length Wtd. (ft)	95.55	Wetted Per. (ft)		51.63	
Min Ch El (ft)	1571.96	Shear (lb/sq ft)		2.54	
Alpha	1.00	Stream Power (lb/ft s)		65.54	
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)		54.75	
C & E Loss (ft)	0.02	Cum SA (acres)		10.61	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3500.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1581.51	0	1571.4	20	1571	40	1571.4	40	1581.51

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	99	100	101	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1587.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.50	Wt. n-Val.		0.015	
W.S. Elev (ft)	1577.17	Reach Len. (ft)	99.00	100.00	101.00
Crit W.S. (ft)	1580.27	Flow Area (sq ft)		238.79	
E.G. Slope (ft/ft)	0.008919	Area (sq ft)		238.79	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	26.00	Avg. Vel. (ft/s)		26.00	

* Conv. Total (cfs)	* 65733.0	* Conv. (cfs)	*	* 65733.0	*	*
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 51.55	*	*
* Min Ch El (ft)	* 1571.00	* Shear (lb/sq ft)	*	* 2.58	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 67.06	*	*
* Frctn Loss (ft)	* 0.84	* Cum Volume (acre-ft)	*	* 54.23	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 10.52	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3600.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1580.51	0	1570.4	20	1570	40	1570.4	40	1580.51

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	49	50	51	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1586.75	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 10.61	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1576.14	* Reach Len. (ft)	* 49.00	* 50.00	* 51.00 *
* Crit W.S. (ft)	* 1579.27	* Flow Area (sq ft)	*	* 237.52	* *
* E.G. Slope (ft/ft)	*0.009064	* Area (sq ft)	*	* 237.52	* *
* Q Total (cfs)	* 6208.00	* Flow (cfs)	*	* 6208.00	* *
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	* *
* Vel Total (ft/s)	* 26.14	* Avg. Vel. (ft/s)	*	* 26.14	* *
* Max Chl Dpth (ft)	* 6.14	* Hydr. Depth (ft)	*	* 5.94	* *
* Conv. Total (cfs)	* 65205.1	* Conv. (cfs)	*	* 65205.1	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 51.48	* *
* Min Ch El (ft)	* 1570.00	* Shear (lb/sq ft)	*	* 2.61	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 68.24	* *
* Frctn Loss (ft)	* 0.90	* Cum Volume (acre-ft)	*	* 53.68	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 10.43	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3650.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1579.43	0	1569.43	20	1569.23	40	1569.43	40	1579.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	49	50	51	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1586.22	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 11.08	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1575.14	* Reach Len. (ft)	* 49.00	* 50.00	* 51.00 *
* Crit W.S. (ft)	* 1578.41	* Flow Area (sq ft)	*	* 232.39	* *
* E.G. Slope (ft/ft)	*0.009733	* Area (sq ft)	*	* 232.39	* *
* Q Total (cfs)	* 6208.00	* Flow (cfs)	*	* 6208.00	* *
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	* *
* Vel Total (ft/s)	* 26.71	* Avg. Vel. (ft/s)	*	* 26.71	* *
* Max Chl Dpth (ft)	* 5.91	* Hydr. Depth (ft)	*	* 5.81	* *
* Conv. Total (cfs)	* 62925.0	* Conv. (cfs)	*	* 62925.0	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 51.42	* *
* Min Ch El (ft)	* 1569.23	* Shear (lb/sq ft)	*	* 2.75	* *

* Frctn Loss (ft)	* 0.47	* Cum Volume (acre-ft)	*	* 53.41	*	*
* C & E Loss (ft)	* 0.05	* Cum SA (acres)	*	* 10.38	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3700.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1578.86	0	1568.86	20	1568.46	40	1568.86	40	1578.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47	50	53	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1585.71	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 11.29	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1574.42	* Reach Len. (ft)	* 47.00	* 50.00	* 53.00 *
* Crit W.S. (ft)	* 1577.73	* Flow Area (sq ft)	*	* 230.21	* *
* E.G. Slope (ft/ft)	*0.009965	* Area (sq ft)	*	* 230.21	* *
* Q Total (cfs)	* 6208.00	* Flow (cfs)	*	* 6208.00	* *
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	* *
* Vel Total (ft/s)	* 26.97	* Avg. Vel. (ft/s)	*	* 26.97	* *
* Max Chl Dpth (ft)	* 5.96	* Hydr. Depth (ft)	*	* 5.76	* *
* Conv. Total (cfs)	* 62189.7	* Conv. (cfs)	*	* 62189.7	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 51.12	* *
* Min Ch El (ft)	* 1568.46	* Shear (lb/sq ft)	*	* 2.80	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 75.55	* *
Frctn Loss (ft)	* 0.49	* Cum Volume (acre-ft)	*	* 53.15	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 10.34	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3750.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1578.08	0	1568.08	20	1567.68	40	1568.08	40	1578.08

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47	50	53	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1585.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 11.61	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1573.56	* Reach Len. (ft)	* 47.00	* 50.00	* 53.00 *
* Crit W.S. (ft)	* 1576.95	* Flow Area (sq ft)	*	* 227.07	* *
* E.G. Slope (ft/ft)	*0.010388	* Area (sq ft)	*	* 227.07	* *
* Q Total (cfs)	* 6208.00	* Flow (cfs)	*	* 6208.00	* *
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	* *
Vel Total (ft/s)	* 27.34	* Avg. Vel. (ft/s)	*	* 27.34	* *
Max Chl Dpth (ft)	* 5.88	* Hydr. Depth (ft)	*	* 5.68	* *
* Conv. Total (cfs)	* 60908.2	* Conv. (cfs)	*	* 60908.2	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 50.96	* *
* Min Ch El (ft)	* 1567.68	* Shear (lb/sq ft)	*	* 2.89	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 79.00	* *
* Frctn Loss (ft)	* 0.51	* Cum Volume (acre-ft)	*	* 52.88	* *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 10.29	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3800.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1577.3	0	1567.3	20	1566.9	40	1567.3	40	1577.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1584.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.89	Wt. n-Val.		0.015	
W.S. Elev (ft)	1572.71	Reach Len. (ft)	47.00	50.00	53.00
Crit W.S. (ft)	1576.17	Flow Area (sq ft)		224.30	
E.G. Slope (ft/ft)	0.010783	Area (sq ft)		224.30	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	27.68	Avg. Vel. (ft/s)		27.68	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		5.61	
Conv. Total (cfs)	59782.9	Conv. (cfs)		59782.9	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		50.82	
Min Ch El (ft)	1566.90	Shear (lb/sq ft)		2.97	
Alpha	1.00	Stream Power (lb/ft s)		82.23	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		52.63	
C & E Loss (ft)	0.03	Cum SA (acres)		10.25	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3850.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1576.53	0	1566.53	20	1566.13	40	1566.53	40	1576.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1584.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.15	Wt. n-Val.		0.015	
W.S. Elev (ft)	1571.88	Reach Len. (ft)	47.00	50.00	53.00
Crit W.S. (ft)	1575.40	Flow Area (sq ft)		221.94	
E.G. Slope (ft/ft)	0.011136	Area (sq ft)		221.94	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	27.97	Avg. Vel. (ft/s)		27.97	
Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)		5.55	
Conv. Total (cfs)	58828.0	Conv. (cfs)		58828.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		50.70	
Min Ch El (ft)	1566.13	Shear (lb/sq ft)		3.04	
Alpha	1.00	Stream Power (lb/ft s)		85.12	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		52.37	
C & E Loss (ft)	0.03	Cum SA (acres)		10.20	

CROSS SECTION

REACH: 1 RS: -3900.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1575.75	0	1565.75	20	1565.35	40	1565.75	40	1575.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47	50	53	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1583.44	Element			
Vel Head (ft)	12.39	Wt. n-Val.		0.015	
W.S. Elev (ft)	1571.04	Reach Len. (ft)	47.00	50.00	53.00
Crit W.S. (ft)	1574.62	Flow Area (sq ft)		219.74	
E.G. Slope (ft/ft)	0.011478	Area (sq ft)		219.74	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	28.25	Avg. Vel. (ft/s)		28.25	
Max Chl Dpth (ft)	5.69	Hydr. Depth (ft)		5.49	
Conv. Total (cfs)	57944.3	Conv. (cfs)		57944.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		50.59	
Min Ch El (ft)	1565.35	Shear (lb/sq ft)		3.11	
Alpha	1.00	Stream Power (lb/ft s)		87.93	
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)		52.12	
C & E Loss (ft)	0.02	Cum SA (acres)		10.15	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -3950.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1574.97	0	1564.97	20	1564.57	40	1564.97	40	1574.97

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	48	50	52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1582.83	Element			
Vel Head (ft)	12.62	Wt. n-Val.		0.015	
W.S. Elev (ft)	1570.21	Reach Len. (ft)	48.00	50.00	52.00
Crit W.S. (ft)	1573.84	Flow Area (sq ft)		217.78	
E.G. Slope (ft/ft)	0.011796	Area (sq ft)		217.78	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	28.51	Avg. Vel. (ft/s)		28.51	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		5.44	
Conv. Total (cfs)	57158.1	Conv. (cfs)		57158.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		50.50	
Min Ch El (ft)	1564.57	Shear (lb/sq ft)		3.18	
Alpha	1.00	Stream Power (lb/ft s)		90.54	
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		51.87	
C & E Loss (ft)	0.02	Cum SA (acres)		10.11	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -4000.

INPUT

```
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  1574.2       0  1564.2      20  1563.8      40  1564.2      40  1574.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40              950     950     950             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         * 1582.22  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   12.81  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1569.40  * Reach Len. (ft)       *  950.00  *  950.00  *  950.00  *
* Crit W.S. (ft)         * 1573.07  * Flow Area (sq ft)     *          *  216.11  *          *
* E.G. Slope (ft/ft)     *0.012075  * Area (sq ft)          *          *  216.11  *          *
* Q Total (cfs)          * 6208.00  * Flow (cfs)           *          * 6208.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)       *   28.73  * Avg. Vel. (ft/s)     *          *   28.73  *          *
* Max Chl Dpth (ft)      *    5.60  * Hydr. Depth (ft)     *          *    5.40  *          *
* Conv. Total (cfs)      * 56494.6  * Conv. (cfs)          *          * 56494.6  *          *
* Length Wtd. (ft)       *  950.00  * Wetted Per. (ft)     *          *   50.41  *          *
* Min Ch El (ft)         * 1563.80  * Shear (lb/sq ft)     *          *    3.23  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   92.83  *          *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)  *          *   51.62  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *   10.06  *          *
*************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -4950.

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1559.44       0 1549.44      20 1549.04      40 1549.44      40 1559.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40            47.77   47.77   47.77             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         * 1569.17  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   14.92  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1554.25  * Reach Len. (ft)       *   47.77  *   47.77  *   47.77  *
* Crit W.S. (ft)         * 1558.31  * Flow Area (sq ft)     *          *  200.29  *          *
* E.G. Slope (ft/ft)     *0.015234  * Area (sq ft)          *          *  200.29  *          *
* Q Total (cfs)          * 6208.00  * Flow (cfs)           *          * 6208.00  *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)       *   31.00  * Avg. Vel. (ft/s)     *          *   31.00  *          *
* Max Chl Dpth (ft)      *    5.21  * Hydr. Depth (ft)     *          *    5.01  *          *
* Conv. Total (cfs)      * 50297.1  * Conv. (cfs)          *          * 50297.1  *          *
* Length Wtd. (ft)       *   47.77  * Wetted Per. (ft)     *          *   49.62  *          *
* Min Ch El (ft)         * 1549.04  * Shear (lb/sq ft)     *          *    3.84  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *  118.98  *          *
* Frctn Loss (ft)        *   12.84  * Cum Volume (acre-ft)  *          *   47.08  *          *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)        *          *    9.19  *          *
*************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -4997.7
```

Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1558.69	0	1548.69	20	1548.29	40	1548.69	40	1558.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	2.23	2.23	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1568.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.94	Wt. n-Val.		0.015	
W.S. Elev (ft)	1553.49	Reach Len. (ft)	2.23	2.23	2.23
Crit W.S. (ft)	1557.56	Flow Area (sq ft)		200.14	
E.G. Slope (ft/ft)	0.015269	Area (sq ft)		200.14	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	31.02	Avg. Vel. (ft/s)		31.02	
Max Chl Dpth (ft)	5.20	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	50238.9	Conv. (cfs)		50238.9	
Length Wtd. (ft)	2.23	Wetted Per. (ft)		49.61	
Min Ch El (ft)	1548.29	Shear (lb/sq ft)		3.85	
Alpha	1.00	Stream Power (lb/ft s)		119.28	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		46.86	
C & E Loss (ft)	0.00	Cum SA (acres)		9.15	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5000.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1558.63	0	1548.63	20	1548.23	40	1548.63	40	1558.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	450	450	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1568.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.97	Wt. n-Val.		0.015	
W.S. Elev (ft)	1553.43	Reach Len. (ft)	450.00	450.00	450.00
Crit W.S. (ft)	1557.50	Flow Area (sq ft)		199.95	
E.G. Slope (ft/ft)	0.015313	Area (sq ft)		199.95	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	31.05	Avg. Vel. (ft/s)		31.05	
Max Chl Dpth (ft)	5.20	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	50166.7	Conv. (cfs)		50166.7	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		49.61	
Min Ch El (ft)	1548.23	Shear (lb/sq ft)		3.85	
Alpha	1.00	Stream Power (lb/ft s)		119.64	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		46.85	
C & E Loss (ft)	0.00	Cum SA (acres)		9.14	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5450.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0 1545.49       0 1535.49      20 1534.99      40 1535.49      40 1545.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      40            39.14   39.14   39.14             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1559.45  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   19.87  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1539.58  * Reach Len. (ft)       *   39.14  *    39.14 *   39.14  *
* Crit W.S. (ft)         * 1544.29  * Flow Area (sq ft)     *          *   173.54 *          *
* E.G. Slope (ft/ft)     *0.023625  * Area (sq ft)          *          *   173.54 *          *
* Q Total (cfs)          * 6208.00  * Flow (cfs)           *          *  6208.00 *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *    40.00 *          *
* Vel Total (ft/s)       *   35.77  * Avg. Vel. (ft/s)     *          *    35.77 *          *
* Max Chl Dpth (ft)      *    4.59  * Hydr. Depth (ft)     *          *     4.34 *          *
* Conv. Total (cfs)      * 40389.5  * Conv. (cfs)          *          * 40389.5  *          *
* Length Wtd. (ft)       *   39.14  * Wetted Per. (ft)     *          *    48.19 *          *
* Min Ch El (ft)         * 1534.99  * Shear (lb/sq ft)     *          *     5.31 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   190.00 *          *
* Frctn Loss (ft)        *    8.46  * Cum Volume (acre-ft)  *          *    44.92 *          *
* C & E Loss (ft)        *    0.49  * Cum SA (acres)        *          *     8.73 *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5489.1

INPUT
Description:
Station Elevation Data    num=       5
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************
       0 1544.23       0 1534.23      20 1533.83      40 1534.23      40 1544.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      40            11.5   10.86   10.22             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1558.49  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *   20.15  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)         * 1538.34  * Reach Len. (ft)       *   11.50  *    10.86 *   10.22  *
* Crit W.S. (ft)         * 1543.10  * Flow Area (sq ft)     *          *   172.34 *          *
* E.G. Slope (ft/ft)     *0.024201  * Area (sq ft)          *          *   172.34 *          *
* Q Total (cfs)          * 6208.00  * Flow (cfs)           *          *  6208.00 *          *
* Top Width (ft)         *   40.00  * Top Width (ft)       *          *    40.00 *          *
* Vel Total (ft/s)       *   36.02  * Avg. Vel. (ft/s)     *          *    36.02 *          *
* Max Chl Dpth (ft)      *    4.51  * Hydr. Depth (ft)     *          *     4.31 *          *
* Conv. Total (cfs)      * 39906.0  * Conv. (cfs)          *          * 39906.0  *          *
* Length Wtd. (ft)       *   10.86  * Wetted Per. (ft)     *          *    48.23 *          *
* Min Ch El (ft)         * 1533.83  * Shear (lb/sq ft)     *          *     5.40 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   194.49 *          *
* Frctn Loss (ft)        *    0.94  * Cum Volume (acre-ft)  *          *    44.76 *          *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)        *          *     8.70 *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5500.

INPUT
Description:
Station Elevation Data    num=       5
```

```
       0 1543.91       0 1533.91      20 1533.51      40 1533.91      40 1543.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40               53      50      47             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
```

E.G. Elev (ft)	1558.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	20.21	Wt. n-Val.		0.015	
W.S. Elev (ft)	1538.01	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1542.78	Flow Area (sq ft)		172.10	
E.G. Slope (ft/ft)	0.024307	Area (sq ft)		172.10	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	36.07	Avg. Vel. (ft/s)		36.07	
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	39818.5	Conv. (cfs)		39818.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.21	
Min Ch El (ft)	1533.51	Shear (lb/sq ft)		5.42	
Alpha	1.00	Stream Power (lb/ft s)		195.40	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		44.72	
C & E Loss (ft)	0.01	Cum SA (acres)		8.69	

```
CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5550.

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 1542.44       0 1532.44      20 1532.04      40 1532.44      40 1542.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40            48.62   45.92   43.22             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
```

E.G. Elev (ft)	1556.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	20.45	Wt. n-Val.		0.015	
W.S. Elev (ft)	1536.52	Reach Len. (ft)	48.62	45.92	43.22
Crit W.S. (ft)	1541.31	Flow Area (sq ft)		171.07	
E.G. Slope (ft/ft)	0.024762	Area (sq ft)		171.07	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	36.29	Avg. Vel. (ft/s)		36.29	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		4.28	
Conv. Total (cfs)	39450.9	Conv. (cfs)		39450.9	
Length Wtd. (ft)	45.92	Wetted Per. (ft)		48.16	
Min Ch El (ft)	1532.04	Shear (lb/sq ft)		5.49	
Alpha	1.00	Stream Power (lb/ft s)		199.27	
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)		44.52	
C & E Loss (ft)	0.02	Cum SA (acres)		8.64	

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
        This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5595.6

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
      0  1541.1       0  1531.1      20  1530.7      40  1531.1      40  1541.1

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40             4.28    4.04     3.8             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)        * 1555.80  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   20.64  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)        * 1535.16  * Reach Len. (ft)       *    4.28  *     4.04 *     3.80 *
* Crit W.S. (ft)        * 1539.97  * Flow Area (sq ft)     *          *   170.26 *          *
* E.G. Slope (ft/ft)    *0.025128  * Area (sq ft)          *          *   170.26 *          *
* Q Total (cfs)         * 6208.00  * Flow (cfs)            *          * 6208.00 *          *
* Top Width (ft)        *   40.00  * Top Width (ft)        *          *    40.00 *          *
* Vel Total (ft/s)      *   36.46  * Avg. Vel. (ft/s)      *          *    36.46 *          *
* Max Chl Dpth (ft)     *    4.46  * Hydr. Depth (ft)      *          *     4.26 *          *
* Conv. Total (cfs)     * 39162.8  * Conv. (cfs)           *          * 39162.8  *          *
* Length Wtd. (ft)      *    4.04  * Wetted Per. (ft)      *          *    48.12 *          *
* Min Ch El (ft)        * 1530.70  * Shear (lb/sq ft)      *          *     5.55 *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   202.38 *          *
* Frctn Loss (ft)       *    1.15  * Cum Volume (acre-ft)  *          *    44.34 *          *
* C & E Loss (ft)       *    0.02  * Cum SA (acres)        *          *     8.60 *          *
*****************************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5600.

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 1541.04       0 1531.04      20 1530.64      40 1531.04      40 1541.04

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
       0    .015       0    .015      40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      40                  53      50      47             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)        * 1555.69  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *   20.59  * Wt. n-Val.            *          *    0.015 *          *
* W.S. Elev (ft)        * 1535.10  * Reach Len. (ft)       *   53.00  *    50.00 *    47.00 *
* Crit W.S. (ft)        * 1539.92  * Flow Area (sq ft)     *          *   170.49 *          *
* E.G. Slope (ft/ft)    *0.025023  * Area (sq ft)          *          *   170.49 *          *
* Q Total (cfs)         * 6208.00  * Flow (cfs)            *          * 6208.00 *          *
* Top Width (ft)        *   40.00  * Top Width (ft)        *          *    40.00 *          *
* Vel Total (ft/s)      *   36.41  * Avg. Vel. (ft/s)      *          *    36.41 *          *
* Max Chl Dpth (ft)     *    4.46  * Hydr. Depth (ft)      *          *     4.26 *          *
* Conv. Total (cfs)     * 39244.6  * Conv. (cfs)           *          * 39244.6  *          *
* Length Wtd. (ft)      *   50.00  * Wetted Per. (ft)      *          *    48.13 *          *
* Min Ch El (ft)        * 1530.64  * Shear (lb/sq ft)      *          *     5.53 *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   201.49 *          *
* Frctn Loss (ft)       *    0.10  * Cum Volume (acre-ft)  *          *    44.33 *          *
* C & E Loss (ft)       *    0.02  * Cum SA (acres)        *          *     8.59 *          *
*****************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -5650.

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
0	40		53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1554.21	Element			
Vel Head (ft)	19.65	Wt. n-Val.		0.015	
W.S. Elev (ft)	1534.56	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1539.28	Flow Area (sq ft)		174.52	
E.G. Slope (ft/ft)	*0.023277	Area (sq ft)		174.52	
Q Total (cfs)	6208.00	Flow (cfs)		6208.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	35.57	Avg. Vel. (ft/s)		35.57	
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)		4.36	
Conv. Total (cfs)	40690.5	Conv. (cfs)		40690.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.33	
Min Ch El (ft)	1530.00	Shear (lb/sq ft)		5.25	
Alpha	1.00	Stream Power (lb/ft s)		186.64	
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)		44.13	
C & E Loss (ft)	0.28	Cum SA (acres)		8.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5700.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1539.75	0	1529.75	20	1529.35	40	1529.75	40	1539.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
0	40		53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1552.85	Element			
Vel Head (ft)	18.83	Wt. n-Val.		0.015	
W.S. Elev (ft)	1534.02	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1538.65	Flow Area (sq ft)		178.87	
E.G. Slope (ft/ft)	*0.021712	Area (sq ft)		178.87	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	34.82	Avg. Vel. (ft/s)		34.82	
Max Chl Dpth (ft)	4.67	Hydr. Depth (ft)		4.47	
Conv. Total (cfs)	42266.5	Conv. (cfs)		42266.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.55	
Min Ch El (ft)	1529.35	Shear (lb/sq ft)		4.99	
Alpha	1.00	Stream Power (lb/ft s)		173.88	
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)		43.92	
C & E Loss (ft)	0.25	Cum SA (acres)		8.50	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5750.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1539.1	0	1529.1	20	1528.7	40	1529.1	40	1539.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1551.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	18.12	Wt. n-Val.		0.015	
W.S. Elev (ft)	1533.46	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1537.99	Flow Area (sq ft)		182.30	
E.G. Slope (ft/ft)	*0.020477	Area (sq ft)		182.30	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	34.16	Avg. Vel. (ft/s)		34.16	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		4.56	
Conv. Total (cfs)	43522.7	Conv. (cfs)		43522.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.72	
Min Ch El (ft)	1528.70	Shear (lb/sq ft)		4.78	
Alpha	1.00	Stream Power (lb/ft s)		163.41	
Frctn Loss (ft)	1.05	Cum Volume (acre-ft)		43.72	
C & E Loss (ft)	0.21	Cum SA (acres)		8.46	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5800.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1538.46	0	1528.46	20	1528.06	40	1528.46	40	1538.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1550.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.50	Wt. n-Val.		0.015	
W.S. Elev (ft)	1532.90	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1537.35	Flow Area (sq ft)		185.53	
E.G. Slope (ft/ft)	*0.019398	Area (sq ft)		185.53	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	33.57	Avg. Vel. (ft/s)		33.57	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		4.64	
Conv. Total (cfs)	44716.7	Conv. (cfs)		44716.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.88	
Min Ch El (ft)	1528.06	Shear (lb/sq ft)		4.60	
Alpha	1.00	Stream Power (lb/ft s)		154.29	
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)		43.51	
C & E Loss (ft)	0.19	Cum SA (acres)		8.41	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5850.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1537.81	0	1527.81	20	1527.41	40	1527.81	40	1537.81

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1549.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.97	Wt. n-Val.		0.015	
W.S. Elev (ft)	1532.32	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1536.70	Flow Area (sq ft)		188.39	
E.G. Slope (ft/ft)	0.018506	Area (sq ft)		188.39	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	33.06	Avg. Vel. (ft/s)		33.06	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		4.71	
Conv. Total (cfs)	45781.9	Conv. (cfs)		45781.9	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		49.03	
Min Ch El (ft)	1527.41	Shear (lb/sq ft)		4.44	
Alpha	1.00	Stream Power (lb/ft s)		146.76	
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)		43.29	
C & E Loss (ft)	0.16	Cum SA (acres)		8.36	

arning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5900.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1537.16	0	1527.16	20	1526.76	40	1527.16	40	1537.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	53	50	47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1548.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.51	Wt. n-Val.		0.015	
W.S. Elev (ft)	1531.74	Reach Len. (ft)	53.00	50.00	47.00
Crit W.S. (ft)	1536.05	Flow Area (sq ft)		190.98	
E.G. Slope (ft/ft)	0.017743	Area (sq ft)		190.98	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	32.61	Avg. Vel. (ft/s)		32.61	
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)		4.77	
Conv. Total (cfs)	46756.3	Conv. (cfs)		46756.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		49.16	
Min Ch El (ft)	1526.76	Shear (lb/sq ft)		4.30	
Alpha	1.00	Stream Power (lb/ft s)		140.34	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)		43.07	
C & E Loss (ft)	0.14	Cum SA (acres)		8.32	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5950.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1536.52	0	1526.52	20	1526.12	40	1526.52	40	1536.52

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	5.27	4.98	4.69	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1547.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1531.16	Reach Len. (ft)	5.27	4.98	4.69
Crit W.S. (ft)	1535.41	Flow Area (sq ft)		193.51	
E.G. Slope (ft/ft)	*0.017041	Area (sq ft)		193.51	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	32.18	Avg. Vel. (ft/s)		32.18	
Max Chl Dpth (ft)	5.04	Hydr. Depth (ft)		4.84	
Conv. Total (cfs)	47709.3	Conv. (cfs)		47709.3	
Length Wtd. (ft)	4.98	Wetted Per. (ft)		49.28	
Min Ch El (ft)	1526.12	Shear (lb/sq ft)		4.18	
Alpha	1.00	Stream Power (lb/ft s)		134.44	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		42.85	
C & E Loss (ft)	0.13	Cum SA (acres)		8.27	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -5954.9

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1536.45	0	1526.45	20	1526.05	40	1526.45	40	1536.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	45.02	45.02	45.02	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1547.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.06	Wt. n-Val.		0.015	
W.S. Elev (ft)	1531.09	Reach Len. (ft)	45.02	45.02	45.02
Crit W.S. (ft)	1535.34	Flow Area (sq ft)		193.66	
E.G. Slope (ft/ft)	*0.016999	Area (sq ft)		193.66	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	32.16	Avg. Vel. (ft/s)		32.16	
Max Chl Dpth (ft)	5.04	Hydr. Depth (ft)		4.84	
Conv. Total (cfs)	47767.5	Conv. (cfs)		47767.5	
Length Wtd. (ft)	45.02	Wetted Per. (ft)		49.29	
Min Ch El (ft)	1526.05	Shear (lb/sq ft)		4.17	
Alpha	1.00	Stream Power (lb/ft s)		134.09	

* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 8.27	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6000.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1535.87	0	1525.87	20	1525.47	40	1525.87	40	1535.87

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1546.30	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 15.74	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1530.56	* Reach Len. (ft)	* 300.00	* 300.00	* 300.00	*
* Crit W.S. (ft)	* 1534.76	* Flow Area (sq ft)	*	* 195.64	*	*
* E.G. Slope (ft/ft)	*0.016478	* Area (sq ft)	*	* 195.64	*	*
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	*	*
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	*	*
* Vel Total (ft/s)	* 31.83	* Avg. Vel. (ft/s)	*	* 31.83	*	*
* Max Chl Dpth (ft)	* 5.09	* Hydr. Depth (ft)	*	* 4.89	*	*
* Conv. Total (cfs)	* 48517.5	* Conv. (cfs)	*	* 48517.5	*	*
* Length Wtd. (ft)	* 300.00	* Wetted Per. (ft)	*	* 49.39	*	*
* Min Ch El (ft)	* 1525.47	* Shear (lb/sq ft)	*	* 4.07	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 129.72	*	*
* Frctn Loss (ft)	* 0.75	* Cum Volume (acre-ft)	*	* 42.63	*	*
* C & E Loss (ft)	* 0.10	* Cum SA (acres)	*	* 8.23	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6300.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1531.99	0	1521.99	20	1521.59	40	1521.99	40	1531.99

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.77	47.77	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1541.28	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 14.37	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1526.91	* Reach Len. (ft)	* 47.77	* 47.77	* 47.77	*
* Crit W.S. (ft)	* 1530.88	* Flow Area (sq ft)	*	* 204.71	*	*
* E.G. Slope (ft/ft)	*0.014341	* Area (sq ft)	*	* 204.71	*	*
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	*	*
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	*	*
* Vel Total (ft/s)	* 30.42	* Avg. Vel. (ft/s)	*	* 30.42	*	*
Max Chl Dpth (ft)	* 5.32	* Hydr. Depth (ft)	*	* 5.12	*	*
Conv. Total (cfs)	* 52007.0	* Conv. (cfs)	*	* 52007.0	*	*
* Length Wtd. (ft)	* 47.77	* Wetted Per. (ft)	*	* 49.84	*	*
* Min Ch El (ft)	* 1521.59	* Shear (lb/sq ft)	*	* 3.68	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 111.87	*	*
* Frctn Loss (ft)	* 4.61	* Cum Volume (acre-ft)	*	* 41.25	*	*
* C & E Loss (ft)	* 0.41	* Cum SA (acres)	*	* 7.95	*	*

additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6347.7

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1531.37	0	1521.37	20	1520.97	40	1521.37	40	1531.37

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	2.23	2.23	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1540.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.27	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.31	Reach Len. (ft)	2.23	2.23	2.23
Crit W.S. (ft)	1530.26	Flow Area (sq ft)		205.45	
E.G. Slope (ft/ft)	0.014183	Area (sq ft)		205.45	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	30.31	Avg. Vel. (ft/s)		30.31	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		5.14	
Conv. Total (cfs)	52295.7	Conv. (cfs)		52295.7	
Length Wtd. (ft)	2.23	Wetted Per. (ft)		49.88	
Min Ch El (ft)	1520.97	Shear (lb/sq ft)		3.65	
Alpha	1.00	Stream Power (lb/ft s)		110.55	
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)		41.03	
C & E Loss (ft)	0.03	Cum SA (acres)		7.91	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6350.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1531.36	0	1521.36	20	1520.96	40	1521.36	40	1531.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1540.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.23	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.30	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1530.25	Flow Area (sq ft)		205.73	
E.G. Slope (ft/ft)	0.014123	Area (sq ft)		205.73	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	30.27	Avg. Vel. (ft/s)		30.27	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		5.14	
Conv. Total (cfs)	52406.0	Conv. (cfs)		52406.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		49.89	
Min Ch El (ft)	1520.96	Shear (lb/sq ft)		3.64	
Alpha	1.00	Stream Power (lb/ft s)		110.06	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		41.02	
C & E Loss (ft)	0.01	Cum SA (acres)		7.90	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6400.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1531.16	0	1521.16	20	1520.76	40	1521.16	40	1531.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1539.58	Element	Left OB	Channel	Right OB	
Vel Head (ft)	13.30	Wt. n-Val.		0.015		
W.S. Elev (ft)	1526.28	Reach Len. (ft)	200.00	200.00	200.00	
Crit W.S. (ft)	1530.05	Flow Area (sq ft)		212.79		
E.G. Slope (ft/ft)	0.012742	Area (sq ft)		212.79		
Q Total (cfs)	6228.00	Flow (cfs)		6228.00		
Top Width (ft)	40.00	Top Width (ft)		40.00		
Vel Total (ft/s)	29.27	Avg. Vel. (ft/s)		29.27		
Max Chl Dpth (ft)	5.52	Hydr. Depth (ft)		5.32		
Conv. Total (cfs)	55173.8	Conv. (cfs)		55173.8		
Length Wtd. (ft)	200.00	Wetted Per. (ft)		50.25		
Min Ch El (ft)	1520.76	Shear (lb/sq ft)		3.37		
Alpha	1.00	Stream Power (lb/ft s)		98.60		
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		40.78		
C & E Loss (ft)	0.28	Cum SA (acres)		7.86		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6600.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.36	0	1520.36	20	1519.96	40	1520.36	40	1530.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	33.38	33.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1536.62	Element	Left OB	Channel	Right OB	
Vel Head (ft)	10.47	Wt. n-Val.		0.015		
W.S. Elev (ft)	1526.16	Reach Len. (ft)	33.38	33.38	33.38	
Crit W.S. (ft)	1529.25	Flow Area (sq ft)		239.88		
E.G. Slope (ft/ft)	0.008854	Area (sq ft)		239.88		
Q Total (cfs)	6228.00	Flow (cfs)		6228.00		
Top Width (ft)	40.00	Top Width (ft)		40.00		
Vel Total (ft/s)	25.96	Avg. Vel. (ft/s)		25.96		
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)		6.00		
Conv. Total (cfs)	66188.7	Conv. (cfs)		66188.7		
Length Wtd. (ft)	33.38	Wetted Per. (ft)		51.60		
Min Ch El (ft)	1519.96	Shear (lb/sq ft)		2.57		
Alpha	1.00	Stream Power (lb/ft s)		66.71		
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)		39.74		
C & E Loss (ft)	0.85	Cum SA (acres)		7.68		

additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6633.3

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.23	0	1520.23	20	1519.83	40	1520.23	40	1530.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	15.64	16.62	17.6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1536.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.14	Reach Len. (ft)	15.64	16.62	17.60
Crit W.S. (ft)	1529.12	Flow Area (sq ft)		244.42	
E.G. Slope (ft/ft)	*0.008366	Area (sq ft)		244.42	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.48	Avg. Vel. (ft/s)		25.48	
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	68090.6	Conv. (cfs)		68090.6	
Length Wtd. (ft)	16.62	Wetted Per. (ft)		51.83	
Min Ch El (ft)	1519.83	Shear (lb/sq ft)		2.46	
Alpha	1.00	Stream Power (lb/ft s)		62.76	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		39.55	
C & E Loss (ft)	0.12	Cum SA (acres)		7.64	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6650.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.16	0	1520.16	20	1519.76	40	1520.16	40	1530.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1536.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.91	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.12	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1529.05	Flow Area (sq ft)		246.52	
E.G. Slope (ft/ft)	*0.008153	Area (sq ft)		246.52	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	25.26	Avg. Vel. (ft/s)		25.26	
Max Chl Dpth (ft)	6.36	Hydr. Depth (ft)		6.16	
Conv. Total (cfs)	68975.1	Conv. (cfs)		68975.1	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		51.93	
Min Ch El (ft)	1519.76	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		61.04	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)		39.46	
C & E Loss (ft)	0.05	Cum SA (acres)		7.63	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6700.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1529.96	0	1519.96	20	1519.56	40	1519.96	40	1529.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1535.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.41	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.09	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1528.85	Flow Area (sq ft)		253.03	
E.G. Slope (ft/ft)	0.007537	Area (sq ft)		253.03	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	24.61	Avg. Vel. (ft/s)		24.61	
Max Chl Dpth (ft)	6.53	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	71736.4	Conv. (cfs)		71736.4	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		52.26	
Min Ch El (ft)	1519.56	Shear (lb/sq ft)		2.28	
Alpha	1.00	Stream Power (lb/ft s)		56.08	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		39.17	
C & E Loss (ft)	0.15	Cum SA (acres)		7.58	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6750.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1529.76	0	1519.76	20	1519.36	40	1519.76	40	1529.76

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1535.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.95	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.05	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1528.65	Flow Area (sq ft)		259.43	
E.G. Slope (ft/ft)	0.006992	Area (sq ft)		259.43	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	24.01	Avg. Vel. (ft/s)		24.01	
Max Chl Dpth (ft)	6.69	Hydr. Depth (ft)		6.49	
Conv. Total (cfs)	74481.9	Conv. (cfs)		74481.9	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		52.58	
Min Ch El (ft)	1519.36	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)		51.70	
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		38.88	
C & E Loss (ft)	0.14	Cum SA (acres)		7.54	

RIVER: C-1 Channel
REACH: 1 RS: -6800.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1529.56	0	1519.56	20	1519.16	40	1519.56	40	1529.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1534.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.53	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.00	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1528.45	Flow Area (sq ft)		265.69	
E.G. Slope (ft/ft)	0.006509	Area (sq ft)		265.69	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	23.44	Avg. Vel. (ft/s)		23.44	
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)		6.64	
Conv. Total (cfs)	77197.3	Conv. (cfs)		77197.3	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		52.89	
Min Ch El (ft)	1519.16	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		47.85	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		38.58	
C & E Loss (ft)	0.13	Cum SA (acres)		7.49	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6850.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1529.36	0	1519.36	20	1518.96	40	1519.36	40	1529.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1534.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.15	Wt. n-Val.		0.015	
W.S. Elev (ft)	1525.96	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1528.25	Flow Area (sq ft)		271.79	
E.G. Slope (ft/ft)	0.006081	Area (sq ft)		271.79	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	22.91	Avg. Vel. (ft/s)		22.91	
Max Chl Dpth (ft)	6.99	Hydr. Depth (ft)		6.79	
Conv. Total (cfs)	79868.6	Conv. (cfs)		79868.6	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		53.20	
Min Ch El (ft)	1518.96	Shear (lb/sq ft)		1.94	
Alpha	1.00	Stream Power (lb/ft s)		44.44	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)		38.27	
C & E Loss (ft)	0.11	Cum SA (acres)		7.45	

CROSS SECTION

RIVER: C-1 Channel

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1529.16	0	1519.16	20	1518.76	40	1519.16	40	1529.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1533.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1525.90	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1528.05	Flow Area (sq ft)		277.71	
E.G. Slope (ft/ft)	0.005702	Area (sq ft)		277.71	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	22.43	Avg. Vel. (ft/s)		22.43	
Max Chl Dpth (ft)	7.14	Hydr. Depth (ft)		6.94	
Conv. Total (cfs)	82480.3	Conv. (cfs)		82480.3	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		53.49	
Min Ch El (ft)	1518.76	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)		41.44	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		37.95	
C & E Loss (ft)	0.10	Cum SA (acres)		7.40	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -6950.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1528.96	0	1518.96	20	1518.56	40	1518.96	40	1528.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1533.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.50	Wt. n-Val.		0.015	
W.S. Elev (ft)	1525.85	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1527.85	Flow Area (sq ft)		283.39	
E.G. Slope (ft/ft)	0.005367	Area (sq ft)		283.39	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	21.98	Avg. Vel. (ft/s)		21.98	
Max Chl Dpth (ft)	7.28	Hydr. Depth (ft)		7.08	
Conv. Total (cfs)	85010.8	Conv. (cfs)		85010.8	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		53.78	
Min Ch El (ft)	1518.56	Shear (lb/sq ft)		1.77	
Alpha	1.00	Stream Power (lb/ft s)		38.81	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)		37.63	
C & E Loss (ft)	0.09	Cum SA (acres)		7.35	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7000.

INPUT
Description:

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1528.76	0	1518.76	20	1518.36	40	1518.76	40	1528.76

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1533.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.22	Wt. n-Val.		0.015	
W.S. Elev (ft)	1525.78	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1527.65	Flow Area (sq ft)		288.79	
E.G. Slope (ft/ft)	0.005074	Area (sq ft)		288.79	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	21.57	Avg. Vel. (ft/s)		21.57	
Max Chl Dpth (ft)	7.42	Hydr. Depth (ft)		7.22	
Conv. Total (cfs)	87436.7	Conv. (cfs)		87436.7	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		54.05	
Min Ch El (ft)	1518.36	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)		36.50	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		37.30	
C & E Loss (ft)	0.08	Cum SA (acres)		7.31	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7050.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1528.56	0	1518.56	20	1518.16	40	1518.56	40	1528.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	47.02	49.95	52.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1532.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.98	Wt. n-Val.		0.015	
W.S. Elev (ft)	1525.71	Reach Len. (ft)	47.02	49.95	52.89
Crit W.S. (ft)	1527.45	Flow Area (sq ft)		293.84	
E.G. Slope (ft/ft)	0.004819	Area (sq ft)		293.84	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	21.20	Avg. Vel. (ft/s)		21.20	
Max Chl Dpth (ft)	7.55	Hydr. Depth (ft)		7.35	
Conv. Total (cfs)	89717.9	Conv. (cfs)		89717.9	
Length Wtd. (ft)	49.95	Wetted Per. (ft)		54.30	
Min Ch El (ft)	1518.16	Shear (lb/sq ft)		1.63	
Alpha	1.00	Stream Power (lb/ft s)		34.51	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		36.97	
C & E Loss (ft)	0.07	Cum SA (acres)		7.26	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7063.9

INPUT
Description: li
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1528.56	0	1518.56	20	1518.11	40	1518.56	40	1528.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	36.08	36.08	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1532.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.45	Reach Len. (ft)	36.08	36.08	36.08
Crit W.S. (ft)	1527.40	Flow Area (sq ft)		324.52	
E.G. Slope (ft/ft)	0.003587	Area (sq ft)		324.52	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	19.19	Avg. Vel. (ft/s)		19.19	
Max Chl Dpth (ft)	8.34	Hydr. Depth (ft)		8.11	
Conv. Total (cfs)	103983.3	Conv. (cfs)		103983.3	
Length Wtd. (ft)	36.08	Wetted Per. (ft)		55.79	
Min Ch El (ft)	1518.11	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		25.00	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		36.61	
C & E Loss (ft)	0.72	Cum SA (acres)		7.22	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7100.

INPUT
Description: li
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1528.36	0	1518.36	20	1517.96	40	1518.36	40	1528.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	40	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	40	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1532.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.85	Wt. n-Val.		0.015	
W.S. Elev (ft)	1526.18	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	1527.25	Flow Area (sq ft)		320.95	
E.G. Slope (ft/ft)	0.003710	Area (sq ft)		320.95	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	19.40	Avg. Vel. (ft/s)		19.40	
Max Chl Dpth (ft)	8.22	Hydr. Depth (ft)		8.02	
Conv. Total (cfs)	102243.8	Conv. (cfs)		102243.8	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		55.66	
Min Ch El (ft)	1517.96	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)		25.92	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		36.35	
C & E Loss (ft)	0.01	Cum SA (acres)		7.18	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7250.

INPUT
Description: li
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0 1527.76       0 1517.76      20 1517.36      40 1517.76      40 1527.76

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .015       0    .015       40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
             0      40             47.77   47.77   47.77              .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1531.46  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    5.95  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1525.51  * Reach Len. (ft)      *   47.77  *   47.77  *   47.77  *
* Crit W.S. (ft)        * 1526.65  * Flow Area (sq ft)    *          *  318.17  *          *
* E.G. Slope (ft/ft)    *0.003807  * Area (sq ft)         *          *  318.17  *          *
* Q Total (cfs)         * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)        *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)      *   19.57  * Avg. Vel. (ft/s)     *          *   19.57  *          *
* Max Chl Dpth (ft)     *    8.15  * Hydr. Depth (ft)     *          *    7.95  *          *
* Conv. Total (cfs)     *100938.6  * Conv. (cfs)          *          *100938.6  *          *
* Length Wtd. (ft)      *   47.77  * Wetted Per. (ft)     *          *   55.52  *          *
* Min Ch El (ft)        * 1517.36  * Shear (lb/sq ft)     *          *    1.36  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *   26.66  *          *
* Frctn Loss (ft)       *    0.56  * Cum Volume (acre-ft)  *          *   35.25  *          *
* C & E Loss (ft)       *    0.01  * Cum SA (acres)        *          *    7.05  *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -7297.7

INPUT
Description: li
Station Elevation Data    num=       5
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 1527.57       0 1517.57      20 1517.17      40 1517.57      40 1527.57

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .015       0    .015       40    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
             0      40             5.15       5    5.15              .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)        * 1531.27  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    5.93  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1525.34  * Reach Len. (ft)      *    5.15  *    5.00  *    5.15  *
* Crit W.S. (ft)        * 1526.47  * Flow Area (sq ft)    *          *  318.59  *          *
* E.G. Slope (ft/ft)    *0.003792  * Area (sq ft)         *          *  318.59  *          *
* Q Total (cfs)         * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)        *   40.00  * Top Width (ft)       *          *   40.00  *          *
* Vel Total (ft/s)      *   19.55  * Avg. Vel. (ft/s)     *          *   19.55  *          *
* Max Chl Dpth (ft)     *    8.16  * Hydr. Depth (ft)     *          *    7.96  *          *
* Conv. Total (cfs)     *101134.0  * Conv. (cfs)          *          *101134.0  *          *
* Length Wtd. (ft)      *    5.00  * Wetted Per. (ft)     *          *   55.54  *          *
* Min Ch El (ft)        * 1517.17  * Shear (lb/sq ft)     *          *    1.36  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *        *   26.55  *          *
* Frctn Loss (ft)       *    0.18  * Cum Volume (acre-ft)  *          *   34.90  *          *
* C & E Loss (ft)       *    0.00  * Cum SA (acres)        *          *    7.00  *          *
*****************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                RS: -7302.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
    1.56 1527.57     1.56 1517.57    22.81 1517.15    44.06 1517.57    44.06 1527.57

Manning's n Values        num=       3
```

```
**********************************************
    1.56    .015    1.56    .015   44.06    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1.56   44.06             5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1531.16  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    6.79  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1524.37  * Reach Len. (ft)       *    5.15  *     5.00  *    5.15  *
* Crit W.S. (ft)         * 1526.09  * Flow Area (sq ft)     *          *   297.87  *          *
* E.G. Slope (ft/ft)     *0.004810  * Area (sq ft)          *          *   297.87  *          *
* Q Total (cfs)          * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)         *   42.50  * Top Width (ft)       *          *   42.50  *          *
* Vel Total (ft/s)       *   20.91  * Avg. Vel. (ft/s)     *          *   20.91  *          *
* Max Chl Dpth (ft)      *    7.22  * Hydr. Depth (ft)     *          *    7.01  *          *
* Conv. Total (cfs)      * 89799.3  * Conv. (cfs)          *          * 89799.3  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)     *          *   56.11  *          *
* Min Ch El (ft)         * 1517.15  * Shear (lb/sq ft)     *          *    1.59  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   33.33  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft) *          *   34.86  *          *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)       *          *    7.00  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                 RS: -7307.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    3.12 1527.58    3.12 1517.58   25.62 1517.13   48.12 1517.58   48.12 1527.58

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
    3.12    .015    3.12    .015   48.12    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          3.12   48.12             5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1531.08  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    7.37  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1523.71  * Reach Len. (ft)       *    5.15  *     5.00  *    5.15  *
* Crit W.S. (ft)         * 1525.76  * Flow Area (sq ft)     *          *   285.82  *          *
* E.G. Slope (ft/ft)     *0.005672  * Area (sq ft)          *          *   285.82  *          *
* Q Total (cfs)          * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)         *   45.00  * Top Width (ft)       *          *   45.00  *          *
* Vel Total (ft/s)       *   21.79  * Avg. Vel. (ft/s)     *          *   21.79  *          *
* Max Chl Dpth (ft)      *    6.58  * Hydr. Depth (ft)     *          *    6.35  *          *
* Conv. Total (cfs)      * 82695.2  * Conv. (cfs)          *          * 82695.2  *          *
* Length Wtd. (ft)       *    5.00  * Wetted Per. (ft)     *          *   57.26  *          *
* Min Ch El (ft)         * 1517.13  * Shear (lb/sq ft)     *          *    1.77  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   38.51  *          *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft) *          *   34.83  *          *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)       *          *    6.99  *          *
*****************************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION


 IVER: C-1 Channel
REACH: 1                 RS: -7312.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    4.69 1527.58    4.69 1517.58   28.44 1517.11   52.19 1517.58   52.19 1527.58
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4.69	.015	4.69	.015	52.19	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4.69	52.19	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1531.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.82	Wt. n-Val.		0.015	
W.S. Elev (ft)	1523.19	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1525.45	Flow Area (sq ft)		277.60	
E.G. Slope (ft/ft)	0.006466	Area (sq ft)		277.60	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	47.50	Top Width (ft)		47.50	
Vel Total (ft/s)	22.44	Avg. Vel. (ft/s)		22.44	
Max Chl Dpth (ft)	6.08	Hydr. Depth (ft)		5.84	
Conv. Total (cfs)	77454.0	Conv. (cfs)		77454.0	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		58.73	
Min Ch El (ft)	1517.11	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)		42.81	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		34.80	
C & E Loss (ft)	0.04	Cum SA (acres)		6.99	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7317.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6.25	1527.59	6.25	1517.59	31.25	1517.09	56.25	1517.59	56.25	1527.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6.25	.015	6.25	.015	56.25	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
6.25	56.25	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.16	Wt. n-Val.		0.015	
W.S. Elev (ft)	1522.77	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1525.18	Flow Area (sq ft)		271.66	
E.G. Slope (ft/ft)	0.007210	Area (sq ft)		271.66	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	22.93	Avg. Vel. (ft/s)		22.93	
Max Chl Dpth (ft)	5.68	Hydr. Depth (ft)		5.43	
Conv. Total (cfs)	73345.3	Conv. (cfs)		73345.3	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		60.38	
Min Ch El (ft)	1517.09	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)		46.43	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		34.76	
C & E Loss (ft)	0.03	Cum SA (acres)		6.98	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7322.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7.81	1527.59	7.81	1517.59	34.06	1517.07	60.31	1517.59	60.31	1527.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          7.81   60.31              5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
  E.G. Elev (ft)          * 1530.86  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    8.44  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)          * 1522.42  * Reach Len. (ft)       *    5.15  *    5.00  *    5.15  *
* Crit W.S. (ft)          * 1524.91  * Flow Area (sq ft)     *          *  267.08  *          *
* E.G. Slope (ft/ft)      *0.007934  * Area (sq ft)          *          *  267.08  *          *
* Q Total (cfs)           * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)          *   52.50  * Top Width (ft)       *          *   52.50  *          *
* Vel Total (ft/s)        *   23.32  * Avg. Vel. (ft/s)     *          *   23.32  *          *
* Max Chl Dpth (ft)       *    5.35  * Hydr. Depth (ft)     *          *    5.09  *          *
* Conv. Total (cfs)       * 69919.7  * Conv. (cfs)          *          * 69919.7  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)     *          *   62.16  *          *
* Min Ch El (ft)          * 1517.07  * Shear (lb/sq ft)     *          *    2.13  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *        *   49.62  *          *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)  *          *   34.73  *          *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)        *          *    6.98  *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -7327.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    9.38  1527.6    9.38  1517.6   36.88 1517.05   64.38  1517.6   64.38  1527.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    9.38    .015    9.38    .015   64.38    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9.38   64.38              5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 1530.79  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    8.68  * Wt. n-Val.            *          *   0.015  *          *
* W.S. Elev (ft)          * 1522.12  * Reach Len. (ft)       *    5.15  *    5.00  *    5.15  *
* Crit W.S. (ft)          * 1524.68  * Flow Area (sq ft)     *          *  263.44  *          *
* E.G. Slope (ft/ft)      *0.008641  * Area (sq ft)          *          *  263.44  *          *
* Q Total (cfs)           * 6228.00  * Flow (cfs)           *          * 6228.00  *          *
* Top Width (ft)          *   55.00  * Top Width (ft)       *          *   55.00  *          *
* Vel Total (ft/s)        *   23.64  * Avg. Vel. (ft/s)     *          *   23.64  *          *
* Max Chl Dpth (ft)       *    5.06  * Hydr. Depth (ft)     *          *    4.79  *          *
* Conv. Total (cfs)       * 66997.3  * Conv. (cfs)          *          * 66997.3  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)     *          *   64.04  *          *
* Min Ch El (ft)          * 1517.05  * Shear (lb/sq ft)     *          *    2.22  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *        *   52.46  *          *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)  *          *   34.70  *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)        *          *    6.97  *          *
*********************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -7332.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
   10.94  1527.6   10.94  1517.6   39.69 1517.03   68.44  1517.6   68.44  1527.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   10.94    .015   10.94    .015   68.44    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10.94   68.44              5.15       5    5.15             .1       .3
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.88	Wt. n-Val.		0.015	
W.S. Elev (ft)	1521.84	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1524.45	Flow Area (sq ft)		260.39	
E.G. Slope (ft/ft)	0.009351	Area (sq ft)		260.39	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	57.50	Top Width (ft)		57.50	
Vel Total (ft/s)	23.92	Avg. Vel. (ft/s)		23.92	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		4.53	
Conv. Total (cfs)	64405.0	Conv. (cfs)		64405.0	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		66.00	
Min Ch El (ft)	1517.03	Shear (lb/sq ft)		2.30	
Alpha	1.00	Stream Power (lb/ft s)		55.09	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		34.67	
C & E Loss (ft)	0.02	Cum SA (acres)		6.96	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7337.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
12.5	1527.61	12.5	1517.61	42.5	1517.01	72.5	1517.61	72.5	1527.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
12.5	.015	12.5	.015	72.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
12.5	72.5	5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.05	Wt. n-Val.		0.015	
W.S. Elev (ft)	1521.61	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1524.25	Flow Area (sq ft)		257.96	
E.G. Slope (ft/ft)	0.010043	Area (sq ft)		257.96	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	60.00	Top Width (ft)		60.00	
Vel Total (ft/s)	24.14	Avg. Vel. (ft/s)		24.14	
Max Chl Dpth (ft)	4.60	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	62148.0	Conv. (cfs)		62148.0	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		68.01	
Min Ch El (ft)	1517.01	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)		57.41	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		34.64	
C & E Loss (ft)	0.02	Cum SA (acres)		6.96	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7342.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
14.06	1527.61	14.06	1517.61	45.31	1516.99	76.56	1517.61	76.56	1527.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
14.06	.015	14.06	.015	76.56	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14.06	76.56	5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.59	Element	Left OB	Channel	Right OB

W.S. Elev (ft)	1521.39	Reach Len. (ft)		5.15		5.00		5.15	
Crit W.S. (ft)	1524.05	Flow Area (sq ft)				255.87			
E.G. Slope (ft/ft)	0.010739	Area (sq ft)				255.87			
Q Total (cfs)	6228.00	Flow (cfs)				6228.00			
Top Width (ft)	62.50	Top Width (ft)				62.50			
Vel Total (ft/s)	24.34	Avg. Vel. (ft/s)				24.34			
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)				4.09			
Conv. Total (cfs)	60100.1	Conv. (cfs)				60100.1			
Length Wtd. (ft)	5.00	Wetted Per. (ft)				70.08			
Min Ch El (ft)	1516.99	Shear (lb/sq ft)				2.45			
Alpha	1.00	Stream Power (lb/ft s)				59.58			
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)				34.61			
C & E Loss (ft)	0.01	Cum SA (acres)				6.95			

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7347.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
15.62	1527.62	15.62	1517.62	48.12	1516.97	80.62	1517.62	80.62	1527.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
15.62	.015	15.62	.015	80.62	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
15.62	80.62	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.53	Element	Left OB	Channel	Right OB	
Vel Head (ft)	9.32	Wt. n-Val.		0.015		
W.S. Elev (ft)	1521.21	Reach Len. (ft)	5.15	5.00	5.15	
Crit W.S. (ft)	1523.87	Flow Area (sq ft)		254.21		
E.G. Slope (ft/ft)	0.011416	Area (sq ft)		254.21		
Q Total (cfs)	6228.00	Flow (cfs)		6228.00		
Top Width (ft)	65.00	Top Width (ft)		65.00		
Vel Total (ft/s)	24.50	Avg. Vel. (ft/s)		24.50		
Max Chl Dpth (ft)	4.24	Hydr. Depth (ft)		3.91		
Conv. Total (cfs)	58290.7	Conv. (cfs)		58290.7		
Length Wtd. (ft)	5.00	Wetted Per. (ft)		72.18		
Min Ch El (ft)	1516.97	Shear (lb/sq ft)		2.51		
Alpha	1.00	Stream Power (lb/ft s)		61.49		
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		34.58		
C & E Loss (ft)	0.01	Cum SA (acres)		6.94		

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7352.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
17.19	1527.62	17.19	1517.62	50.94	1516.95	84.69	1517.62	84.69	1527.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
17.19	.015	17.19	.015	84.69	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.19	84.69	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1530.46	Element	Left OB	Channel	Right OB	
Vel Head (ft)	9.43	Wt. n-Val.		0.015		
W.S. Elev (ft)	1521.03	Reach Len. (ft)	5.15	5.00	5.15	
Crit W.S. (ft)	1523.70	Flow Area (sq ft)		252.77		
E.G. Slope (ft/ft)	0.012097	Area (sq ft)		252.77		

* Top Width (ft)	* 67.50	* Top Width (ft)	*	* 67.50	*
* Vel Total (ft/s)	* 24.64	* Avg. Vel. (ft/s)	*	* 24.64	*
* Max Chl Dpth (ft)	* 4.08	* Hydr. Depth (ft)	*	* 3.74	*
* Conv. Total (cfs)	* 56624.7	* Conv. (cfs)	*	* 56624.7	*
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 74.33	*
* Min Ch El (ft)	* 1516.95	* Shear (lb/sq ft)	*	* 2.57	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 63.28	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	*	* 34.56	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 6.93	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7357.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
18.75	1527.63	18.75	1517.63	53.75	1516.93	88.75	1517.63	88.75	1527.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
18.75	.015	18.75	.015	88.75	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18.75	88.75	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.39	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 9.51	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1520.88	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15 *
* Crit W.S. (ft)	* 1523.54	* Flow Area (sq ft)	*	* 251.66	* *
* E.G. Slope (ft/ft)	*0.012758	* Area (sq ft)	*	* 251.66	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 70.00	* Top Width (ft)	*	* 70.00	* *
* Vel Total (ft/s)	* 24.75	* Avg. Vel. (ft/s)	*	* 24.75	* *
* Max Chl Dpth (ft)	* 3.95	* Hydr. Depth (ft)	*	* 3.60	* *
* Conv. Total (cfs)	* 55139.2	* Conv. (cfs)	*	* 55139.2	* *
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 76.50	* *
* Min Ch El (ft)	* 1516.93	* Shear (lb/sq ft)	*	* 2.62	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 64.84	* *
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	*	* 34.53	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 6.93	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7362.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
20.31	1527.64	20.31	1517.64	56.56	1516.91	92.81	1517.64	92.81	1527.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
20.31	.015	20.31	.015	92.81	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
20.31	92.81	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.31	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 9.58	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1520.73	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15 *
* Crit W.S. (ft)	* 1523.39	* Flow Area (sq ft)	*	* 250.75	* *
* E.G. Slope (ft/ft)	*0.013409	* Area (sq ft)	*	* 250.75	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 72.50	* Top Width (ft)	*	* 72.50	* *
* Vel Total (ft/s)	* 24.84	* Avg. Vel. (ft/s)	*	* 24.84	* *
* Max Chl Dpth (ft)	* 3.82	* Hydr. Depth (ft)	*	* 3.46	* *

* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 78.70	*	*			
* Min Ch El (ft)	* 1516.91	* Shear (lb/sq ft)	*	* 2.67	*	*			
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 66.25	*	*			
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	*	* 34.50	*	*			
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 6.92	*	*			

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7367.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
21.88	1527.64	21.88	1517.64	59.38	1516.89	96.88	1517.64	96.88	1527.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
21.88	.015	21.88	.015	96.88	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
21.88	96.88	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.24	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 9.64	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1520.60	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15 *
* Crit W.S. (ft)	* 1523.23	* Flow Area (sq ft)	*	* 249.96	* *
* E.G. Slope (ft/ft)	*0.014065	* Area (sq ft)	*	* 249.96	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 75.00	* Top Width (ft)	*	* 75.00	* *
* Vel Total (ft/s)	* 24.92	* Avg. Vel. (ft/s)	*	* 24.92	* *
* Max Chl Dpth (ft)	* 3.71	* Hydr. Depth (ft)	*	* 3.33	* *
* Conv. Total (cfs)	* 52513.6	* Conv. (cfs)	*	* 52513.6	* *
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 80.93	* *
* Min Ch El (ft)	* 1516.89	* Shear (lb/sq ft)	*	* 2.71	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 67.57	* *
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	*	* 34.47	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 6.91	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7372.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
23.44	1527.65	23.44	1517.65	62.19	1516.87	100.94	1517.65	100.94	1527.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
23.44	.015	23.44	.015	100.94	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
23.44	100.94	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 9.68	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1520.48	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15 *
* Crit W.S. (ft)	* 1523.11	* Flow Area (sq ft)	*	* 249.40	* *
* E.G. Slope (ft/ft)	*0.014697	* Area (sq ft)	*	* 249.40	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 77.50	* Top Width (ft)	*	* 77.50	* *
* Vel Total (ft/s)	* 24.97	* Avg. Vel. (ft/s)	*	* 24.97	* *
* Max Chl Dpth (ft)	* 3.61	* Hydr. Depth (ft)	*	* 3.22	* *
* Conv. Total (cfs)	* 51373.3	* Conv. (cfs)	*	* 51373.3	* *
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 83.17	* *
* Min Ch El (ft)	* 1516.87	* Shear (lb/sq ft)	*	* 2.75	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 68.71	* *

* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 6.90	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7377.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
25	1527.65	25	1517.65	65	1516.85	105	1517.65	105	1527.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
25	.015	25	.015	105	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
25	105	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.08	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 9.72	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1520.36	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15	*
* Crit W.S. (ft)	* 1522.96	* Flow Area (sq ft)	*	* 248.91	*	*
* E.G. Slope (ft/ft)	*0.015334	* Area (sq ft)	*	* 248.91	*	*
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	*	*
* Top Width (ft)	* 80.00	* Top Width (ft)	*	* 80.00	*	*
* Vel Total (ft/s)	* 25.02	* Avg. Vel. (ft/s)	*	* 25.02	*	*
* Max Chl Dpth (ft)	* 3.51	* Hydr. Depth (ft)	*	* 3.11	*	*
* Conv. Total (cfs)	* 50295.3	* Conv. (cfs)	*	* 50295.3	*	*
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 85.44	*	*
* Min Ch El (ft)	* 1516.85	* Shear (lb/sq ft)	*	* 2.79	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 69.78	*	*
* Frctn Loss (ft)	* 0.08	* Cum Volume (acre-ft)	*	* 34.41	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 6.89	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7382.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
26.56	1527.65	26.56	1517.65	67.81	1516.83	109.06	1517.65	109.06	1527.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
26.56	.015	26.56	.015	109.06	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
26.56	109.06	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1530.00	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 9.75	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1520.25	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15	*
* Crit W.S. (ft)	* 1522.83	* Flow Area (sq ft)	*	* 248.56	*	*
* E.G. Slope (ft/ft)	*0.015957	* Area (sq ft)	*	* 248.56	*	*
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	*	*
* Top Width (ft)	* 82.50	* Top Width (ft)	*	* 82.50	*	*
* Vel Total (ft/s)	* 25.06	* Avg. Vel. (ft/s)	*	* 25.06	*	*
* Max Chl Dpth (ft)	* 3.42	* Hydr. Depth (ft)	*	* 3.01	*	*
* Conv. Total (cfs)	* 49303.4	* Conv. (cfs)	*	* 49303.4	*	*
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 87.72	*	*
* Min Ch El (ft)	* 1516.83	* Shear (lb/sq ft)	*	* 2.82	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 70.73	*	*
* Frctn Loss (ft)	* 0.08	* Cum Volume (acre-ft)	*	* 34.38	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 6.88	*	*

RIVER: C-1 Channel
REACH: 1 RS: -7387.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
28.12	1527.66	28.12	1517.66	70.62	1516.81	113.12	1517.66	113.12	1527.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
28.12	.015	28.12	.015	113.12	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
28.12 113.12 5.15 5 5.15 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.77	Wt. n-Val.		0.015	
W.S. Elev (ft)	1520.16	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.72	Flow Area (sq ft)		248.27	
E.G. Slope (ft/ft)	*0.016577	Area (sq ft)		248.27	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	25.09	Avg. Vel. (ft/s)		25.09	
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	48371.7	Conv. (cfs)		48371.7	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		90.01	
Min Ch El (ft)	1516.81	Shear (lb/sq ft)		2.85	
Alpha	1.00	Stream Power (lb/ft s)		71.61	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		34.35	
C & E Loss (ft)	0.00	Cum SA (acres)		6.87	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7392.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
29.69	1527.66	29.69	1517.66	73.44	1516.79	117.19	1517.66	117.19	1527.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
29.69	.015	29.69	.015	117.19	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.69 117.19 5.15 5 5.15 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.79	Wt. n-Val.		0.015	
W.S. Elev (ft)	1520.06	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.60	Flow Area (sq ft)		248.06	
E.G. Slope (ft/ft)	*0.017194	Area (sq ft)		248.06	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	87.50	Top Width (ft)		87.50	
Vel Total (ft/s)	25.11	Avg. Vel. (ft/s)		25.11	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.84	
Conv. Total (cfs)	47495.9	Conv. (cfs)		47495.9	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		92.32	
Min Ch El (ft)	1516.79	Shear (lb/sq ft)		2.88	
Alpha	1.00	Stream Power (lb/ft s)		72.42	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		34.33	
C & E Loss (ft)	0.00	Cum SA (acres)		6.86	

CROSS SECTION

RIVER: C-1 Channel

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
31.25	1527.67	31.25	1517.67	76.25	1516.77	121.25	1517.67	121.25	1527.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
31.25	.015	31.25	.015	121.25	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.25	121.25	5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.76	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.98	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.50	Flow Area (sq ft)		248.36	
E.G. Slope (ft/ft)	*0.017702	Area (sq ft)		248.36	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	90.00	Top Width (ft)		90.00	
Vel Total (ft/s)	25.08	Avg. Vel. (ft/s)		25.08	
Max Chl Dpth (ft)	3.21	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	46810.1	Conv. (cfs)		46810.1	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		94.64	
Min Ch El (ft)	1516.77	Shear (lb/sq ft)		2.90	
Alpha	1.00	Stream Power (lb/ft s)		72.73	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		34.30	
C & E Loss (ft)	0.01	Cum SA (acres)		6.85	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7402.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
32.81	1527.67	32.81	1517.67	79.06	1516.75	125.31	1517.67	125.31	1527.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
32.81	.015	32.81	.015	125.31	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32.81	125.31	5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.90	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.39	Flow Area (sq ft)		248.70	
E.G. Slope (ft/ft)	*0.018205	Area (sq ft)		248.70	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	92.50	Top Width (ft)		92.50	
Vel Total (ft/s)	25.04	Avg. Vel. (ft/s)		25.04	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	46159.2	Conv. (cfs)		46159.2	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		96.98	
Min Ch El (ft)	1516.75	Shear (lb/sq ft)		2.91	
Alpha	1.00	Stream Power (lb/ft s)		72.99	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		34.27	
C & E Loss (ft)	0.01	Cum SA (acres)		6.84	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7407.*

INPUT
Description:

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
34.38	1527.68	34.38	1517.68	81.88	1516.73	129.38	1517.68	129.38	1527.68

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
34.38	.015	34.38	.015	129.38	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
34.38	129.38	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.70	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.83	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.30	Flow Area (sq ft)		249.15	
E.G. Slope (ft/ft)	*0.018680	Area (sq ft)		249.15	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	95.00	Top Width (ft)		95.00	
Vel Total (ft/s)	25.00	Avg. Vel. (ft/s)		25.00	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	45568.1	Conv. (cfs)		45568.1	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		99.31	
Min Ch El (ft)	1516.73	Shear (lb/sq ft)		2.93	
Alpha	1.00	Stream Power (lb/ft s)		73.13	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		34.24	
C & E Loss (ft)	0.01	Cum SA (acres)		6.83	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7412.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
35.94	1527.68	35.94	1517.68	84.69	1516.71	133.44	1517.68	133.44	1527.68

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
35.94	.015	35.94	.015	133.44	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.94	133.44	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.66	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.76	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.20	Flow Area (sq ft)		249.64	
E.G. Slope (ft/ft)	*0.019148	Area (sq ft)		249.64	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	97.50	Top Width (ft)		97.50	
Vel Total (ft/s)	24.95	Avg. Vel. (ft/s)		24.95	
Max Chl Dpth (ft)	3.05	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	45007.6	Conv. (cfs)		45007.6	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		101.67	
Min Ch El (ft)	1516.71	Shear (lb/sq ft)		2.94	
Alpha	1.00	Stream Power (lb/ft s)		73.23	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		34.21	
C & E Loss (ft)	0.01	Cum SA (acres)		6.82	

CROSS SECTION

IVER: C-1 Channel
EACH: 1 RS: -7417.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
37.5	1527.69	37.5	1517.69	87.5	1516.69	137.5	1517.69	137.5	1527.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
37.5	.015	37.5	.015	137.5	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
37.5	137.5		5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.61	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.69	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.11	Flow Area (sq ft)		250.34	
E.G. Slope (ft/ft)	0.019557	Area (sq ft)		250.34	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	100.00	Top Width (ft)		100.00	
Vel Total (ft/s)	24.88	Avg. Vel. (ft/s)		24.88	
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	44534.4	Conv. (cfs)		44534.4	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		104.03	
Min Ch El (ft)	1516.69	Shear (lb/sq ft)		2.94	
Alpha	1.00	Stream Power (lb/ft s)		73.10	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		34.18	
C & E Loss (ft)	0.02	Cum SA (acres)		6.81	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7422.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
39.06	1527.69	39.06	1517.69	90.31	1516.67	141.56	1517.69	141.56	1527.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
39.06	.015	39.06	.015	141.56	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
39.06	141.56		5.15	5	5.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1529.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.63	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1522.02	Flow Area (sq ft)		251.08	
E.G. Slope (ft/ft)	0.019958	Area (sq ft)		251.08	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	102.50	Top Width (ft)		102.50	
Vel Total (ft/s)	24.81	Avg. Vel. (ft/s)		24.81	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	44084.6	Conv. (cfs)		44084.6	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		106.40	
Min Ch El (ft)	1516.67	Shear (lb/sq ft)		2.94	
Alpha	1.00	Stream Power (lb/ft s)		72.93	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		34.15	
C & E Loss (ft)	0.02	Cum SA (acres)		6.80	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7427.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40.62	1527.7	40.62	1517.7	93.12	1516.65	145.62	1517.7	145.62	1527.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         40.62  145.62             5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
************************************************************************************************
  E.G. Elev (ft)          • 1529.06  • Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    9.49  * Wt. n-Val.            •          *   0.015  *          *
* W.S. Elev (ft)          • 1519.58  * Reach Len. (ft)       *    5.15  *    5.00  *    5.15  *
• Crit W.S. (ft)          • 1521.94  * Flow Area (sq ft)     *          *  251.98  •          *
* E.G. Slope (ft/ft)      *0.020308  * Area (sq ft)          *          •  251.98  *          *
* Q Total (cfs)           * 6228.00  * Flow (cfs)           •          * 6228.00  *          *
• Top Width (ft)          *  105.00  * Top Width (ft)       *          *  105.00  *          *
* Vel Total (ft/s)        •   24.72  * Avg. Vel. (ft/s)     *          *   24.72  *          *
* Max Chl Dpth (ft)       *    2.92  * Hydr. Depth (ft)     *          *    2.40  *          *
* Conv. Total (cfs)       * 43703.4  * Conv. (cfs)          *          • 43703.4  *          *
* Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)     *          *  108.77  *          *
* Min Ch El (ft)          * 1516.65  * Shear (lb/sq ft)     *          •    2.94  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *        •   72.59  *          •
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)  •          *   34.13  *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)        *          *    6.79  *          *
************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -7432.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
   42.19  1527.7   42.19  1517.7   95.94 1516.63  149.69  1517.7  149.69  1527.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   42.19    .015   42.19    .015  149.69    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         42.19  149.69             5.15       5    5.15             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
************************************************************************************************
* E.G. Elev (ft)          * 1528.93  * Element               *  Left OB *  Channel • Right OB •
* Vel Head (ft)           *    9.42  * Wt. n-Val.            *          *   0.015  *          *
• W.S. Elev (ft)          * 1519.52  * Reach Len. (ft)       *    5.15  *    5.00  •    5.15  *
• Crit W.S. (ft)          * 1521.87  * Flow Area (sq ft)     •          *  252.90  •          *
* E.G. Slope (ft/ft)      *0.020651  * Area (sq ft)          *          *  252.90  *          •
* Q Total (cfs)           * 6228.00  * Flow (cfs)           *          • 6228.00  •          *
* Top Width (ft)          *  107.50  * Top Width (ft)       *          *  107.50  *          *
* Vel Total (ft/s)        •   24.63  * Avg. Vel. (ft/s)     •          *   24.63  *          *
* Max Chl Dpth (ft)       *    2.89  * Hydr. Depth (ft)     *          *    2.35  *          *
• Conv. Total (cfs)       * 43338.6  * Conv. (cfs)          •          * 43338.6  *          *
• Length Wtd. (ft)        *    5.00  * Wetted Per. (ft)     *          •  111.16  •          •
* Min Ch El (ft)          * 1516.63  * Shear (lb/sq ft)     *          *    2.93  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *        *   72.24  *          •
* Frctn Loss (ft)         *    0.10  * Cum Volume (acre-ft)  *          *   34.10  *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)        *          *    6.77  *          *
************************************************************************************************

CROSS SECTION


RIVER: C-1 Channel
REACH: 1                  RS: -7437.*

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
   43.75 1527.71   43.75 1517.71   98.75 1516.61  153.75 1517.71  153.75 1527.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   43.75    .015   43.75    .015  153.75    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         43.75  153.75             5.15       5    5.15             .1       .3
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1528.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.34	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.47	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1521.78	Flow Area (sq ft)		254.01	
E.G. Slope (ft/ft)	0.020938	Area (sq ft)		254.01	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	110.00	Top Width (ft)		110.00	
Vel Total (ft/s)	24.52	Avg. Vel. (ft/s)		24.52	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		2.31	
Conv. Total (cfs)	43040.4	Conv. (cfs)		43040.4	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		113.54	
Min Ch El (ft)	1516.61	Shear (lb/sq ft)		2.92	
Alpha	1.00	Stream Power (lb/ft s)		71.70	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		34.07	
C & E Loss (ft)	0.02	Cum SA (acres)		6.76	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7442.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
45.31	1527.71	45.31	1517.71	101.56	1516.59	157.81	1517.71	157.81	1527.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
45.31	.015	45.31	.015	157.81	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45.31	157.81	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1528.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.26	Wt. n-Val.		0.015	
W.S. Elev (ft)	1519.42	Reach Len. (ft)	5.15	5.00	5.15
Crit W.S. (ft)	1521.70	Flow Area (sq ft)		255.10	
E.G. Slope (ft/ft)	0.021225	Area (sq ft)		255.10	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	112.50	Top Width (ft)		112.50	
Vel Total (ft/s)	24.41	Avg. Vel. (ft/s)		24.41	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	42749.1	Conv. (cfs)		42749.1	
Length Wtd. (ft)	5.00	Wetted Per. (ft)		115.94	
Min Ch El (ft)	1516.59	Shear (lb/sq ft)		2.92	
Alpha	1.00	Stream Power (lb/ft s)		71.18	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		34.04	
C & E Loss (ft)	0.02	Cum SA (acres)		6.75	

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7447.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
46.88	1527.72	46.88	1517.72	104.38	1516.57	161.88	1517.72	161.88	1527.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
46.88	.015	46.88	.015	161.88	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
46.88	161.88	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1528.55	Element	Left OB	Channel	Right OB

* W.S. Elev (ft)	* 1519.37	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15	*
* Crit W.S. (ft)	* 1521.63	* Flow Area (sq ft)	*	* 256.24	*	*
* E.G. Slope (ft/ft)	*0.021487	* Area (sq ft)	*	* 256.24	*	*
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	*	*
* Top Width (ft)	* 115.00	* Top Width (ft)	*	* 115.00	*	*
* Vel Total (ft/s)	* 24.30	* Avg. Vel. (ft/s)	*	* 24.30	*	*
* Max Chl Dpth (ft)	* 2.80	* Hydr. Depth (ft)	*	* 2.23	*	*
* Conv. Total (cfs)	* 42487.9	* Conv. (cfs)	*	* 42487.9	*	*
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 118.33	*	*
* Min Ch El (ft)	* 1516.57	* Shear (lb/sq ft)	*	* 2.90	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 70.60	*	*
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	*	* 34.01	*	*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 6.73	*	*

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7452.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
48.44	1527.72	48.44	1517.72	107.19	1516.55	165.94	1517.72	165.94	1527.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
48.44	.015	48.44	.015	165.94	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.44	165.94	5.15	5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1528.42	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 9.09	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1519.33	* Reach Len. (ft)	* 5.15	* 5.00	* 5.15 *
* Crit W.S. (ft)	* 1521.56	* Flow Area (sq ft)	*	* 257.39	* *
* E.G. Slope (ft/ft)	*0.021745	* Area (sq ft)	*	* 257.39	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 117.50	* Top Width (ft)	*	* 117.50	* *
* Vel Total (ft/s)	* 24.20	* Avg. Vel. (ft/s)	*	* 24.20	* *
* Max Chl Dpth (ft)	* 2.78	* Hydr. Depth (ft)	*	* 2.19	* *
* Conv. Total (cfs)	* 42234.6	* Conv. (cfs)	*	* 42234.6	* *
* Length Wtd. (ft)	* 5.00	* Wetted Per. (ft)	*	* 120.73	* *
* Min Ch El (ft)	* 1516.55	* Shear (lb/sq ft)	*	* 2.89	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 70.03	* *
* Frctn Loss (ft)	* 0.11	* Cum Volume (acre-ft)	*	* 33.98	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 6.72	* *

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7457.7

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
50	1527.73	50	1517.73	110	1516.53	170	1517.73	170	1527.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
50	.0395	50	.0395	170	.0395

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50	170	42.24	42.24	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1528.10	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 8.79	* Wt. n-Val.	*	* 0.040	* *
* W.S. Elev (ft)	* 1519.31	* Reach Len. (ft)	* 42.24	* 42.24	* 42.24 *
* Crit W.S. (ft)	* 1521.49	* Flow Area (sq ft)	*	* 261.77	* *
* E.G. Slope (ft/ft)	*0.146420	* Area (sq ft)	*	* 261.77	* *

* Top Width (ft)	* 120.00	* Top Width (ft)	*	* 120.00	*
* Vel Total (ft/s)	* 23.79	* Avg. Vel. (ft/s)	*	* 23.79	*
* Max Chl Dpth (ft)	* 2.78	* Hydr. Depth (ft)	*	* 2.18	*
* Conv. Total (cfs)	* 16276.0	* Conv. (cfs)	*	* 16276.0	*
* Length Wtd. (ft)	* 42.24	* Wetted Per. (ft)	*	* 123.19	*
* Min Ch El (ft)	* 1516.53	* Shear (lb/sq ft)	*	* 19.42	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 462.15	*
* Frctn Loss (ft)	* 0.23	* Cum Volume (acre-ft)	*	* 33.95	*
* C & E Loss (ft)	* 0.09	* Cum SA (acres)	*	* 6.71	*

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7500.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
50	1527.56	50	1517.56	110	1516.36	170	1517.56	170	1527.56

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
50	.0395	50	.0395	170	.0395

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50	170	27.75 27.75	27.75	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1523.95	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.56	* Wt. n-Val.	*	* 0.040	* *
* W.S. Elev (ft)	* 1520.39	* Reach Len. (ft)	* 27.75	* 27.75	* 27.75 *
* Crit W.S. (ft)	* 1521.32	* Flow Area (sq ft)	*	* 411.13	* *
* E.G. Slope (ft/ft)	*0.033392	* Area (sq ft)	*	* 411.13	* *
* Q Total (cfs)	* 6228.00	* Flow (cfs)	*	* 6228.00	* *
* Top Width (ft)	* 120.00	* Top Width (ft)	*	* 120.00	* *
* Vel Total (ft/s)	* 15.15	* Avg. Vel. (ft/s)	*	* 15.15	* *
* Max Chl Dpth (ft)	* 4.03	* Hydr. Depth (ft)	*	* 3.43	* *
* Conv. Total (cfs)	* 34082.3	* Conv. (cfs)	*	* 34082.3	* *
* Length Wtd. (ft)	* 27.75	* Wetted Per. (ft)	*	* 125.68	* *
* Min Ch El (ft)	* 1516.36	* Shear (lb/sq ft)	*	* 6.82	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 103.31	* *
* Frctn Loss (ft)	* 2.58	* Cum Volume (acre-ft)	*	* 33.62	* *
* C & E Loss (ft)	* 1.57	* Cum SA (acres)	*	* 6.59	* *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7527.7

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1527.72	49.53	1517.43	111.98	1516.07	163.7	1517.34	220.73	1527.54

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0395	0	.0395	220.73	.0395

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	220.73	92.61 92.61	92.61	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1522.95	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.97	Wt. n-Val.		0.040		
W.S. Elev (ft)	1520.98	Reach Len. (ft)	92.61	92.61	92.61	
Crit W.S. (ft)	1521.08	Flow Area (sq ft)		553.15		
E.G. Slope (ft/ft)	0.016054	Area (sq ft)		553.15		
Q Total (cfs)	6228.00	Flow (cfs)		6228.00		
Top Width (ft)	151.64	Top Width (ft)		151.64		
Vel Total (ft/s)	11.26	Avg. Vel. (ft/s)		11.26		
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		3.65		
Conv. Total (cfs)	49153.6	Conv. (cfs)		49153.6		
Length Wtd. (ft)	92.61	Wetted Per. (ft)		152.36		
Min Ch El (ft)	1516.07	Shear (lb/sq ft)		3.64		
Alpha	1.00	Stream Power (lb/ft s)		40.97		
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		33.32		
C & E Loss (ft)	0.51	Cum SA (acres)		6.50		

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7620.3

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1526.79	66.47	1514.7	104.62	1514.26	171.92	1515.29	224.69	1525.93

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	224.69	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	224.69	176.24	170.74	165.33	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1521.97	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.75	Wt. n-Val.		0.040		
W.S. Elev (ft)	1521.22	Reach Len. (ft)	176.24	170.74	165.33	
Crit W.S. (ft)	1519.14	Flow Area (sq ft)		894.27		
E.G. Slope (ft/ft)	0.003898	Area (sq ft)		894.27		
Q Total (cfs)	6228.00	Flow (cfs)		6228.00		
Top Width (ft)	170.67	Top Width (ft)		170.67		
Vel Total (ft/s)	6.96	Avg. Vel. (ft/s)		6.96		
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)		5.24		
Conv. Total (cfs)	99756.1	Conv. (cfs)		99756.1		
Length Wtd. (ft)	170.74	Wetted Per. (ft)		171.86		
Min Ch El (ft)	1514.26	Shear (lb/sq ft)		1.27		
Alpha	1.00	Stream Power (lb/ft s)		8.82		
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		31.78		
C & E Loss (ft)	0.04	Cum SA (acres)		6.16		

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -7791.

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1523.65	50.48	1514.68	114.67	1514	169.76	1514.16	221.47	1523.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 221.47 438.8 438.8 438.8 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1521.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.040	
W.S. Elev (ft)	1520.73	Reach Len. (ft)	438.80	438.80	438.80
Crit W.S. (ft)		Flow Area (sq ft)		997.13	
E.G. Slope (ft/ft)	0.003109	Area (sq ft)		997.13	
Q Total (cfs)	6228.00	Flow (cfs)		6228.00	
Top Width (ft)	189.28	Top Width (ft)		189.28	
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)		6.25	
Max Chl Dpth (ft)	6.73	Hydr. Depth (ft)		5.27	
Conv. Total (cfs)	111701.4	Conv. (cfs)		111701.4	
Length Wtd. (ft)	438.80	Wetted Per. (ft)		190.41	
Min Ch El (ft)	1514.00	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)		6.35	
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		28.07	
C & E Loss (ft)	0.03	Cum SA (acres)		5.46	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -8229.8

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1522.94	76.07	1513.13	124.38	1511.92	179.85	1513.11	230.61	1524.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	230.61	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 230.61 458.65 647.14 856.86 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1519.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.040	
W.S. Elev (ft)	1518.76	Reach Len. (ft)	458.65	647.14	856.86
Crit W.S. (ft)		Flow Area (sq ft)		840.57	
E.G. Slope (ft/ft)	0.004891	Area (sq ft)		840.57	
Q Total (cfs)	6255.00	Flow (cfs)		6255.00	
Top Width (ft)	172.37	Top Width (ft)		172.37	
Vel Total (ft/s)	7.44	Avg. Vel. (ft/s)		7.44	
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)		4.88	
Conv. Total (cfs)	89443.4	Conv. (cfs)		89443.4	
Length Wtd. (ft)	647.14	Wetted Per. (ft)		173.39	
Min Ch El (ft)	1511.92	Shear (lb/sq ft)		1.48	
Alpha	1.00	Stream Power (lb/ft s)		11.01	
Frctn Loss (ft)	2.53	Cum Volume (acre-ft)		18.82	
C & E Loss (ft)	0.06	Cum SA (acres)		3.64	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -8876.9

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.46	89.45	1510.3	133.07	1509.11	209.14	1510.3	259.16	1522.6

Manning's n Values num= 3

```
*********************************************
       0     .04       0     .04  259.16     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
             0  259.16             95.14   95.14   95.14              .1        .3
```

ROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1517.04	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.67	Wt. n-Val.		0.040		
W.S. Elev (ft)	1516.37	Reach Len. (ft)	95.14	95.14	95.14	
Crit W.S. (ft)		Flow Area (sq ft)		954.22		
E.G. Slope (ft/ft)	0.003189	Area (sq ft)		954.22		
Q Total (cfs)	6255.00	Flow (cfs)		6255.00		
Top Width (ft)	171.30	Top Width (ft)		171.30		
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)		6.56		
Max Chl Dpth (ft)	7.26	Hydr. Depth (ft)		5.57		
Conv. Total (cfs)	110771.9	Conv. (cfs)		110771.9		
Length Wtd. (ft)	95.14	Wetted Per. (ft)		172.74		
Min Ch El (ft)	1509.11	Shear (lb/sq ft)		1.10		
Alpha	1.00	Stream Power (lb/ft s)		7.21		
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		5.48		
C & E Loss (ft)	0.01	Cum SA (acres)		1.08		

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -8972.0*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.33	89.45	1510.17	133.07	1508.98	209.14	1510.17	259.16	1522.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	259.16	.04

Bank Sta: Left 0, Right 259.16; Lengths: Left Channel 95.14, Right 95.14; Coeff Contr. .1; Expan. .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1516.71	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.74	Wt. n-Val.		0.040		
W.S. Elev (ft)	1515.97	Reach Len. (ft)	95.14	95.14	95.14	
Crit W.S. (ft)		Flow Area (sq ft)		908.17		
E.G. Slope (ft/ft)	0.003692	Area (sq ft)		908.17		
Q Total (cfs)	6255.00	Flow (cfs)		6255.00		
Top Width (ft)	169.00	Top Width (ft)		169.00		
Vel Total (ft/s)	6.89	Avg. Vel. (ft/s)		6.89		
Max Chl Dpth (ft)	6.99	Hydr. Depth (ft)		5.37		
Conv. Total (cfs)	102948.4	Conv. (cfs)		102948.4		
Length Wtd. (ft)	95.14	Wetted Per. (ft)		170.37		
Min Ch El (ft)	1508.98	Shear (lb/sq ft)		1.23		
Alpha	1.00	Stream Power (lb/ft s)		8.46		
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		3.45		
C & E Loss (ft)	0.01	Cum SA (acres)		0.71		

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -9067.1*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.2	89.45	1510.04	133.07	1508.85	209.14	1510.04	259.16	1522.34

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	259.16	.04

0	259.16	95.14	95.14	95.14	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1516.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.040	
W.S. Elev (ft)	1515.45	Reach Len. (ft)	95.14	95.14	95.14
Crit W.S. (ft)	1513.70	Flow Area (sq ft)		842.38	
E.G. Slope (ft/ft)	0.004616	Area (sq ft)		842.38	
Q Total (cfs)	6255.00	Flow (cfs)		6255.00	
Top Width (ft)	165.65	Top Width (ft)		165.65	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		5.09	
Conv. Total (cfs)	92062.9	Conv. (cfs)		92062.9	
Length Wtd. (ft)	95.14	Wetted Per. (ft)		166.94	
Min Ch El (ft)	1508.85	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		10.80	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		1.54	
C & E Loss (ft)	0.10	Cum SA (acres)		0.35	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C-1 Channel
REACH: 1 RS: -9162.3

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1530.07	89.45	1509.91	133.07	1508.72	209.14	1509.91	259.16	1522.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	259.16	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	259.16	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1515.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.90	Wt. n-Val.		0.040	
W.S. Elev (ft)	1513.57	Reach Len. (ft)			
Crit W.S. (ft)	1513.57	Flow Area (sq ft)		565.64	
E.G. Slope (ft/ft)	0.015320	Area (sq ft)		565.64	
Q Total (cfs)	6255.00	Flow (cfs)		6255.00	
Top Width (ft)	150.78	Top Width (ft)		150.78	
Vel Total (ft/s)	11.06	Avg. Vel. (ft/s)		11.06	
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)		3.75	
Conv. Total (cfs)	50535.4	Conv. (cfs)		50535.4	
Length Wtd. (ft)		Wetted Per. (ft)		151.66	
Min Ch El (ft)	1508.72	Shear (lb/sq ft)		3.57	
Alpha	1.00	Stream Power (lb/ft s)		39.45	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:C-1 Channel

Reach	River Sta.	n1	n2	n3
1	8	.015	.015	.015
1	7	.015	.015	.015
1	6	.015	.015	.015
1	5.5	Culvert		
1	5	.015	.015	.015
1	4	.015	.015	.015
1	3	.015	.015	.015
1	2.5	.015	.015	.015
1	2.25	.015	.015	.015

*1	*	1.75	*	.015*	.015*	.015*
*1	*	1.5	*	.015*	.015*	.015*
*1	*	1	*	.015*	.015*	.015*
*1	*	-2.	*	.03*	.028*	.03*
*1	*	-4.5	*	.03*	.028*	.03*
1	*	-8.	*	.03*	.028*	.03*
1	*	-10.5	*	.03*	.028*	.03*
*1	*	-13.	*	.03*	.028*	.03*
*1	*	-16.	*	.03*	.028*	.03*
*1	*	-17.	*	.03*	.028*	.03*
*1	*	-21.	*	.03*	.028*	.03*
*1	*	-23.	*	.03*	.028*	.03*
*1	*	-24.	*	.03*	.028*	.03*
*1	*	-27.	*	.03*	.028*	.03*
*1	*	-27.5	*	.03*	.015*	.03*
*1	*	-28.	*	.03*	.015*	.03*
*1	*	-28.5	*	.03*	.015*	.03*
*1	*	-999.5	*	.015*	.015*	.015*
*1	*	-1009.*	*	.015*	.015*	.015*
*1	*	-1018.*	*	.015*	.015*	.015*
*1	*	-1027.*	*	.015*	.015*	.015*
*1	*	-1037.*	*	.015*	.015*	.015*
*1	*	-1046.*	*	.015*	.015*	.015*
*1	*	-1056.*	*	.015*	.015*	.015*
*1	*	-1065.*	*	.015*	.015*	.015*
*1	*	-1075.*	*	.015*	.015*	.015*
*1	*	-1084.*	*	.015*	.015*	.015*
*1	*	-1094.*	*	.015*	.015*	.015*
*1	*	-1103.*	*	.015*	.015*	.015*
*1	*	-1113.*	*	.015*	.015*	.015*
*1	*	-1122.*	*	.015*	.015*	.015*
*1	*	-1132.*	*	.015*	.015*	.015*
*1	*	-1141.*	*	.015*	.015*	.015*
*1	*	-1151.*	*	.015*	.015*	.015*
*1	*	-1160.*	*	.015*	.015*	.015*
*1	*	-1170.*	*	.015*	.015*	.015*
*1	*	-1179.5	*	.015*	.015*	.015*
*1	*	-1204.4	*	.015*	.015*	.015*
*1	*	-1299.8	*	.015*	.015*	.015*
*1	*	-1320.	*	.015*	.015*	.015*
1	*	-1500.	*	.015*	.015*	.015*
1	*	-1729.8	*	.015*	.015*	.015*
*1	*	-1800.	*	.015*	.015*	.015*
*1	*	-1908.1	*	.015*	.015*	.015*
*1	*	-2000.	*	.015*	.015*	.015*
*1	*	-2200.	*	.015*	.015*	.015*
*1	*	-2347.4	*	.015*	.015*	.015*
*1	*	-2359.4	*Bridge	*	*	*
*1	*	-2424.4	*	.015*	.015*	.015*
*1	*	-2430.6	*	.015*	.015*	.015*
*1	*	-2440.*	*	.015*	.015*	.015*
*1	*	-2449.*	*	.015*	.015*	.015*
*1	*	-2458.*	*	.015*	.015*	.015*
*1	*	-2468.*	*	.015*	.015*	.015*
*1	*	-2477.*	*	.015*	.015*	.015*
*1	*	-2486.*	*	.015*	.015*	.015*
*1	*	-2496.*	*	.015*	.015*	.015*
*1	*	-2505.*	*	.015*	.015*	.015*
*1	*	-2515.*	*	.015*	.015*	.015*
*1	*	-2524.*	*	.015*	.015*	.015*
*1	*	-2533.*	*	.015*	.015*	.015*
*1	*	-2543.*	*	.015*	.015*	.015*
*1	*	-2552.*	*	.015*	.015*	.015*
*1	*	-2562.*	*	.015*	.015*	.015*
*1	*	-2571.*	*	.015*	.015*	.015*
*1	*	-2580.*	*	.015*	.015*	.015*
*1	*	-2590.2	*	.015*	.015*	.015*
*1	*	-2599.*	*	.015*	.015*	.015*
*1	*	-2607.*	*	.015*	.015*	.015*
*1	*	-2616.*	*	.015*	.015*	.015*
*1	*	-2625.*	*	.015*	.015*	.015*
*1	*	-2634.*	*	.015*	.015*	.015*
*1	*	-2642.*	*	.015*	.015*	.015*
*1	*	-2651.6	*	.015*	.015*	.015*
1	*	-2704.6	*	.015*	.015*	.015*
1	*	-3084.2	*	.015*	.015*	.015*
*1	*	-3104.4	*	.015*	.015*	.015*
*1	*	-3154.4	*	.015*	.015*	.015*
*1	*	-3204.4	*	.015*	.015*	.015*
*1	*	-3304.4	*	.015*	.015*	.015*
*1	*	-3404.4	*	.015*	.015*	.015*
*1	*	-3500.	*	.015*	.015*	.015*
*1	*	-3600.	*	.015*	.015*	.015*

*1	*	-3700.	*	.015*	.015*	.015*
*1	*	-3750.	*	.015*	.015*	.015*
*1	*	-3800.	*	.015*	.015*	.015*
*1	*	-3850.	*	.015*	.015*	.015*
*1	*	-3900.	*	.015*	.015*	.015*
*1	*	-3950.	*	.015*	.015*	.015*
*1	*	-4000.	*	.015*	.015*	.015*
*1	*	-4950.	*	.015*	.015*	.015*
*1	•	-4997.7	*	.015*	.015*	.015*
*1	*	-5000.	*	.015*	.015*	.015*
*1	*	-5450.	*	.015*	.015*	.015*
*1	*	-5489.1	*	.015*	.015*	.015*
*1	*	-5500.	*	.015*	.015*	.015*
*1	*	-5550.	*	.015*	.015*	.015*
*1	*	-5595.6	*	.015*	.015*	.015*
*1	•	-5600.	•	.015*	.015*	.015*
*1	*	-5650.	*	.015*	.015*	.015*
*1	*	-5700.	*	.015*	.015*	.015*
*1	*	-5750.	*	.015*	.015*	.015*
*1	*	-5800.	*	.015*	.015*	.015*
*1	*	-5850.	*	.015*	.015*	.015*
*1	*	-5900.	*	.015*	.015*	.015*
*1	*	-5950.	*	.015*	.015*	.015*
*1	*	-5954.9	*	.015*	.015*	.015*
*1	*	-6000.	*	.015*	.015*	.015*
*1	*	-6300.	*	.015*	.015*	.015*
*1	*	-6347.7	*	.015*	.015*	.015*
*1	*	-6350.	*	.015*	.015*	.015*
*1	*	-6400.	*	.015*	.015*	.015*
*1	*	-6600.	*	.015*	.015*	.015*
*1	*	-6633.3	*	.015*	.015*	.015*
*1	*	-6650.	•	.015*	.015*	.015*
*1	*	-6700.	*	.015*	.015*	.015*
*1	*	-6750.	•	.015*	.015*	.015*
*1	•	-6800.	*	.015*	.015*	.015*
*1	*	-6850.	•	.015*	.015*	.015*
*1	*	-6900.	*	.015*	.015*	.015*
*1	*	-6950.	*	.015*	.015*	.015*
*1	*	-7000.	*	.015*	.015*	.015*
*1	*	-7050.	*	.015*	.015*	.015*
*1	*	-7063.9	*	.015*	.015*	.015*
*1	*	-7100.	*	.015*	.015*	.015*
*1	*	-7250.	*	.015*	.015*	.015*
*1	*	-7297.7	*	.015*	.015*	.015*
*1	*	-7302.*	*	.015*	.015*	.015*
*1	*	-7307.*	*	.015*	.015*	.015*
*1	*	-7312.*	*	.015*	.015*	.015*
*1	*	-7317.*	*	.015*	.015*	.015*
*1	*	-7322.*	*	.015*	.015*	.015*
*1	*	-7327.*	*	.015*	.015*	.015*
*1	*	-7332.*	*	.015*	.015*	.015*
*1	*	-7337.*	*	.015*	.015*	.015*
*1	*	-7342.*	*	.015*	.015*	.015*
*1	*	-7347.*	•	.015*	.015*	.015*
*1	*	-7352.*	*	.015*	.015*	.015*
*1	*	-7357.*	*	.015*	.015*	.015*
*1	*	-7362.*	*	.015*	.015*	.015*
*1	*	-7367.*	*	.015*	.015*	.015*
*1	*	-7372.*	*	.015*	.015*	.015*
*1	*	-7377.*	*	.015*	.015*	.015*
*1	*	-7382.*	*	.015*	.015*	.015*
*1	*	-7387.*	*	.015*	.015*	.015*
*1	*	-7392.*	*	.015*	.015*	.015*
*1	*	-7397.*	*	.015*	.015*	.015*
*1	*	-7402.•	*	.015*	.015*	.015*
*1	*	-7407.*	*	.015*	.015*	.015*
*1	*	-7412.•	*	.015*	.015*	.015*
*1	*	-7417.*	*	.015*	.015*	.015*
*1	*	-7422.*	*	.015*	.015*	.015*
*1	*	-7427.*	*	.015*	.015*	.015*
*1	*	-7432.•	*	.015*	.015*	.015*
*1	*	-7437.*	*	.015*	.015*	.015*
*1	*	-7442.*	*	.015*	.015*	.015*
*1	*	-7447.*	*	.015*	.015*	.015*
*1	•	-7452.*	*	.015*	.015*	.015*
*1	*	-7457.7	*	.0395*	.0395*	.0395*
*1	*	-7500.	*	.0395*	.0395*	.0395*
*1	*	-7527.7	•	.0395*	.0395*	.0395*
*1	*	-7620.3	*	.04*	.04*	.04*
*1	*	-7791.	*	.04*	.04*	.04*
*1	*	-8229.8	*	.04*	.04*	.04*
*1	*	-8876.9	*	.04*	.04*	.04*
*1	*	-8972.0*	*	.04*	.04*	.04*

*1	*	-9162.3	* .04*	.04*	.04*

SUMMARY OF REACH LENGTHS

River: C-1 Channel

Reach	River Sta.	Left	Channel	Right
*1	8	55.33*	55.33*	55.33*
*1	7	94.26*	94.26*	94.26*
*1	6	270.97*	270.97*	270.97*
*1	5.5	*Culvert *	*	*
*1	5	16.01*	16.01*	16.01*
*1	4	47.91*	47.91*	47.91*
*1	3	26.77*	26.77*	26.77*
*1	2.5	7*	7*	7*
*1	2.25*	7*	7*	7*
*1	2	18*	18*	18*
*1	1.75	23*	23*	23*
*1	1.5	28*	28*	28*
*1	1	26*	26*	26*
*1	-2.	250*	250*	250*
*1	-4.5	349.96*	349.96*	349.96*
*1	-8.	250.03*	250.03*	250.03*
*1	-10.5	250*	250*	250*
*1	-13.	300*	300*	300*
*1	-16.	100*	100*	100*
*1	-17.	400*	400*	400*
*1	-21.	200*	200*	200*
*1	-23.	100*	100*	100*
*1	-24.	300*	300*	300*
*1	-27.	50*	50*	50*
*1	-27.5	50*	50*	50*
*1	-28.	50*	50*	50*
*1	-28.5	10*	10*	10*
*1	-999.5	9.56*	9.47*	9.56*
*1	-1009.*	9.56*	9.47*	9.56*
*1	-1018.*	9.56*	9.47*	9.56*
*1	-1027.*	9.56*	9.47*	9.56*
*1	-1037.*	9.56*	9.47*	9.56*
*1	-1046.*	9.56*	9.47*	9.56*
*1	-1056.*	9.56*	9.47*	9.56*
*1	-1065.*	9.56*	9.47*	9.56*
*1	-1075.*	9.56*	9.47*	9.56*
*1	-1084.*	9.56*	9.47*	9.56*
*1	-1094.*	9.56*	9.47*	9.56*
*1	-1103.*	9.56*	9.47*	9.56*
*1	-1113.*	9.56*	9.47*	9.56*
*1	-1122.*	9.56*	9.47*	9.56*
*1	-1132.*	9.56*	9.47*	9.56*
*1	-1141.*	9.56*	9.47*	9.56*
*1	-1151.*	9.56*	9.47*	9.56*
*1	-1160.*	9.56*	9.47*	9.56*
*1	-1170.*	9.56*	9.47*	9.56*
*1	-1179.5	24.92*	24.92*	24.92*
*1	-1204.4	95.35*	95.35*	95.35*
*1	-1299.8	20.2*	20.2*	20.2*
*1	-1320.	184.4*	180*	175.6*
*1	-1500.	225.6*	230*	224.4*
*1	-1729.8	68.8*	70.2*	71.4*
*1	-1800.	105.4*	107.8*	109.6*
*1	-1908.1	91.82*	91.82*	91.82*
*1	-2000.	200*	200*	200*
*1	-2200.	147.5*	147.5*	147.5*
*1	-2347.4	77*	77*	77*
*1	-2359.4	*Bridge *	*	*
*1	-2424.4	6.18*	6.18*	6.18*
*1	-2430.6	9.39*	9.39*	9.39*
*1	-2440.*	9.39*	9.39*	9.39*
*1	-2449.*	9.39*	9.39*	9.39*
*1	-2458.*	9.39*	9.39*	9.39*
*1	-2468.*	9.39*	9.39*	9.39*
*1	-2477.*	9.39*	9.39*	9.39*
*1	-2486.*	9.39*	9.39*	9.39*
*1	-2496.*	9.39*	9.39*	9.39*
*1	-2505.*	9.39*	9.39*	9.39*
*1	-2515.*	9.39*	9.39*	9.39*
*1	-2524.*	9.39*	9.39*	9.39*
*1	-2533.*	9.39*	9.39*	9.39*
*1	-2543.*	9.39*	9.39*	9.39*

*1	*	-2562.•	*	9.39*	9.39*	9.39*
*1	*	-2571.*	*	9.39*	9.39*	9.39*
*1	*	-2580.•	*	9.39*	9.39*	9.39*
*1	*	-2590.2	*	8.82*	8.82*	8.82*
*1	*	-2599.*	*	8.82*	8.82*	8.82*
*1	*	-2607.•	*	8.82*	8.82*	8.82*
*1	•	-2616.*	*	8.82*	8.82*	8.82*
*1	*	-2625.*	*	8.82*	8.82*	8.82*
*1	*	-2634.*	*	8.82*	8.82*	8.82*
*1	*	-2642.*	*	8.82*	8.82*	8.82*
*1	*	-2651.6	*	52.93*	52.93*	52.93*
*1	*	-2704.6	*	379.55*	379.55*	379.55*
*1	*	-3084.2	•	20.22*	20.22*	20.22*
*1	*	-3104.4	*	50*	50*	50*
*1	*	-3154.4	*	50*	50*	50*
*1	*	-3204.4	•	100*	100*	100*
*1	*	-3304.4	*	100*	100*	100*
*1	*	-3404.4	*	95.55*	95.55*	95.55*
*1	•	-3500.	*	99*	100*	101*
*1	*	-3600.	*	49*	50*	51*
*1	*	-3650.	*	49*	50*	51*
*1	*	-3700.	*	47*	50*	53*
*1	•	-3750.	*	47*	50*	53*
*1	*	-3800.	*	47*	50*	53*
*1	•	-3850.	*	47*	50*	53*
*1	*	-3900.	*	47*	50*	53*
*1	*	-3950.	*	48*	50*	52*
*1	*	-4000.	*	950*	950*	950*
*1	*	-4950.	*	47.77*	47.77*	47.77*
*1	*	-4997.7	*	2.23*	2.23*	2.23*
*1	*	-5000.	*	450*	450*	450*
*1	*	-5450.	*	39.14*	39.14*	39.14*
*1	*	-5489.1	*	11.5*	10.86*	10.22*
*1	*	-5500.	*	53*	50*	47*
*1	*	-5550.	*	48.62*	45.92*	43.22*
*1	•	-5595.6	*	4.28*	4.04*	3.8*
*1	*	-5600.	*	53*	50*	47*
*1	*	-5650.	*	53*	50*	47*
*1	*	-5700.	*	53*	50*	47*
*1	*	-5750.	*	53*	50*	47*
*1	•	-5800.	•	53*	50*	47*
*1	*	-5850.	*	53*	50*	47*
*1	*	-5900.	*	53*	50*	47*
*1	*	-5950.	*	5.27*	4.98*	4.69*
*1	*	-5954.9	•	45.02*	45.02*	45.02*
*1	*	-6000.	*	300*	300*	300*
*1	*	-6300.	*	47.77*	47.77*	47.77*
*1	*	-6347.7	*	2.23*	2.23*	2.23*
*1	*	-6350.	*	50*	50*	50*
*1	*	-6400.	*	200*	200*	200*
*1	*	-6600.	*	33.38*	33.38*	33.38*
*1	*	-6633.3	*	15.64*	16.62*	17.6*
*1	*	-6650.	*	47.02*	49.95*	52.89*
*1	*	-6700.	*	47.02*	49.95*	52.89*
*1	*	-6750.	*	47.02*	49.95*	52.89*
*1	*	-6800.	*	47.02*	49.95*	52.89*
*1	*	-6850.	*	47.02*	49.95*	52.89*
*1	*	-6900.	•	47.02*	49.95*	52.89*
*1	*	-6950.	*	47.02*	49.95*	52.89*
*1	*	-7000.	*	47.02*	49.95*	52.89*
*1	*	-7050.	*	47.02*	49.95*	52.89*
*1	*	-7063.9	*	36.08*	36.08*	36.08*
*1	*	-7100.	*	150*	150*	150*
*1	*	-7250.	*	47.77*	47.77*	47.77*
*1	*	-7297.7	*	5.15*	5*	5.15*
*1	*	-7302.•	*	5.15*	5*	5.15*
*1	*	-7307.*	*	5.15*	5*	5.15*
*1	*	-7312.*	*	5.15*	5*	5.15*
*1	*	-7317.*	*	5.15*	5*	5.15*
*1	*	-7322.*	*	5.15*	5*	5.15*
*1	*	-7327.*	*	5.15*	5*	5.15*
*1	•	-7332.*	*	5.15*	5*	5.15*
*1	*	-7337.*	*	5.15*	5*	5.15*
*1	*	-7342.*	*	5.15*	5*	5.15*
*1	*	-7347.*	*	5.15*	5*	5.15*
*1	*	-7352.*	*	5.15*	5*	5.15*
*1	*	-7357.*	•	5.15*	5*	5.15*
*1	*	-7362.*	*	5.15*	5*	5.15*
*1	*	-7367.*	*	5.15*	5*	5.15*
*1	•	-7372.*	*	5.15*	5*	5.15*
*1	*	-7377.*	*	5.15*	5*	5.15*
*1	•	-7382.*	*	5.15*	5*	5.15*
*1	*	-7387.*	*	5.15*	5*	5.15*

*1	*	-7397.*	*	5.15*	5*	5.15*
*1	*	-7402.*	*	5.15*	5*	5.15*
*1	*	-7407.*	*	5.15*	5*	5.15*
*1	*	-7412.*	*	5.15*	5*	5.15*
*1	*	-7417.*	*	5.15*	5*	5.15*
*1	*	-7422.*	*	5.15*	5*	5.15*
1	*	-7427.*	*	5.15*	5*	5.15*
*1	*	-7432.*	*	5.15*	5*	5.15*
*1	*	-7437.*	*	5.15*	5*	5.15*
*1	*	-7442.*	*	5.15*	5*	5.15*
*1	*	-7447.*	*	5.15*	5*	5.15*
*1	*	-7452.*	*	5.15*	5*	5.15*
*1	*	-7457.7	*	42.24*	42.24*	42.24*
*1	*	-7500.	*	27.75*	27.75*	27.75*
*1	*	-7527.7	*	92.61*	92.61*	92.61*
*1	*	-7620.3	*	176.24*	170.74*	165.33*
*1	*	-7791.	*	438.8*	438.8*	438.8*
*1	*	-8229.8	*	458.65*	647.14*	856.86*
*1	*	-8876.9	*	95.14*	95.14*	95.14*
*1	*	-8972.0*	*	95.14*	95.14*	95.14*
*1	*	-9067.1*	*	95.14*	95.14*	95.14*
*1	*	-9162.3	*	*	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: C-1 Channel

Reach	River Sta.	Contr.	Expan.
*1	8	.1*	.3*
*1	7	.3*	.5*
*1	6	.3*	.5*
*1	5.5	*Culvert *	*
*1	5	.3*	.5*
*1	4	.1*	.3*
*1	3	.1*	.3*
*1	2.5	.1*	.3*
1	2.25*	.1*	.3*
*1	2	.1*	.3*
*1	1.75	.1*	.3*
*1	1.5	.1*	.3*
*1	1	.1*	.3*
*1	-2.	.1*	.3*
*1	-4.5	.1*	.3*
*1	-8.	.1*	.3*
*1	-10.5	.1*	.3*
*1	-13.	.1*	.3*
*1	-16.	.1*	.3*
*1	-17.	.1*	.3*
*1	-21.	.1*	.3*
*1	-23.	.1*	.3*
*1	-24.	.1*	.3*
*1	-27.	.1*	.3*
*1	-27.5	.1*	.3*
*1	-28.	.1*	.3*
*1	-28.5	.1*	.3*
*1	-999.5	.1*	.3*
*1	-1009.*	.1*	.3*
*1	-1018.*	.1*	.3*
*1	-1027.*	.1*	.3*
*1	-1037.*	.1*	.3*
*1	-1046.*	.1*	.3*
*1	-1056.*	.1*	.3*
*1	-1065.*	.1*	.3*
*1	-1075.*	.1*	.3*
*1	-1084.*	.1*	.3*
*1	-1094.*	.1*	.3*
*1	-1103.*	.1*	.3*
*1	-1113.*	.1*	.3*
*1	-1122.*	.1*	.3*
*1	-1132.*	.1*	.3*
1	-1141.*	.1*	.3*
*1	-1151.*	.1*	.3*
*1	-1160.*	.1*	.3*
*1	-1170.*	.1*	.3*
*1	-1179.5	.1*	.3*
*1	-1204.4	.1*	.3*
*1	-1299.8	.1*	.3*
*1	-1320.	.1*	.3*
*1	-1500.	.1*	.3*

```
*1              •    -1800.  *       .1*       .3*
*1              •    -1908.1 *       .1*       .3*
*1              *    -2000.  *       .1*       .3*
*1              *    -2200.  *       .3*       .5*
*1              *    -2347.4 •       .3*       .5*
*1              *    -2359.4 *Bridge   *         *
*1              *    -2424.4 *       .3*       .5*
*1              *    -2430.6 •       .1*       .3*
*1              *    -2440.* *       .1*       .3*
*1              *    -2449.* *       .1*       .3*
*1              •    -2458.* *       .1*       .3*
*1              •    -2468.* *       .1*       .3*
*1              *    -2477.* *       .1*       .3*
*1              *    -2486.* *       .1*       .3*
*1              *    -2496.* *       .1*       .3*
*1              *    -2505.* *       .1*       .3*
*1              *    -2515.* *       .1*       .3*
*1              •    -2524.* *       .1*       .3*
*1              *    -2533.* *       .1*       .3*
*1              *    -2543.* *       .1*       .3*
*1              *    -2552.* *       .1*       .3*
*1              •    -2562.* *       .1*       .3*
*1              *    -2571.* *       .1*       .3*
*1              *    -2580.* •       .1*       .3*
*1              *    -2590.2 *       .1*       .3*
*1              *    -2599.* *       .1*       .3*
*1              *    -2607.* •       .1*       .3*
*1              *    -2616.* *       .1*       .3*
*1              *    -2625.* *       .1*       .3*
*1              *    -2634.* *       .1*       .3*
*1              *    -2642.* *       .1*       .3*
*1              *    -2651.6 *       .1*       .3*
*1              *    -2704.6 *       .1*       .3*
*1              *    -3084.2 *       .1*       .3*
*1              *    -3104.4 *       .1*       .3*
*1              *    -3154.4 *       .1*       .3*
*1              *    -3204.4 *       .1*       .3*
*1              *    -3304.4 *       .1*       .3*
*1              *    -3404.4 *       .1*       .3*
*1              *    -3500.  *       .1*       .3*
*1              *    -3600.  *       .1*       .3*
*1              •    -3650.  *       .1*       .3*
*1              *    -3700.  *       .1*       .3*
*1              *    -3750.  *       .1*       .3*
*1              *    -3800.  *       .1*       .3*
*1              *    -3850.  *       .1*       .3*
*1              *    -3900.  *       .1*       .3*
*1              *    -3950.  *       .1*       .3*
*1              *    -4000.  *       .1*       .3*
*1              *    -4950.  *       .1*       .3*
*1              *    -4997.7 *       .1*       .3*
*1              *    -5000.  *       .1*       .3*
*1              *    -5450.  *       .1*       .3*
*1              *    -5489.1 *       .1*       .3*
*1              *    -5500.  *       .1*       .3*
*1              •    -5550.  *       .1*       .3*
*1              *    -5595.6 *       .1*       .3*
*1              *    -5600.  *       .1*       .3*
*1              *    -5650.  *       .1*       .3*
*1              *    -5700.  •       .1*       .3*
*1              *    -5750.  •       .1*       .3*
*1              •    -5800.  *       .1*       .3*
*1              *    -5850.  *       .1*       .3*
*1              •    -5900.  *       .1*       .3*
*1              *    -5950.  *       .1*       .3*
*1              *    -5954.9 *       .1*       .3*
*1              •    -6000.  *       .1*       .3*
*1              *    -6300.  *       .1*       .3*
*1              *    -6347.7 *       .1*       .3*
*1              *    -6350.  *       .1*       .3*
*1              *    -6400.  *       .1*       .3*
*1              *    -6600.  *       .1*       .3*
*1              *    -6633.3 *       .1*       .3*
*1              •    -6650.  *       .1*       .3*
*1              *    -6700.  *       .1*       .3*
*1              *    -6750.  •       .1*       .3*
*1              *    -6800.  *       .1*       .3*
*1              *    -6850.  *       .1*       .3*
*1              *    -6900.  *       .1*       .3*
*1              *    -6950.  *       .1*       .3*
*1              *    -7000.  *       .1*       .3*
*1              *    -7050.  *       .1*       .3*
*1              *    -7063.9 *       .1*       .3*
```

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*1              *    -7250.  *       .1*       .3*
*1              *    -7297.7 *       .1*       .3*
*1              *    -7302.* *       .1*       .3*
*1              *    -7307.* *       .1*       .3*
*1              *    -7312.* *       .1*       .3*
*1              *    -7317.* *       .1*       .3*
 1              *    -7322.* *       .1*       .3*
*1              *    -7327.* *       .1*       .3*
*1              *    -7332.* *       .1*       .3*
*1              *    -7337.* *       .1*       .3*
*1              *    -7342.* *       .1*       .3*
*1              *    -7347.* *       .1*       .3*
*1              *    -7352.* *       .1*       .3*
*1              *    -7357.* *       .1*       .3*
*1              *    -7362.* *       .1*       .3*
*1              *    -7367.* *       .1*       .3*
*1              *    -7372.* *       .1*       .3*
*1              *    -7377.* *       .1*       .3*
*1              *    -7382.* *       .1*       .3*
*1              *    -7387.* *       .1*       .3*
*1              *    -7392.* *       .1*       .3*
*1              *    -7397.* *       .1*       .3*
*1              *    -7402.* *       .1*       .3*
*1              *    -7407.* *       .1*       .3*
*1              *    -7412.* *       .1*       .3*
*1              *    -7417.* *       .1*       .3*
*1              *    -7422.* *       .1*       .3*
*1              *    -7427.* *       .1*       .3*
*1              *    -7432.* *       .1*       .3*
*1              *    -7437.* *       .1*       .3*
*1              *    -7442.* *       .1*       .3*
*1              *    -7447.* *       .1*       .3*
*1              *    -7452.* *       .1*       .3*
*1              *    -7457.7 *       .1*       .3*
*1              *    -7500.  *       .1*       .3*
*1              *    -7527.7 *       .1*       .3*
*1              *    -7620.3 *       .1*       .3*
*1              *    -7791.  *       .1*       .3*
*1              *    -8229.8 *       .1*       .3*
*1              *    -8876.9 *       .1*       .3*
 1              *    -8972.0**       .1*       .3*
*1              *    -9067.1**       .1*       .3*
*1              *    -9162.3 *       .1*       .3*
*************************************************
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Profile Output Table - CHECKRAS

```
*****************************************************************************************************************
*****************************************************************************
* Reach       * River Sta   * Profile     *Froude # Chl *Top Wdth Act *Conv. Total *Prof Delta WS *Left Sta Eff
*Enc Sta L *Center Station *Enc Sta R *Rght Sta Eff *Min Ch El *Left Stagn *Right Stagn *
*           *             *            *            *          (ft) *      (cfs) *          (ft) *         (ft) *
(ft) *          (ft) *      (ft) *         (ft) *      (ft) *      (ft) *       (ft) *
*****************************************************************************************************************
*****************************************************************************
* 1           * 8           * PF 1         *         3.62 *       28.00 *    33832.2 *              *      -14.00 *
*         0.00 *             *       14.00 *  1726.25 *             *            *
* 1           * 7           * PF 1         *         3.55 *       26.41 *    33291.1 *              *      -13.21 *
*         0.00 *             *       13.21 *  1724.61 *             *            *
* 1           * 6           * PF 1         *         3.43 *       24.58 *    31849.3 *              *      -12.29 *
*         0.00 *             *       12.29 *  1721.70 *             *            *
* 1           * 5.5      Culvert #1  * PF 1         *             *            *              *
*         *                  *           *            *           *            *          *
* 1           * 5           * PF 1         *         3.43 *       24.58 *    37163.0 *              *      -12.29 *
*         0.00 *             *       12.29 *  1713.13 *             *            *
* 1           * 4           * PF 1         *         3.20 *       28.00 *    34974.2 *              *      -14.00 *
*         0.00 *             *       14.00 *  1712.32 *             *            *
* 1           * 3           * PF 1         *         4.02 *       34.00 *    28552.6 *              *      -17.00 *
*         0.00 *             *       17.00 *  1706.29 *             *            *
* 1           * 2.5         * PF 1         *         4.76 *       38.00 *    24199.1 *              *      -19.00 *
*         0.00 *             *       19.00 *  1699.95 *             *            *
* 1           * 2.25*       * PF 1         *         4.85 *       39.00 *    17196.7 *              *      -19.50 *
*         0.00 *             *       19.50 *  1698.29 *             *            *
* 1           * 2           * PF 1         *         4.90 *       40.00 *    13813.7 *              *      -20.00 *
*         0.00 *             *       20.00 *  1696.63 *             *            *
  1         * 1.75        * PF 1         *         4.42 *       40.00 *    16104.9 *              *      -20.00 *
*         0.00 *             *       20.00 *  1696.63 *             *            *
* 1           * 1.5         * PF 1         *         4.32 *       40.00 *    26814.5 *              *      -20.00 *
*         0.00 *             *       20.00 *  1697.20 *             *            *
* 1           * 1           * PF 1         *         4.19 *       40.00 *    27675.3 *              *      -20.00 *
*         0.00 *             *       20.00 *  1696.63 *             *            *
* 1           * -2.         * PF 1         *         3.72 *       40.23 *    17500.2 *              *      -24.00 *
*       -11.01 *             *       16.23 *  1697.00 *             *            *
* 1           * -4.5        * PF 1         *         1.41 *       35.36 *    46857.2 *              *      -14.94 *
```

* 1	* -8.	* PF 1	*	1.63 *	33.56 *	41477.3 *	*	*	-15.02 *
*	-4.62 *	*	18.54 *	1687.00 *	*	*			
* 1	* -10.5	* PF 1	*	1.15 *	33.55 *	57317.3 *	*	*	-17.58 *
*	-3.39 *	*	15.98 *	1683.00 *	*	*			
* 1	* -13.	* PF 1	*	1.48 *	40.26 *	46316.3 *	*	*	-15.05 *
*	1.63 *	*	25.20 *	1681.00 *	*	*			
* 1	* -16.	* PF 1	*	2.07 *	75.99 *	33105.8 *	*	*	-42.5
*	-8.01 *	*	33.02 *	1678.76 *	*	*			
* 1	* -17.	* PF 1	*	2.30 *	50.25 *	29620.9 *	*	*	-22.99 *
*	1.37 *	*	27.26 *	1669.15 *	*	*			
* 1	* -21.	* PF 1	*	1.38 *	84.50 *	51288.2 *	*	*	-43.66 *
*	-14.22 *	*	40.85 *	1666.00 *	*	*			
* 1	* -23.	* PF 1	*	1.39 *	89.63 *	50938.4 *	*	*	-38.78 *
*	1.74 *	*	50.85 *	1664.00 *	*	*			
* 1	* -24.	* PF 1	*	1.29 *	77.39 *	55759.1 *	*	*	-30.37 *
*	4.17 *	*	47.02 *	1661.00 *	*	*			
* 1	* -27.	* PF 1	*	1.65 *	115.85 *	40963.4 *	*	*	-62.94 *
*	-5.39 *	*	52.91 *	1659.00 *	*	*			
* 1	* -27.5	* PF 1	*	1.20 *	105.89 *	108581.5 *	*	*	-55.95 *
*	-4.73 *	*	49.94 *	1658.70 *	*	*			
* 1	* -28.	* PF 1	*	5.84 *	96.52 *	18981.5 *	*	*	-56.00 *
*	-5.01 *	*	40.52 *	1635.96 *	*	*			
* 1	* -28.5	* PF 1	*	8.50 *	98.12 *	12548.6 *	*	*	-57.27 *
*	-9.60 *	*	40.86 *	1611.00 *	*	*			
* 1	* -999.5	* PF 1	*	10.42 *	100.00 *	9967.0 *	*	*	0.00 *
*	50.00 *	*	100.00 *	1594.49 *	*	*			
* 1	* -1009.*	* PF 1	*	9.61 *	96.84 *	10927.4 *	*	*	0.00 *
*	48.42 *	*	96.84 *	1594.44 *	*	*			
* 1	* -1018.*	* PF 1	*	8.91 *	93.68 *	11912.0 *	*	*	0.00 *
*	46.84 *	*	93.68 *	1594.40 *	*	*			
* 1	* -1027.*	* PF 1	*	8.30 *	90.53 *	12918.5 *	*	*	0.00 *
*	45.27 *	*	90.53 *	1594.35 *	*	*			
* 1	* -1037.*	* PF 1	*	7.76 *	87.37 *	13951.7 *	*	*	0.00 *
*	43.69 *	*	87.37 *	1594.30 *	*	*			
* 1	* -1046.*	* PF 1	*	7.28 *	84.21 *	15022.5 *	*	*	0.00 *
*	42.11 *	*	84.21 *	1594.26 *	*	*			
* 1	* -1056.*	* PF 1	*	6.84 *	81.05 *	16121.1 *	*	*	0.00 *
*	40.53 *	*	81.05 *	1594.21 *	*	*			
* 1	* -1065.*	* PF 1	*	6.44 *	77.89 *	17258.4 *	*	*	0.00 *
*	38.95 *	*	77.89 *	1594.16 *	*	*			
* 1	* -1075.*	* PF 1	*	6.08 *	74.74 *	18432.4 *	*	*	0.
*	37.37 *	*	74.74 *	1594.12 *	*	*			
* 1	* -1084.*	* PF 1	*	5.75 *	71.58 *	19650.4 *	*	*	0.00 *
*	35.79 *	*	71.58 *	1594.07 *	*	*			
* 1	* -1094.*	* PF 1	*	5.44 *	68.42 *	20925.5 *	*	*	0.00 *
*	34.21 *	*	68.42 *	1594.02 *	*	*			
* 1	* -1103.*	* PF 1	*	5.15 *	65.26 *	22252.7 *	*	*	0.00 *
*	32.63 *	*	65.26 *	1593.97 *	*	*			
* 1	* -1113.*	* PF 1	*	4.88 *	62.11 *	23646.7 *	*	*	0.00 *
*	31.06 *	*	62.11 *	1593.93 *	*	*			
* 1	* -1122.*	* PF 1	*	4.62 *	58.95 *	25125.6 *	*	*	0.00 *
*	29.48 *	*	58.95 *	1593.88 *	*	*			
* 1	* -1132.*	* PF 1	*	4.38 *	55.79 *	26686.1 *	*	*	0.00 *
*	27.90 *	*	55.79 *	1593.83 *	*	*			
* 1	* -1141.*	* PF 1	*	4.14 *	52.63 *	28354.8 *	*	*	0.00 *
*	26.32 *	*	52.63 *	1593.79 *	*	*			
* 1	* -1151.*	* PF 1	*	3.91 *	49.47 *	30147.6 *	*	*	0.00 *
*	24.74 *	*	49.47 *	1593.74 *	*	*			
* 1	* -1160.*	* PF 1	*	3.68 *	46.32 *	32086.3 *	*	*	0.00 *
*	23.16 *	*	46.32 *	1593.69 *	*	*			
* 1	* -1170.*	* PF 1	*	3.45 *	43.16 *	34228.4 *	*	*	0.00 *
*	21.58 *	*	43.16 *	1593.65 *	*	*			
* 1	* -1179.5	* PF 1	*	3.23 *	40.00 *	36581.3 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1593.60 *	*	*			
* 1	* -1204.4	* PF 1	*	3.12 *	40.00 *	37815.2 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1593.48 *	*	*			
* 1	* -1299.8	* PF 1	*	2.79 *	40.00 *	42493.0 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1593.00 *	*	*			
* 1	* -1320.	* PF 1	*	2.74 *	40.00 *	43511.0 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1592.80 *	*	*			
* 1	* -1500.	* PF 1	*	2.45 *	40.00 *	48744.3 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1591.00 *	*	*			
* 1	* -1729.8	* PF 1	*	2.23 *	40.00 *	53738.6 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1588.71 *	*	*			
* 1	* -1800.	* PF 1	*	2.14 *	40.00 *	56052.7 *	*	*	0.
*	20.00 *	*	40.00 *	1588.20 *	*	*			
* 1	* -1908.1	* PF 1	*	2.14 *	40.00 *	55983.8 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1586.92 *	*	*			
* 1	* -2000.	* PF 1	*	2.05 *	40.00 *	58346.4 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1586.20 *	*	*			
* 1	* -2200.	* PF 1	*	2.06 *	40.00 *	58146.2 *	*	*	0.00 *
*	20.00 *	*	40.00 *	1584.00 *	*	*			
* 1	* -2347.4	* PF 1	*	2.08 *	41.00 *	57699.3 *	*	*	0.00 *

| | | |

1	-3900.	PF 1	2.12	40.00	57944.3		0.00		
	20.00		40.00	1565.35					
1	-3950.	PF 1	2.15	40.00	57158.1		0.00		
	20.00		40.00	1564.57					
1	-4000.	PF 1	2.18	40.00	56494.6		0.00		
	20.00		40.00	1563.80					
1	-4950.	PF 1	2.44	40.00	50297.1		0.6		
	20.00		40.00	1549.04					
1	-4997.7	PF 1	2.44	40.00	50238.9		0.00		
	20.00		40.00	1548.29					
1	-5000.	PF 1	2.45	40.00	50166.7		0.00		
	20.00		40.00	1548.23					
1	-5450.	PF 1	3.03	40.00	40389.5		0.00		
	20.00		40.00	1534.99					
1	-5489.1	PF 1	3.06	40.00	39906.0		0.00		
	20.00		40.00	1533.83					
1	-5500.	PF 1	3.06	40.00	39818.5		0.00		
	20.00		40.00	1533.51					
1	-5550.	PF 1	3.09	40.00	39450.9		0.00		
	20.00		40.00	1532.04					
1	-5595.6	PF 1	3.11	40.00	39162.8		0.00		
	20.00		40.00	1530.70					
1	-5600.	PF 1	3.11	40.00	39244.6		0.00		
	20.00		40.00	1530.64					
1	-5650.	PF 1	3.00	40.00	40690.5		0.00		
	20.00		40.00	1530.00					
1	-5700.	PF 1	2.90	40.00	42266.5		0.00		
	20.00		40.00	1529.35					
1	-5750.	PF 1	2.82	40.00	43522.7		0.00		
	20.00		40.00	1528.70					
1	-5800.	PF 1	2.75	40.00	44716.7		0.00		
	20.00		40.00	1528.06					
1	-5850.	PF 1	2.68	40.00	45781.9		0.00		
	20.00		40.00	1527.41					
1	-5900.	PF 1	2.63	40.00	46756.3		0.00		
	20.00		40.00	1526.76					
1	-5950.	PF 1	2.58	40.00	47709.3		0.00		
	20.00		40.00	1526.12					
1	-5954.9	PF 1	2.58	40.00	47767.5		0.00		
	20.00		40.00	1526.05					
1	-6000.	PF 1	2.54	40.00	48517.5		0.		
	20.00		40.00	1525.47					
1	-6300.	PF 1	2.37	40.00	52007.0		0.00		
	20.00		40.00	1521.59					
1	-6347.7	PF 1	2.36	40.00	52295.7		0.00		
	20.00		40.00	1520.97					
1	-6350.	PF 1	2.35	40.00	52406.0		0.00		
	20.00		40.00	1520.96					
1	-6400.	PF 1	2.24	40.00	55173.8		0.00		
	20.00		40.00	1520.76					
1	-6600.	PF 1	1.87	40.00	66188.7		0.00		
	20.00		40.00	1519.96					
1	-6633.3	PF 1	1.82	40.00	68090.6		0.00		
	20.00		40.00	1519.83					
1	-6650.	PF 1	1.79	40.00	68975.1		0.00		
	20.00		40.00	1519.76					
1	-6700.	PF 1	1.72	40.00	71736.4		0.00		
	20.00		40.00	1519.56					
1	-6750.	PF 1	1.66	40.00	74481.9		0.00		
	20.00		40.00	1519.36					
1	-6800.	PF 1	1.60	40.00	77197.3		0.00		
	20.00		40.00	1519.16					
1	-6850.	PF 1	1.55	40.00	79868.6		0.00		
	20.00		40.00	1518.96					
1	-6900.	PF 1	1.50	40.00	82480.3		0.00		
	20.00		40.00	1518.76					
1	-6950.	PF 1	1.46	40.00	85010.8		0.00		
	20.00		40.00	1518.56					
1	-7000.	PF 1	1.41	40.00	87436.7		0.00		
	20.00		40.00	1518.36					
1	-7050.	PF 1	1.38	40.00	89717.9		0.00		
	20.00		40.00	1518.16					
1	-7063.9	PF 1	1.19	40.00	103983.3		0.00		
	20.00		40.00	1518.11					
1	-7100.	PF 1	1.21	40.00	102243.8		0.		
	20.00		40.00	1517.96					
1	-7250.	PF 1	1.22	40.00	100938.6		0.00		
	20.00		40.00	1517.36					
1	-7297.7	PF 1	1.22	40.00	101134.0		0.00		
	20.00		40.00	1517.17					
1	-7302.*	PF 1	1.39	42.50	89799.3		1.56		
	22.81		44.06	1517.15					
1	-7307.*	PF 1	1.52	45.00	82695.2		3.12		

* 1	* -7312.*	* PF 1	*	1.64 *	47.50 *	77454.0 *	*	4.69 *
*	28.44 *	*	52.19 *	1517.11 *	*	*		
* 1	* -7317.*	* PF 1	*	1.73 *	50.00 *	73345.3 *	*	6.25 *
*	31.25 *	*	56.25 *	1517.09 *	*	*		
* 1	* -7322.*	* PF 1	*	1.82 *	52.50 *	69919.7 *	*	7.81 *
*	34.06 *	*	60.31 *	1517.07 *	*	*		
* 1	* -7327.*	* PF 1	*	1.90 *	55.00 *	66997.3 *	*	9.38 *
*	36.88 *	*	64.38 *	1517.05 *	*	*		
* 1	* -7332.*	* PF 1	*	1.98 *	57.50 *	64405.0 *	*	10.94 *
*	39.69 *	*	68.44 *	1517.03 *	*	*		
* 1	* -7337.*	* PF 1	*	2.05 *	60.00 *	62148.0 *	*	12.50 *
*	42.50 *	*	72.50 *	1517.01 *	*	*		
* 1	* -7342.*	* PF 1	*	2.12 *	62.50 *	60100.1 *	*	14.06 *
*	45.31 *	*	76.56 *	1516.99 *	*	*		
* 1	* -7347.*	* PF 1	*	2.18 *	65.00 *	58290.7 *	*	15.62 *
*	48.12 *	*	80.62 *	1516.97 *	*	*		
* 1	* -7352.*	* PF 1	*	2.24 *	67.50 *	56624.7 *	*	17.19 *
*	50.94 *	*	84.69 *	1516.95 *	*	*		
* 1	* -7357.*	* PF 1	*	2.30 *	70.00 *	55139.2 *	*	18.75 *
*	53.75 *	*	88.75 *	1516.93 *	*	*		
* 1	* -7362.*	* PF 1	*	2.35 *	72.50 *	53783.4 *	*	20.31 *
*	56.56 *	*	92.81 *	1516.91 *	*	*		
* 1	* -7367.*	* PF 1	*	2.41 *	75.00 *	52513.6 *	*	21.88 *
*	59.38 *	*	96.88 *	1516.89 *	*	*		
* 1	* -7372.*	* PF 1	*	2.45 *	77.50 *	51373.3 *	*	23.44 *
*	62.19 *	*	100.94 *	1516.87 *	*	*		
* 1	* -7377.*	* PF 1	*	2.50 *	80.00 *	50295.3 *	*	25.00 *
*	65.00 *	*	105.00 *	1516.85 *	*	*		
* 1	* -7382.*	* PF 1	*	2.54 *	82.50 *	49303.4 *	*	26.56 *
*	67.81 *	*	109.06 *	1516.83 *	*	*		
* 1	* -7387.*	* PF 1	*	2.59 *	85.00 *	48371.7 *	*	28.12 *
*	70.62 *	*	113.12 *	1516.81 *	*	*		
* 1	* -7392.*	* PF 1	*	2.63 *	87.50 *	47495.9 *	*	29.69 *
*	73.44 *	*	117.19 *	1516.79 *	*	*		
* 1	* -7397.*	* PF 1	*	2.66 *	90.00 *	46810.1 *	*	31.25 *
*	76.25 *	*	121.25 *	1516.77 *	*	*		
* 1	* -7402.*	* PF 1	*	2.69 *	92.50 *	46159.2 *	*	32.81 *
*	79.06 *	*	125.31 *	1516.75 *	*	*		
* 1	* -7407.*	* PF 1	*	2.72 *	95.00 *	45568.1 *	*	34.38 *
*	81.88 *	*	129.38 *	1516.73 *	*	*		
* 1	* -7412.*	* PF 1	*	2.75 *	97.50 *	45007.6 *	*	35.94 *
*	84.69 *	*	133.44 *	1516.71 *	*	*		
* 1	* -7417.*	* PF 1	*	2.77 *	100.00 *	44534.4 *	*	37.50 *
*	87.50 *	*	137.50 *	1516.69 *	*	*		
* 1	* -7422.*	* PF 1	*	2.79 *	102.50 *	44084.6 *	*	39.06 *
*	90.31 *	*	141.56 *	1516.67 *	*	*		
* 1	* -7427.*	* PF 1	*	2.81 *	105.00 *	43703.4 *	*	40.62 *
*	93.12 *	*	145.62 *	1516.65 *	*	*		
* 1	* -7432.*	* PF 1	*	2.83 *	107.50 *	43338.6 *	*	42.19 *
*	95.94 *	*	149.69 *	1516.63 *	*	*		
* 1	* -7437.*	* PF 1	*	2.84 *	110.00 *	43040.4 *	*	43.75 *
*	98.75 *	*	153.75 *	1516.61 *	*	*		
* 1	* -7442.*	* PF 1	*	2.86 *	112.50 *	42749.1 *	*	45.31 *
*	101.56 *	*	157.81 *	1516.59 *	*	*		
* 1	* -7447.*	* PF 1	*	2.87 *	115.00 *	42487.9 *	*	46.88 *
*	104.38 *	*	161.88 *	1516.57 *	*	*		
* 1	* -7452.*	* PF 1	*	2.88 *	117.50 *	42234.6 *	*	48.44 *
*	107.19 *	*	165.94 *	1516.55 *	*	*		
* 1	* -7457.7	* PF 1	*	2.84 *	120.00 *	16276.0 *	*	50.00 *
*	110.00 *	*	170.00 *	1516.53 *	*	*		
* 1	* -7500.	* PF 1	*	1.44 *	120.00 *	34082.3 *	*	50.00 *
*	110.00 *	*	170.00 *	1516.36 *	*	*		
* 1	* -7527.7	* PF 1	*	1.04 *	151.64 *	49153.6 *	*	32.43 *
*	110.37 *	*	184.07 *	1516.07 *	*	*		
* 1	* -7620.3	* PF 1	*	0.54 *	170.67 *	99756.1 *	*	30.65 *
*	112.35 *	*	201.31 *	1514.26 *	*	*		
* 1	* -7791.	* PF 1	*	0.48 *	189.28 *	111701.4 *	*	16.45 *
*	110.74 *	*	205.73 *	1514.00 *	*	*		
* 1	* -8229.8	* PF 1	*	0.59 *	172.37 *	89443.4 *	*	32.43 *
*	115.31 *	*	204.80 *	1511.92 *	*	*		
* 1	* -8876.9	* PF 1	*	0.49 *	171.30 *	110771.9 *	*	62.52 *
*	129.58 *	*	233.82 *	1509.11 *	*	*		
* 1	* -8972.0*	* PF 1	*	0.52 *	169.00 *	102948.4 *	*	63.72 *
*	129.58 *	*	232.72 *	1508.98 *	*	*		
* 1	* -9067.1*	* PF 1	*	0.58 *	165.65 *	92062.9 *	*	65.47 *
*	129.58 *	*	231.12 *	1508.85 *	*	*		
* 1	* -9162.3	* PF 1	*	1.01 *	150.78 *	50535.4 *	*	73.23 *
*	129.58 *	*	224.01 *	1508.72 *	*	*		

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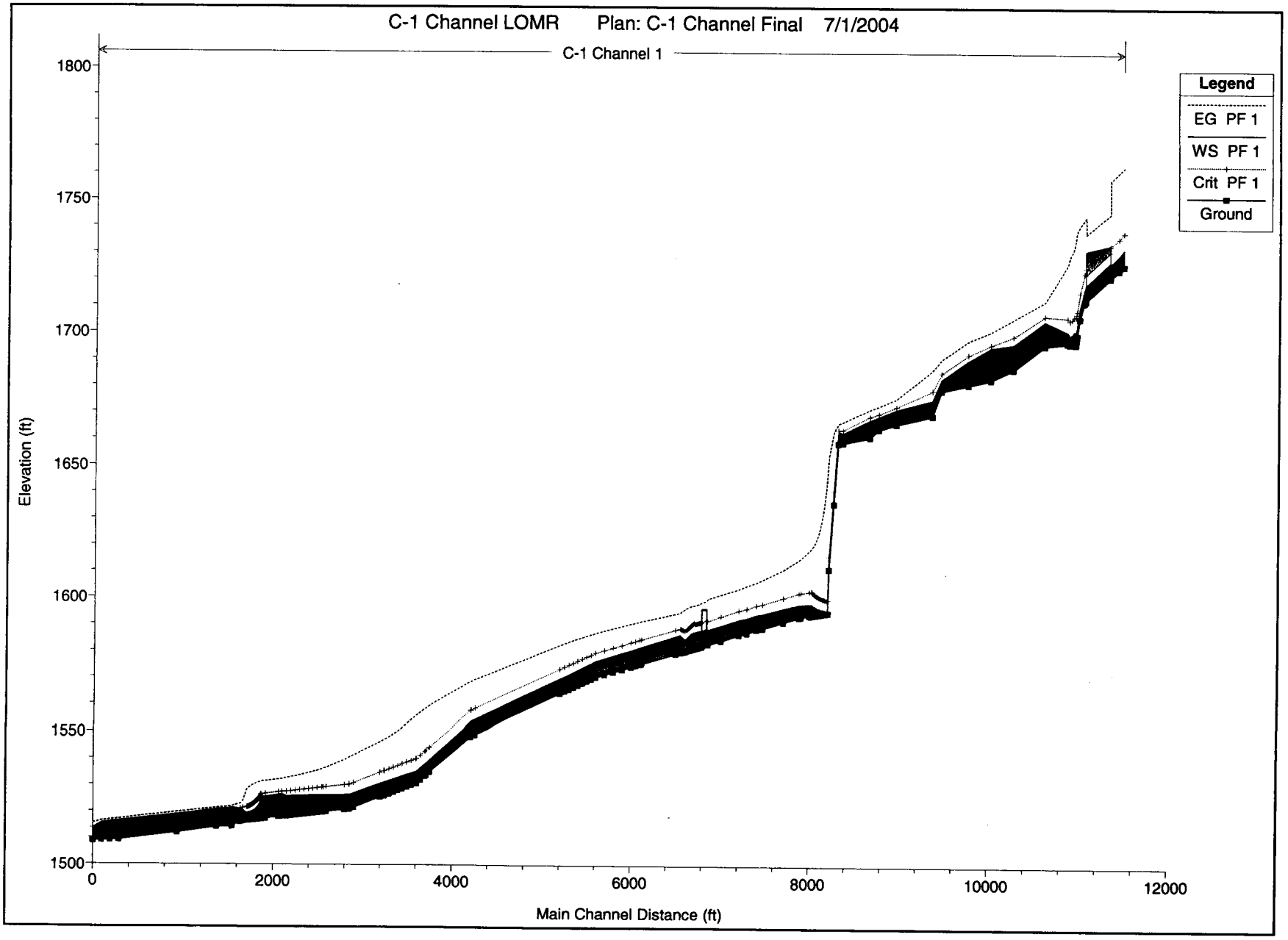

C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
C-1 Channel 1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
1800
1750
1700
1650
1600
1550
1500
0
2000
4000
6000
8000
10000
12000
Main Channel Distance (ft)

HEC-RAS Plan: C-1 Final River: C-1 Channel Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
1	8	PF 1	6019.00	1726.25	1732.63	1738.82	1763.95	44.91	134.02	28.00	3.62
1	7	PF 1	6019.00	1724.61	1730.34	1736.85	1762.13	45.24	133.04	26.41	3.55
1	6	PF 1	6019.00	1721.70	1727.11	1734.00	1758.90	45.25	133.03	24.58	3.43
1	5.5		Culvert								
1	5	PF 1	6019.00	1713.13	1719.15	1725.41	1744.86	40.69	147.91	24.58	3.43
1	4	PF 1	6019.00	1712.32	1717.51	1723.58	1744.15	41.42	145.33	28.00	3.20
1	3	PF 1	6019.00	1706.29	1710.21	1716.17	1741.92	45.19	133.19	34.00	4.02
1	2.5	PF 1	6019.00	1699.95	1703.20	1709.15	1740.01	48.69	123.63	38.00	4.76
1	2.25*	PF 1	6019.00	1698.29	1702.25	1708.13	1739.38	48.91	123.08	39.00	4.85
1	2	PF 1	6019.00	1696.63	1701.27	1707.08	1738.31	48.84	123.24	40.00	4.90
1	1.75	PF 1	6019.00	1696.63	1701.69	1707.26	1733.97	45.60	132.01	40.00	4.42
1	1.5	PF 1	6019.00	1697.20	1700.55	1706.08	1731.87	44.91	134.03	40.00	4.32
1	1	PF 1	6019.00	1696.63	1700.05	1705.51	1730.13	44.01	136.76	40.00	4.19
1	-2.	PF 1	6019.00	1697.00	1701.37	1706.60	1726.92	40.57	148.38	40.23	3.72
1	-4.5	PF 1	6019.00	1696.00	1705.14	1707.26	1712.80	22.20	271.10	35.36	1.41
1	-8.	PF 1	6019.00	1687.00	1696.50	1699.50	1706.10	24.86	242.15	33.56	1.63
1	-10.5	PF 1	6019.00	1683.00	1695.27	1696.29	1701.33	19.75	304.80	33.55	1.15
1	-13.	PF 1	6019.00	1681.00	1690.38	1692.51	1697.82	21.89	274.93	40.26	1.48
1	-16.	PF 1	6019.00	1678.76	1683.27	1685.56	1690.91	22.18	271.42	75.99	2.07
1	-17.	PF 1	6019.00	1669.15	1675.21	1678.78	1686.83	27.36	220.01	50.25	2.30
1	-21.	PF 1	6019.00	1666.00	1671.58	1672.67	1675.73	16.36	367.95	84.50	1.38
1	-23.	PF 1	6019.00	1664.00	1668.91	1669.98	1672.92	16.07	374.56	89.63	1.39
1	-24.	PF 1	6019.00	1661.00	1667.62	1668.91	1671.64	16.09	373.97	77.39	1.29
1	-27.	PF 1	6019.00	1659.00	1662.70	1663.97	1666.97	16.59	362.87	115.85	1.65
1	-27.5	PF 1	6019.00	1658.70	1663.30	1663.84	1666.25	13.78	436.67	105.89	1.20
1	-28.	PF 1	6019.00	1635.96	1637.49	1640.89	1663.50	40.93	147.06	96.52	5.84
1	-28.5	PF 1	6019.00	1611.00	1612.18	1615.88	1654.58	52.26	115.18	98.12	8.50
1	-999.5	PF 1	6019.00	1594.49	1595.51	1599.31	1650.47	59.49	101.17	100.00	10.42
1	-1009.*	PF 1	6019.00	1594.44	1595.55	1599.37	1645.96	56.98	105.64	96.84	9.61
1	-1018.*	PF 1	6019.00	1594.40	1595.60	1599.46	1642.19	54.78	109.88	93.68	8.91
1	-1027.*	PF 1	6019.00	1594.35	1595.64	1599.54	1639.00	52.84	113.90	90.53	8.30
1	-1037.*	PF 1	6019.00	1594.30	1595.69	1599.62	1636.28	51.13	117.73	87.37	7.76
1	-1046.*	PF 1	6019.00	1594.26	1595.76	1599.72	1633.92	49.57	121.42	84.21	7.28
1	-1056.*	PF 1	6019.00	1594.21	1595.82	1599.83	1631.87	48.19	124.91	81.05	6.84
1	-1065.*	PF 1	6019.00	1594.16	1595.89	1599.94	1630.08	46.93	128.26	77.89	6.44
1	-1075.*	PF 1	6019.00	1594.12	1595.96	1600.06	1628.51	45.78	131.47	74.74	6.08

HEC-RAS Plan: C-1 Final River: C-1 Channel Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
1	-1084.*	PF 1	6019.00	1594.07	1596.05	1600.18	1627.12	44.74	134.54	71.58	5.75
1	-1094.*	PF 1	6019.00	1594.02	1596.14	1600.33	1625.89	43.77	137.51	68.42	5.44
1	-1103.*	PF 1	6019.00	1593.97	1596.24	1600.51	1624.80	42.88	140.36	65.26	5.15
1	-1113.*	PF 1	6019.00	1593.93	1596.36	1600.68	1623.81	42.05	143.14	62.11	4.88
1	-1122.*	PF 1	6019.00	1593.88	1596.50	1600.88	1622.93	41.26	145.87	58.95	4.62
1	-1132.*	PF 1	6019.00	1593.83	1596.64	1601.10	1622.14	40.52	148.54	55.79	4.38
1	-1141.*	PF 1	6019.00	1593.79	1596.82	1601.35	1621.43	39.81	151.21	52.63	4.14
1	-1151.*	PF 1	6019.00	1593.74	1597.02	1601.63	1620.77	39.11	153.91	49.47	3.91
1	-1160.*	PF 1	6019.00	1593.69	1597.25	1601.93	1620.16	38.41	156.70	46.32	3.68
1	-1170.*	PF 1	6019.00	1593.65	1597.54	1602.29	1619.60	37.69	159.71	43.16	3.45
1	-1179.5	PF 1	6019.00	1593.60	1597.87	1602.69	1619.06	36.94	162.94	40.00	3.23
1	-1204.4	PF 1	6019.00	1593.48	1597.84	1602.57	1618.14	36.16	166.46	40.00	3.12
1	-1299.8	PF 1	6019.00	1593.00	1597.69	1602.10	1615.15	33.53	179.49	40.00	2.79
1	-1320.	PF 1	6045.00	1592.80	1597.56	1601.92	1614.64	33.17	182.27	40.00	2.74
1	-1500.	PF 1	6045.00	1591.00	1596.11	1600.11	1610.84	30.81	196.23	40.00	2.45
1	-1729.8	PF 1	6045.00	1588.71	1594.14	1597.82	1607.11	28.90	209.14	40.00	2.23
1	-1800.	PF 1	6045.00	1588.20	1593.78	1597.31	1606.05	28.12	215.00	40.00	2.14
1	-1908.1	PF 1	6045.00	1586.92	1592.49	1596.03	1604.79	28.14	214.83	40.00	2.14
1	-2000.	PF 1	6045.00	1586.20	1591.92	1595.31	1603.56	27.39	220.74	40.00	2.05
1	-2200.	PF 1	6045.00	1584.00	1589.71	1593.11	1601.40	27.45	220.24	40.00	2.06
1	-2347.4	PF 1	6045.00	1582.53	1588.11	1591.48	1599.78	27.42	220.49	41.00	2.08
1	-2359.4		Bridge								
1	-2424.4	PF 1	6045.00	1581.76	1587.61	1590.74	1598.21	26.13	231.37	41.00	1.94
1	-2430.6	PF 1	6045.00	1581.70	1587.84	1590.80	1597.88	25.43	237.73	40.00	1.84
1	-2440.*	PF 1	6045.00	1581.60	1587.74	1590.71	1597.80	25.46	237.47	40.00	1.84
1	-2449.*	PF 1	6045.00	1581.51	1587.64	1590.62	1597.73	25.48	237.20	40.00	1.84
1	-2458.*	PF 1	6045.00	1581.42	1587.54	1590.53	1597.65	25.51	236.94	40.00	1.85
1	-2468.*	PF 1	6045.00	1581.32	1587.44	1590.43	1597.57	25.54	236.67	40.00	1.85
1	-2477.*	PF 1	6045.00	1581.23	1587.34	1590.34	1597.49	25.57	236.43	40.00	1.85
1	-2486.*	PF 1	6045.00	1581.13	1587.23	1590.24	1597.41	25.60	236.17	40.00	1.86
1	-2496.*	PF 1	6045.00	1581.04	1587.14	1590.81	1597.33	25.62	235.94	40.00	1.86
1	-2505.*	PF 1	6045.00	1580.95	1587.04	1590.51	1597.26	25.64	235.73	40.00	1.86
1	-2515.*	PF 1	6045.00	1580.85	1586.94	1590.21	1597.17	25.67	235.48	40.00	1.86
1	-2524.*	PF 1	6045.00	1580.76	1586.84	1589.88	1597.09	25.69	235.28	40.00	1.87
1	-2533.*	PF 1	6045.00	1580.66	1586.61	1589.56	1596.98	25.84	233.92	52.83	2.16
1	-2543.*	PF 1	6045.00	1580.57	1586.27	1589.26	1596.85	26.10	231.59	52.83	2.20

HEC-RAS Plan: C-1 Final River: C-1 Channel Reach: 1 Profile: PF 1 (Continued)

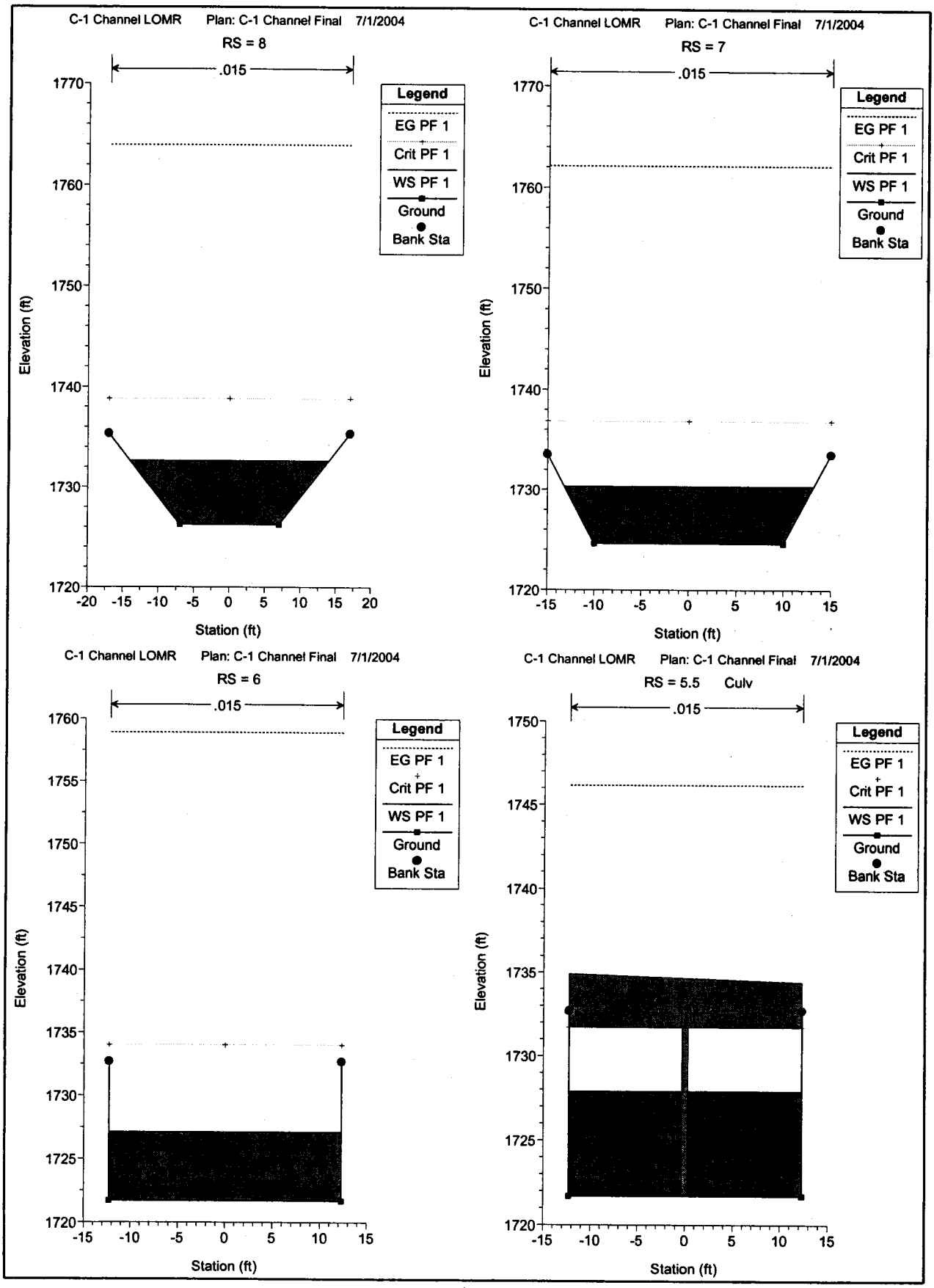
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
1	-2552.*	PF 1	6045.00	1580.48	1585.92	1588.96	1596.71	26.35	229.37	52.83	2.23
1	-2562.*	PF 1	6045.00	1580.38	1585.57	1588.65	1596.56	26.61	227.18	52.83	2.26
1	-2571.*	PF 1	6045.00	1580.29	1585.23	1588.34	1596.42	26.85	225.18	52.83	2.29
1	-2580.*	PF 1	6045.00	1580.19	1584.88	1588.04	1596.27	27.09	223.19	52.83	2.32
1	-2590.2	PF 1	6045.00	1580.10	1584.54	1587.73	1596.12	27.30	221.39	52.83	2.35
1	-2599.*	PF 1	6045.00	1580.01	1584.66	1587.83	1595.90	26.91	224.61	51.00	2.26
1	-2607.*	PF 1	6045.00	1579.93	1584.81	1587.93	1595.69	26.47	228.35	49.16	2.16
1	-2616.*	PF 1	6045.00	1579.84	1584.98	1588.03	1595.48	26.01	232.43	47.33	2.07
1	-2625.*	PF 1	6045.00	1579.75	1585.18	1588.15	1595.27	25.48	237.22	45.50	1.97
1	-2634.*	PF 1	6045.00	1579.66	1585.44	1588.28	1595.04	24.87	243.05	43.67	1.86
1	-2642.*	PF 1	6045.00	1579.58	1585.78	1588.44	1594.80	24.10	250.87	41.83	1.73
1	-2651.6	PF 1	6045.00	1579.49	1586.23	1588.60	1594.52	23.10	261.66	40.00	1.59
1	-2704.6	PF 1	6045.00	1578.96	1585.60	1588.07	1594.15	23.46	257.72	40.00	1.63
1	-3084.2	PF 1	6208.00	1575.16	1581.57	1584.43	1591.26	24.98	248.53	40.00	1.77
1	-3104.4	PF 1	6208.00	1574.96	1581.36	1584.23	1591.10	25.04	247.88	40.00	1.77
1	-3154.4	PF 1	6208.00	1574.46	1580.82	1583.73	1590.68	25.19	246.42	40.00	1.79
1	-3204.4	PF 1	6208.00	1573.96	1580.29	1583.23	1590.25	25.33	245.08	40.00	1.80
1	-3304.4	PF 1	6208.00	1572.96	1579.23	1582.23	1589.39	25.59	242.61	40.00	1.83
1	-3404.4	PF 1	6208.00	1571.96	1578.17	1581.23	1588.52	25.82	240.48	40.00	1.86
1	-3500.	PF 1	6208.00	1571.00	1577.17	1580.27	1587.67	26.00	238.79	40.00	1.88
1	-3600.	PF 1	6208.00	1570.00	1576.14	1579.27	1586.75	26.14	237.52	40.00	1.89
1	-3650.	PF 1	6208.00	1569.23	1575.14	1578.41	1586.22	26.71	232.39	40.00	1.95
1	-3700.	PF 1	6208.00	1568.46	1574.42	1577.73	1585.71	26.97	230.21	40.00	1.98
1	-3750.	PF 1	6208.00	1567.68	1573.56	1576.95	1585.16	27.34	227.07	40.00	2.02
1	-3800.	PF 1	6208.00	1566.90	1572.71	1576.17	1584.60	27.68	224.30	40.00	2.06
1	-3850.	PF 1	6208.00	1566.13	1571.88	1575.40	1584.03	27.97	221.94	40.00	2.09
1	-3900.	PF 1	6208.00	1565.35	1571.04	1574.62	1583.44	28.25	219.74	40.00	2.12
1	-3950.	PF 1	6208.00	1564.57	1570.21	1573.84	1582.83	28.51	217.78	40.00	2.15
1	-4000.	PF 1	6208.00	1563.80	1569.40	1573.07	1582.22	28.73	216.11	40.00	2.18
1	-4950.	PF 1	6208.00	1549.04	1554.25	1558.31	1569.17	31.00	200.29	40.00	2.44
1	-4997.7	PF 1	6208.00	1548.29	1553.49	1557.56	1568.43	31.02	200.14	40.00	2.44
1	-5000.	PF 1	6208.00	1548.23	1553.43	1557.50	1568.40	31.05	199.95	40.00	2.45
1	-5450.	PF 1	6208.00	1534.99	1539.58	1544.29	1559.45	35.77	173.54	40.00	3.03
1	-5489.1	PF 1	6208.00	1533.83	1538.34	1543.10	1558.49	36.02	172.34	40.00	3.06
1	-5500.	PF 1	6208.00	1533.51	1538.01	1542.78	1558.22	36.07	172.10	40.00	3.06
1	-5550.	PF 1	6208.00	1532.04	1536.52	1541.31	1556.97	36.29	171.07	40.00	3.09

HEC-RAS Plan: C-1 Final River: C-1 Channel Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
1	-5595.6	PF 1	6208.00	1530.70	1535.16	1539.97	1555.80	36.46	170.26	40.00	3.11
1	-5600.	PF 1	6208.00	1530.64	1535.10	1539.92	1555.69	36.41	170.49	40.00	3.11
1	-5650.	PF 1	6208.00	1530.00	1534.56	1539.28	1554.21	35.57	174.52	40.00	3.00
1	-5700.	PF 1	6228.00	1529.35	1534.02	1538.65	1552.85	34.82	178.87	40.00	2.90
1	-5750.	PF 1	6228.00	1528.70	1533.46	1537.99	1551.58	34.16	182.30	40.00	2.82
1	-5800.	PF 1	6228.00	1528.06	1532.90	1537.35	1550.40	33.57	185.53	40.00	2.75
1	-5850.	PF 1	6228.00	1527.41	1532.32	1536.70	1549.29	33.06	188.39	40.00	2.68
1	-5900.	PF 1	6228.00	1526.76	1531.74	1536.05	1548.25	32.61	190.98	40.00	2.63
1	-5950.	PF 1	6228.00	1526.12	1531.16	1535.41	1547.24	32.18	193.51	40.00	2.58
1	-5954.9	PF 1	6228.00	1526.05	1531.09	1535.34	1547.15	32.16	193.66	40.00	2.58
1	-6000.	PF 1	6228.00	1525.47	1530.56	1534.76	1546.30	31.83	195.64	40.00	2.54
1	-6300.	PF 1	6228.00	1521.59	1526.91	1530.88	1541.28	30.42	204.71	40.00	2.37
1	-6347.7	PF 1	6228.00	1520.97	1526.31	1530.26	1540.58	30.31	205.45	40.00	2.36
1	-6350.	PF 1	6228.00	1520.96	1526.30	1530.25	1540.53	30.27	205.73	40.00	2.35
1	-6400.	PF 1	6228.00	1520.76	1526.28	1530.05	1539.58	29.27	212.79	40.00	2.24
1	-6600.	PF 1	6228.00	1519.96	1526.16	1529.25	1536.62	25.96	239.88	40.00	1.87
1	-6633.3	PF 1	6228.00	1519.83	1526.14	1529.12	1536.22	25.48	244.42	40.00	1.82
1	-6650.	PF 1	6228.00	1519.76	1526.12	1529.05	1536.03	25.26	246.52	40.00	1.79
1	-6700.	PF 1	6228.00	1519.56	1526.09	1528.85	1535.49	24.61	253.03	40.00	1.72
1	-6750.	PF 1	6228.00	1519.36	1526.05	1528.65	1535.00	24.01	259.43	40.00	1.66
1	-6800.	PF 1	6228.00	1519.16	1526.00	1528.45	1534.53	23.44	265.69	40.00	1.60
1	-6850.	PF 1	6228.00	1518.96	1525.96	1528.25	1534.11	22.91	271.79	40.00	1.55
1	-6900.	PF 1	6228.00	1518.76	1525.90	1528.05	1533.71	22.43	277.71	40.00	1.50
1	-6950.	PF 1	6228.00	1518.56	1525.85	1527.85	1533.34	21.98	283.39	40.00	1.46
1	-7000.	PF 1	6228.00	1518.36	1525.78	1527.65	1533.00	21.57	288.79	40.00	1.41
1	-7050.	PF 1	6228.00	1518.16	1525.71	1527.45	1532.68	21.20	293.84	40.00	1.38
1	-7063.9	PF 1	6228.00	1518.11	1526.45	1527.40	1532.17	19.19	324.52	40.00	1.19
1	-7100.	PF 1	6228.00	1517.96	1526.18	1527.25	1532.03	19.40	320.95	40.00	1.21
1	-7250.	PF 1	6228.00	1517.36	1525.51	1526.65	1531.46	19.57	318.17	40.00	1.22
1	-7297.7	PF 1	6228.00	1517.17	1525.34	1526.47	1531.27	19.55	318.59	40.00	1.22
1	-7302.*	PF 1	6228.00	1517.15	1524.37	1526.09	1531.16	20.91	297.87	42.50	1.39
1	-7307.*	PF 1	6228.00	1517.13	1523.71	1525.76	1531.08	21.79	285.82	45.00	1.52
1	-7312.*	PF 1	6228.00	1517.11	1523.19	1525.45	1531.01	22.44	277.60	47.50	1.64
1	-7317.*	PF 1	6228.00	1517.09	1522.77	1525.18	1530.93	22.93	271.66	50.00	1.73
1	-7322.*	PF 1	6228.00	1517.07	1522.42	1524.91	1530.86	23.32	267.08	52.50	1.82
1	-7327.*	PF 1	6228.00	1517.05	1522.12	1524.68	1530.79	23.64	263.44	55.00	1.90

HEC-RAS Plan: C-1 Final River: C-1 Channel Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
1	-7332.*	PF 1	6228.00	1517.03	1521.84	1524.45	1530.73	23.92	260.39	57.50	1.98
1	-7337.*	PF 1	6228.00	1517.01	1521.61	1524.25	1530.66	24.14	257.96	60.00	2.05
1	-7342.*	PF 1	6228.00	1516.99	1521.39	1524.05	1530.59	24.34	255.87	62.50	2.12
1	-7347.*	PF 1	6228.00	1516.97	1521.21	1523.87	1530.53	24.50	254.21	65.00	2.18
1	-7352.*	PF 1	6228.00	1516.95	1521.03	1523.70	1530.46	24.64	252.77	67.50	2.24
1	-7357.*	PF 1	6228.00	1516.93	1520.88	1523.54	1530.39	24.75	251.66	70.00	2.30
1	-7362.*	PF 1	6228.00	1516.91	1520.73	1523.39	1530.31	24.84	250.75	72.50	2.35
1	-7367.*	PF 1	6228.00	1516.89	1520.60	1523.23	1530.24	24.92	249.96	75.00	2.41
1	-7372.*	PF 1	6228.00	1516.87	1520.48	1523.11	1530.16	24.97	249.40	77.50	2.45
1	-7377.*	PF 1	6228.00	1516.85	1520.36	1522.96	1530.08	25.02	248.91	80.00	2.50
1	-7382.*	PF 1	6228.00	1516.83	1520.25	1522.83	1530.00	25.06	248.56	82.50	2.54
1	-7387.*	PF 1	6228.00	1516.81	1520.16	1522.72	1529.93	25.09	248.27	85.00	2.59
1	-7392.*	PF 1	6228.00	1516.79	1520.06	1522.60	1529.85	25.11	248.06	87.50	2.63
1	-7397.*	PF 1	6228.00	1516.77	1519.98	1522.50	1529.74	25.08	248.36	90.00	2.66
1	-7402.*	PF 1	6228.00	1516.75	1519.90	1522.39	1529.64	25.04	248.70	92.50	2.69
1	-7407.*	PF 1	6228.00	1516.73	1519.83	1522.30	1529.53	25.00	249.15	95.00	2.72
1	-7412.*	PF 1	6228.00	1516.71	1519.76	1522.20	1529.42	24.95	249.64	97.50	2.75
1	-7417.*	PF 1	6228.00	1516.69	1519.69	1522.11	1529.30	24.88	250.34	100.00	2.77
1	-7422.*	PF 1	6228.00	1516.67	1519.63	1522.02	1529.18	24.81	251.08	102.50	2.79
1	-7427.*	PF 1	6228.00	1516.65	1519.58	1521.94	1529.06	24.72	251.98	105.00	2.81
1	-7432.*	PF 1	6228.00	1516.63	1519.52	1521.87	1528.93	24.63	252.90	107.50	2.83
1	-7437.*	PF 1	6228.00	1516.61	1519.47	1521.78	1528.80	24.52	254.01	110.00	2.84
1	-7442.*	PF 1	6228.00	1516.59	1519.42	1521.70	1528.67	24.41	255.10	112.50	2.86
1	-7447.*	PF 1	6228.00	1516.57	1519.37	1521.63	1528.55	24.30	256.24	115.00	2.87
1	-7452.*	PF 1	6228.00	1516.55	1519.33	1521.56	1528.42	24.20	257.39	117.50	2.88
1	-7457.7	PF 1	6228.00	1516.53	1519.31	1521.49	1528.10	23.79	261.77	120.00	2.84
1	-7500.	PF 1	6228.00	1516.36	1520.39	1521.32	1523.95	15.15	411.13	120.00	1.44
1	-7527.7	PF 1	6228.00	1516.07	1520.98	1521.08	1522.95	11.26	553.15	151.64	1.04
1	-7620.3	PF 1	6228.00	1514.26	1521.22	1519.14	1521.97	6.96	894.27	170.67	0.54
1	-7791.	PF 1	6228.00	1514.00	1520.73		1521.33	6.25	997.13	189.28	0.48
1	-8229.8	PF 1	6255.00	1511.92	1518.76		1519.62	7.44	840.57	172.37	0.59
1	-8876.9	PF 1	6255.00	1509.11	1516.37		1517.04	6.56	954.22	171.30	0.49
1	-8972.0*	PF 1	6255.00	1508.98	1515.97		1516.71	6.89	908.17	169.00	0.52
1	-9067.1*	PF 1	6255.00	1508.85	1515.45	1513.70	1516.30	7.43	842.38	165.65	0.58
1	-9162.3	PF 1	6255.00	1508.72	1513.57	1513.57	1515.47	11.06	565.64	150.78	1.01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Bank Sta
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Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = 7
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = 6
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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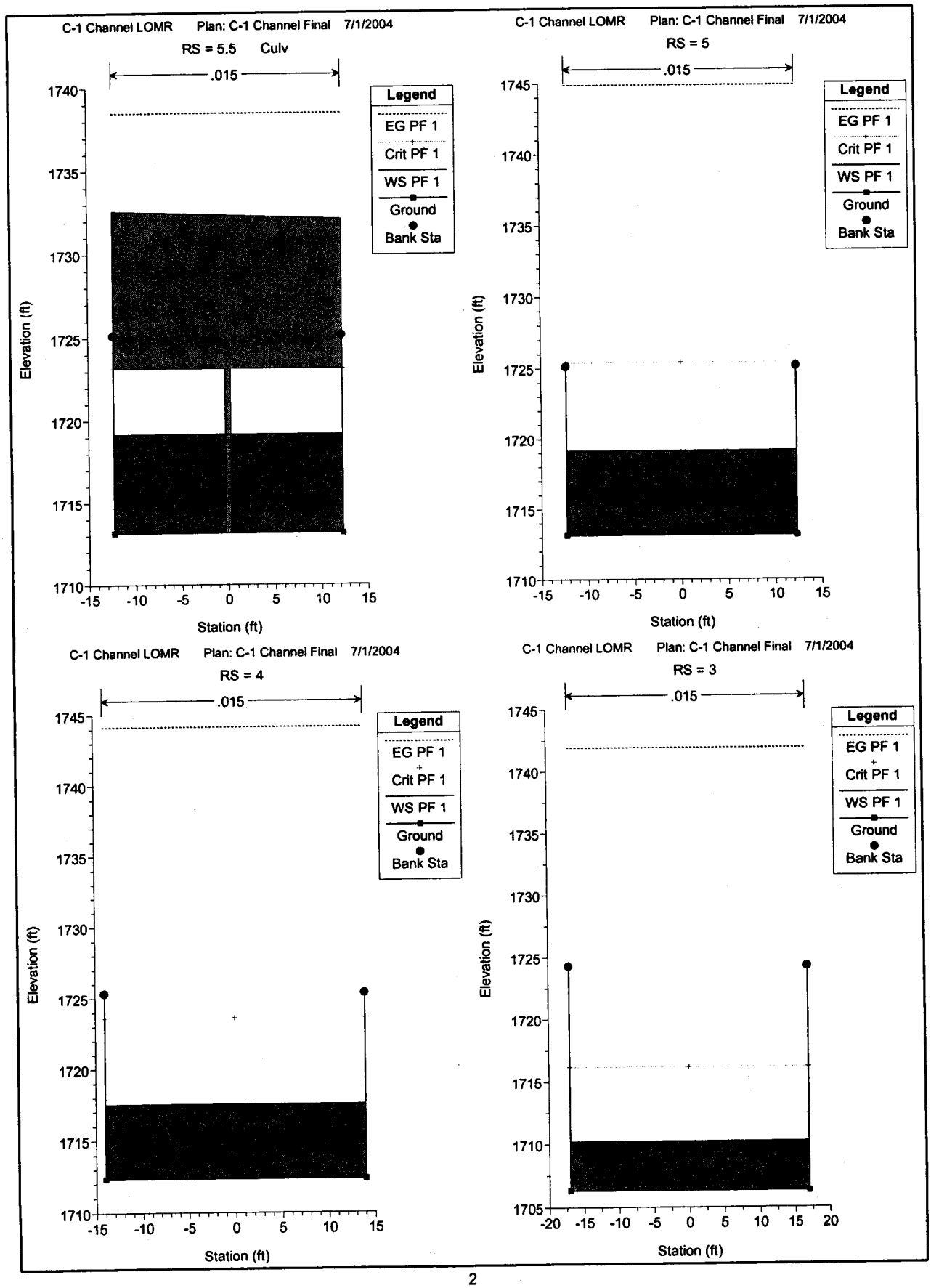
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = 5
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Crit PF 1
WS PF 1
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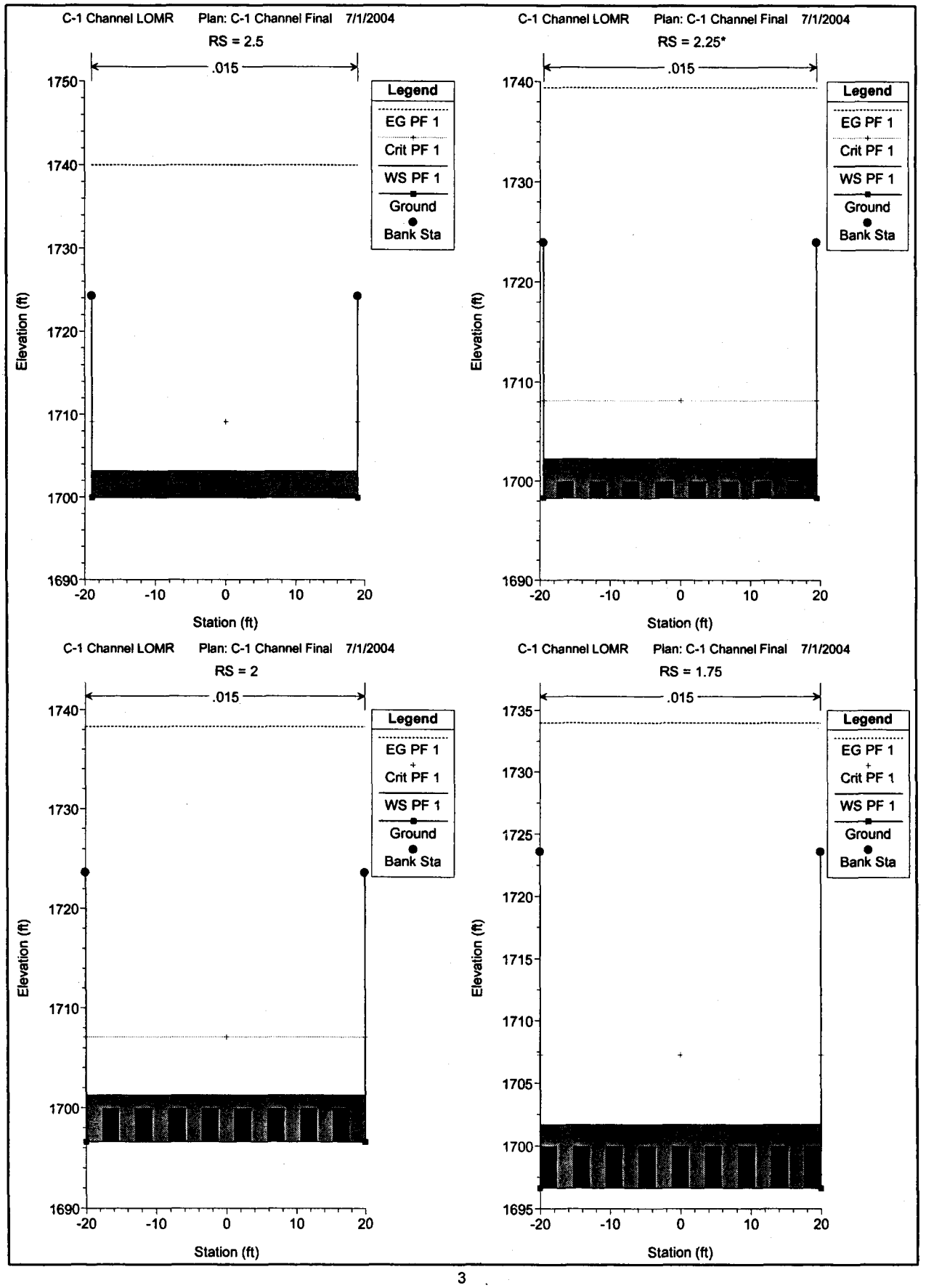
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = 2
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
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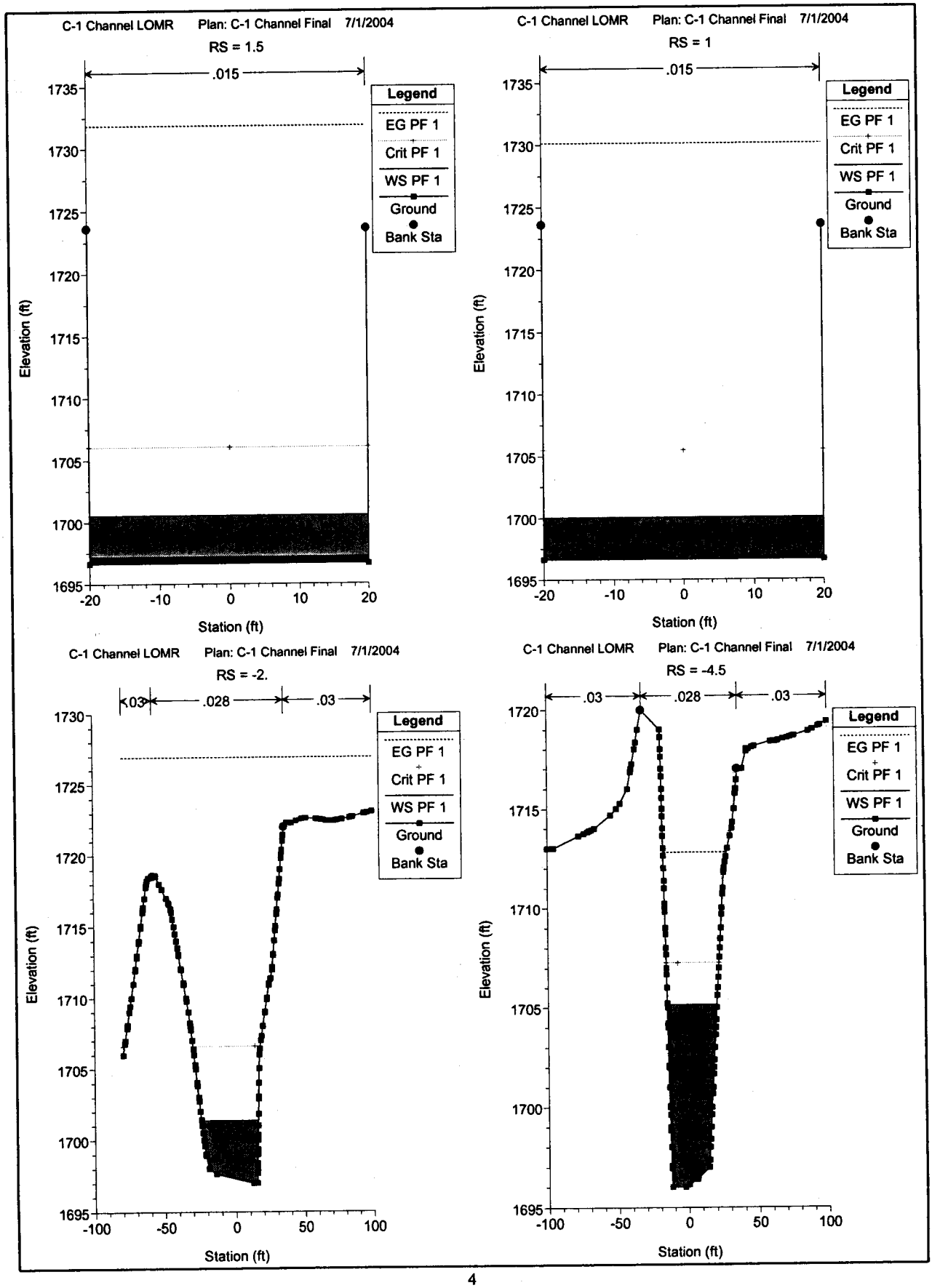
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
Crit PF 1
WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = 1
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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.028
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
EG PF 1
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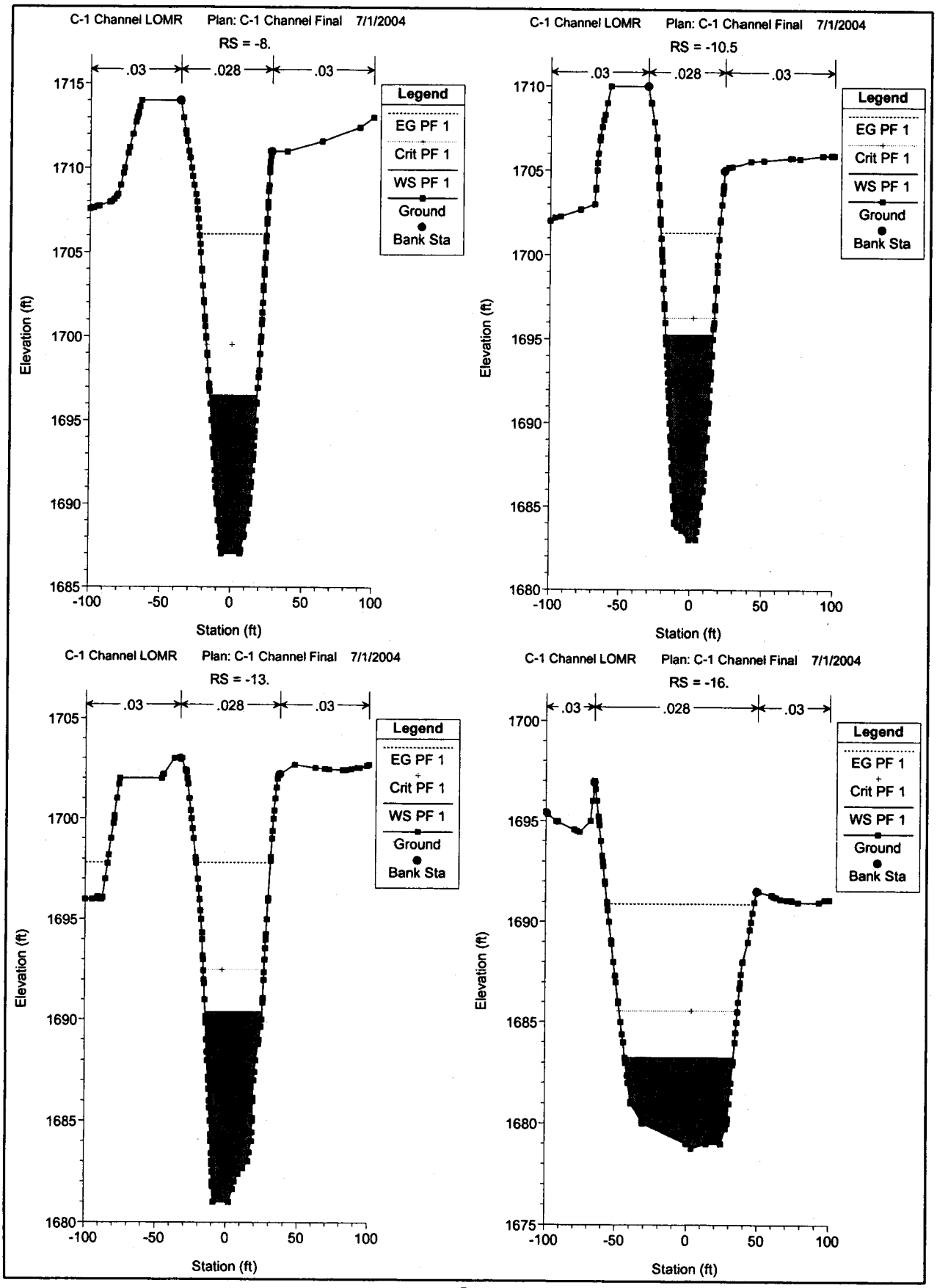
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
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Bank Sta
Elevation (ft)
Station (ft)
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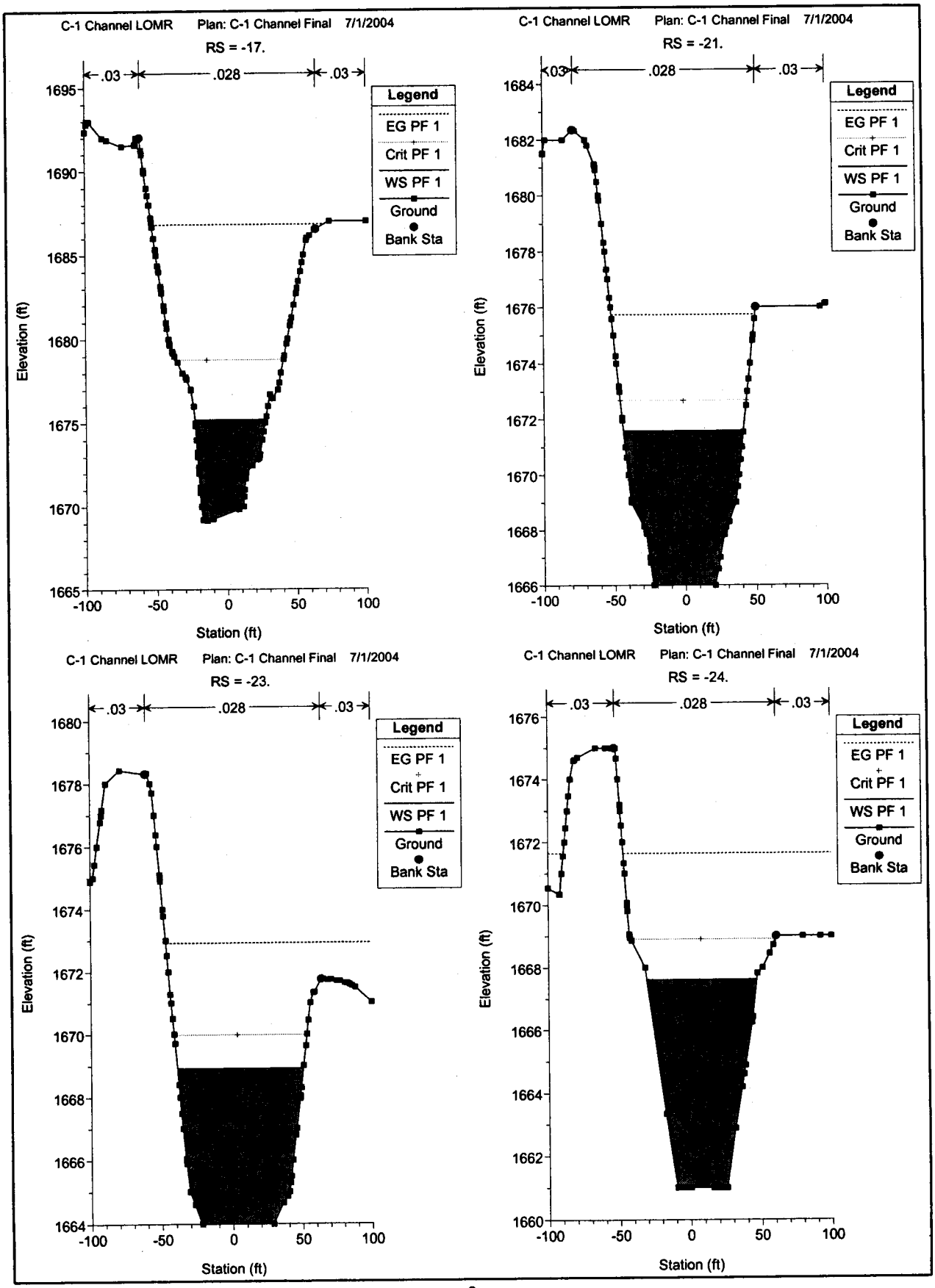
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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.03
.028
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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.03
.028
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Crit PF 1
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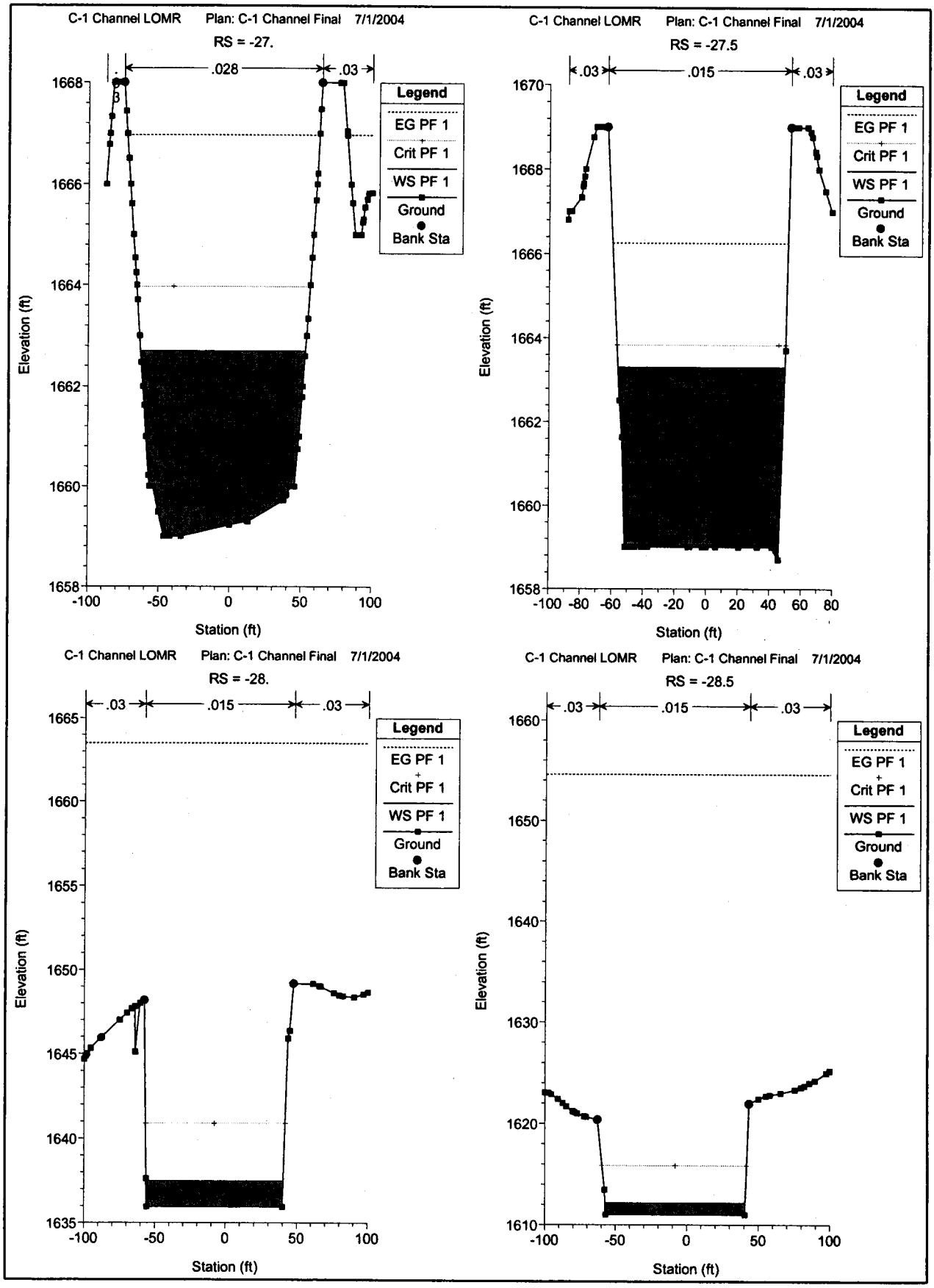
Bank Sta
Elevation (ft)
Station (ft)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EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -27.5
.03
.015
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -28.
.03
.015
.03
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -28.5
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Legend
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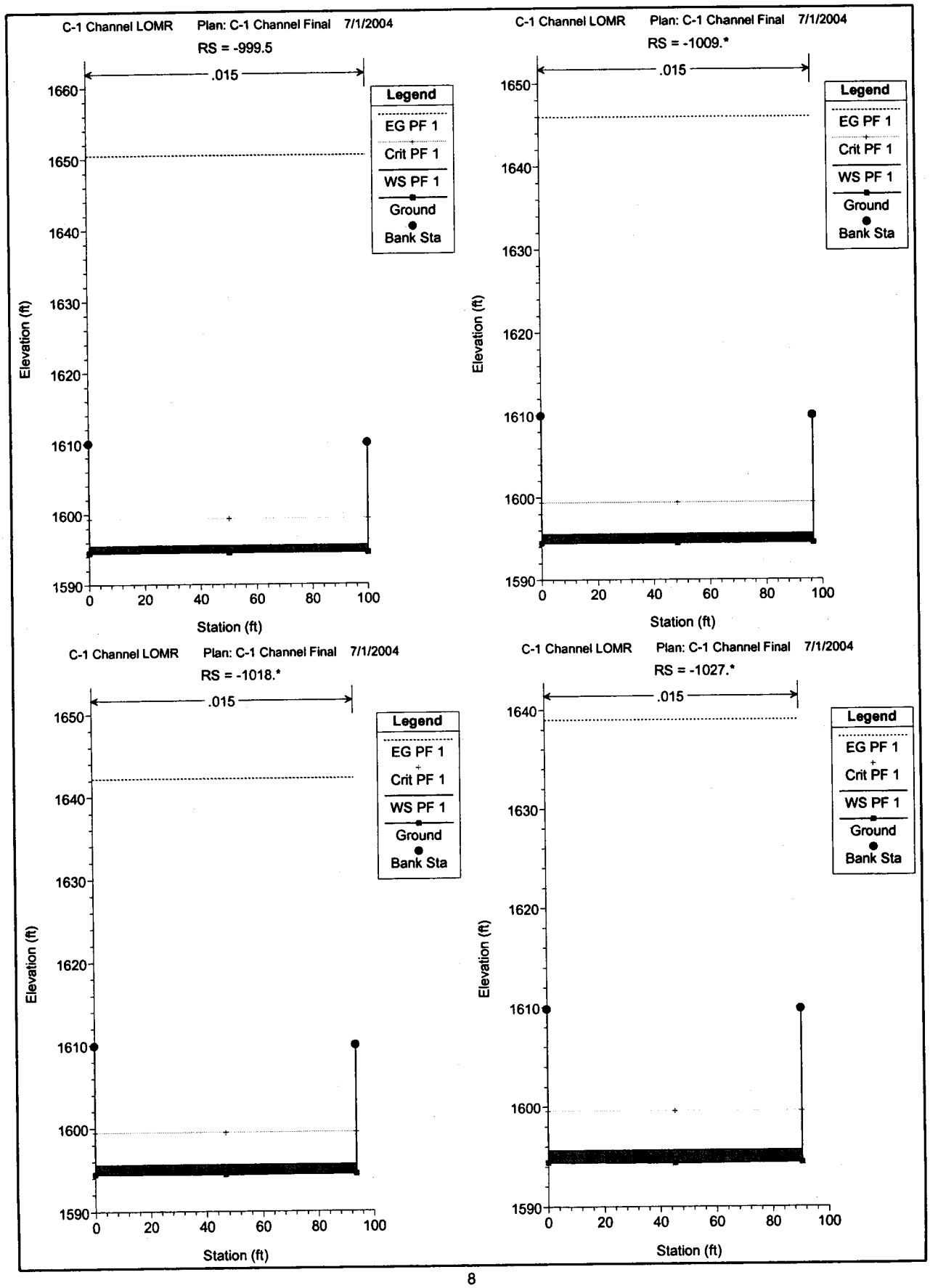
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
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WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
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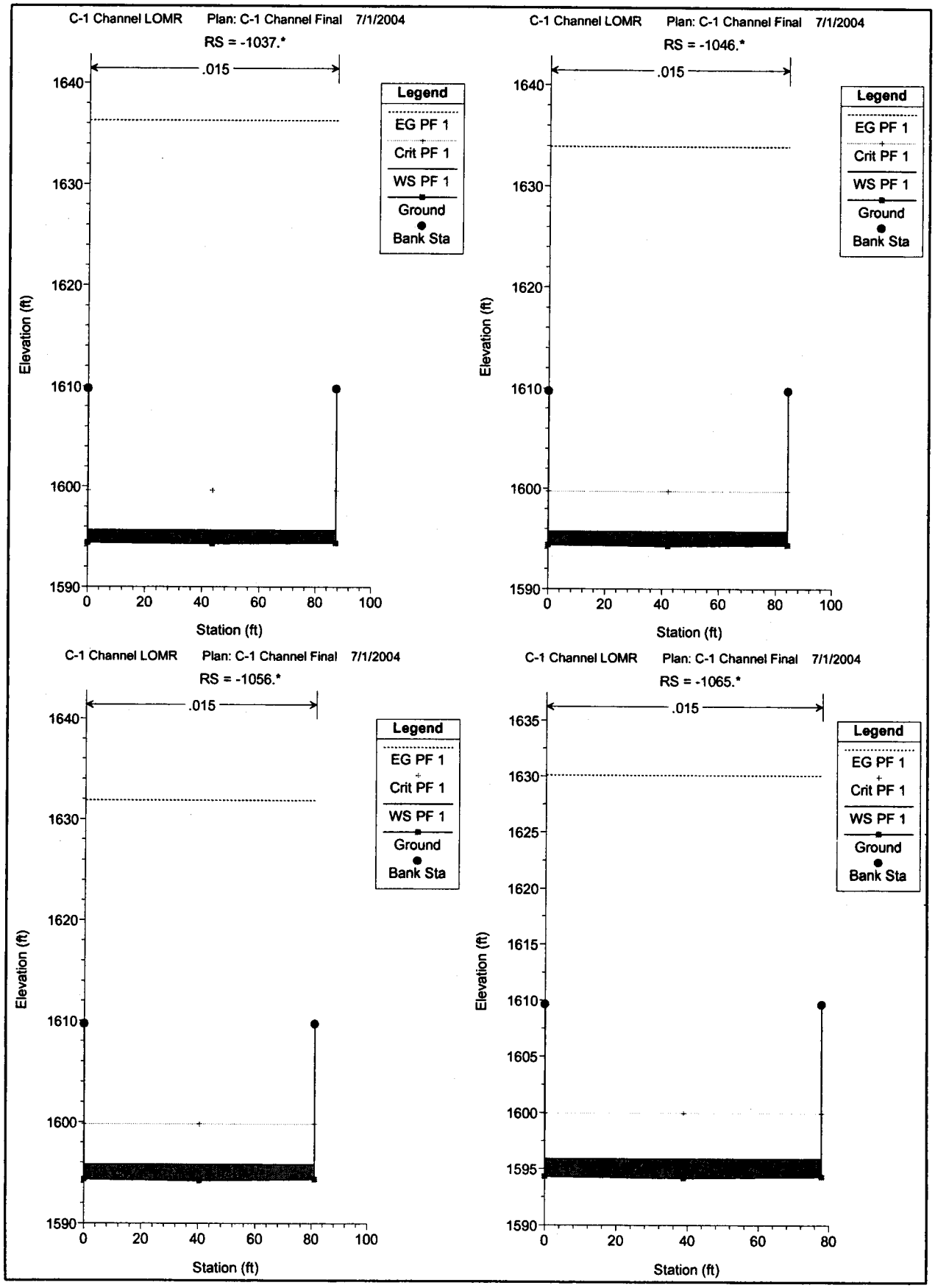
Bank Sta
Elevation (ft)
Station (ft)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Legend
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Bank Sta
Elevation (ft)
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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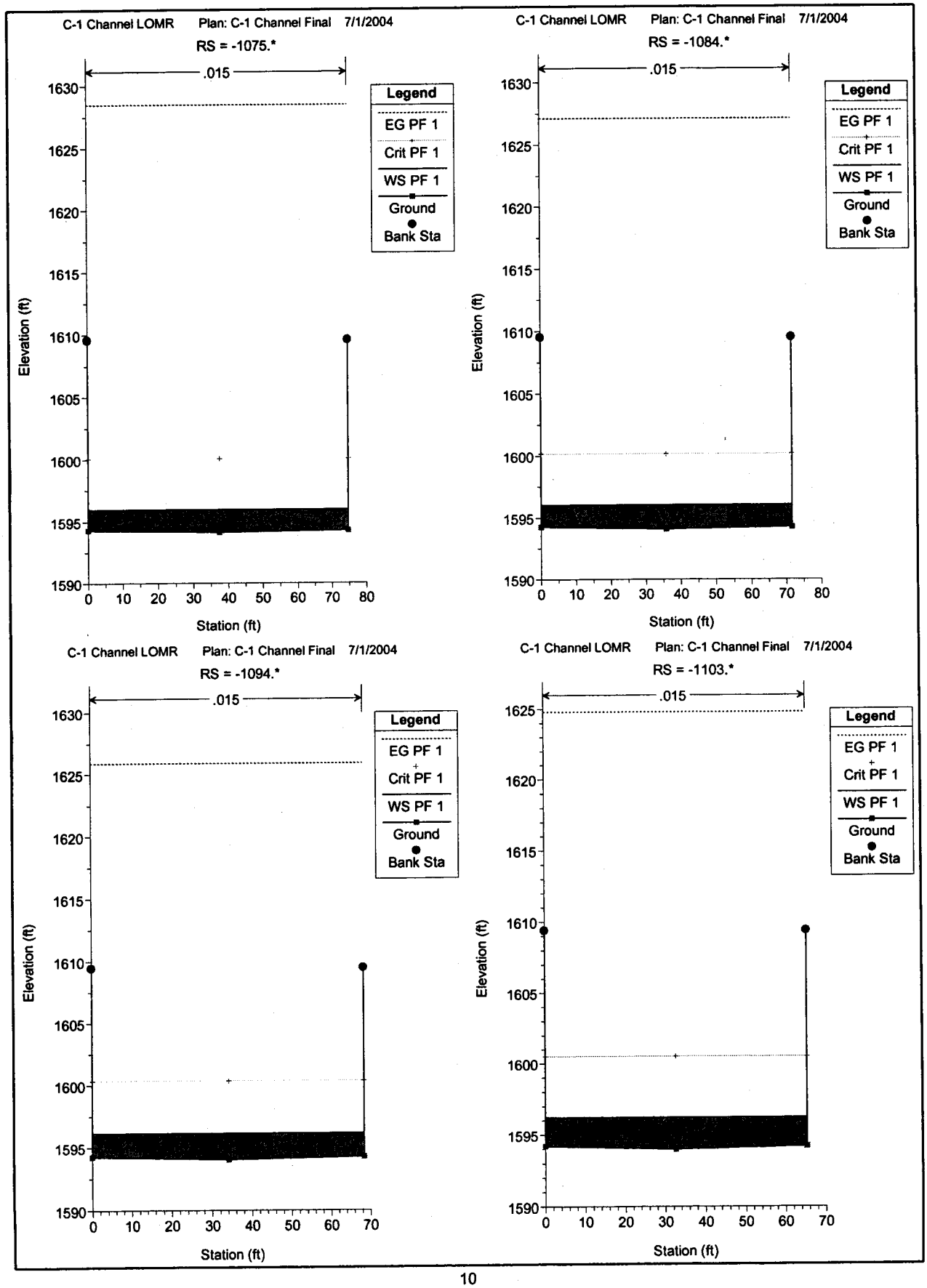
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
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RS = -1084.*
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WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
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RS = -1094.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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WS PF 1
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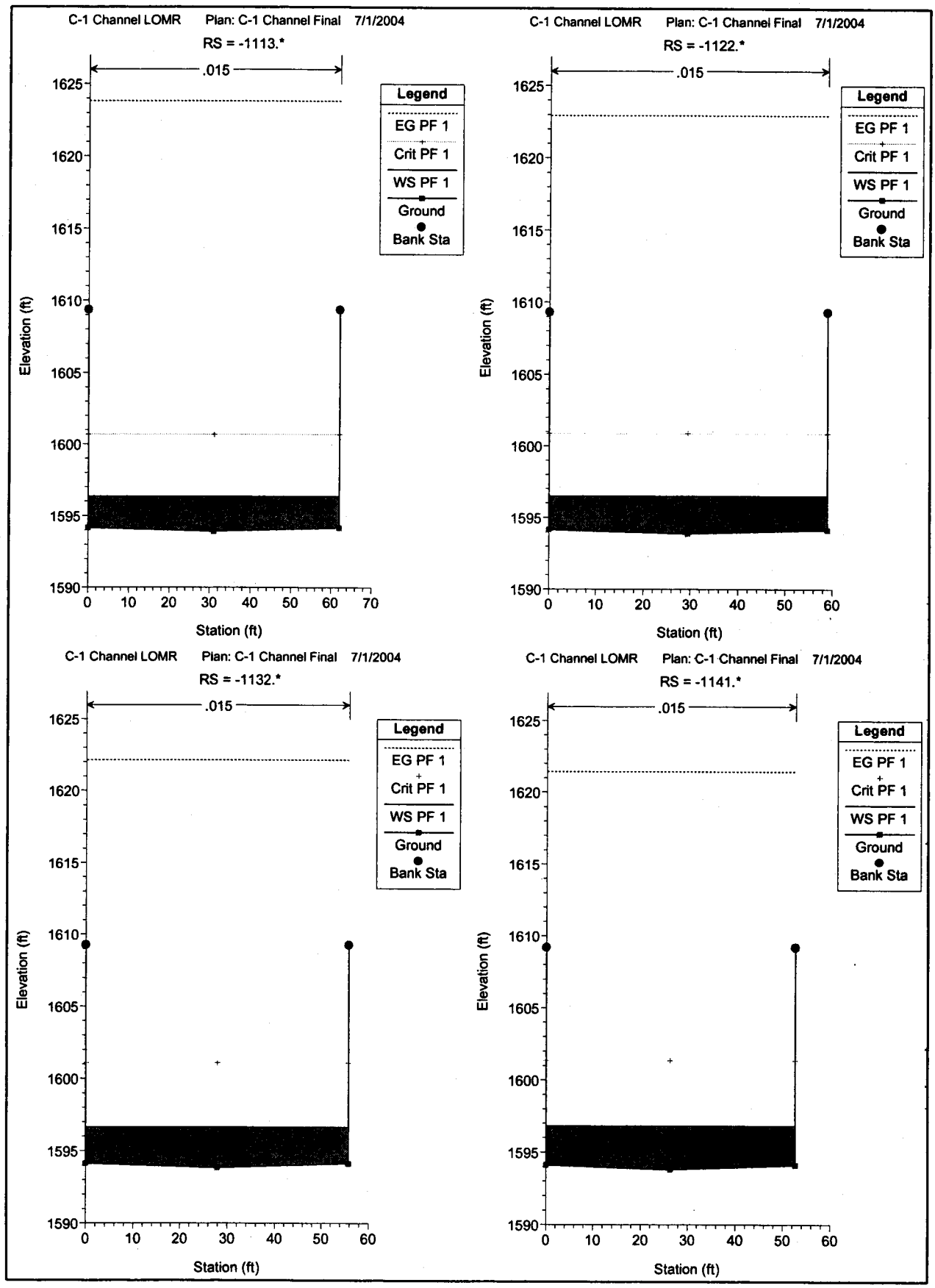
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -1122.*
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Legend
EG PF 1
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Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = -1132.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Crit PF 1
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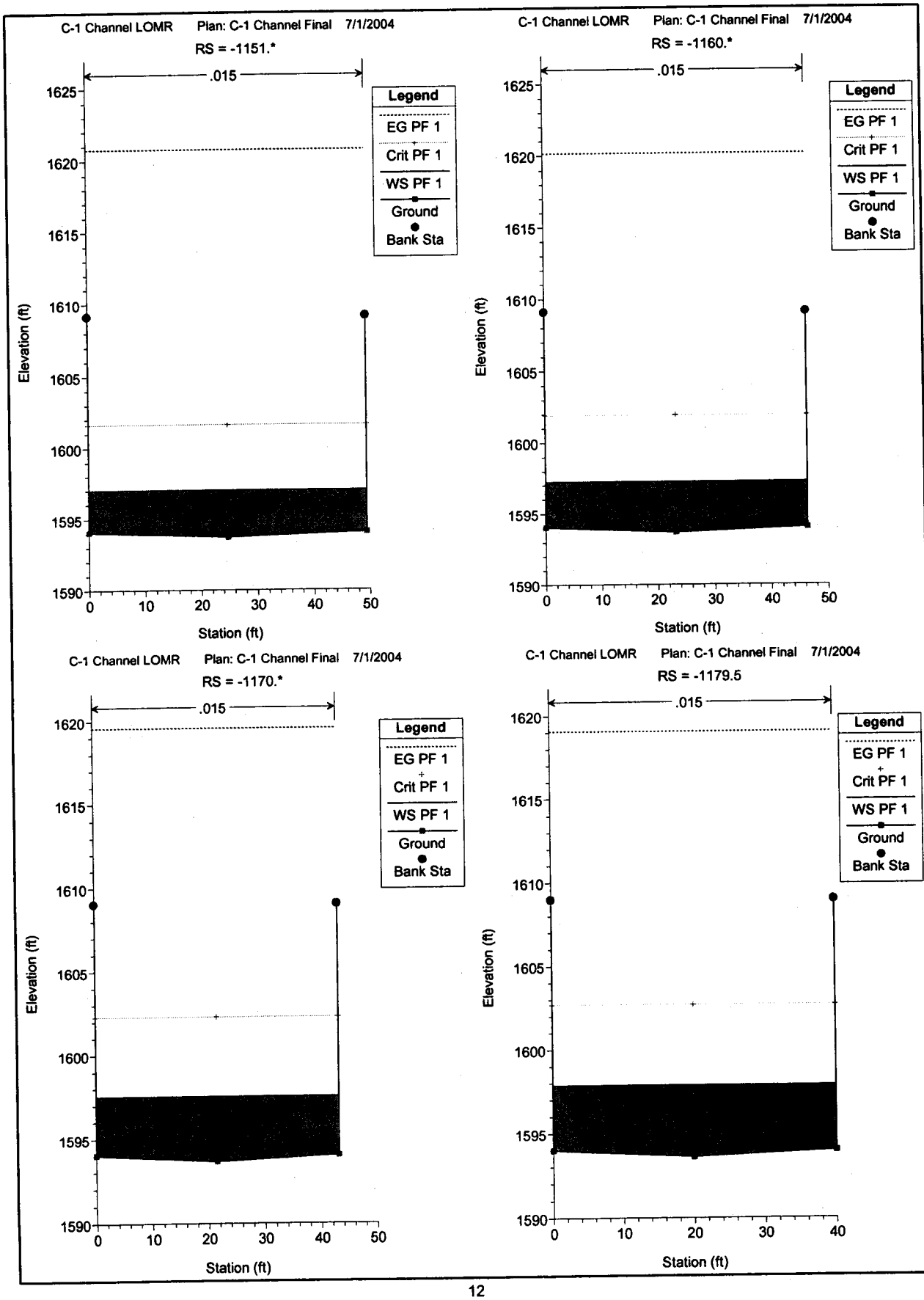
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
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Legend
EG PF 1
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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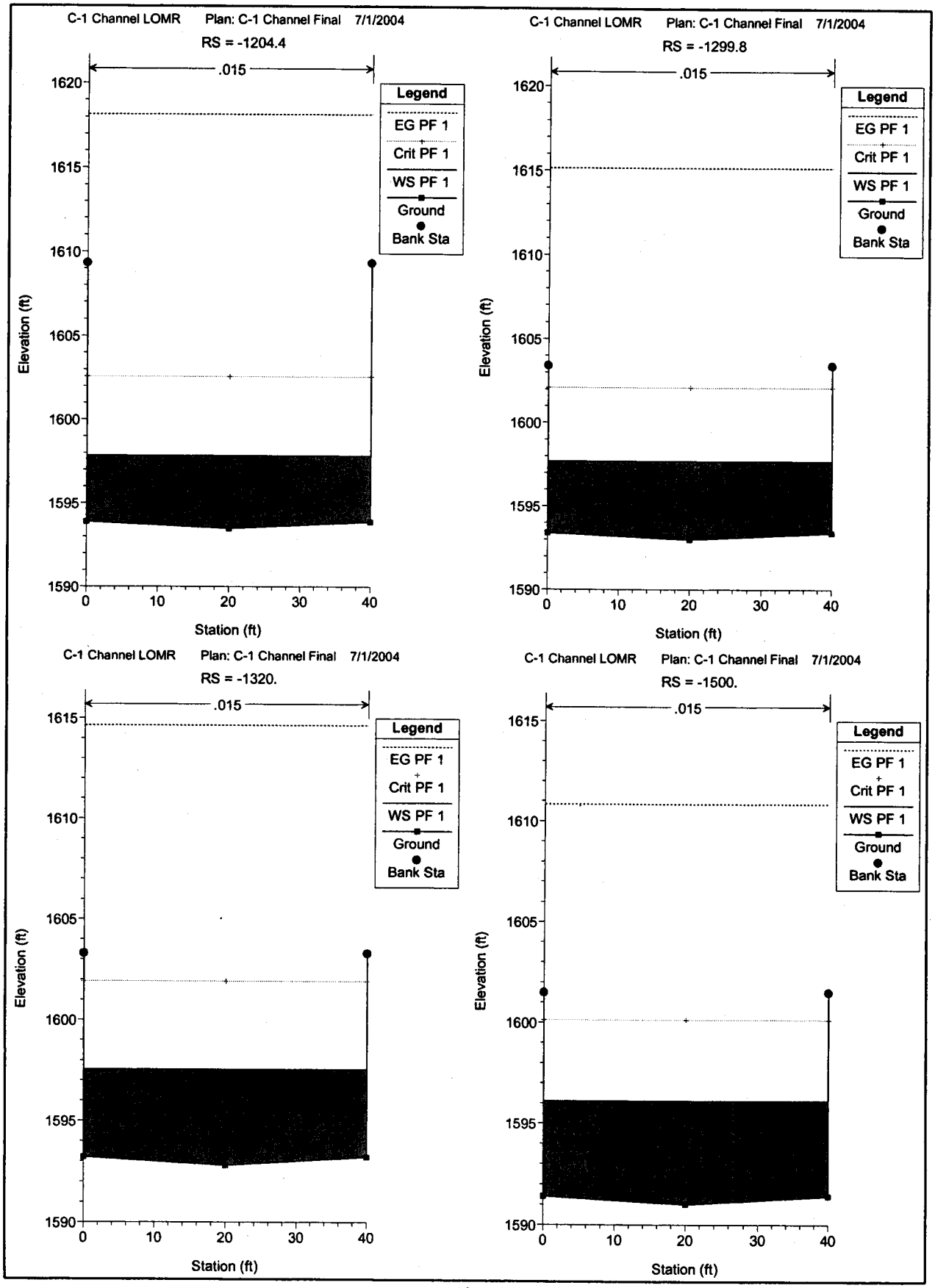
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -1299.8
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -1320.
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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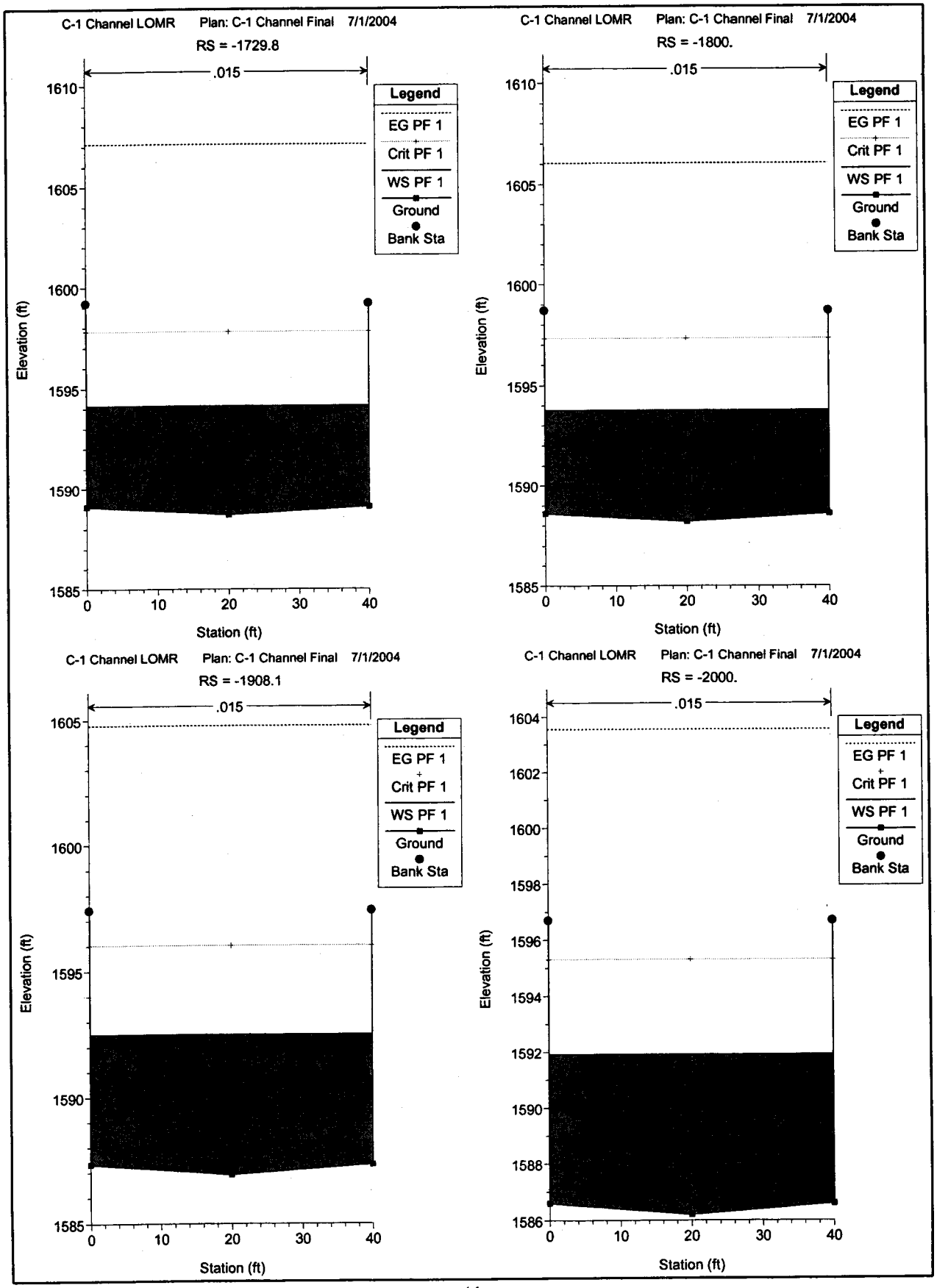
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = -1800.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -1908.1
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
EG PF 1
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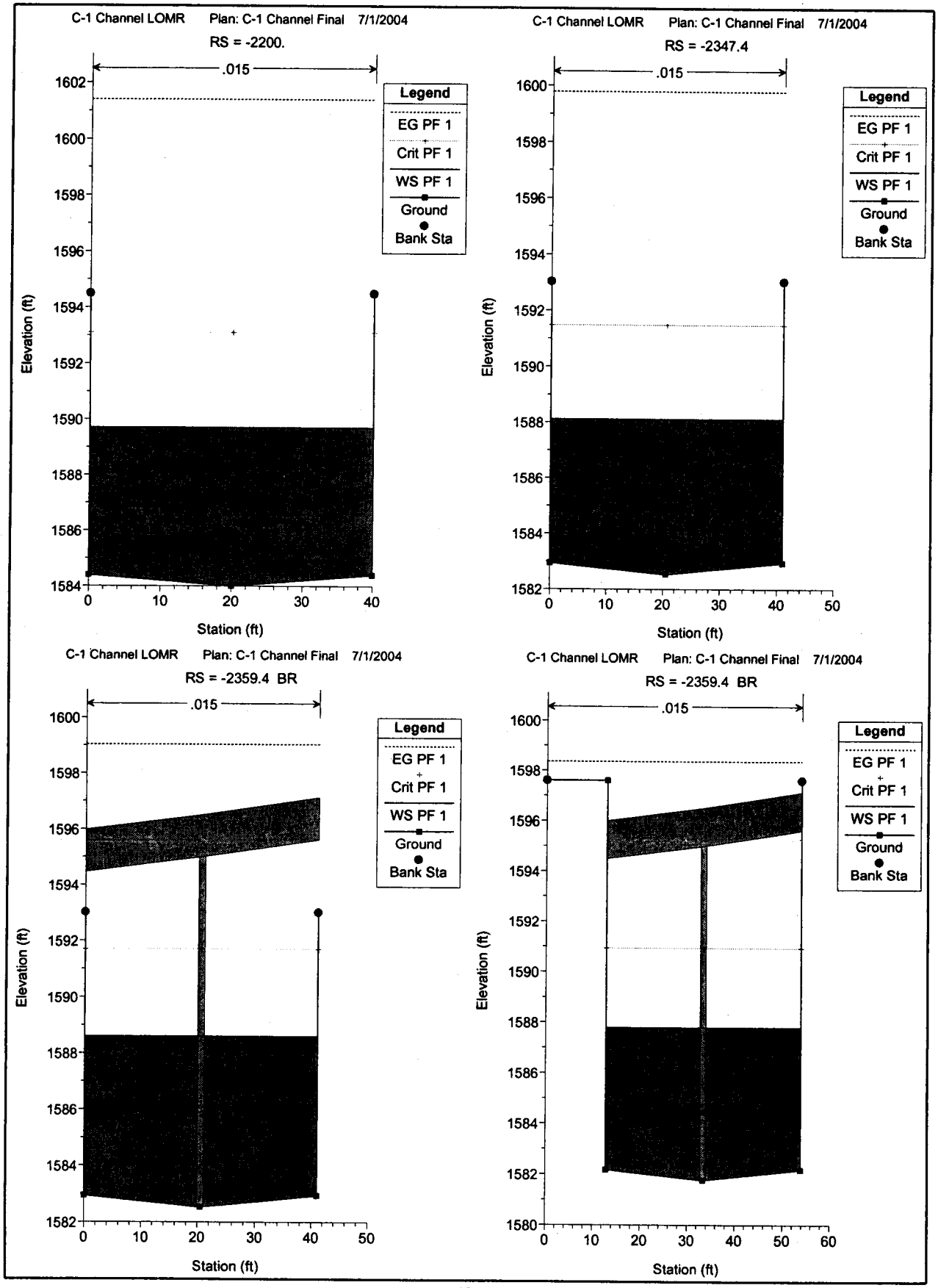
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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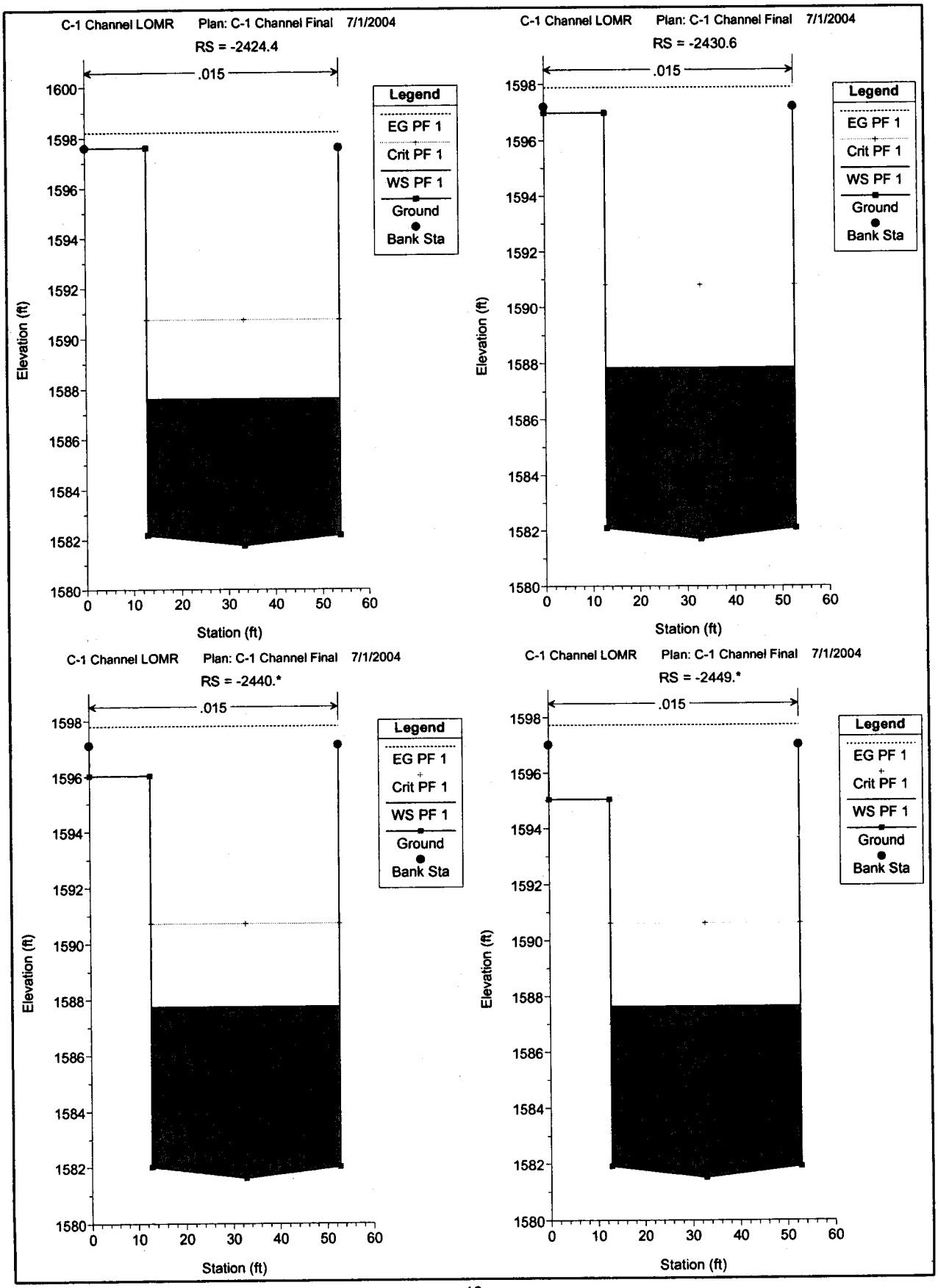
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2347.4
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2359.4 BR
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2359.4 BR
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2430.6
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2440.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
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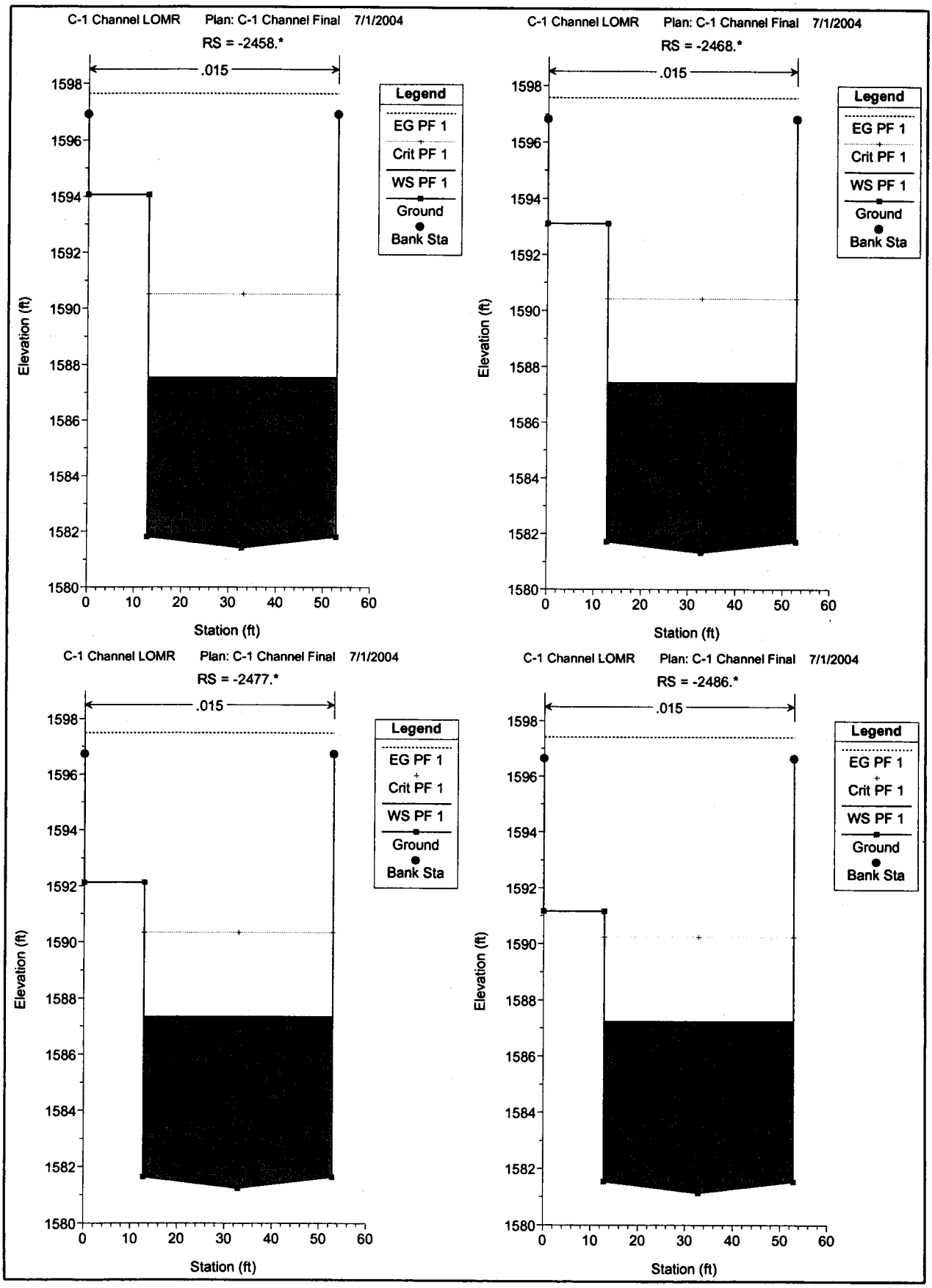
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2468.*
.015
Legend
EG PF 1
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2477.*
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Legend
EG PF 1
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
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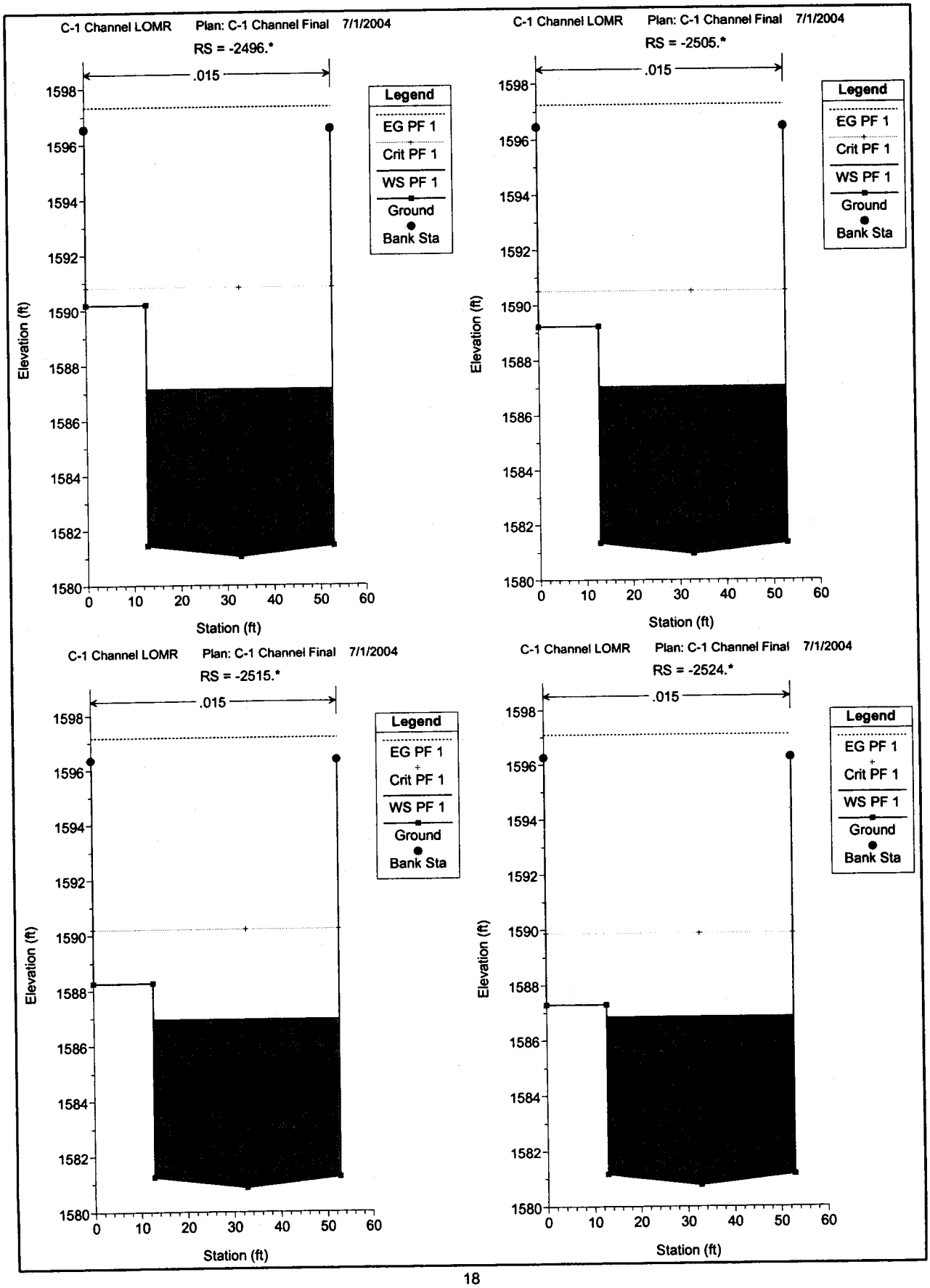
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
Station (ft)
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Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2515.*
.015
Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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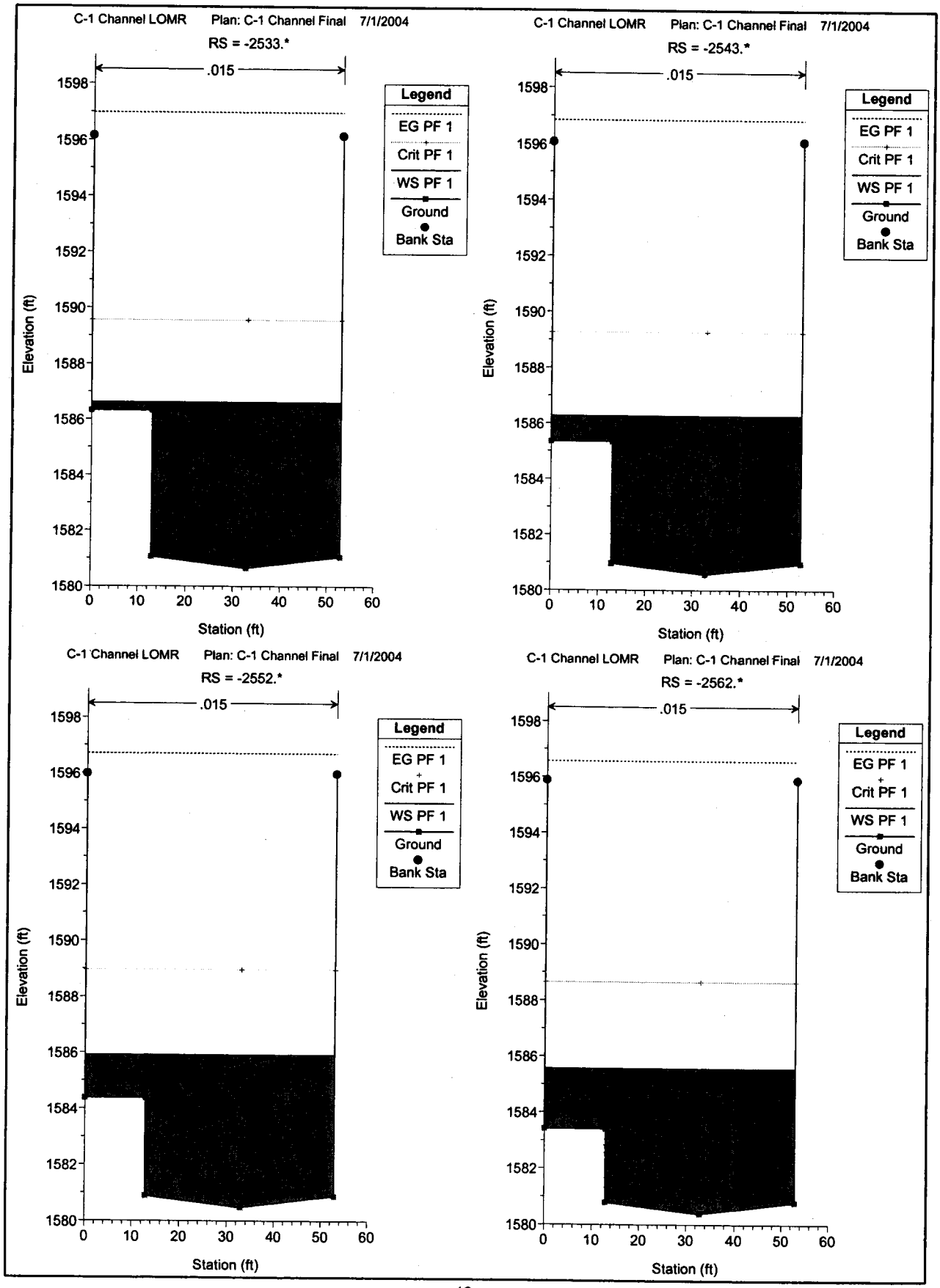
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
Station (ft)
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Legend
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Bank Sta
Elevation (ft)
Station (ft)
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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Crit PF 1
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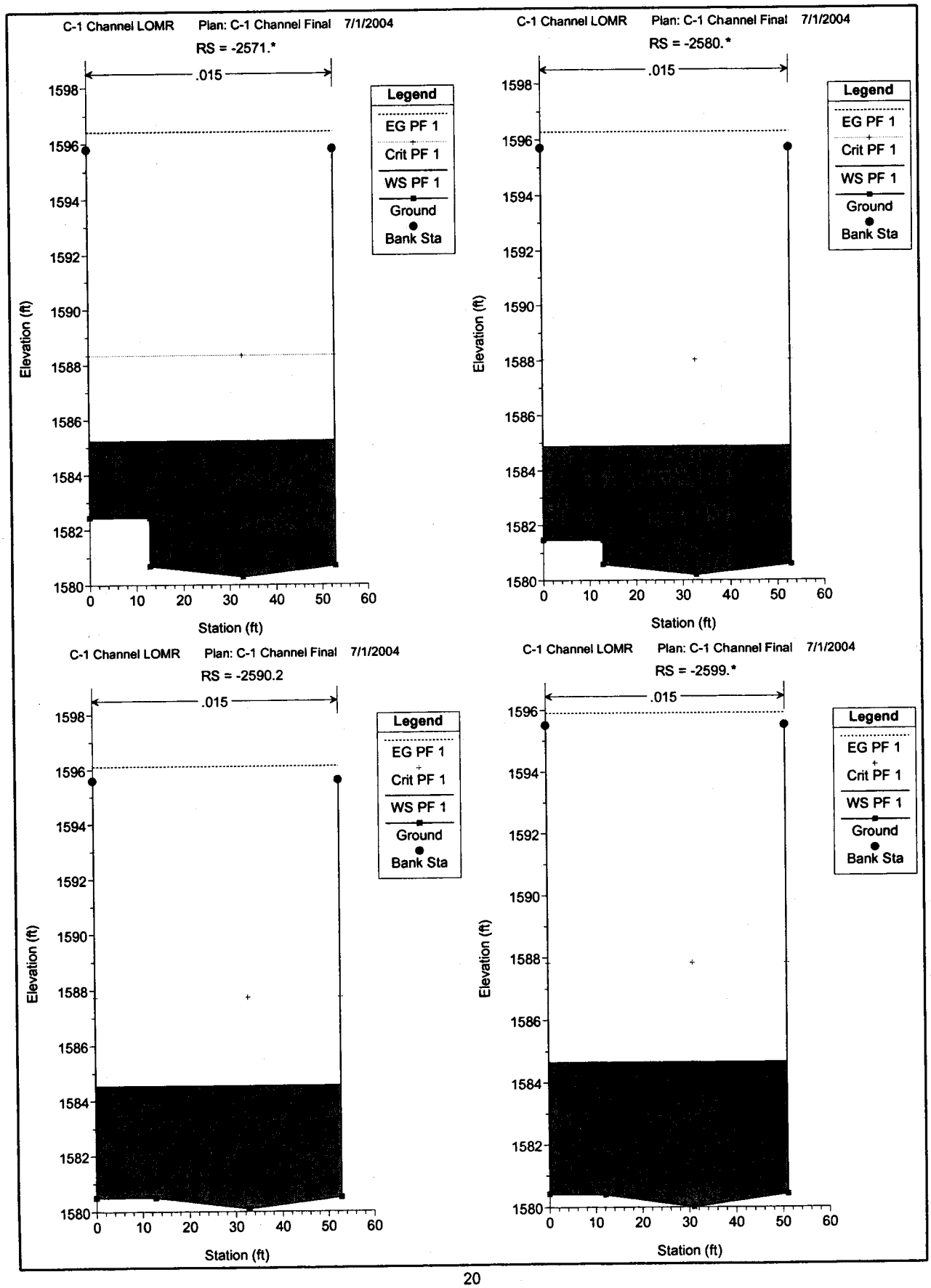
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
Station (ft)
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RS = -2580.*
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Legend
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Bank Sta
Elevation (ft)
Station (ft)
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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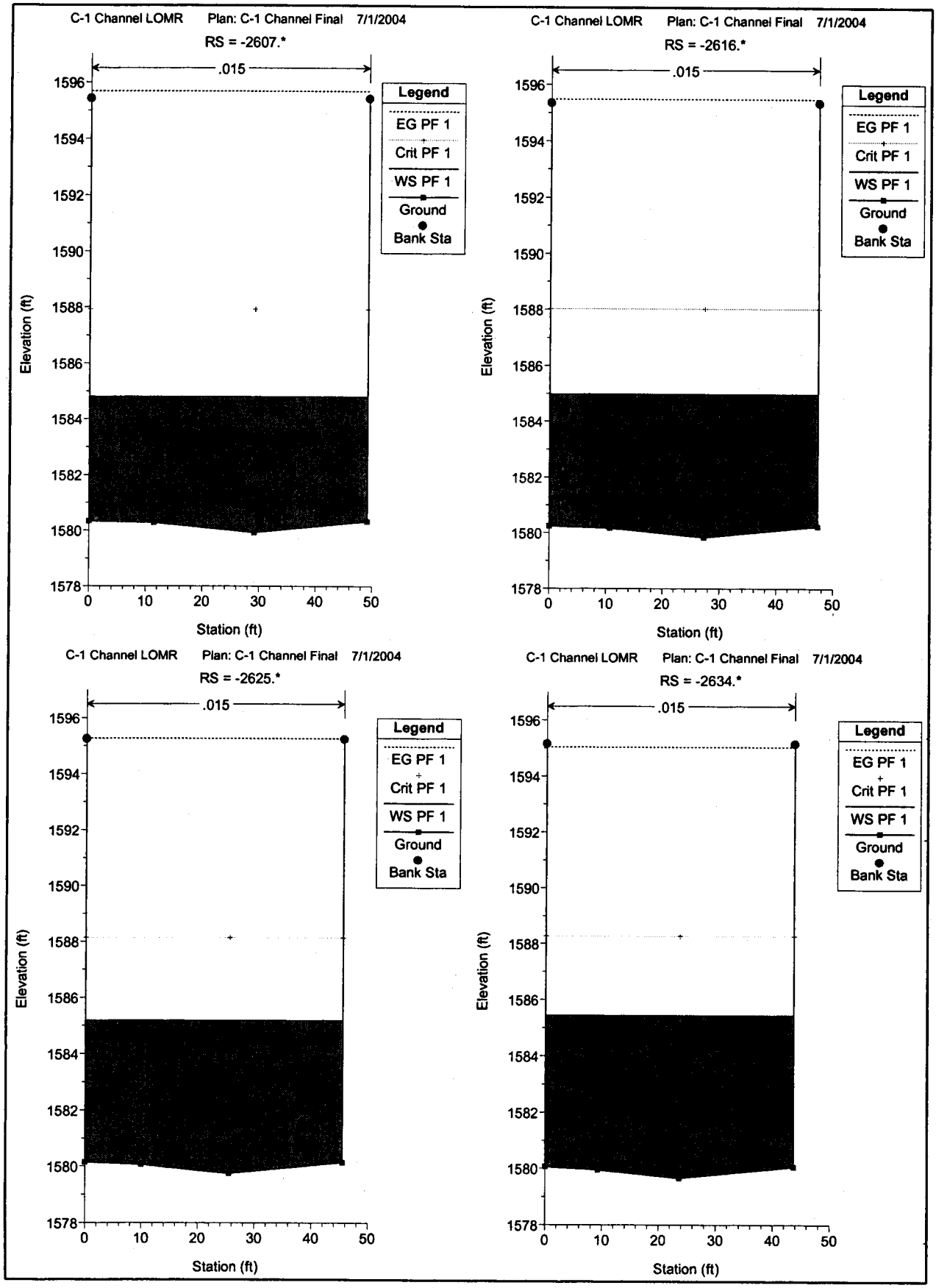
Bank Sta
Elevation (ft)
Station (ft)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Bank Sta
Elevation (ft)
Station (ft)
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Bank Sta
Elevation (ft)
Station (ft)
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RS = -2625.*
.015
Legend
EG PF 1
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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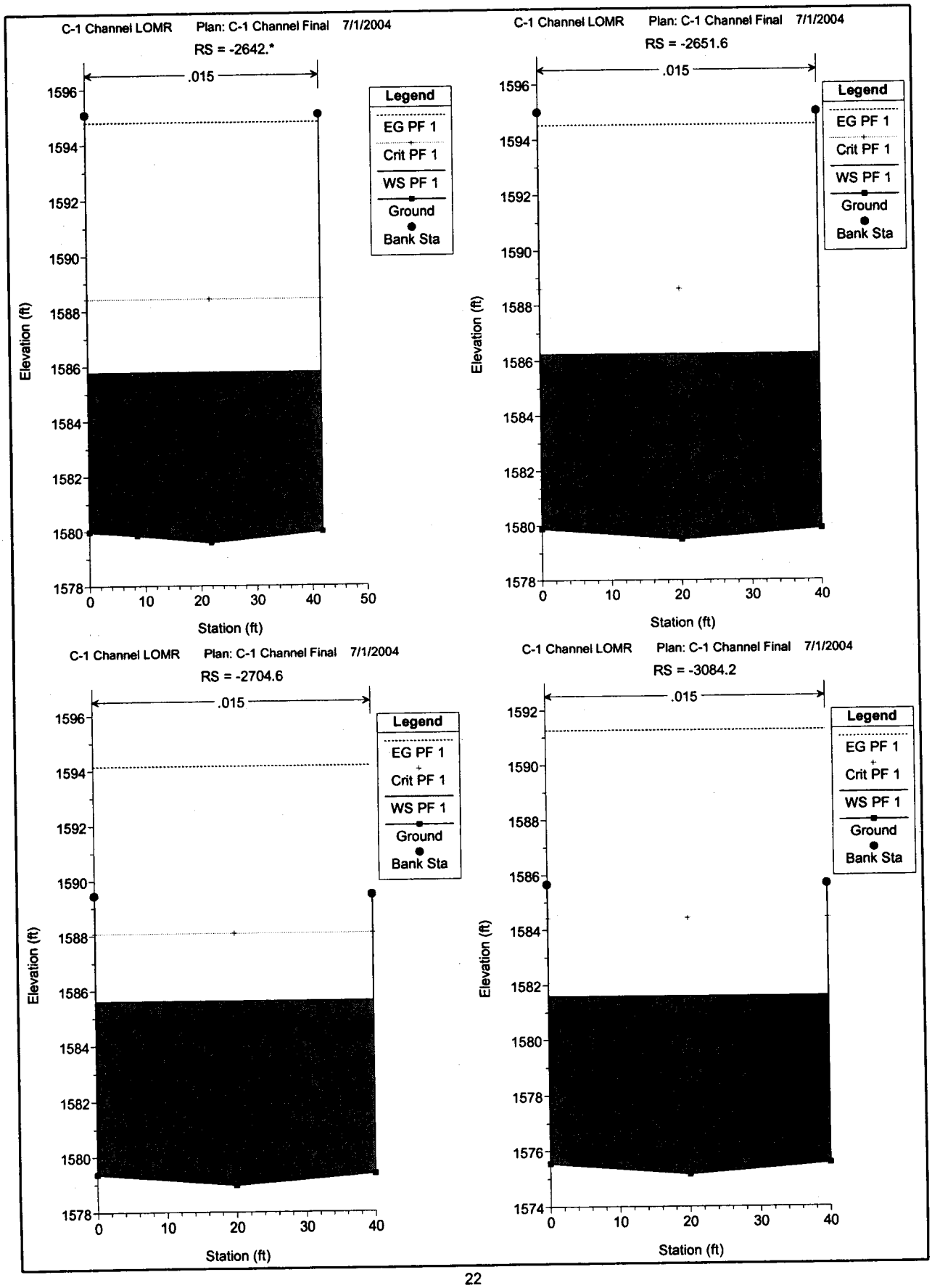
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -2651.6
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = -2704.6
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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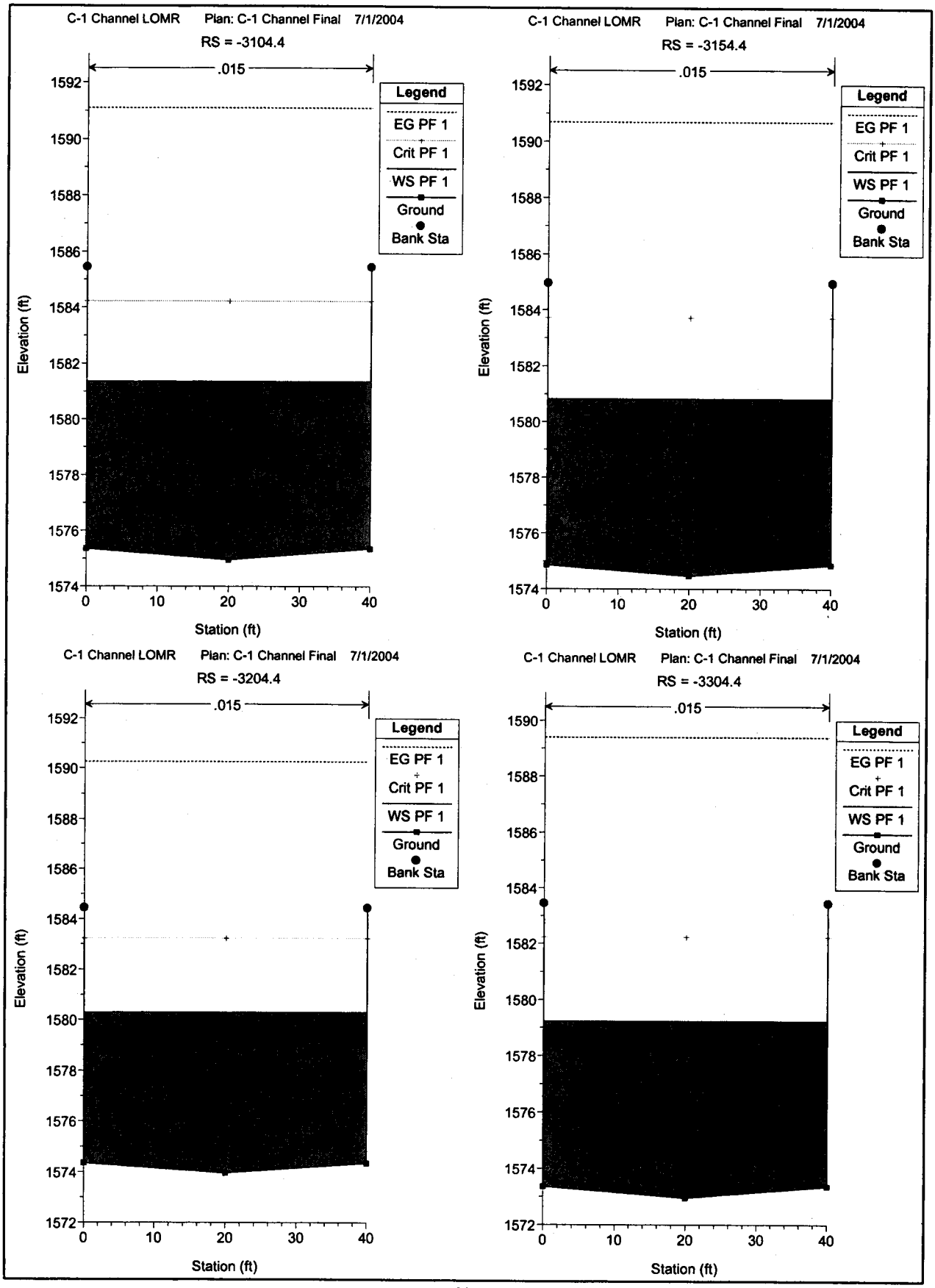
Bank Sta
Elevation (ft)
Station (ft)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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3154.4
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Legend
EG PF 1
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = -3204.4
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Legend
EG PF 1
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WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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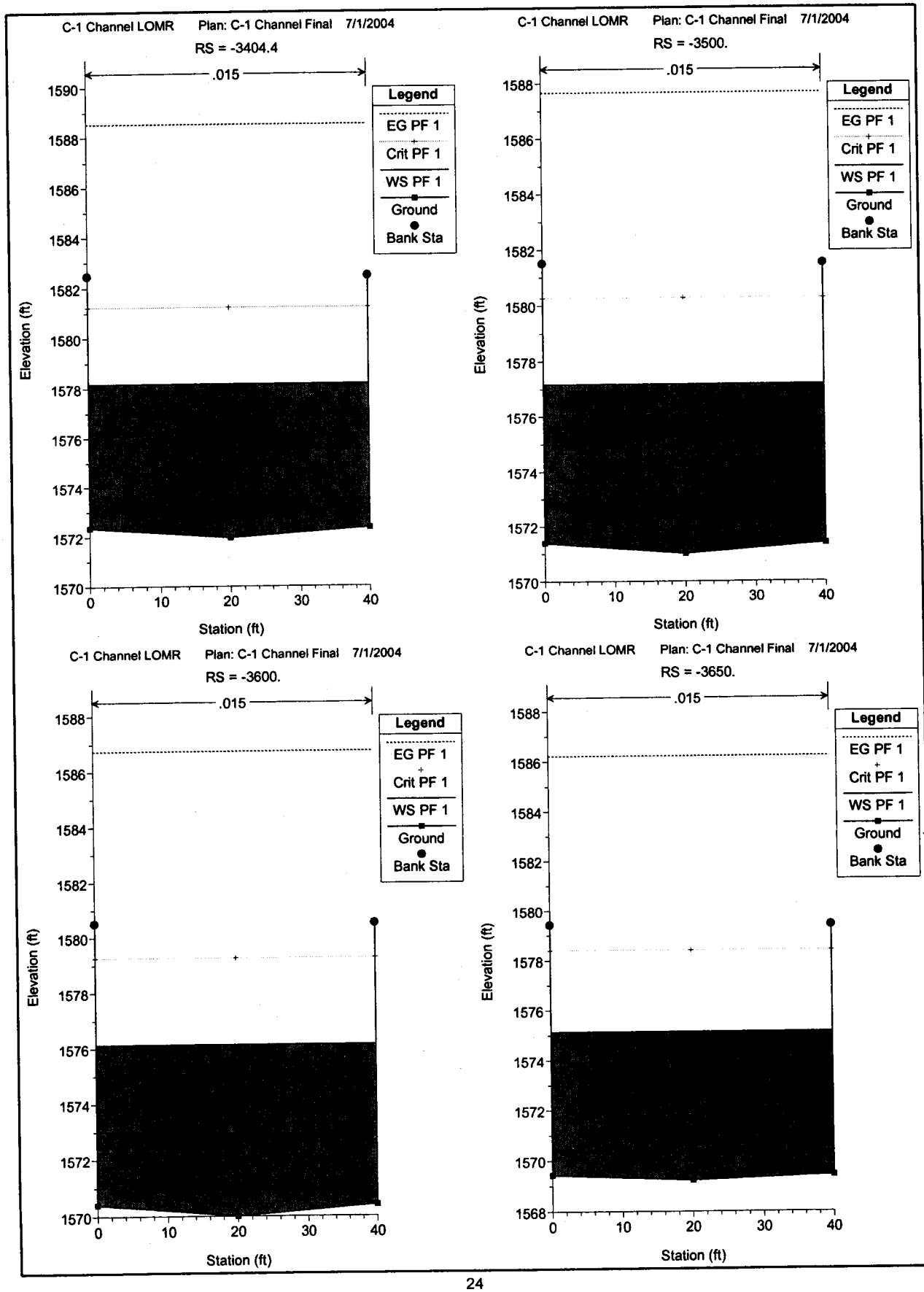
Bank Sta
Elevation (ft)
Station (ft)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RS = -3404.4
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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3500.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3600.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
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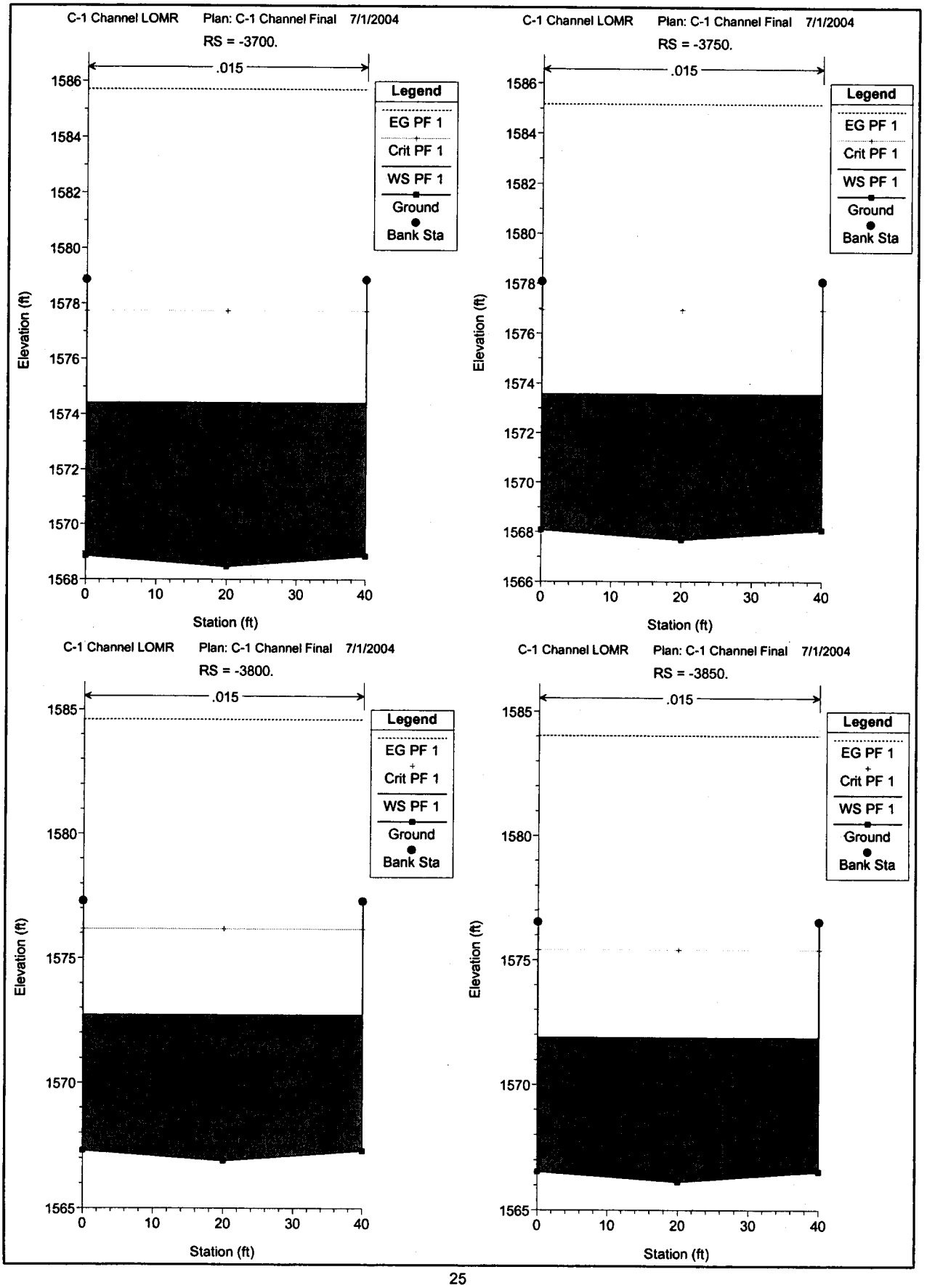
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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RS = -3750.
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3800.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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Legend
EG PF 1
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WS PF 1
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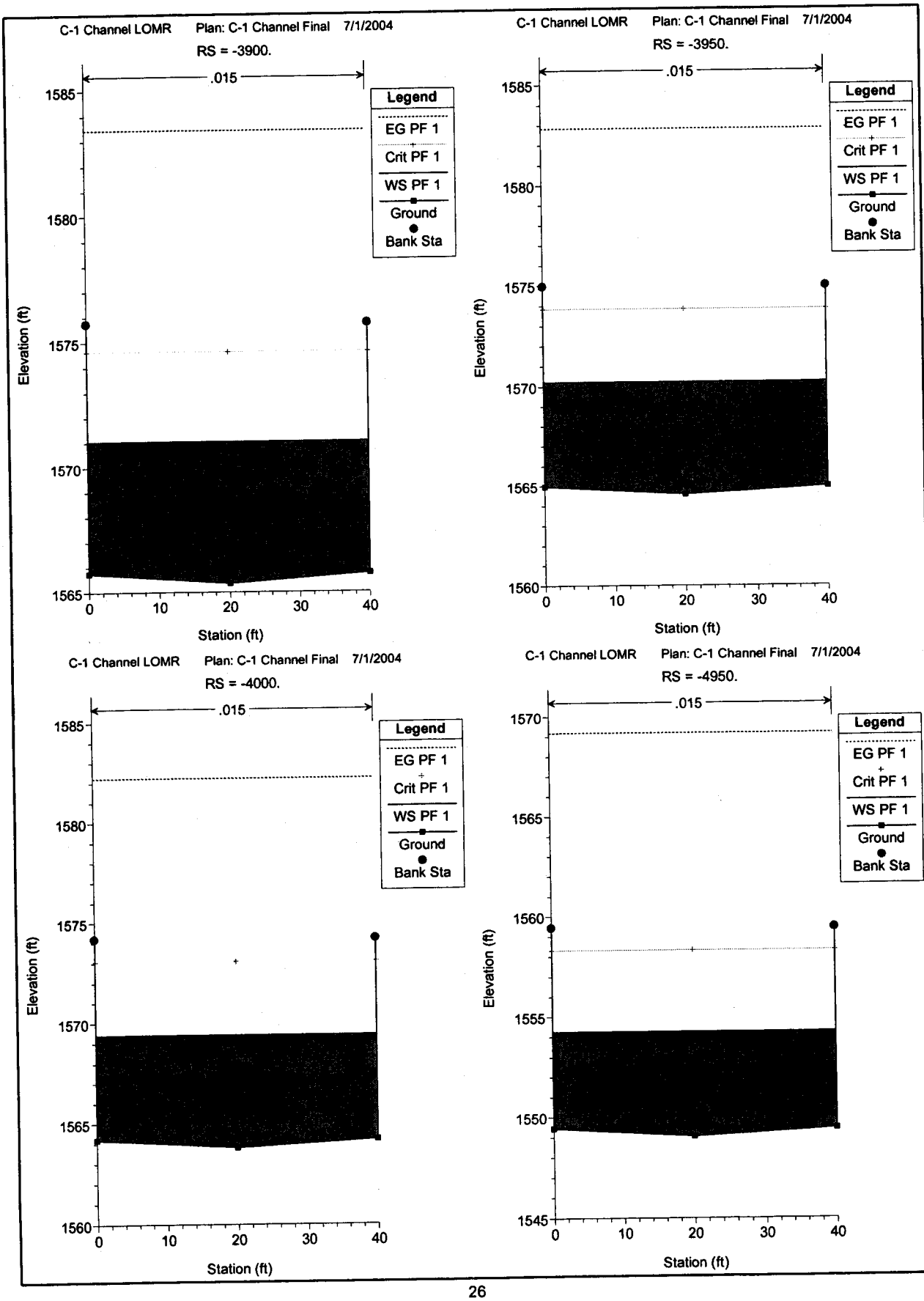
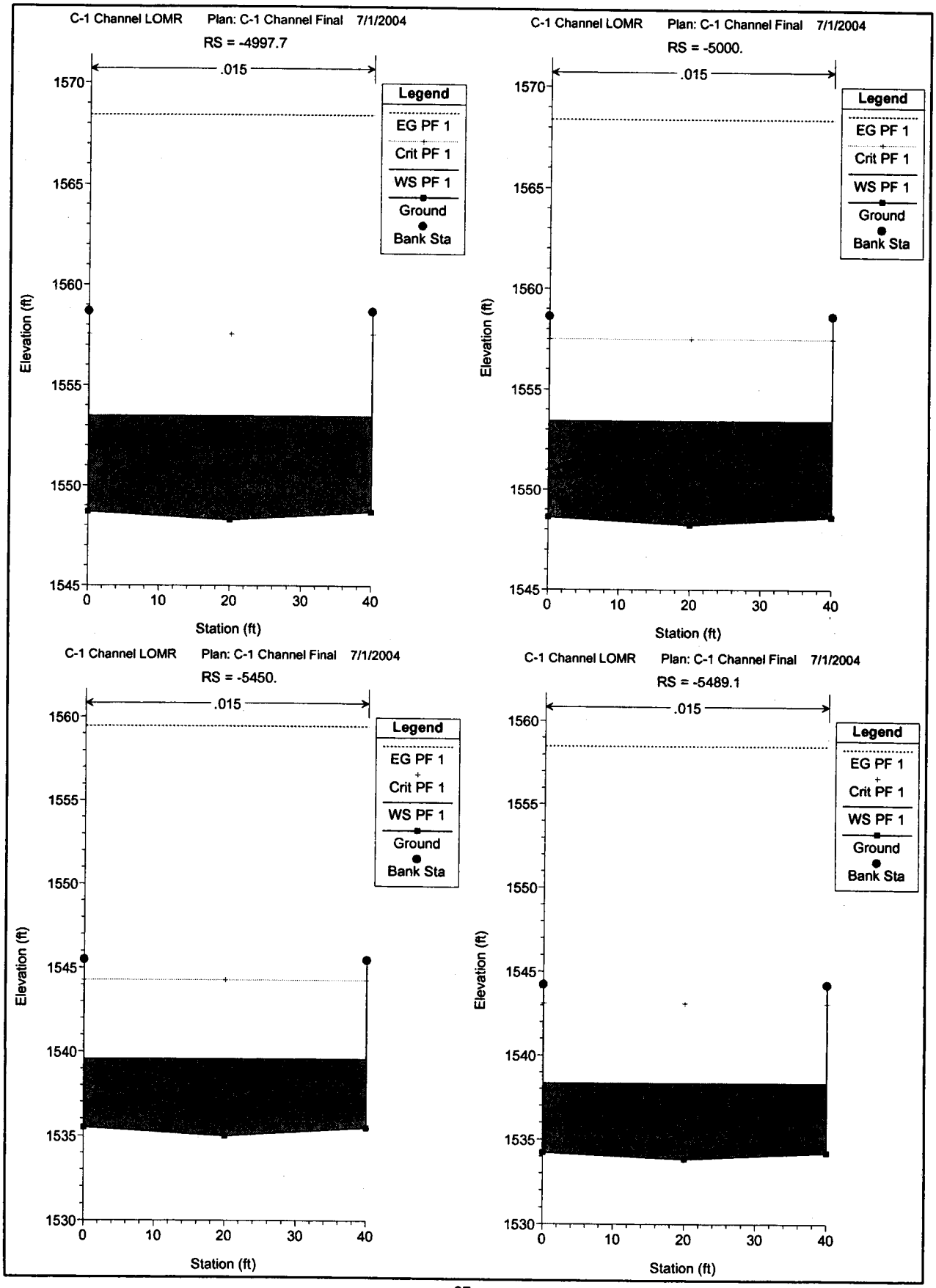
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3900.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -3950.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -4000.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -4950.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -4997.7
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5000.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5450.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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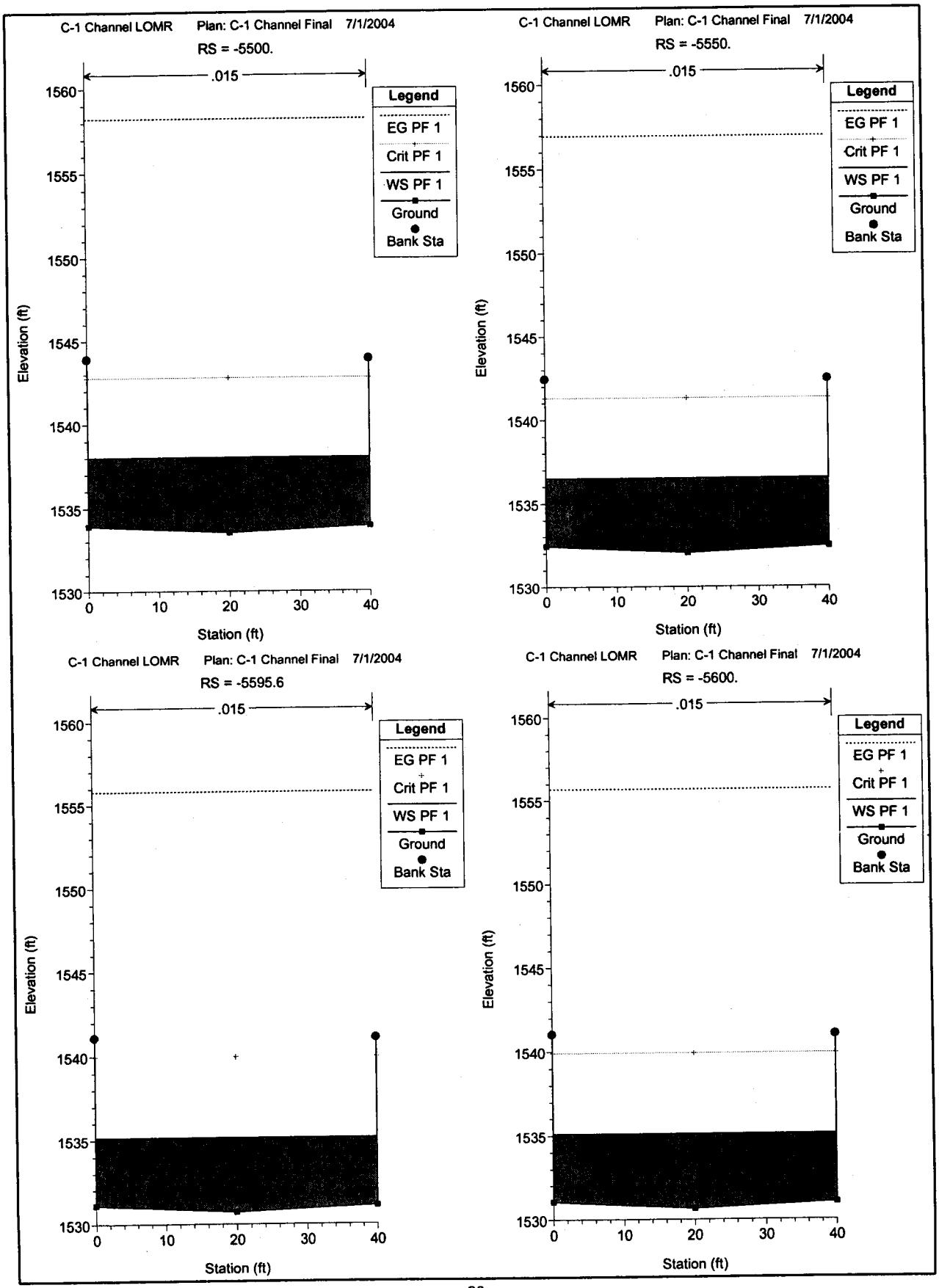
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5500.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5550.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5595.6
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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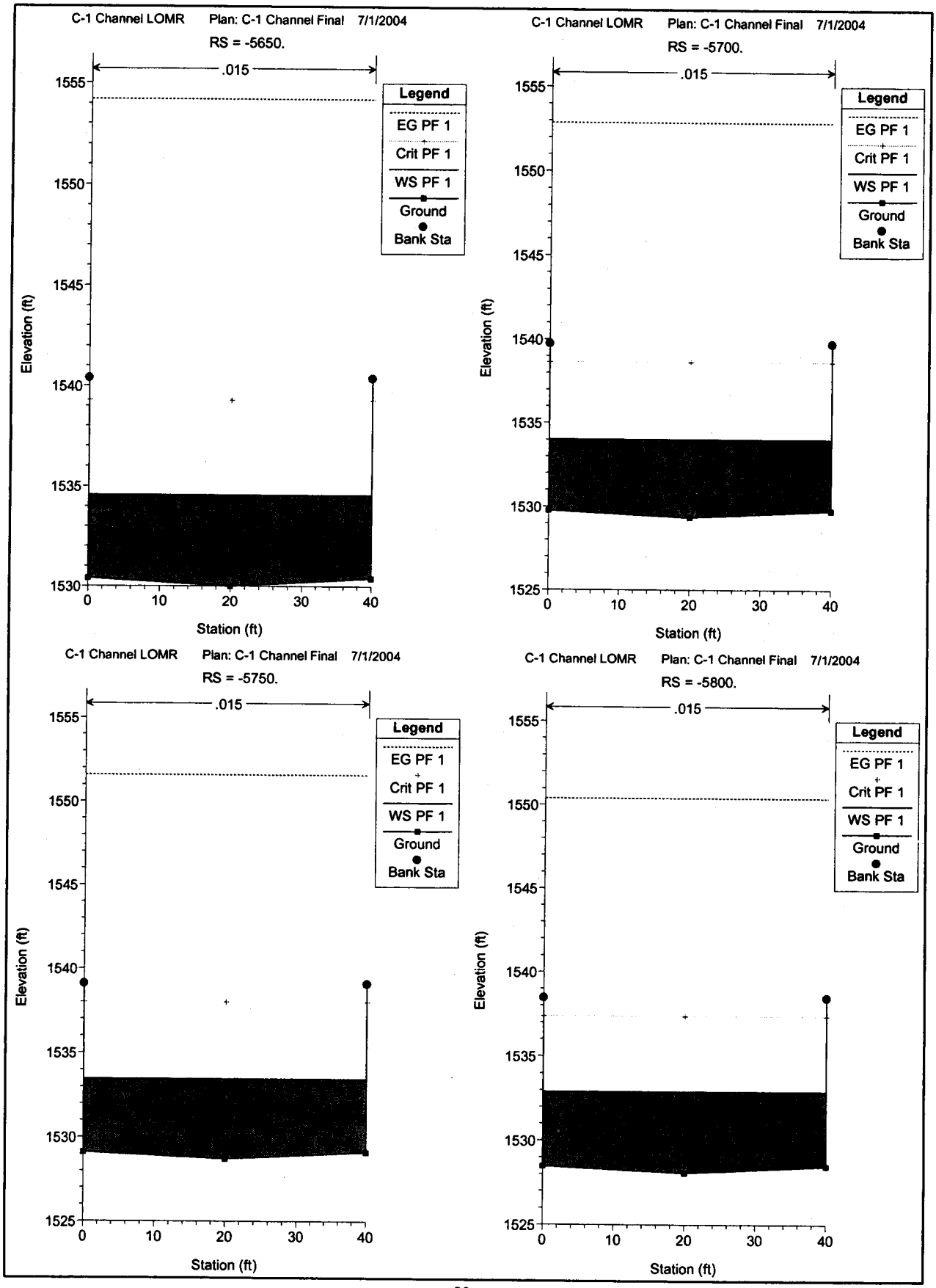
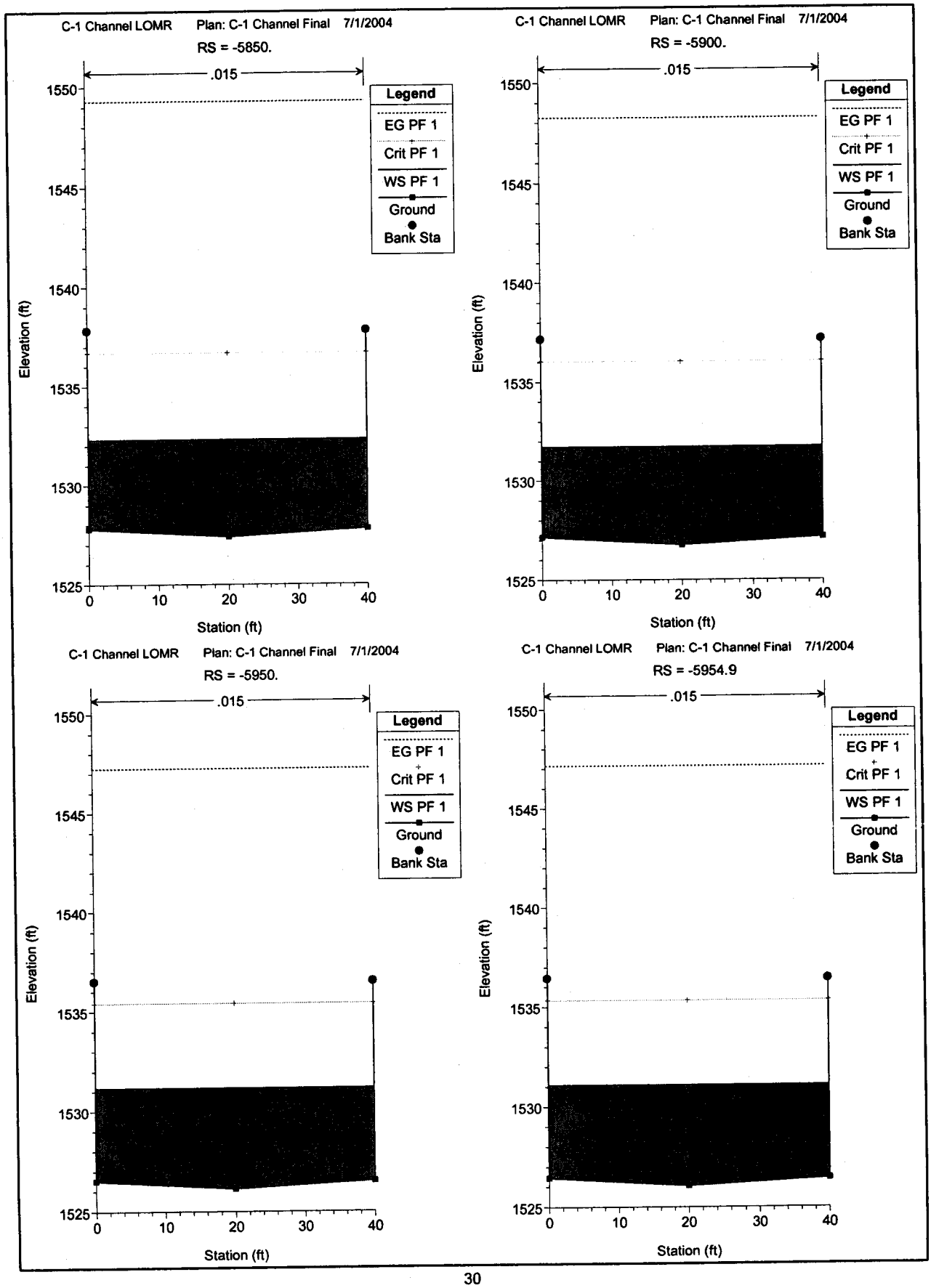
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5650.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5700.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5750.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5800.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5850.
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5900.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -5950.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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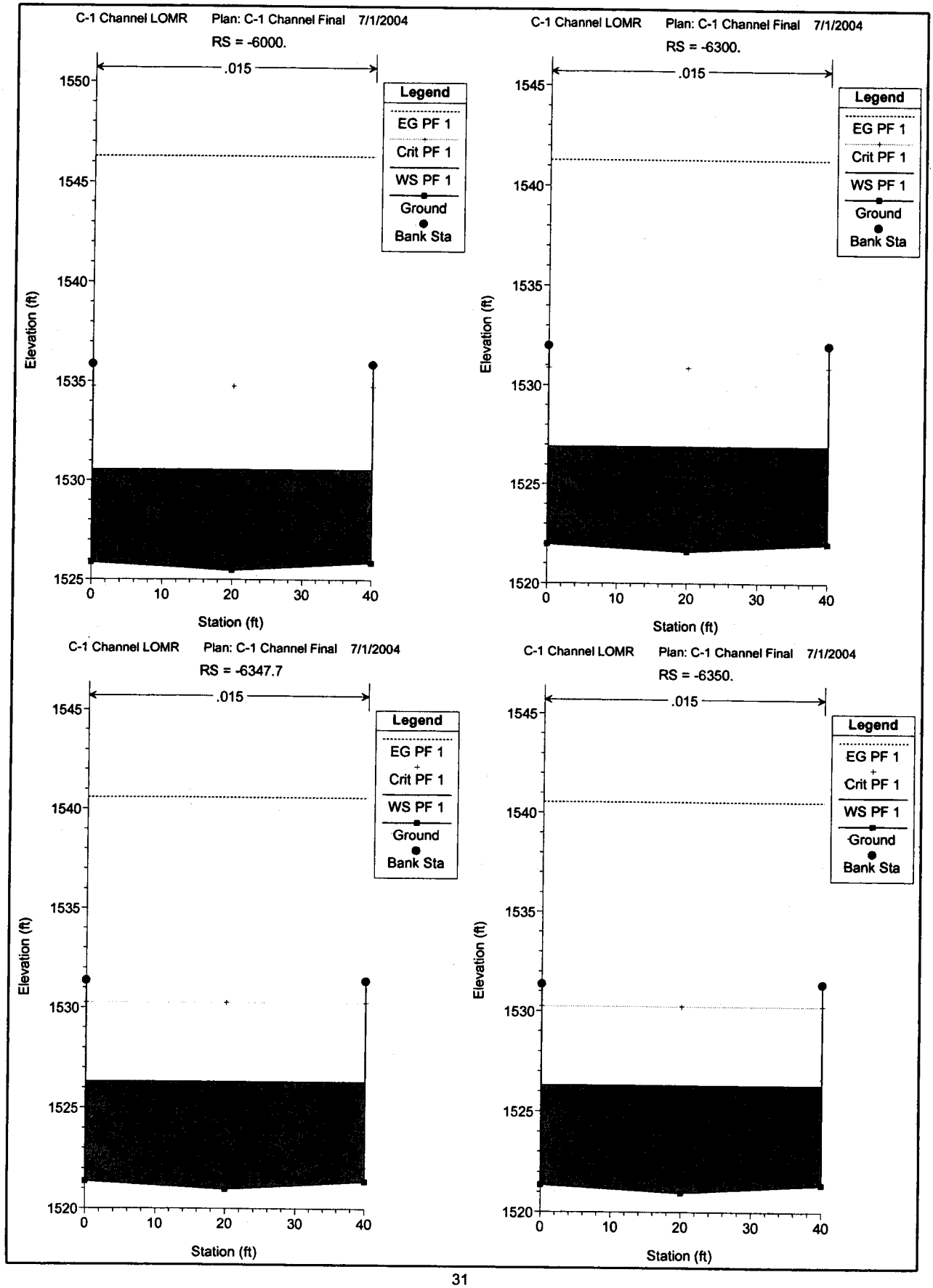
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -6000.
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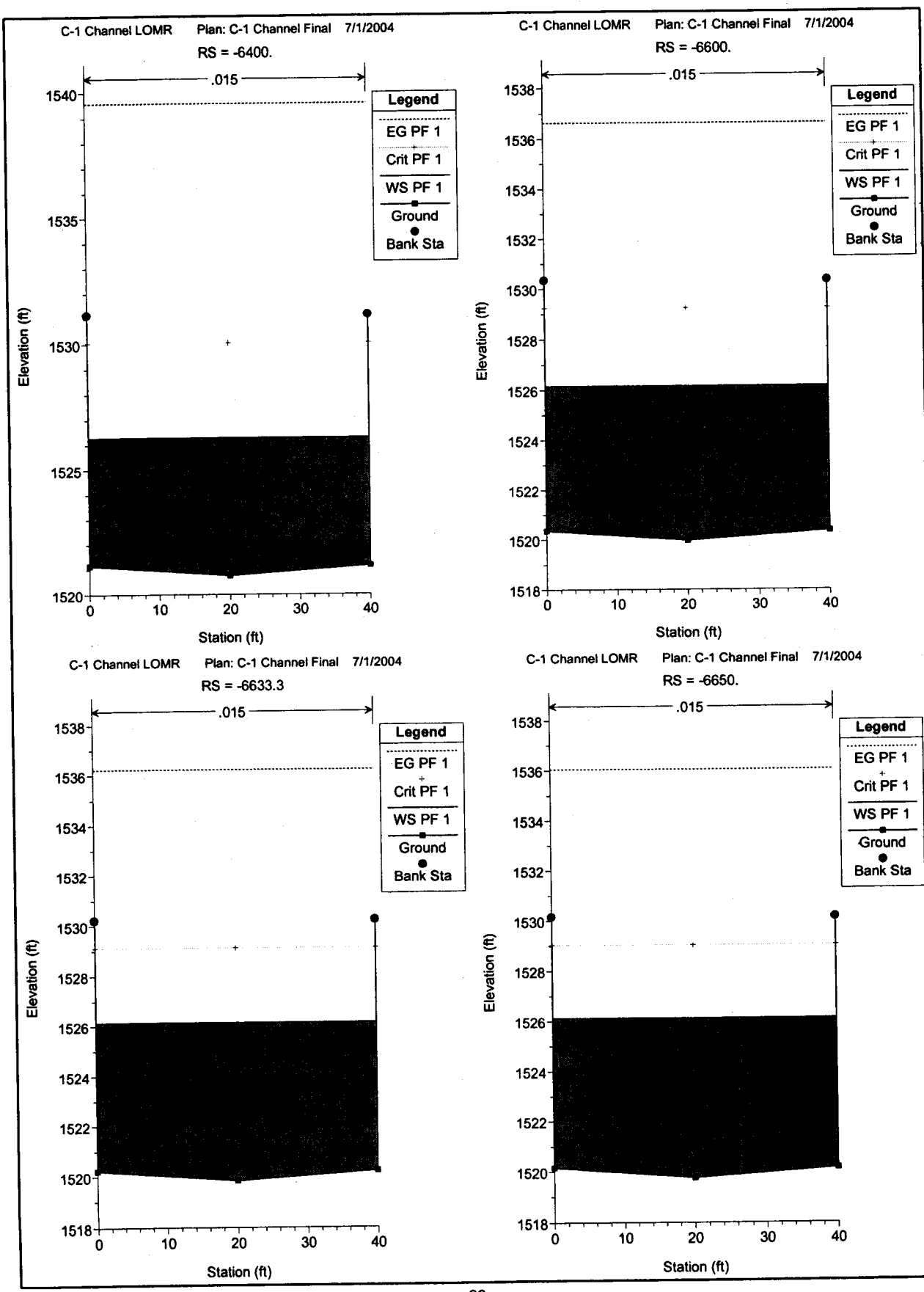
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6300.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6347.7
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6350.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -6400.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6600.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6633.3
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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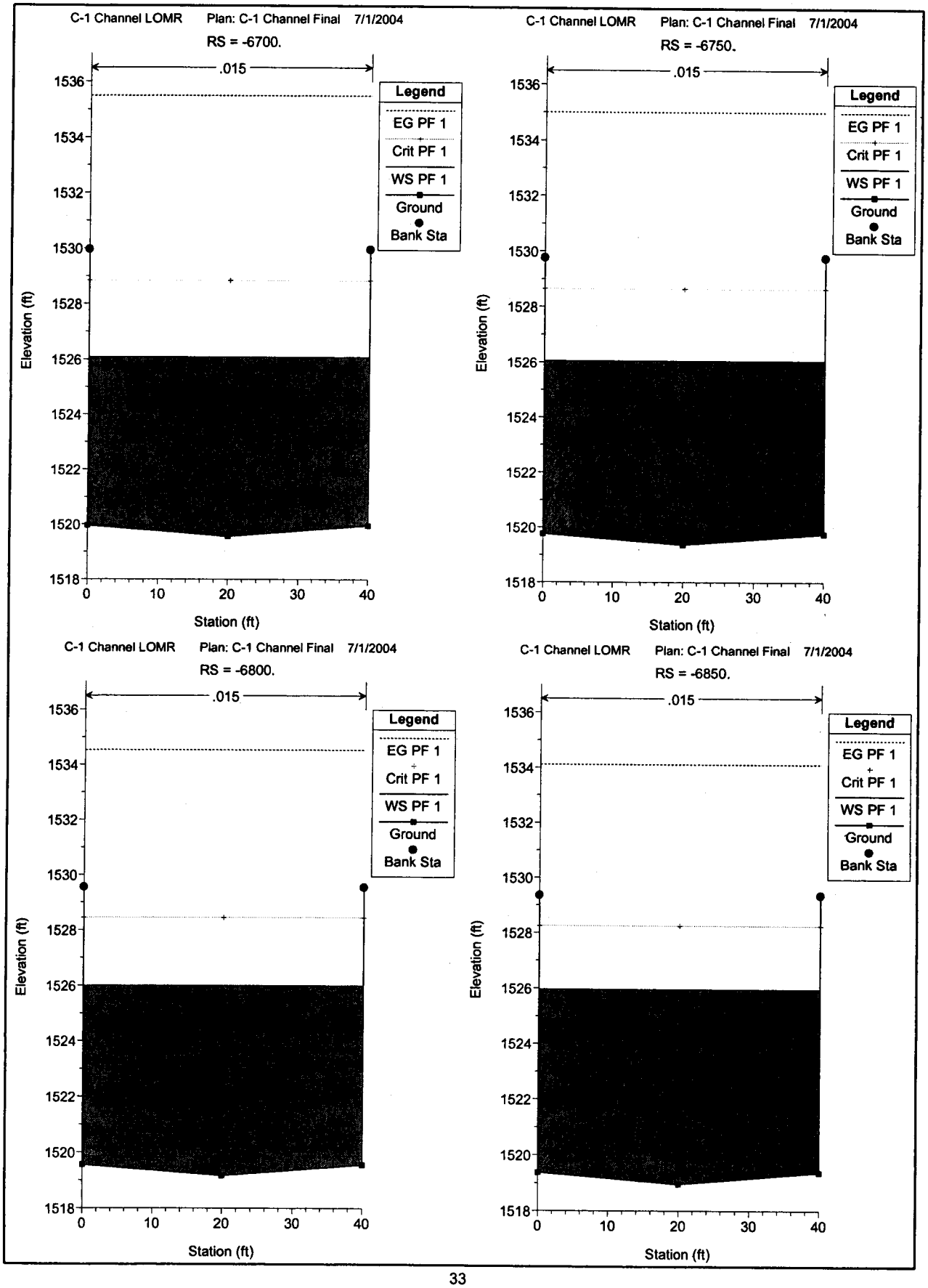
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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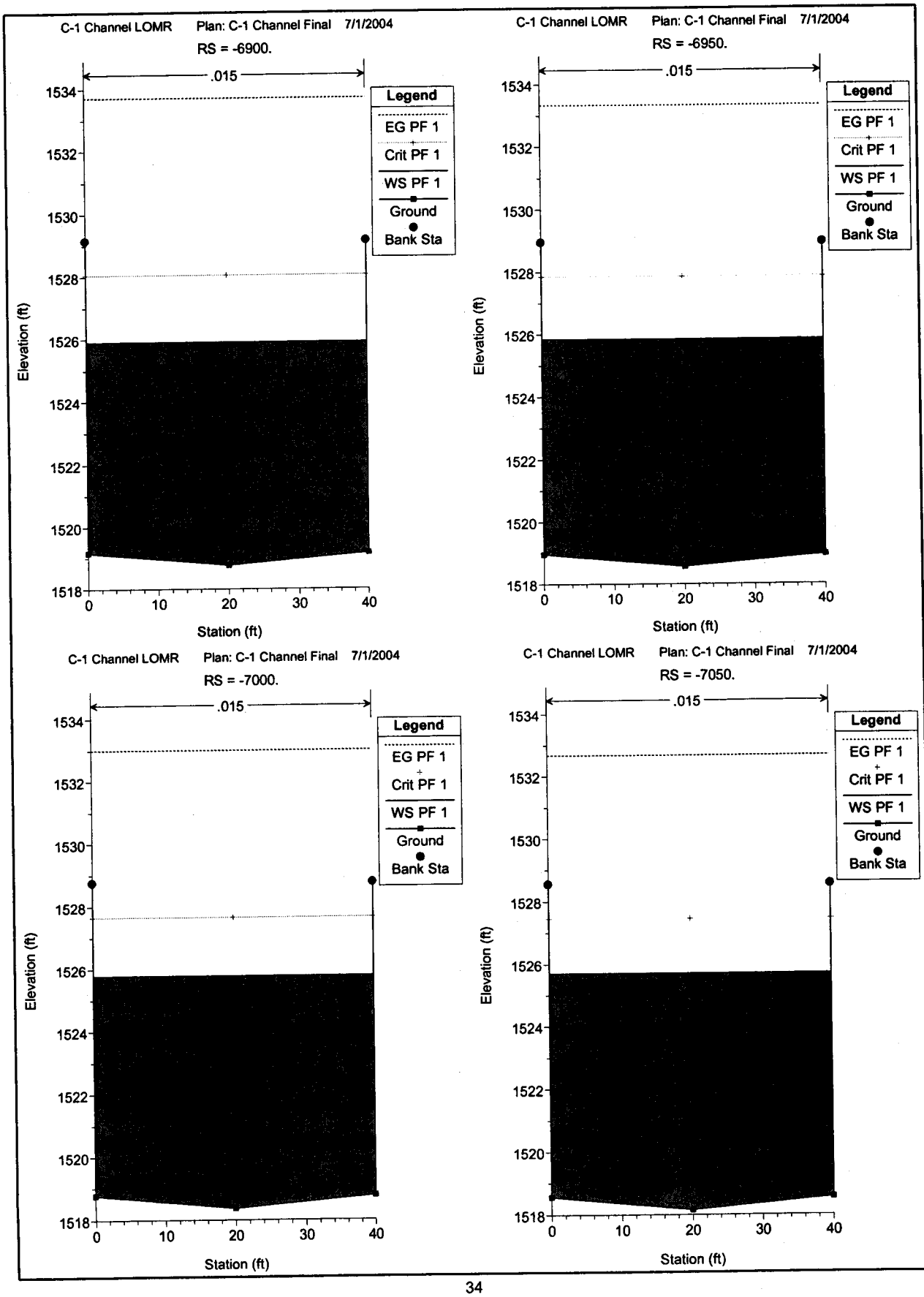
RS = -6700.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6750.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6800.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6850.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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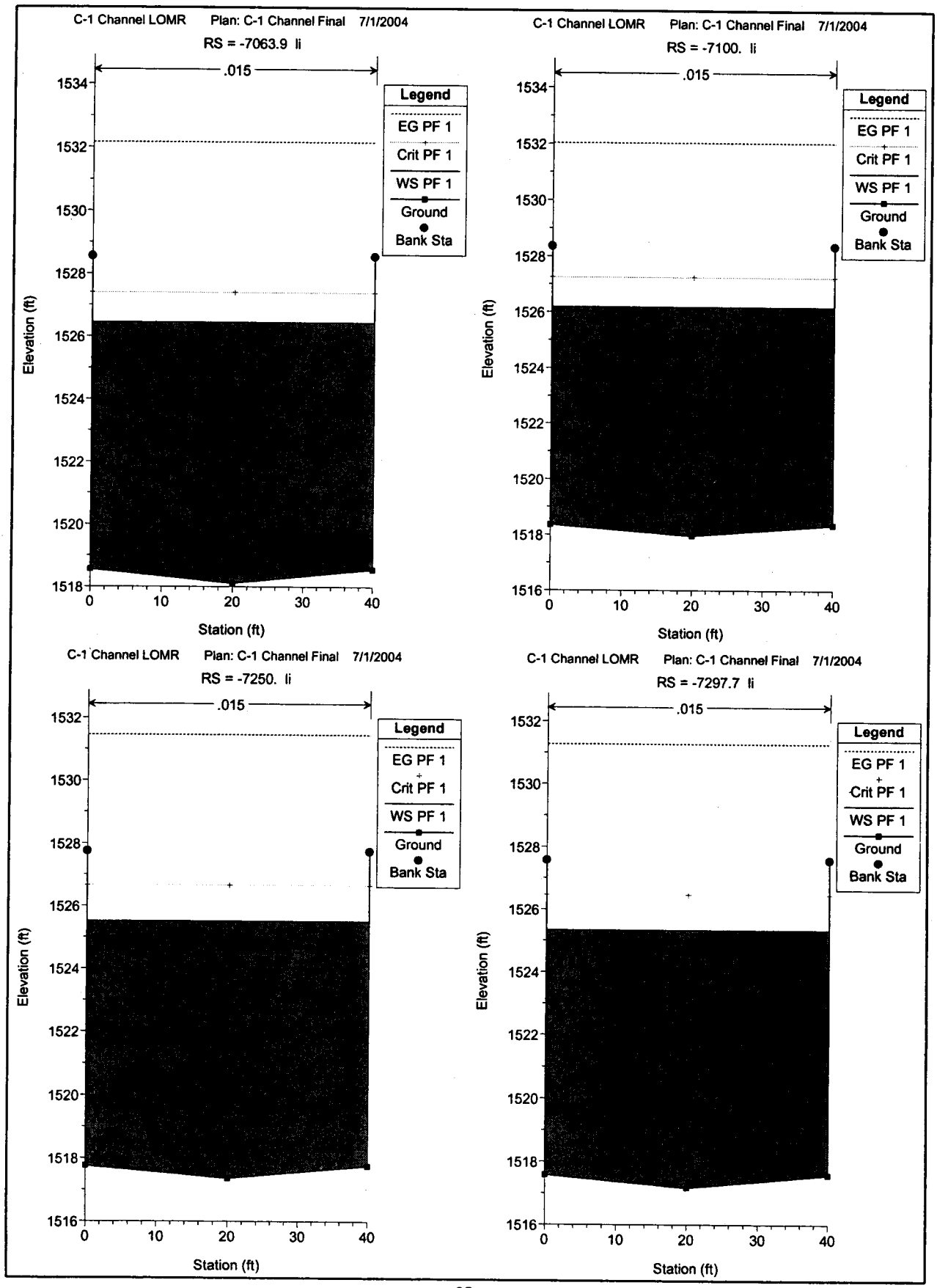
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -6950.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7000.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7050.
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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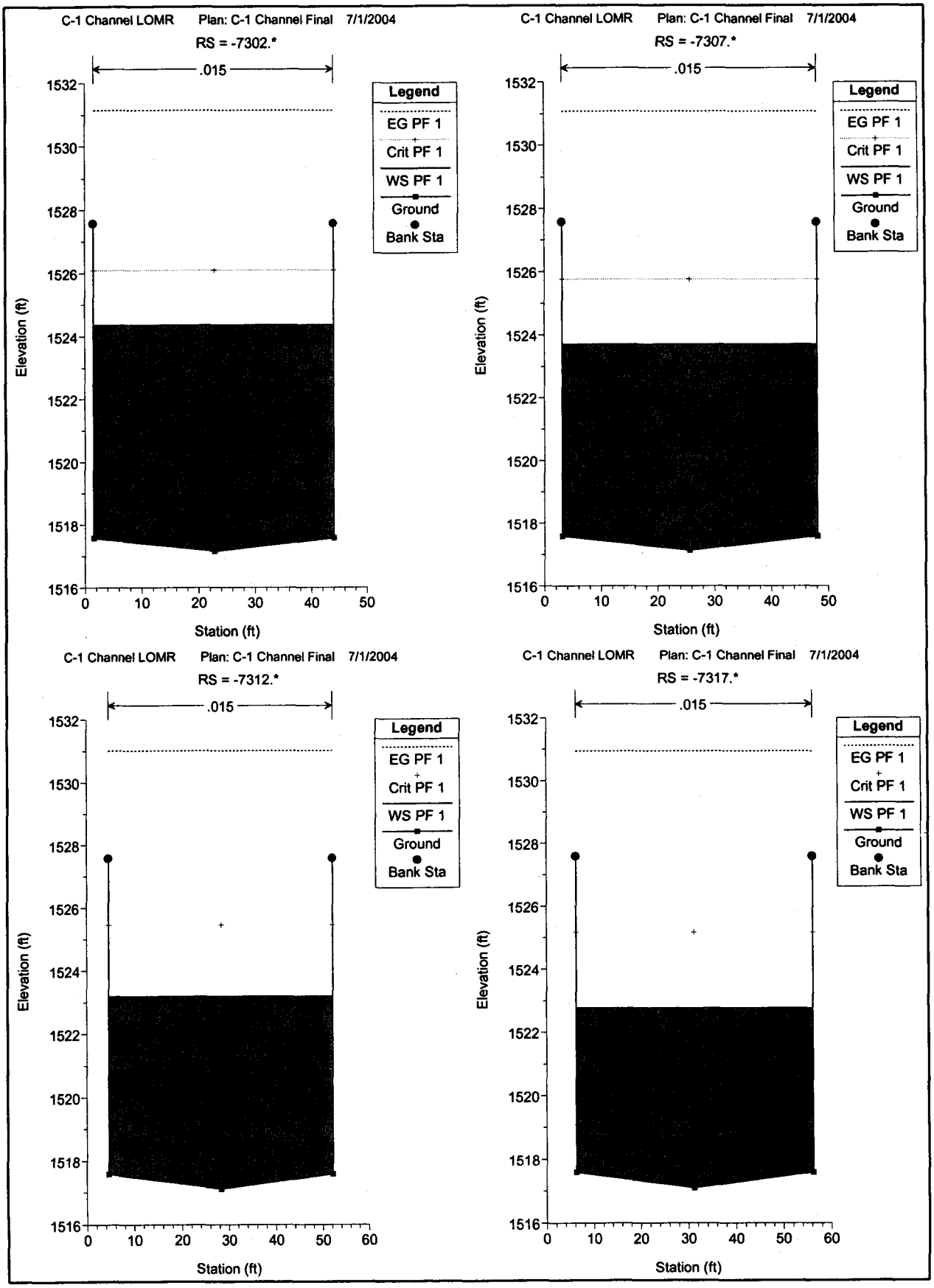
RS = -7063.9 li
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7100. li
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7250. li
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7297.7 li
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7302.*
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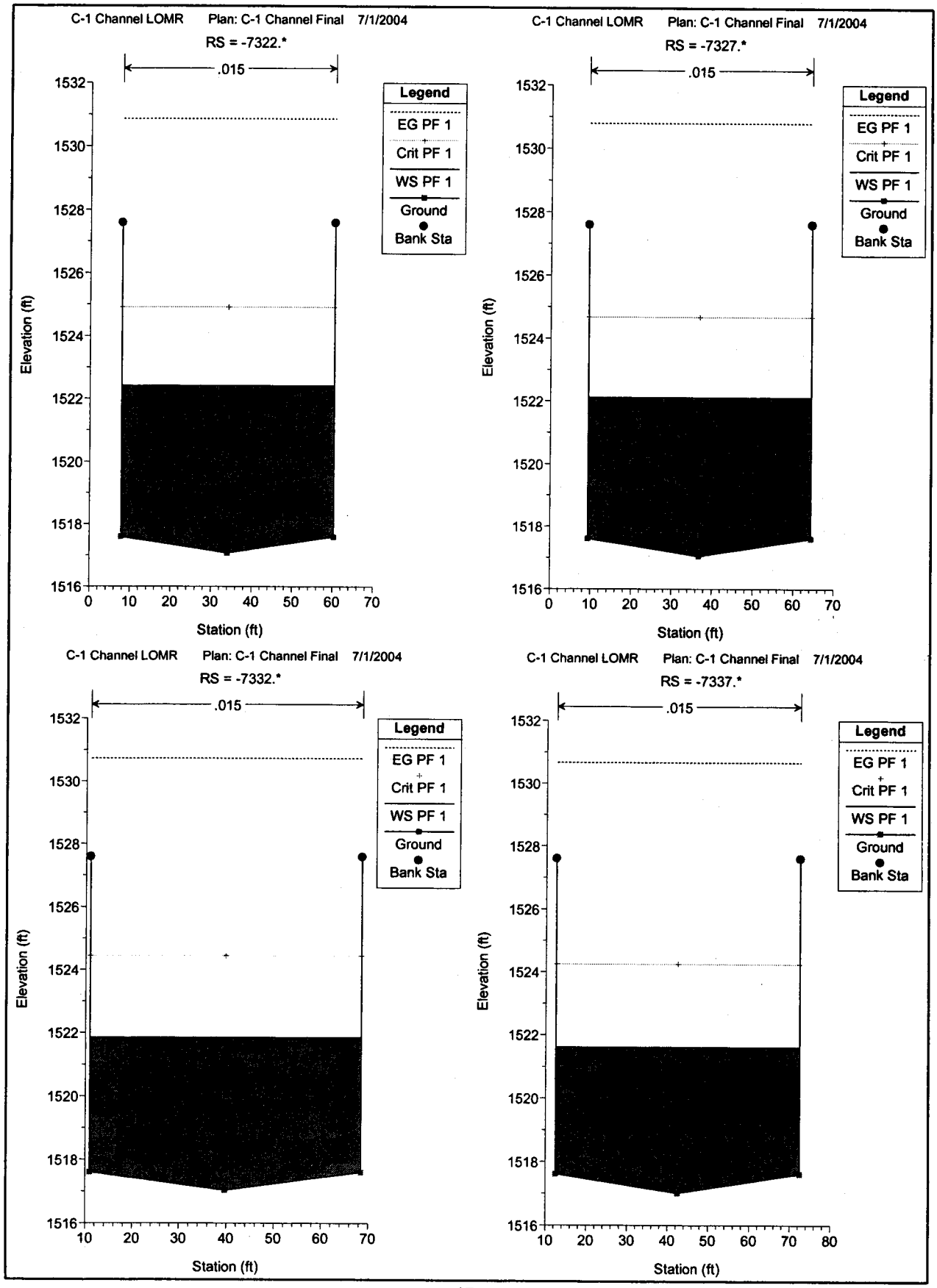
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7307.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7312.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7317.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -7322.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7327.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7332.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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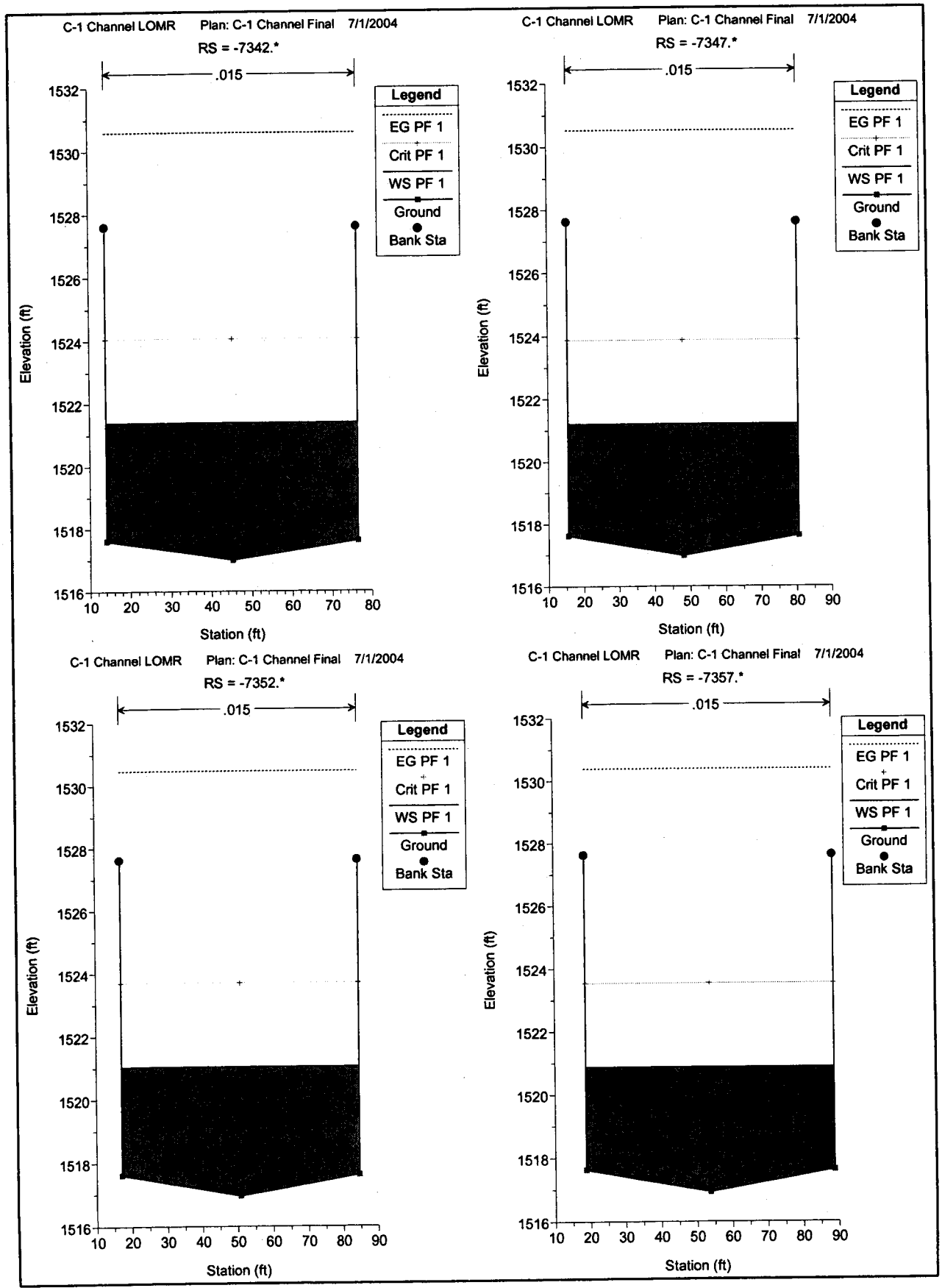
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -7342.*
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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7347.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7352.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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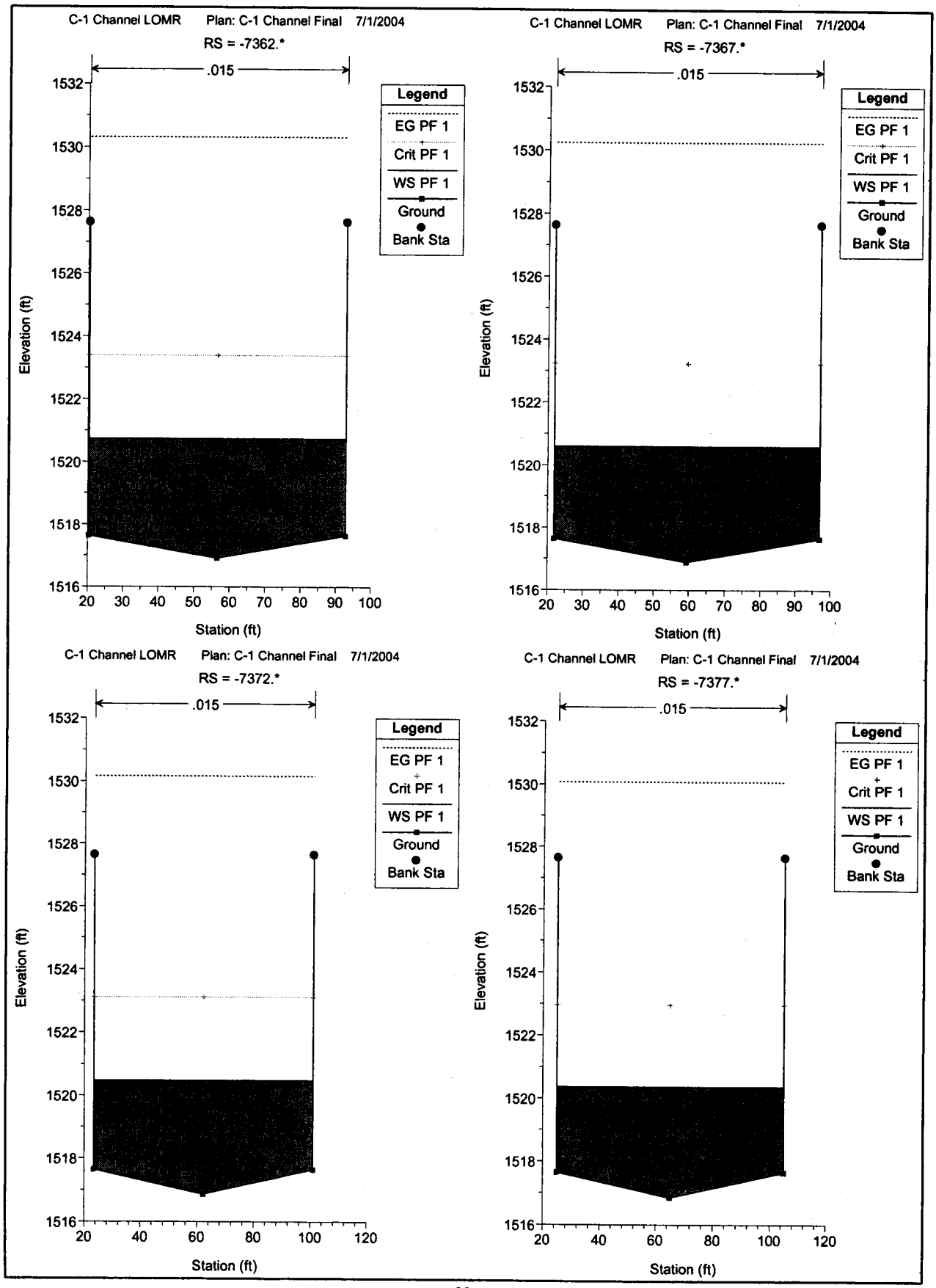
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7367.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7372.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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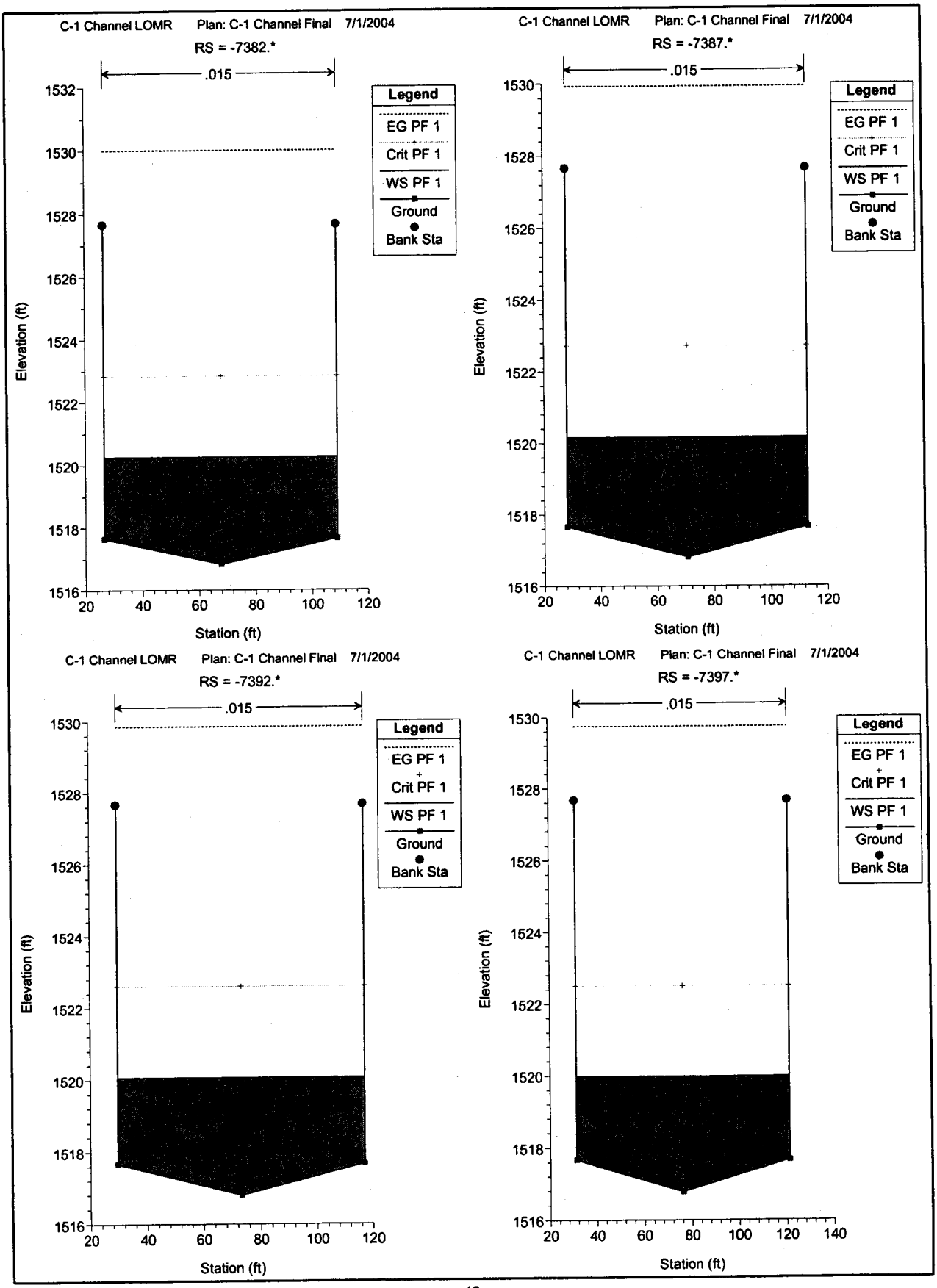
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -7382.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7387.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7392.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
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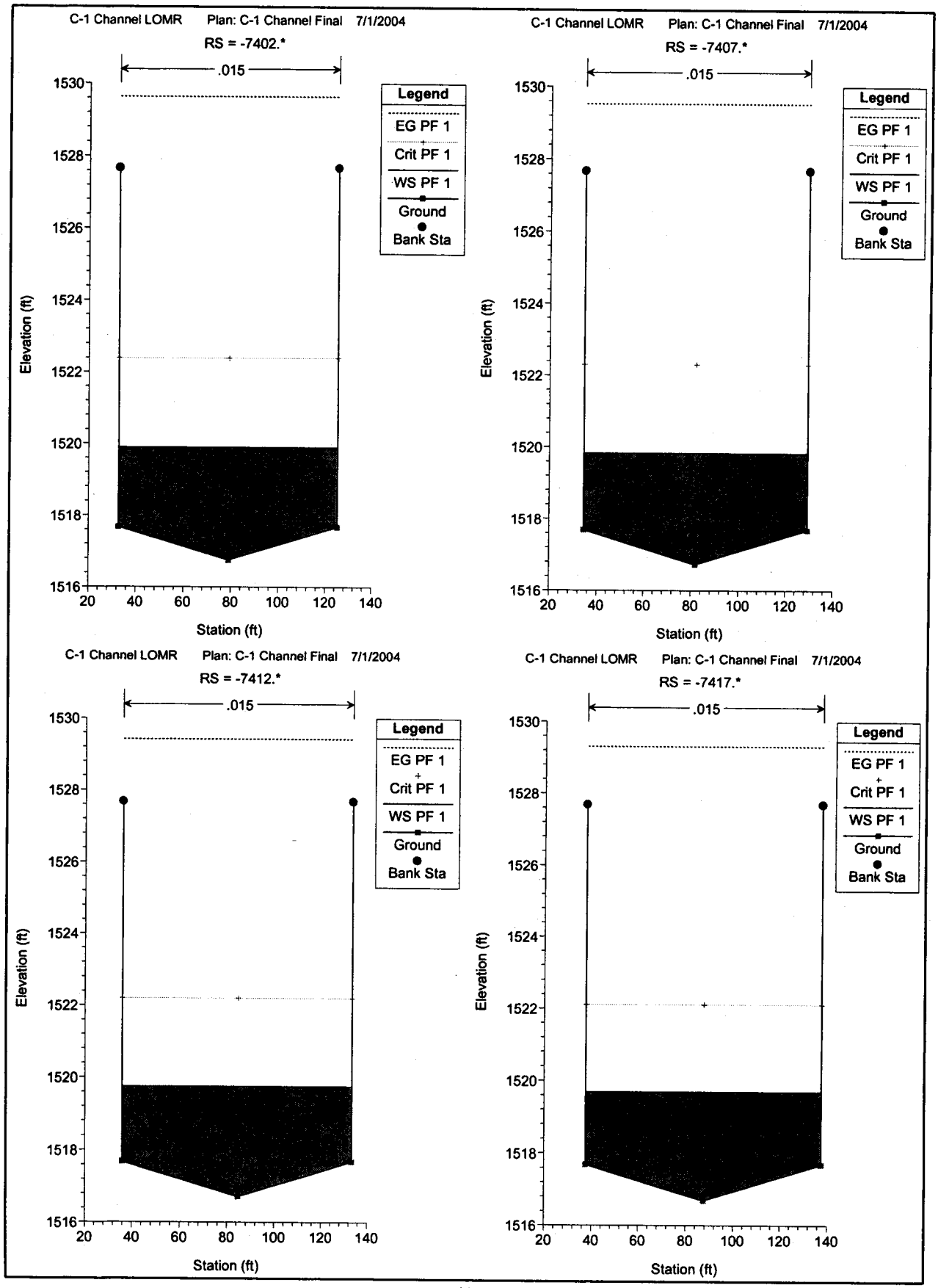
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
EG PF 1
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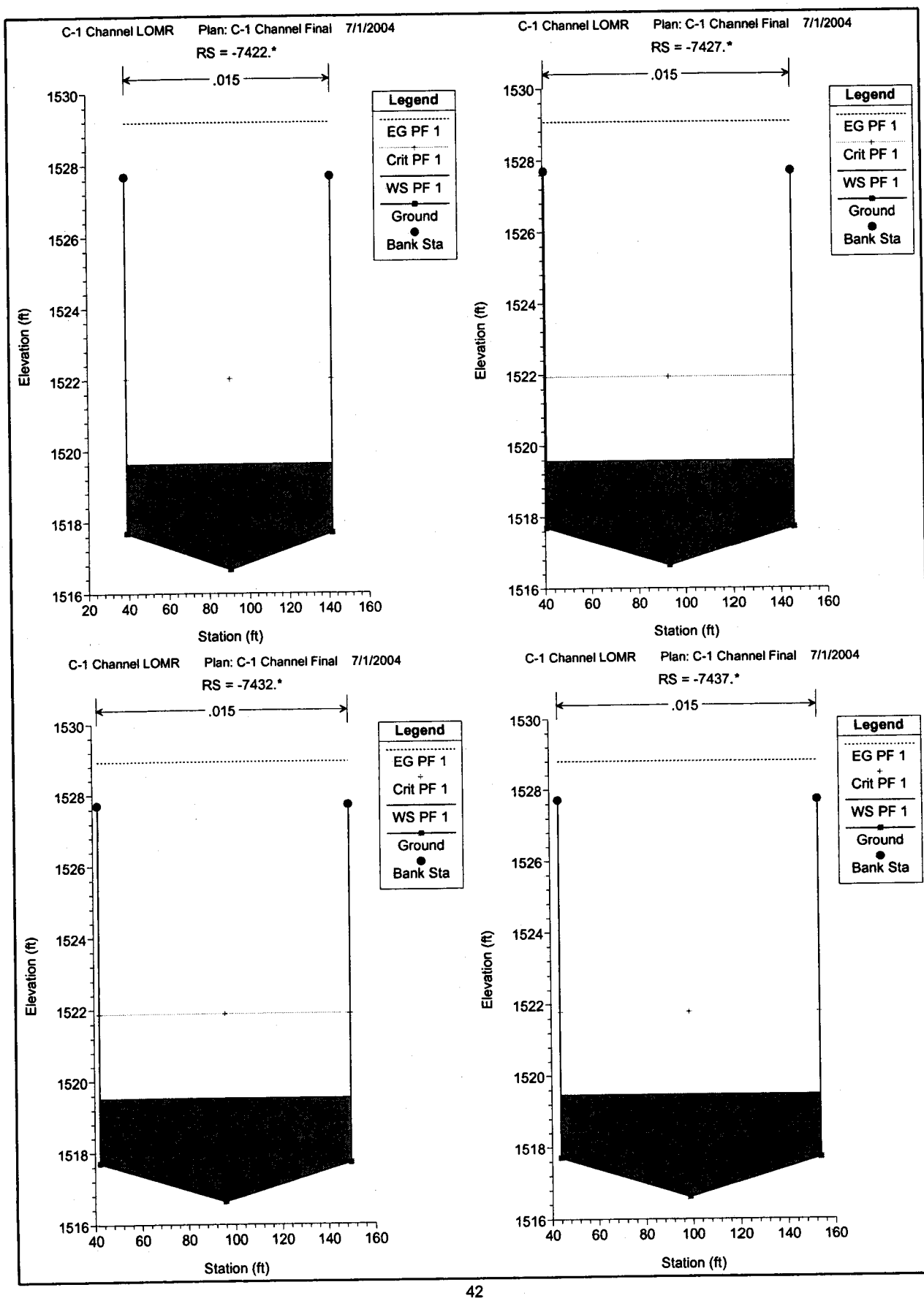
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7407.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7412.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7417.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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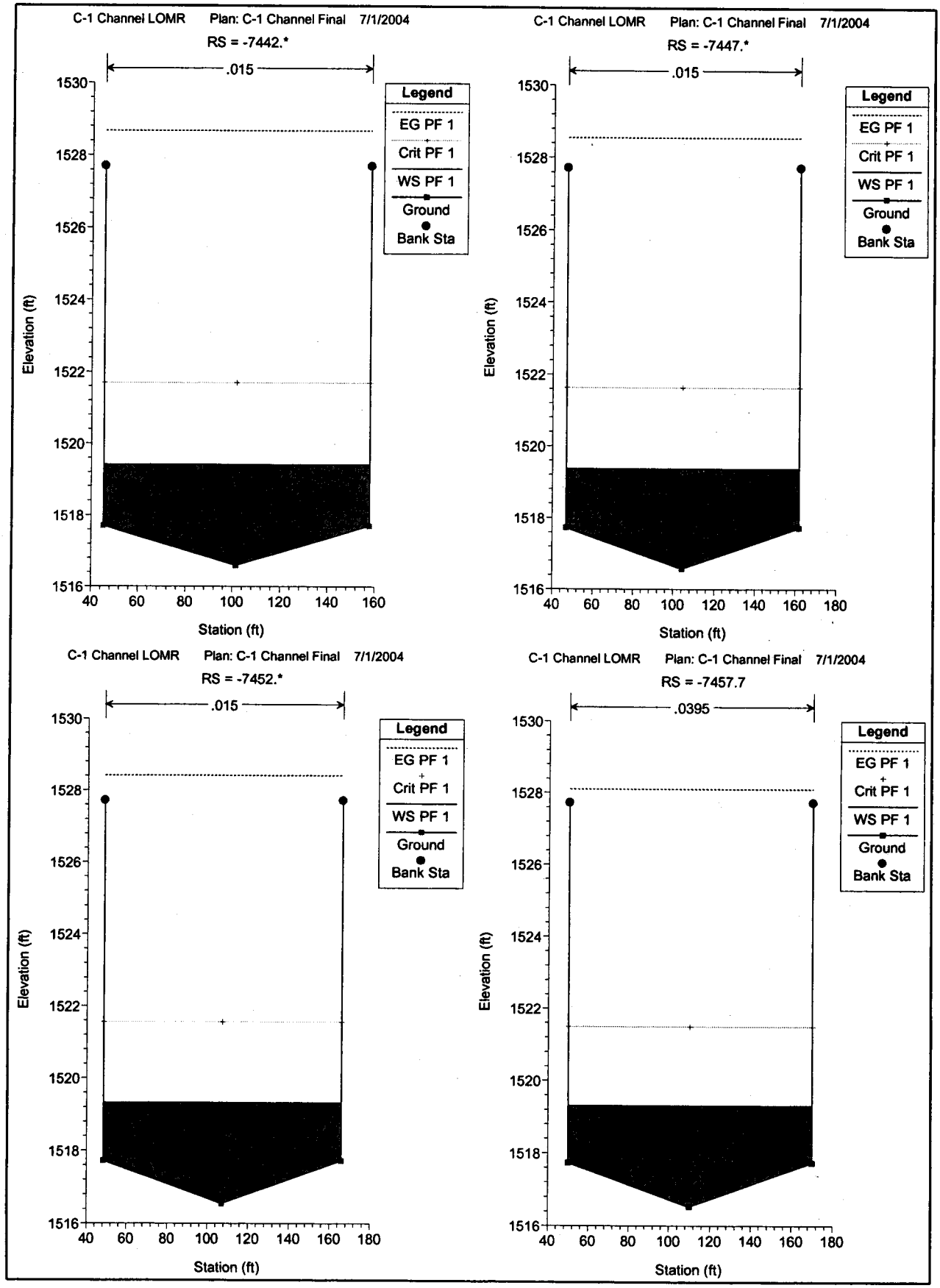
RS = -7422.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7427.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7432.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7437.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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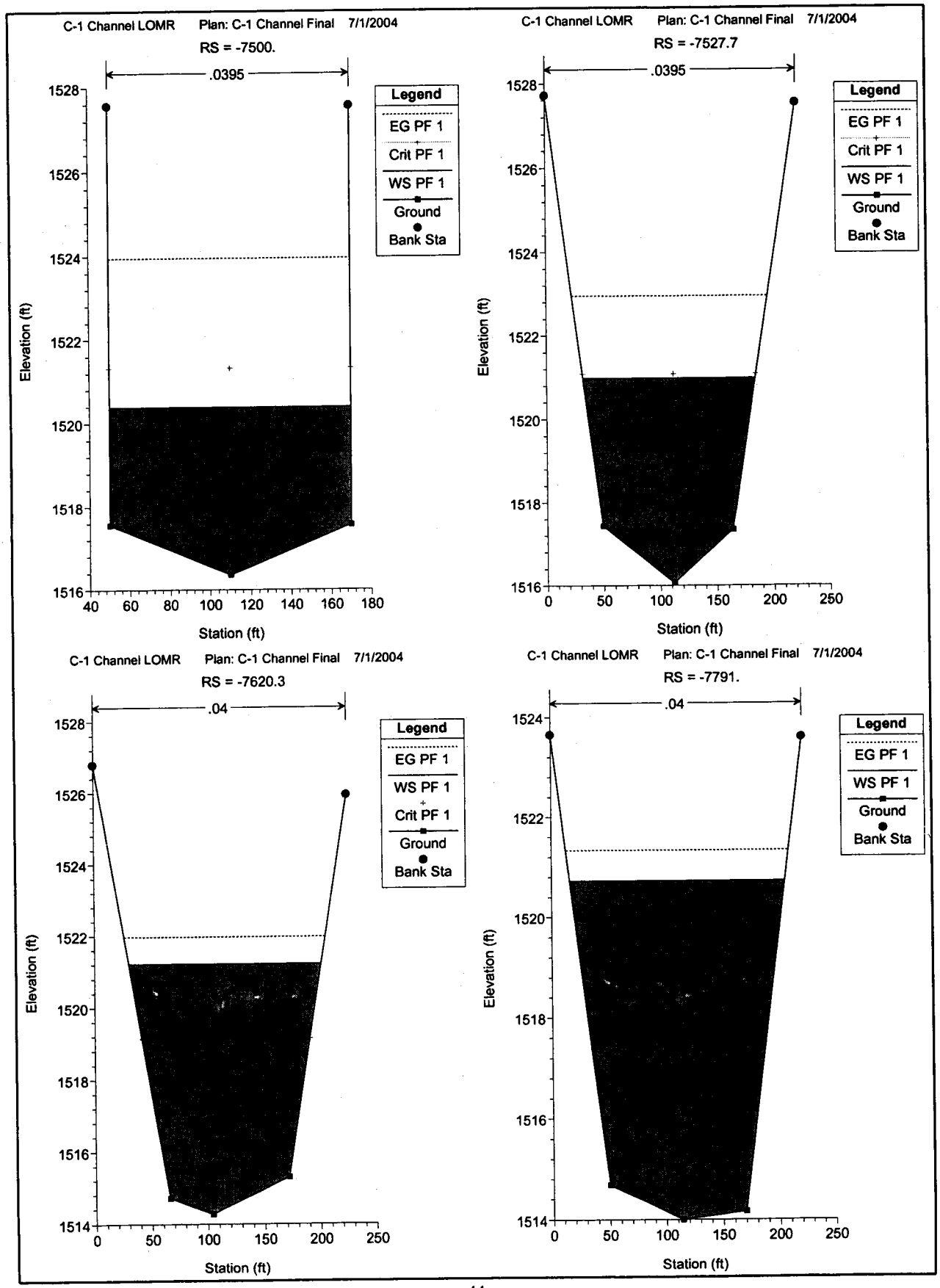
RS = -7442.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7447.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7452.*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7457.7
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = -7500.
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7527.7
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7620.3
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -7791.
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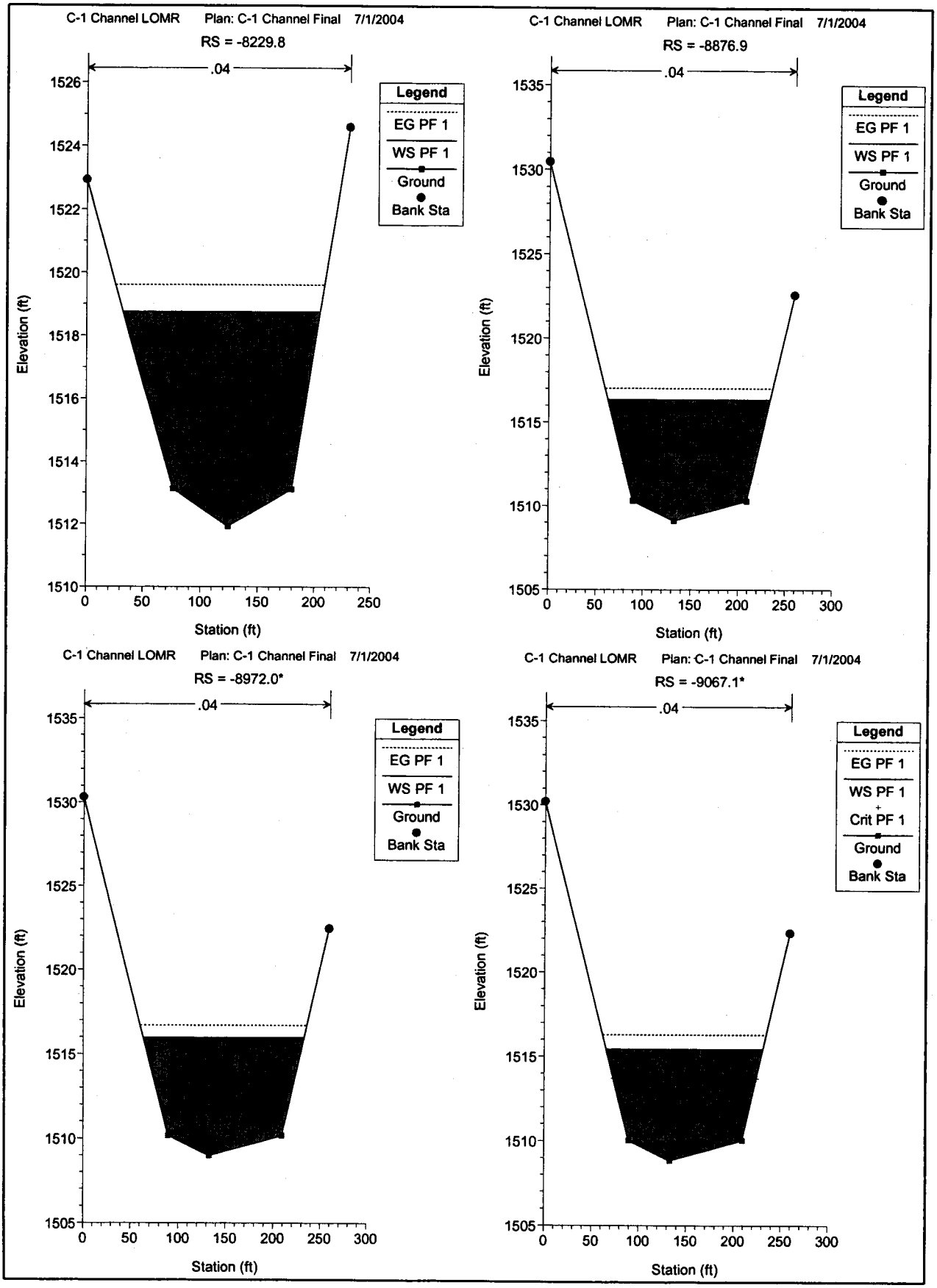
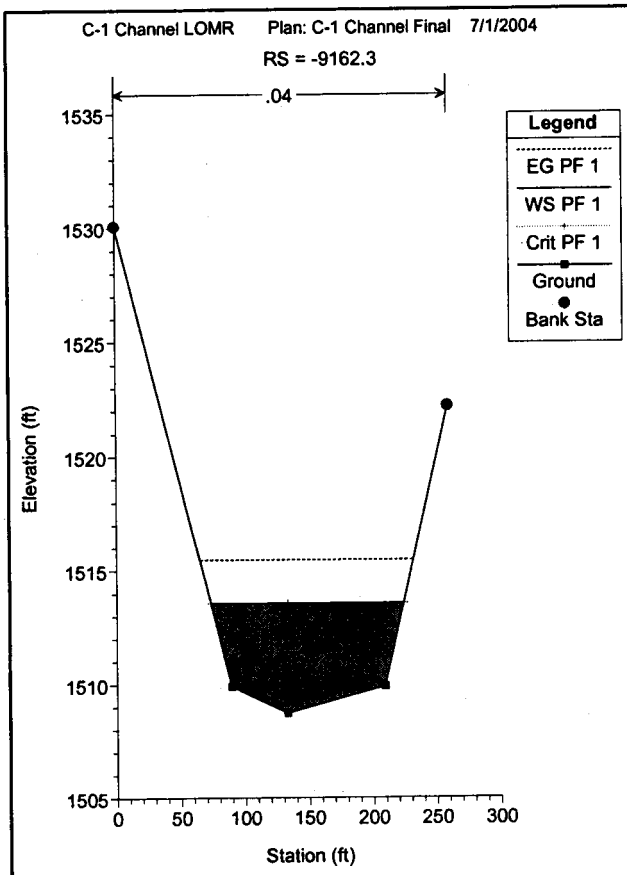
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -8229.8
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -8876.9
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -8972.0*
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -9067.1*
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


C-1 Channel LOMR Plan: C-1 Channel Final 7/1/2004
RS = -9162.3
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1535
1530
1525
1520
1515
1510
1505
0
50
100
150
200
250
300
Station (ft)

CHECKRAS

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.prj
Plan File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.p02
Geometry File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01
Flow File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01
Report File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.nt
Selected profiles: PF 1
Date: 7/1/2004
Time: 11:06:13 AM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP
C-1 Channel,1						
8		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
7		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
6		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5.5	Culvert-Up	-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5.5	Culvert-Dn	-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
4		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
3		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2.25		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1.75		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-2		0.03	0.028	0.03	0.1	0.3
-4.5		0.03	0.028	0.03	0.1	0.3
-8		0.03	0.028	0.03	0.1	0.3
-10.5		0.03	0.028	0.03	0.1	0.3
-13		0.03	0.028	0.03	0.1	0.3
-16		0.03	0.028	0.03	0.1	0.3
-17		0.03	0.028	0.03	0.1	0.3
-21		0.03	0.028	0.03	0.1	0.3
-23		0.03	0.028	0.03	0.1	0.3
-24		0.03	0.028	0.03	0.1	0.3
-27		0.03	0.028	0.03	0.1	0.3
-27.5		0.03	0.015	0.03	0.1	0.3
-28		0.03	0.015	0.03	0.1	0.3
-28.5		0.03	0.015	0.03	0.1	0.3
-999.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1009		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1018		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1027		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1037		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1046		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1056		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1065		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1075		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1084		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1094		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1103		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1113		-----	0.015	0.015	0.1	0.3

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.prj
Plan File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.p02
`eometry File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01
low File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01
Report File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.nt
Selected profiles: PF 1
Date: 7/1/2004
Time: 11:06:13 AM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP
C-1 Channel,1						
8		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
7		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
6		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5.5	Culvert-Up	-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5.5	Culvert-Dn	-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
5		-----	0.015	0.015	0.3	0.5
		-----	0.015	-----		
4		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
3		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2.25		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
2		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1.75		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
1		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-2		0.03	0.028	0.03	0.1	0.3
-4.5		0.03	0.028	0.03	0.1	0.3
-8		0.03	0.028	0.03	0.1	0.3
-10.5		0.03	0.028	0.03	0.1	0.3
-13		0.03	0.028	0.03	0.1	0.3
-16		0.03	0.028	0.03	0.1	0.3
-17		0.03	0.028	0.03	0.1	0.3
-21		0.03	0.028	0.03	0.1	0.3
-23		0.03	0.028	0.03	0.1	0.3
-24		0.03	0.028	0.03	0.1	0.3
-27		0.03	0.028	0.03	0.1	0.3
-27.5		0.03	0.015	0.03	0.1	0.3
-28		0.03	0.015	0.03	0.1	0.3
-28.5		0.03	0.015	0.03	0.1	0.3
-999.5		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1009		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1018		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1027		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1037		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1046		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1056		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1065		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1075		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1084		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1094		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1103		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
-1113		-----	0.015	0.015	0.1	0.3

-1122	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1132	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1141	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1151	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1160	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1170	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1179.5	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1204.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1299.8	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1320	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1500	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1729.8	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1800	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-1908.1	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2000	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2200	-----	0.015	0.015	0.3	0.5
	-----	0.015	-----		
-2347.4	-----	0.015	0.015	0.3	0.5
	-----	0.015	-----		
-2359.4 Bridge-Up	-----	0.015	0.015	0.3	0.5
	-----	0.015	-----		
-2359.4 Bridge-Dn	-----	0.015	0.015	0.3	0.5
	-----	0.015	-----		
-2424.4	-----	0.015	0.015	0.3	0.5
	-----	0.015	-----		
-2430.6	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2440	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2449	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2458	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2468	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2477	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2486	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2496	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2505	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2515	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2524	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2533	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2543	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2552	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2562	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2571	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2580	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2590.2	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2599	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2607	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2616	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2625	-----	0.015	0.015	0.1	0.3

-2634	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2642	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2651.6	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-2704.6	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3084.2	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3104.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3154.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3204.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3304.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3404.4	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3500	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3600	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3650	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3700	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3750	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3800	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3850	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3900	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-3950	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-4000	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-4950	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-4997.7	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5000	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5450	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5489.1	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5500	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5550	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5595.6	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5600	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5650	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5700	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5750	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5800	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5850	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5900	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5950	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-5954.9	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6000	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6300	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6347.7	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6350	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6400	-----	0.015	0.015	0.1	0.3

-6600	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6633.3	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6650	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6700	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6750	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6800	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6850	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6900	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-6950	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7000	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7050	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7063.9	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7100	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7250	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7297.7	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7302	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7307	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7312	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7317	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7322	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7327	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7332	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7337	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7342	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7347	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7352	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7357	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7362	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7367	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7372	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7377	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7382	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7387	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7392	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7397	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7402	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7407	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7412	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7417	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7422	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7427	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7432	-----	0.015	0.015	0.1	0.3

-7437	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7442	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7447	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7452	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
-7457.7	-----	0.0395	0.0395	0.1	0.3
	-----	0.0395	-----		
-7500	-----	0.0395	0.0395	0.1	0.3
	-----	0.0395	-----		
-7527.7	-----	0.0395	0.0395	0.1	0.3
	-----	0.0395	-----		
-7620.3	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-7791	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-8229.8	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-8876.9	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-8972	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-9067.1	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		
-9162.3	-----	0.04	0.04	0.1	0.3
	-----	0.04	-----		

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.03	0.03
Right Overbank n Value:	0.015	0.04
Channel n Value:	0.015	0.04
Contraction Coefficient:	0.1	0.3
Expansion Coefficient:	0.3	0.5

\OUGHNESS COEFFICIENT CHECK

RS: 8
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 8
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 7
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 7
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 6
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 5.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 5.5
NT RC 03 Channel n value is equal to or less than 0.025

The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 5.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

N/A

RS: 5.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 3
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 3
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 2.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 2.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 2.25
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 2.25
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 2
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

S: 2
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 1.75
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.

```
RS:       1.75
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:       1.5
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       1.5
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:       1
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       1
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:      -2
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -4.5
 T RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -4.5
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -8
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -8
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -10.5
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -10.5
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -13
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

 S:      -13
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -16
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.
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RS:     -16
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -17
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -17
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -21
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -21
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -23
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -23
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -24
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -24
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -27
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -27
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -27.5
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -27.5
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -27.5
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -28
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -28
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -28
NT RC 03 Channel n value is equal to or less than 0.025
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The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -28.5
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -28.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -28.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -999.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -999.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1009
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1009
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1018
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1018
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1027
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1027
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1037
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1037
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

S: -1046
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1046
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a

RS: -1056
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

.S: -1056
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1065
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1065
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1075
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1075
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1084
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1084
T RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1094
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1094
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1103
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1103
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1113
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1113
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1122
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1132
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1132
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1141
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1141
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1151
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1151
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1160
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1160
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1170
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1170
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1179.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1179.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1204.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -1204.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -1299.8

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         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1299.8
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -1320
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1320
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -1500
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1500
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -1729.8
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1729.8
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -1800
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1800
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -1908.1
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -1908.1
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2000
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2000
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2200
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2200
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
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concrete lined channel.

RS: -2347.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2347.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2359.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2359.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2359.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2359.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2424.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

S: -2424.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2430.6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2430.6
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2440
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2440
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2449
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2449
T RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2458
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2458
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2468
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2468
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2477
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2477
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2486
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2486
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2496
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2496
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2505
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2505
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2515
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2515
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -2524
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -2524
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

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NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2533
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2543
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2543
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2552
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2552
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2562
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2562
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2571
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2571
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2580
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2580
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2590.2
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2590.2
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2599
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2599
NT RC 03 Channel n value is equal to or less than 0.025
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         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2607
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2607
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2616
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2616
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2625
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2625
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2634
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2634
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2642
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2642
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2651.6
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -2651.6
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -2704.6
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

 S:      -2704.6
 T RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3084.2
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
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RS: -3084.2
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3104.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3104.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3154.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3154.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3204.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3204.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

:S: -3304.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3304.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3404.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3404.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3500
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3500
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -3600
T RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -3600
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

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RS:     -3650
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3650
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3700
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3700
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3750
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3750
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3800
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3800
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3850
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3850
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3900
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3900
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -3950
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -3950
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -4000
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:     -4000
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         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -4950
'T RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -4950
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -4997.7
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -4997.7
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5000
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5000
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5450
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5450
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5489.1
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5489.1
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5500
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5500
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5550
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5550
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5595.6
NT RC 01 Right overbank n value is less than 0.035
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         The n value should be reevaluated.

RS:      -5595.6
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5600
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5600
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5650
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5650
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5700
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5700
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5750
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5750
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5800
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5800
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -5850
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5850
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

 S:     -5900
.T RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -5900
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
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RS: -5950
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

S: -5950
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -5954.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -5954.9
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6000
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -6000
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6300
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -6300
T RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6347.7
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -6347.7
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6350
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -6350
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6400
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -6400
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -6600
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

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NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6633.3
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6633.3
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6650
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6650
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6700
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6700
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6750
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6750
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6800
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6800
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6850
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6850
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6900
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6900
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -6950
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         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -6950
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7000
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7000
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7050
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7050
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7063.9
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7063.9
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7100
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7100
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7250
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7250
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7297.7
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7297.7
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7302
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7302
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
```

concrete lined channel.

RS: -7307
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7307
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7312
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7312
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7317
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7317
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7322
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

S: -7322
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7327
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7327
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7332
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7332
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7337
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7337
T RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7342
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7342
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

S: -7347
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7347
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7352
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7352
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7357
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7357
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7362
T RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7362
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7367
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7367
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7372
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7372
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: -7377
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7377
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

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NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7382
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7387
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7387
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7392
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7392
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7397
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7397
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7402
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7402
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7407
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7407
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7412
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7412
NT RC 03 Channel n value is equal to or less than 0.025
         The n value of the channel is usually larger than 0.025.
         The n value should be reevaluated it if is not representing a
         concrete lined channel.

RS:     -7417
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:      -7417
NT RC 03 Channel n value is equal to or less than 0.025
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The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7422
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7422
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7427
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7427
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7432
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7432
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7437
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7437
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7442
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7442
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7447
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7447
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: -7452
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: -7452
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

TRANSITION LOSS COEFFICIENT CHECK

RS: -2359.4
NT RS 02 The channel n value of 0.015 for the upstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 3.
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 3.
The selection of the n value(s) should be reevaluated.

N/A

RS: -2359.4
NT RS 02 The channel n value of 0.015 for the downstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 2
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 2.
The selection of the n value(s) should be reevaluated.

N/A

---END---

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.prj
Plan File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.p02
Geometry File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01
Flow File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01
Report File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.xs
Selected profiles: PF 1
Date: 7/1/2004
Time: 10:28:14 AM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code
C-1 Channel,1						
8	55.33	55.33	55.33	28	6019	
7	94.26	94.26	94.26	26.41	6019	
6	270.97	270.97	270.97	24.58	6019	
5.5	Culvert #1-Up					
5.5	Culvert #1-Dn					
5	16.01	16.01	16.01	24.58	6019	
4	47.91	47.91	47.91	28	6019	
3	26.77	26.77	26.77	34	6019	
2.5	7	7	7	38	6019	
2.25*	7	7	7	39	6019	B
2	18	18	18	40	6019	B
1.75	23	23	23	40	6019	B
1.5	28	28	28	40	6019	B
1	26	26	26	40	6019	
-2	250	250	250	40.23	6019	
-4.5	349.96	349.96	349.96	35.36	6019	
-8	250.03	250.03	250.03	33.56	6019	
-10.5	250	250	250	33.55	6019	
-13	300	300	300	40.26	6019	
-16	100	100	100	75.99	6019	
-17	400	400	400	50.25	6019	
-21	200	200	200	84.5	6019	
-23	100	100	100	89.63	6019	
24	300	300	300	77.39	6019	
-27	50	50	50	115.85	6019	
-27.5	50	50	50	105.89	6019	
-28	50	50	50	96.52	6019	
-28.5	10	10	10	98.12	6019	
-999.5	9.56	9.47	9.56	100	6019	
-1009*	9.56	9.47	9.56	96.84	6019	
-1018*	9.56	9.47	9.56	93.68	6019	
-1027*	9.56	9.47	9.56	90.53	6019	
-1037*	9.56	9.47	9.56	87.37	6019	
-1046*	9.56	9.47	9.56	84.21	6019	
-1056*	9.56	9.47	9.56	81.05	6019	
-1065*	9.56	9.47	9.56	77.89	6019	
-1075*	9.56	9.47	9.56	74.74	6019	
-1084*	9.56	9.47	9.56	71.58	6019	
-1094*	9.56	9.47	9.56	68.42	6019	
-1103*	9.56	9.47	9.56	65.26	6019	
-1113*	9.56	9.47	9.56	62.11	6019	
-1122*	9.56	9.47	9.56	58.95	6019	
-1132*	9.56	9.47	9.56	55.79	6019	
-1141*	9.56	9.47	9.56	52.63	6019	
-1151*	9.56	9.47	9.56	49.47	6019	
-1160*	9.56	9.47	9.56	46.32	6019	
-1170*	9.56	9.47	9.56	43.16	6019	
-1179.5	24.92	24.92	24.92	40	6019	
-1204.4	95.35	95.35	95.35	40	6019	
-1299.8	20.2	20.2	20.2	40	6019	
-1320	184.4	180	175.6	40	6045	
-1500	225.6	230	224.4	40	6045	
-1729.8	68.8	70.2	71.4	40	6045	
-1800	105.4	107.8	109.6	40	6045	
-1908.1	91.82	91.82	91.82	40	6045	
-2000	200	200	200	40	6045	
-2200	147.5	147.5	147.5	40	6045	
2347.4	77	77	77	41	6045	
-2359.4	Bridge #1-Up					
-2359.4	Bridge #1-Dn					
-2424.4	6.18	6.18	6.18	41	6045	
-2430.6	9.39	9.39	9.39	40	6045	
-2440*	9.39	9.39	9.39	40	6045	
-2449*	9.39	9.39	9.39	40	6045	
-2458*	9.39	9.39	9.39	40	6045	
-2468*	9.39	9.39	9.39	40	6045	

-2486*	9.39	9.39	9.39	40	6045
-2496*	9.39	9.39	9.39	40	6045
-2505*	9.39	9.39	9.39	40	6045
-2515*	9.39	9.39	9.39	40	6045
-2524*	9.39	9.39	9.39	40	6045
2533*	9.39	9.39	9.39	52.83	6045
2543*	9.39	9.39	9.39	52.83	6045
-2552*	9.39	9.39	9.39	52.83	6045
-2562*	9.39	9.39	9.39	52.83	6045
-2571*	9.39	9.39	9.39	52.83	6045
-2580*	9.39	9.39	9.39	52.83	6045
-2590.2	8.82	8.82	8.82	52.83	6045
-2599*	8.82	8.82	8.82	51	6045
-2607*	8.82	8.82	8.82	49.16	6045
-2616*	8.82	8.82	8.82	47.33	6045
-2625*	8.82	8.82	8.82	45.5	6045
-2634*	8.82	8.82	8.82	43.67	6045
-2642*	8.82	8.82	8.82	41.83	6045
-2651.6	52.93	52.93	52.93	40	6045
-2704.6	379.55	379.55	379.55	40	6045
-3084.2	20.22	20.22	20.22	40	6208
-3104.4	50	50	50	40	6208
-3154.4	50	50	50	40	6208
-3204.4	100	100	100	40	6208
-3304.4	100	100	100	40	6208
-3404.4	95.55	95.55	95.55	40	6208
-3500	99	100	101	40	6208
-3600	49	50	51	40	6208
-3650	49	50	51	40	6208
-3700	47	50	53	40	6208
-3750	47	50	53	40	6208
-3800	47	50	53	40	6208
-3850	47	50	53	40	6208
-3900	47	50	53	40	6208
-3950	48	50	52	40	6208
-4000	950	950	950	40	6208
-4950	47.77	47.77	47.77	40	6208
-4997.7	2.23	2.23	2.23	40	6208
-5000	450	450	450	40	6208
-5450	39.14	39.14	39.14	40	6208
5489.1	11.5	10.86	10.22	40	6208
-5500	53	50	47	40	6208
-5550	48.62	45.92	43.22	40	6208
-5595.6	4.28	4.04	3.8	40	6208
-5600	53	50	47	40	6208
-5650	53	50	47	40	6208
-5700	53	50	47	40	6228
-5750	53	50	47	40	6228
-5800	53	50	47	40	6228
-5850	53	50	47	40	6228
-5900	53	50	47	40	6228
-5950	5.27	4.98	4.69	40	6228
-5954.9	45.02	45.02	45.02	40	6228
-6000	300	300	300	40	6228
-6300	47.77	47.77	47.77	40	6228
-6347.7	2.23	2.23	2.23	40	6228
-6350	50	50	50	40	6228
-6400	200	200	200	40	6228
-6600	33.38	33.38	33.38	40	6228
-6633.3	15.64	16.62	17.6	40	6228
-6650	47.02	49.95	52.89	40	6228
-6700	47.02	49.95	52.89	40	6228
-6750	47.02	49.95	52.89	40	6228
-6800	47.02	49.95	52.89	40	6228
-6850	47.02	49.95	52.89	40	6228
-6900	47.02	49.95	52.89	40	6228
-6950	47.02	49.95	52.89	40	6228
-7000	47.02	49.95	52.89	40	6228
-7050	47.02	49.95	52.89	40	6228
-7063.9	36.08	36.08	36.08	40	6228
-7100	150	150	150	40	6228
-7250	47.77	47.77	47.77	40	6228
-7297.7	5.15	5	5.15	40	6228
-7302*	5.15	5	5.15	42.5	6228
7307*	5.15	5	5.15	45	6228
7312*	5.15	5	5.15	47.5	6228
-7317*	5.15	5	5.15	50	6228
-7322*	5.15	5	5.15	52.5	6228
-7327*	5.15	5	5.15	55	6228
-7332*	5.15	5	5.15	57.5	6228
-7337*	5.15	5	5.15	60	6228
-7342*	5.15	5	5.15	62.5	6228
-7347*	5.15	5	5.15	65	6228

-7357*	5.15	5	5.15	70	6228	
-7362*	5.15	5	5.15	72.5	6228	
-7367*	5.15	5	5.15	75	6228	
-7372*	5.15	5	5.15	77.5	6228	
-7377*	5.15	5	5.15	80	6228	
-7382*	5.15	5	5.15	82.5	6228	
7387*	5.15	5	5.15	85	6228	
-7392*	5.15	5	5.15	87.5	6228	
-7397*	5.15	5	5.15	90	6228	
-7402*	5.15	5	5.15	92.5	6228	
-7407*	5.15	5	5.15	95	6228	
-7412*	5.15	5	5.15	97.5	6228	
-7417*	5.15	5	5.15	100	6228	
-7422*	5.15	5	5.15	102.5	6228	
-7427*	5.15	5	5.15	105	6228	
-7432*	5.15	5	5.15	107.5	6228	
-7437*	5.15	5	5.15	110	6228	
-7442*	5.15	5	5.15	112.5	6228	
-7447*	5.15	5	5.15	115	6228	
-7452*	5.15	5	5.15	117.5	6228	
-7457.7	42.24	42.24	42.24	120	6228	
-7500	27.75	27.75	27.75	120	6228	
-7527.7	92.61	92.61	92.61	151.64	6228	
-7620.3	176.24	170.74	165.33	170.67	6228	
-7791	438.8	438.8	438.8	189.28	6228	
-8229.8	458.65	647.14	856.86	172.37	6255	
-8876.9	95.14	95.14	95.14	171.3	6255	
-8972*	95.14	95.14	95.14	169	6255	
-9067.1*	95.14	95.14	95.14	165.65	6255	
-9162.3	0	0	0	150.78	6255	C

B=blocked obstruction XS SC 05
C=critial depth XS SC 03
D=divided flow XS SC 01
E=cross section extended XS SC 02
K=known water-surface XS SC 04

DISTANCE CHECK

SPACING CHECK

XS SP 02 This is an interpolated cross section.
Interpolation of the cross sections should be performed only
when all of the following conditions are met.
Change in velocity head > 0.5
Conveyance Ratio < 0.7 or Conveyance Ratio > 1.4
Hydraulic Depth Ratio < 0.9 or Hydraulic Depth Ratio > 1.1
Top Wdth Act Ratio < 0.5 or Top Wdth Act Ratio > 2.0
Length Chnl Up / 500 > 1.1
Please review the file with no interpolation and select the
cross sections that meet the above criteria to consider
interpolation.
The following is the list of interpolated cross section:
C-1 Channel,1
2.25 — To model impact blocks properly.
-1009
-1018
-1027
-1037
-1046
-1056
-1065
-1075
-1084
-1094
-1103
-1113
-1122
-1132
-1141
-1151
-1160
-1170
-2440
-2449
-2458
-2468
-2477

C-1 channel transitions between HEC-RAS Station -999.5 and -1179.5

cont...

-2496
-2505
-2515
-2524
-2533
-2543
-2552
-2562
-2571
-2580
-2599
-2607
-2616
-2625
-2634
-2642
-7302
-7307
-7312
-7317
-7322
-7327
-7332
-7337
-7342
-7347
-7352
-7357
-7362
-7367
-7372
-7377
-7382
-7387
-7392
-7397
-7402
-7407
-7412
-7417
-7422
-7427
-7432
-7437
-7442
-7447
-7452
-8972
-9067.1

C-1 channel transitions between HEC-RAS Station -2430.6 and -2590.2

C-1 channel transitions between HEC-RAS Station -2590.2 and -2651.6

C-1 channel transitions between HEC-RAS Station -7297.7 and -7457.7

HEC-RAS section -8876.9 was located too far u/s from the critical depth cross-section.

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

LOCATION CHECK

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is C-1 Channel,1
Critical is specified as the downstream boundary
for profile PF 1

XS BC 02 The name of the stream is C-1 Channel,1
Normal S = 0.0316 is specified as the upstream boundary
for profile PF 1

S FR 02 The profile is computed as mixed flow regime.

LATERAL WEIRS CHECK

---END---

CHECK-RAS Program: Structure Check

Project File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.prj
Plan File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.p02
Geometry File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.g01
Flow File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.f01
eport File: L:\PROJECTS\511197\Tuscany C-1 LOMR\HEC-RAS\PBSJ_CompositeModel\c1.br
Selected profiles: PF 1
Date: 7/1/2004
Time: 11:06:22 AM

RS	MaxLoChord	MnTpRd	EGEL	WSEL	MinChEl	Structure
C-1 Channel,1						
8			1763.95	1732.63	1726.25	
7			1762.13	1730.34	1724.61	
6			1758.9	1727.11	1721.7	
5.5	1731.7	1734.39	0	1727.89	1721.7	Culvert #1-Up
5.5	1723.13	1732.1	0	1719.15	1713.13	Culvert #1-Dn
5			1744.86	1719.15	1713.13	
4			1744.15	1717.51	1712.32	
3			1741.92	1710.21	1706.29	
2.5			1740.01	1703.2	1699.95	
2.25			1739.38	1702.25	1698.29	
2			1738.31	1701.27	1696.63	
1.75			1733.97	1701.69	1696.63	
1.5			1731.87	1700.55	1697.2	
1			1730.13	1700.05	1696.63	
-2			1726.92	1701.37	1697	
-4.5			1712.8	1705.14	1696	
-8			1706.1	1696.5	1687	
-10.5			1701.33	1695.27	1683	
-13			1697.82	1690.38	1681	
-16			1690.91	1683.27	1678.76	
-17			1686.83	1675.21	1669.15	
-21			1675.73	1671.58	1666	
-23			1672.92	1668.91	1664	
-24			1671.64	1667.62	1661	
-27			1666.97	1662.7	1659	
27.5			1666.25	1663.3	1658.7	
-28			1663.5	1637.49	1635.96	
-28.5			1654.58	1612.18	1611	
-999.5			1650.47	1595.51	1594.49	
-1009			1645.96	1595.55	1594.44	
-1018			1642.19	1595.6	1594.4	
-1027			1639	1595.64	1594.35	
-1037			1636.28	1595.69	1594.3	
-1046			1633.92	1595.76	1594.26	
-1056			1631.87	1595.82	1594.21	
-1065			1630.08	1595.89	1594.16	
-1075			1628.51	1595.96	1594.12	
-1084			1627.12	1596.05	1594.07	
-1094			1625.89	1596.14	1594.02	
-1103			1624.8	1596.24	1593.97	
-1113			1623.81	1596.36	1593.93	
-1122			1622.93	1596.5	1593.88	
-1132			1622.14	1596.64	1593.83	
-1141			1621.43	1596.82	1593.79	
-1151			1620.77	1597.02	1593.74	
-1160			1620.16	1597.25	1593.69	
-1170			1619.6	1597.54	1593.65	
-1179.5			1619.06	1597.87	1593.6	
-1204.4			1618.14	1597.84	1593.48	
-1299.8			1615.15	1597.69	1593	
-1320			1614.64	1597.56	1592.8	
-1500			1610.84	1596.11	1591	
-1729.8			1607.11	1594.14	1588.71	
-1800			1606.05	1593.78	1588.2	
-1908.1			1604.79	1592.49	1586.92	
-2000			1603.56	1591.92	1586.2	
-2200			1601.4	1589.71	1584	
-2347.4			1599.78	1588.11	1582.53	
-2359.4	1595.63	1595.98	1599.03	1588.6	1582.54	Bridge #1-Up
2359.4	1595.63	1595.99	1598.36	1587.79	1581.77	Bridge #1-Dn
2424.4			1598.21	1587.61	1581.76	
-2430.6			1597.88	1587.84	1581.7	
-2440			1597.8	1587.74	1581.6	
-2449			1597.73	1587.64	1581.51	
-2458			1597.65	1587.54	1581.42	
-2468			1597.57	1587.44	1581.32	
-2477			1597.49	1587.34	1581.23	
-2486			1597.41	1587.23	1581.13	

-2505	1597.26	1587.04	1580.95
-2515	1597.17	1586.94	1580.85
-2524	1597.09	1586.84	1580.76
-2533	1596.98	1586.61	1580.66
-2543	1596.85	1586.27	1580.57
2552	1596.71	1585.92	1580.48
2562	1596.56	1585.57	1580.38
-2571	1596.42	1585.23	1580.29
-2580	1596.27	1584.88	1580.19
-2590.2	1596.12	1584.54	1580.1
-2599	1595.9	1584.66	1580.01
-2607	1595.69	1584.81	1579.93
-2616	1595.48	1584.98	1579.84
-2625	1595.27	1585.18	1579.75
-2634	1595.04	1585.44	1579.66
-2642	1594.8	1585.78	1579.58
-2651.6	1594.52	1586.23	1579.49
-2704.6	1594.15	1585.6	1578.96
-3084.2	1591.26	1581.57	1575.16
-3104.4	1591.1	1581.36	1574.96
-3154.4	1590.68	1580.82	1574.46
-3204.4	1590.25	1580.29	1573.96
-3304.4	1589.39	1579.23	1572.96
-3404.4	1588.52	1578.17	1571.96
-3500	1587.67	1577.17	1571
-3600	1586.75	1576.14	1570
-3650	1586.22	1575.14	1569.23
-3700	1585.71	1574.42	1568.46
-3750	1585.16	1573.56	1567.68
-3800	1584.6	1572.71	1566.9
-3850	1584.03	1571.88	1566.13
-3900	1583.44	1571.04	1565.35
-3950	1582.83	1570.21	1564.57
-4000	1582.22	1569.4	1563.8
-4950	1569.17	1554.25	1549.04
-4997.7	1568.43	1553.49	1548.29
-5000	1568.4	1553.43	1548.23
-5450	1559.45	1539.58	1534.99
-5489.1	1558.49	1538.34	1533.83
-5500	1558.22	1538.01	1533.51
5550	1556.97	1536.52	1532.04
-5595.6	1555.8	1535.16	1530.7
-5600	1555.69	1535.1	1530.64
-5650	1554.21	1534.56	1530
-5700	1552.85	1534.02	1529.35
-5750	1551.58	1533.46	1528.7
-5800	1550.4	1532.9	1528.06
-5850	1549.29	1532.32	1527.41
-5900	1548.25	1531.74	1526.76
-5950	1547.24	1531.16	1526.12
-5954.9	1547.15	1531.09	1526.05
-6000	1546.3	1530.56	1525.47
-6300	1541.28	1526.91	1521.59
-6347.7	1540.58	1526.31	1520.97
-6350	1540.53	1526.3	1520.96
-6400	1539.58	1526.28	1520.76
-6600	1536.62	1526.16	1519.96
-6633.3	1536.22	1526.14	1519.83
-6650	1536.03	1526.12	1519.76
-6700	1535.49	1526.09	1519.56
-6750	1535	1526.05	1519.36
-6800	1534.53	1526	1519.16
-6850	1534.11	1525.96	1518.96
-6900	1533.71	1525.9	1518.76
-6950	1533.34	1525.85	1518.56
-7000	1533	1525.78	1518.36
-7050	1532.68	1525.71	1518.16
-7063.9	1532.17	1526.45	1518.11
-7100	1532.03	1526.18	1517.96
-7250	1531.46	1525.51	1517.36
-7297.7	1531.27	1525.34	1517.17
-7302	1531.16	1524.37	1517.15
-7307	1531.08	1523.71	1517.13
-7312	1531.01	1523.19	1517.11
7317	1530.93	1522.77	1517.09
-7322	1530.86	1522.42	1517.07
-7327	1530.79	1522.12	1517.05
-7332	1530.73	1521.84	1517.03
-7337	1530.66	1521.61	1517.01
-7342	1530.59	1521.39	1516.99
-7347	1530.53	1521.21	1516.97
-7352	1530.46	1521.03	1516.95
-7357	1530.39	1520.88	1516.93

-7367	1530.24	1520.6	1516.89
-7372	1530.16	1520.48	1516.87
-7377	1530.08	1520.36	1516.85
-7382	1530	1520.25	1516.83
-7387	1529.93	1520.16	1516.81
-7392	1529.85	1520.06	1516.79
7397	1529.74	1519.98	1516.77
-7402	1529.64	1519.9	1516.75
-7407	1529.53	1519.83	1516.73
-7412	1529.42	1519.76	1516.71
-7417	1529.3	1519.69	1516.69
-7422	1529.18	1519.63	1516.67
-7427	1529.06	1519.58	1516.65
-7432	1528.93	1519.52	1516.63
-7437	1528.8	1519.47	1516.61
-7442	1528.67	1519.42	1516.59
-7447	1528.55	1519.37	1516.57
-7452	1528.42	1519.33	1516.55
-7457.7	1528.1	1519.31	1516.53
-7500	1523.95	1520.39	1516.36
-7527.7	1522.95	1520.98	1516.07
-7620.3	1521.97	1521.22	1514.26
-7791	1521.33	1520.73	1514
-8229.8	1519.62	1518.76	1511.92
-8876.9	1517.04	1516.37	1509.11
-8972	1516.71	1515.97	1508.98
-9067.1	1516.3	1515.45	1508.85
-9162.3	1515.47	1513.57	1508.72

RIVER/REACH: C-1 Channel, 1
RIVER STATION: 5.5
TYPE OF STRUCTURE: Culvert

Description:

Distance from Upstream XS:	0.05
Deck/Roadway Width:	270.87
Weir Coefficient:	2.6
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	1734.92
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	7	94.26	1730.34		1762.13	26.41	
3	6	270.97	1727.11		1758.9	24.58	
	5.5	270.87	1727.89		0	0	Culvert #1-Up
	5.5	0.05	1719.15		0	0	Culvert #1-Dn
2	5	16.01	1719.15		1744.86	24.58	
1	4	47.91	1717.51		1744.15	28	

Ineffective Flow, Section 3			Ineffective Flow, Section 2		
Sta L	Sta R	Elev	Sta L	Sta R	Elev

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group						U
						D

CULVERT:
Culvert Name: Culvert #1

Shape:	Box	Rise:	10	Span:	12	Barrels:	2

FHWA Chart #: # 8 - flared wingwalls
FHWA Scale #: # 3 - Wingwall flared 0 deg. (sides extended stra
olution Crit:Highest U.S. EG

UpstrmDist:	0.05	Length:	270.87	n-Value:	0.015		
EntLossCoef:	0.7	ExtLossCoef:	1	CulvInvElU	1721.7	CulvInvElD	1713.13
LCntStaU:	-6.29	RCntStaU:	6.29	LCntStaD	-6.29	RCntStaD	6.29

Culvert Depth Blocked: 0

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	-12.29	12.29	1734.39	1734.39	1734.39	1731.7	U
	-12.29	12.29	1732.1	1732.1	1732.1	1723.13	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #1		5096.1	0	Highest U.S. EG	Pressure and Weir Flow

GEOMETRIC CHECK

TYPE OF FLOW CHECK

Incorrect

RS: 5.5 This is Culvert #1
CV PW 01 Type of flow is pressure and weir flow because,
1. EGEL 3 of 1758.9 is greater than MinTopRd of 1734.92.
2. CulvWSIn of 1727.89 is less than MxLoCdU of 1731.70.
3. CulvWSOut of 1719.15 is less than MxLoCdD of 1723.13.
4. Q/AD^0.5 of 6.71 is greater than or equal to 4.0.

DISTANCE CHECK

N/A

RS: 5.5 This is Culvert #1
ST DT 01 'Culvert Upstrm Dist' of 0.05 is less than the height of the culvert opening of 10 .
Section 3 should be placed at the foot of the road embankment or wing walls.
Distances at Sections 4 & 3, and 'Distance from Upstream XS' should be adjusted.

N/A

RS: 5.5 This is Culvert #1
T DT 02 The channel distance of 0.0500061 at Downstream Internal Section is less than the height of the culvert opening of 10
Section 2 should be placed at the foot of the road embankment or wing walls.
Distances at Sections 4, 3 & 2 should be adjusted.

CULVERT COEFFICIENT CHECK

CULVERT CRITERIA CHECK

INEFFECTIVE FLOW CHECK

N/A

RS: 6 This is section 3
ST GD 05 Weir flow occurs at Culvert Group 1
The velocity head at Section 3 is more than 0.5 foot and more than the velocity head at Section 4.
Section 3 should be recoded to represent the natural valley cross section.

RIVER/REACH: C-1 Channel, 1
RIVER STATION: -2359.4
TYPE OF STRUCTURE: Bridge

Description:	
Distance from Upstream XS:	12
Deck/Roadway Width:	52
Weir Coefficient:	2.6
Maximum allowable submergence for weir flow:	0.95
levation at which weir flow begins:	0
eir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual
4	-2200	147.50	1589.71		1601.4	40

```
    -2359.4    52.00   1588.6              1599.03   39.83    Bridge #1-Up
    -2359.4    13.00   1587.79             1598.36   39.83    Bridge #1-Dn
 2  -2424.4    6.18    1587.61             1598.21   41
 1  -2430.6    9.39    1587.84             1597.88   40
---------------------------------------------------------------------------

        Ineffective Flow, Section 3          Ineffective Flow, Section 2
        Sta L     Sta R     Elev             Sta L     Sta R     Elev
---------------------------------------------------------------------------
---------------------------------------------------------------------------

BRIDGE:
Bridge Name:    Bridge #1
LowFlowMethod:  Highest Energy Answer
Momentum Cd:     0
HighFlowMethod: Energy Only
SluiceGate Cd: 0        Submerged Cd:   0

---------------------------------------------------------------------------
Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line
---------------------------------------------------------------------------

---------------------------------------------------------------------------
MaxLowChord:   1595.63  MinTopRd:  1596          MinElPrs:       1595.63

Opening Type      StagStaL    StagStaR  EncStaL   EncStaR   LIfStaS   RIfStaS
---------------------------------------------------------------------------
Bridge                                                                    U
                                                                          D

                  LAbutSt     RAbutSt   LMnTpRd   RMnTpRd   MnTpRd    MxLoCd
---------------------------------------------------------------------------
 ridge #1         0.00        41.00     1595.98   1596.50   1595.98   1595.63 U
                  12.83       53.83     1595.99   1595.99   1595.99   1595.63 D

Name          Q Total.  Q Struc   Q Weir    Selected Method     Flow Type
---------------------------------------------------------------------------
Bridge #1     6045      6045      0         Energy only         Sluicegate Pressure and Weir Flow
---------------------------------------------------------------------------

GEOMETRIC CHECK
-----------------

RS:      -2359.4
ST GD 04  There is only one bridge. This is upstream bridge section.
          However, the low chord line crosses the ground line at more than
          two locations.
          CHECKRAS can not check other messages.
          The ground and deck/roadway data should be checked.

---END
```

Road deck was added with bridge pier.

APPENDIX E

Electronic Data CD

- HEC-1 Model
- HEC-RAS
- Survey Data
- Figures

04-09-1382P

Request for Letter of Map Revision

TUSCANY MASTER PLANNED COMMUNITY
C-1 Channel
Between Lake Mead Drive and Las Vegas Wash

Clark County
City of Henderson, Nevada

VOLUME 2 of 2
Appendix F
C-1 Channel Design Plans (Phase I &II)

Prepared for:

COMMERCE ASSOCIATES, L.L.C.
4511 West Cheyenne Avenue, Suite 801
Las Vegas, NV 89032

Prepared by:

PBS&J
2270 Corporate Circle, Suite 100
Henderson, Nevada 89074
(702) 263-7275

PBS&J

July 2, 2004

July 2, 2004

Mr. Max H. Yuan, P.E.
Federal Emergency Management Agency
Mitigation Hazard Identification Branch
500 C Street, SW
Washington, DC 20472

RE: AS-BUILT CERTIFICATION FOR LETTER OF MAP REVISION APPLICATION FOR TUSCANY MASTER PLANNED COMMUNITY & THE C-1 CHANNEL
PBS&J REFERNCE NO.: 511197.00

Dear Mr. Yuan,

I, Matt Baird, hereby certify that the facilities analyzed in this LOMR were constructed in substantial conformance with the plans provided in Appendix F and the supplemental field survey included on the CD in Appendix E.

Sincerely,

PBS&J

Matthew S. Baird, P.E., CFM
Lic. 13684, Nevada

RFCD
2004 JUL 12 AM 9:57

Phase I

C-1 Channel Extension Phase I Improvement Plans per PBS&J

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-6111
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

TUSCANY IMPROVEMENT PLANS
C-1 CHANNEL EXTENSION
PHASE 1 IMPROVEMENTS

A PORTION OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST
MOUNT DIABLO MERIDIAN, CITY OF HENDERSON, CLARK COUNTY, NEVADA

LEGAL DESCRIPTION

A PORTION OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST, M.D.M., CITY OF HENDERSON, CLARK COUNTY, NEVADA.

BASIS OF BEARING

SOUTH 89°37'49" WEST – BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE1/4) OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST, M.D.M., CITY OF HENDERSON, CLARK COUNTY, NEVADA AS SHOWN ON THE MAP THEREOF IN FILE 57 OF SURVEYS, PAGE 66, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93.
DESC: CITY OF HENDERSON BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET.
ELEVATION IN METERS: 508.195 = 1667.303 FEET
C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

OWNER / DEVELOPER

OWNER

CONTACT: JEFF THOMPSON
CONVERGE ASSOCIATES, LLC
2920 N. GREEN VALLEY PKWY
HENDERSON, NV 89014
(702) 456-8744

DEVELOPER

CONTACT: JEFF THOMPSON
CONVERGE ASSOCIATES, LLC
2920 N. GREEN VALLEY PKWY
HENDERSON, NV 89014
(702) 456-8744

ENGINEER / CONSULTANT

CIVIL

CONTACT: LEE C. FARRIS, P.E.
PBS&J, INC. 901 N. GREEN VALLEY PKWY., SUITE 100, HENDERSON, NEVADA 89074
(702) 263-7275

STRUCTURAL

CONTACT: JASON P. SOUTH, P.E.
SPECIALTY STRUCTURES ENGINEERING AND DESIGN COMPANY
1553 E. LINCOLN ROAD
IDAHO FALLS, IDAHO 83401
(208) 524-0800

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CIVIL

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STRUCTURAL

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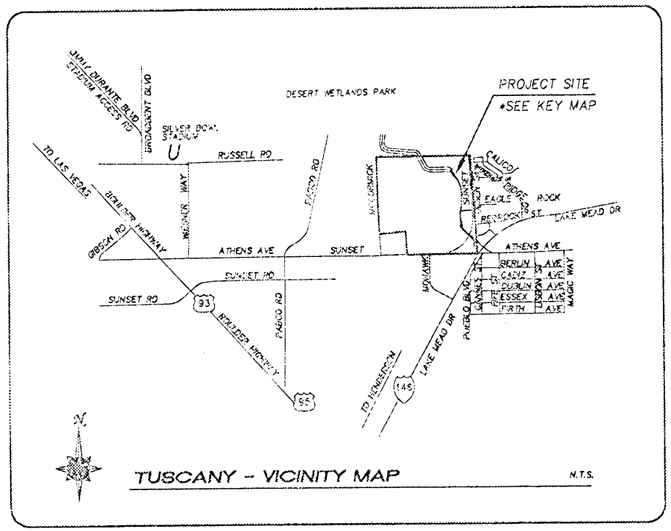

TUSCANY
Vintage Golf Course Living

THE CITY OF HENDERSON

APPROVALS

KURT SEGLER, P.E. — DATE 3/8/02
UTILITIES SERVICES MANAGER DIRECTOR
CITY OF HENDERSON

-NA- — DATE
MICHAEL W. BOUSE
DIRECTOR OF BUILDING AND SAFETY
CITY OF HENDERSON

JOHN F. BARTELS, P.E. — DATE 3-6-02
CITY TRAFFIC ENGINEER
CITY OF HENDERSON

JAMES YADEN — DATE 3-6-02
FIRE MARSHAL
CITY OF HENDERSON

CURT CHANDLER P.E. — DATE 6/3/02
FLOOD CONTROL COORDINATOR
CITY OF HENDERSON

NEVADA POWER COMPANY — DATE 1-31-02

NOTE:
EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600.

SOUTHWEST GAS CORPORATION — DATE 1-31-02

SPRINT Dana T. Williamson — DATE 2/15/02

NOTE:
THE AFFIXED SPRINT NEVADA APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES, AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

-NA- — DATE
SOUTHERN NEVADA WATER AUTHORITY

COX COMMUNICATIONS LAS VEGAS, INC — DATE 1/31/02
SAN DIEGITA

APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE 7-3-02

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY July 1, 2003

THIS SET OF IMPROVEMENT PLANS IS CERTIFIED TO CONFORM TO THE REQUIREMENTS OF THE TRAFFIC STUDY ACCEPTANCE LETTER.
N/A
LEE C. FARRIS — P.E. NO. 13691 — DATE

"APPROVAL OF THESE PLANS BY THE CITY OF HENDERSON IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY IDENTIFIED AS "DEVIATIONS FROM STANDARDS". THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATIONS FROM STANDARDS" IN FAVOR OF THE UNIFORM STANDARDS DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA".

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL
1	ADDITIONAL STRUCTURAL SHEETS	LCF	5-1-02	LCF 5-1-02

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 51197
DRAWING NO.: 1197C1-101
SCALE: HORIZ.: NONE
VERT.:

PBS&J
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7275 Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL — PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691 CIVIL — 1/30/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -
C-1 CHANNEL COVER SHEET

3001705046 (06032)

XXXX

DRAWING NO. C1 — 1/33

CITY OF HENDERSON GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION, AND THE UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION.
2. APPLICATION FOR INSPECTION BY THE CITY OF HENDERSON PUBLIC WORKS SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE THE INSPECTION SERVICES WILL BE REQUIRED, 565-2136 OR 565-2140.
3. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE COMPLETED WITHOUT DELAY SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
4. THE CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTIES FROM ANY AND ALL DAMAGE THAT MAY OCCUR FROM STORM WATER RUNOFF, AND/OR EROSION OR DEBRIS RESULTING FROM ANY AND ALL WORK IN CONNECTION WITH SUBDIVISION CONSTRUCTION.
5. PRIOR TO FINAL ACCEPTANCE, BOND RELEASES AND A CERTIFICATE OF OCCUPANCY, A CERTIFIED LEGIBLE AS-BUILT DRAWING MUST BE SUBMITTED TO THE CITY OF HENDERSON. AS-BUILT MUST SHOW ALL CHANGES AND ACTUAL FIELD LOCATIONS IN THE ABSENCE OF CHANGES, A COPY OF APPROVED DRAWINGS WILL BE REQUIRED, STATING "INSTALLED AS PER DRAWINGS", AND CERTIFIED AS SUCH BY THE DEVELOPER'S ENGINEER.
6. APPROVAL OF THESE PLANS IS FOR THE CONSTRUCTION OF OFFSITE IMPROVEMENTS ONLY. ALL ONSITE IMPROVEMENTS, AS DEFINED BY THE CITY OF HENDERSON, INCLUDING BLOCK WALLS, MUST BE APPROVED BY THE BUILDING AND PLANNING DIVISIONS OF THE CITY OF HENDERSON.
7. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND INGRESS AND EGRESS TO SAID CONSTRUCTION. EXTENT OF TRANSITIONS TO BE DETERMINED BY THE CITY ENGINEER.
8. EXISTING UTILITIES ARE LOCATED ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR THE PROTECTION OF UTILITIES AND THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN ON THE PLANS OR NOT IN THE LOCATION SHOWN ON THE PLANS. THIS INCLUDES ALL SERVICE LATERALS OF ANY KIND.
9. POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION BASED ON HORIZONTAL IMPROVEMENTS SHOWN WILL BE RELOCATED AT NO EXPENSE TO THE CITY OF HENDERSON.
10. WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING NO. 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY A CITY INSPECTOR, OR AS SHOWN ON PLAN.
11. CURB AND GUTTER WITH A GRADE OF LESS THAN FIVE-TENTHS OF ONE PERCENT SHALL BE UNDERCUT AS DIRECTED BY THE INSPECTOR. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
12. ALL GRADING SHALL CONFORM TO THE SOILS REPORT:
    ENGINEER: GEOTEK, INC.-NEVADA
    DATE: MAY 1, 1998
    JOB NUMBER: 1538-NV
13. EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PRELIMINARY GEOTECHNICAL REPORT.
14. ALL STREET STRUCTURAL SECTIONS SHALL BE PER THE RECOMMENDATIONS OF THE SOILS ENGINEER, BASED ON CBR OR R-VALUES. NO PAVING OR BASE WORK SHALL COMMENCE UNTIL A STREET STRUCTURAL SECTION IS APPROVED BY THE CITY ENGINEER, CITY OF HENDERSON.
15. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL "TEMPORARY STOP SIGNS" AT ALL NEW STREET ENCROACHMENTS INTO EXISTING PUBLIC STREETS IMMEDIATELY AFTER THE FIRST GRADING WORK IS ACCOMPLISHED AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE NEVADA TRAFFIC CONTROL MANUAL - CURRENT EDITION AND TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" - CURRENT EDITION AND BE APPROVED BY THE CITY OF HENDERSON BEFORE CONSTRUCTION BEGINS.
16. WHERE EXISTING PAVEMENT IS CUT TO INSTALL UTILITY SERVICE LINES, BACKFILL AND PAVEMENT REPLACEMENT SHALL BE DONE PER STANDARD DRAWING No. 502 AND SECTIONS 208, 207, AND 308 OF THE STANDARD SPECIFICATION ISSUE, LATEST EDITION.
17. ALL STATIONING IS REFERENCED TO CENTERLINE.
18. EXACT LOCATION OF ALL SEWOUT LINES SHALL BE DETERMINED IN THE FIELD BY A CITY OF HENDERSON INSPECTOR.
19. PROTECTION AND REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES NOT DELINEATED ON THE CONTRACT DRAWINGS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES SHALL BE DONE TO THE CITY OF HENDERSON SURVEY SECTION'S SATISFACTION.
20. AFFECTED UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
21. CALL BEFORE YOU DIG: 1-800-227-2600.
22. MODIFICATIONS TO EXISTING UTILITIES SHALL CONFORM TO THE OWNERS' UTILITY STANDARDS AND SPECIFICATIONS.
23. THE CONTRACTOR SHALL TAKE REASONABLE MEASURES TO PROTECT EXISTING IMPROVEMENTS FROM DAMAGE. ALL SUCH IMPROVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED TO THE ENGINEER'S SATISFACTION AT THE EXPENSE OF THE CONTRACTOR.
24. CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY:
    _____
25. ALL OFFSITE AND ONSITE WATER AND SEWER FACILITIES UP TO WITHIN FIVE (5) FEET OF BUILDINGS SHALL BE CONSTRUCTED TO PUBLIC WORKS STANDARDS.
26. IF SEWER OR WATER LINES WITHIN THE PUBLIC UTILITY EASEMENTS REQUIRE REPAIRS, ALL SUCH REPAIRS WILL BE DONE IN ACCORDANCE WITH PUBLIC WORKS DEPARTMENT STANDARDS. CURBS AND GUTTERS AND SPECIAL PAVING REPAIRS SHALL BE THE RESPONSIBILITY OF THE HOMEOWNER'S ASSOCIATION.
27. IF SIGNS ARE PRESENT ON THIS CONSTRUCTION SITE, PLEASE CONTACT SIGN COMPANY LISTED ON THE SIGN 24 HOURS PRIOR TO COMMENCING CONSTRUCTION IN THE SIGN'S LOCATION. CITY OWNED AND CITY SPONSORED SIGNS (MODELS) SHALL BE REMOVED AND REPLACED FOLLOWING CONSTRUCTION IN THEIR ORIGINAL LOCATION IN LIKE-NEW CONDITION AT CONTRACTOR'S EXPENSE. ANY CONTRACTOR HAVING TO REMOVE A SIGN WHICH WAS DAMAGED PRIOR TO THE CONTRACTOR DISRUPTING THE SITE SHALL ARRANGE FOR VERIFICATION OF THE SIGN'S CONDITION BY A CITY INSPECTOR PRIOR TO REMOVAL. ALL SIGNS NOT PREVIOUSLY VERIFIED BY A CITY INSPECTOR SHALL BE ASSUMED TO BE IN LIKE-NEW CONDITION PRIOR TO REMOVAL.

CONDUIT NOTE

ALL CONDUIT (RGK (CULVERT, REINFORCED CONCRETE PIPE, CAST-IN-PLACE PIPE, AND/OR CORRUGATED METAL PIPE) SHOWN ON THESE PLANS ARE DESIGNED FOR STANDARD HIGHWAY LOADINGS. THE STANDARD SATISFACTORY IN COVERAGE REQUIREMENTS AS ESTABLISHED BY THE CONDUIT MANUFACTURER MAY NOT ALWAYS BE ADEQUATE DURING CONSTRUCTION WHEN CONSTRUCTION EQUIPMENT FREQUENTLY HEAVIER THAN TRAFFIC LOADS FOR WHICH CONDUIT HAS BEEN DESIGNED, IS TO BE DRIVEN OVER OR CLOSE TO THE BURIED CONDUIT, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE THE ADDITIONAL COVERAGE REQUIRED TO AVOID DAMAGE TO THE CONDUIT. THE ADEQUACY OF THE COVERAGE REQUIREMENTS FOR CONDUITS SHALL BE ANALYZED AND CHECKED BY THE CONTRACTOR TO ADDRESS LOADING CONDITIONS IMPOSED BY CONSTRUCTION ACTIVITIES. ANY CONDUIT DAMAGE BY CONSTRUCTION ACTIVITY SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

CITY OF HENDERSON STREET LIGHT REQUIREMENTS

STREETLIGHTS SHALL GENERALLY CONFORM WITH CLARK COUNTY STANDARD DRAWINGS (1998), UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY, AREA (1998), THE NATIONAL ELECTRIC CODE INCLUDING ALL ADDENDAS AND REVISIONS AND THE FOLLOWING:

1. STREETLIGHT POLES SHALL BE NOMINAL 30' LONG, STEEL, SHEET 11 GAUGE, FACTORY GALVANIZED INSIDE AND OUTSIDE AS PER ASTM A123, ARMS SHALL BE 8' LONG, 2" STEEL PIPE WITH RISE FOR A LUMINAIRE MOUNTING HEIGHT OF 31'-0". FOUNDATION WILL BE NOT LESS THAN 48" DEEP. POLES SHALL BE VALMONT TYPE 40(1) OR APPROVED EQUIVALENT.
2. HIGH PRESSURE SODIUM LUMINAIRES SHALL HAVE AN INTEGRAL CONSTANT WATTAGE BALLAST, 240 VAC AND SHALL BE:
   A. FOR 51' OR LESS R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 100-WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M2RR10S3ATGMS2.
   B. FOR 80' OR 86' R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 150-WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M2RR15S3ATGMS3.
   C. FOR 100' OR MORE R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 250 WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M4RR25S3ATGMS3.
3. THE STREETLIGHTING CIRCUIT SHALL BE 240V, 1 PHASE, 2 WIRE (2 NO. 4 AND 1 NO. 8 GROUND WIRES IN 1-1/4" CONDUIT). A NO. 10 GREEN WIRE (GROUND) SHALL CONNECT THE LUMINAIRES TO THE POLES GROUND LUG AT THE BASE.
4. STREETLIGHTS SHALL BE LOCATED BEHIND THE SIDEWALK OR IN THE MEDIAN ISLAND. ALTERNATIVE LOCATIONS MAY BE REQUESTED BY THE DEVELOPER AND SHALL BE SHOWN ON THE PLANS SUBMITTED TO THE CITY FOR APPROVAL. SPACING AND LOCATION OF LIGHTS SHALL CONFORM TO THE CLARK COUNTY STANDARD DRAWINGS NO. 200 THROUGH 213, AND 3204 WITH ANY ADDENDAS AND REVISIONS AS AMENDED BY THE CITY OF HENDERSON. LAYOUT MUST BE APPROVED BY THE CITY. FIELD LOCATIONS MUST BE INSPECTED AND APPROVED BY THE CITY PRIOR TO DIGGING THE FOUNDATIONS AND TRENCHING FOR CONDUITS.
5. THE DEVELOPER SHALL INSTALL PAD MOUNTED SERVICE POINTS PER CLARK COUNTY STANDARD DRAWINGS NO. 1301, 331 LOCATED BEHIND THE SIDEWALK AND 313. PHOTOCELL (TORK NO. 3000 OR APPROVED EQUIVALENT) MUST BE MOUNTED ON THE SIDE WITHIN THE ENCLOSURE. PROPOSED LOCATION OF SERVICE POINTS MUST BE SHOWN ON THE DRAWINGS, SUBJECT TO BE REVISED BY NEVADA POWER COMPANY. DESIGN OF SERVICE POINTS SHALL INCLUDE CONNECTION TO NEVADA POWER COMPANY. THE SERVICE RUN SHALL BE 120/240V, 1 PHASE, 3 WIRE. CIRCUIT BREAKER SECTION WILL BE:
   A. 125 AMP SERVICE PEDESTAL:
      a.) 60 AMP DOUBLE POLE/240V - STREETLIGHT CIRCUIT "A".
      b.) 60 AMP DOUBLE POLE/240 V - STREETLIGHT CIRCUIT "B"
      c.) 15 AMP SINGLE POLE/120V - PHOTOCELL.
   B. 200 AMP SERVICE PEDESTAL:
      a.) 80 AMP SINGLE POLE/120V - TRAFFIC SIGNAL.
      b.) 30 AMP SINGLE POLE/120V - INTERSECTION LIGHTS.
      c.) 60 AMP DOUBLE POLE/240V - STREETLIGHT CIRCUIT "A".
      d.) 80 AMP DOUBLE POLE/240V - STREETLIGHT CIRCUIT "B".
      e.) 15 AMP SINGLE POLE/120V - PHOTOCELL.
6. ALL WIRES SHALL BE THHN/THWN OR THW STRANDED COPPER.
7. STREETLIGHTS MUST BE OPERATING BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED. NEW STREETLIGHTS CANNOT BE CONNECTED TO EXISTING STREETLIGHTING CIRCUITS UNTIL AFTER NEW STREET LIGHTS AND THEIR RELATED WIRING ARE ACCEPTED BY THE CITY.
8. WHEN STREETLIGHTS ARE TO BE CONNECTED TO AN EXISTING CIRCUIT, THE DESIGN ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD. EXISTING AND PROPOSED CIRCUIT LOADING MUST BE SHOWN ON THE PLANS. EXISTING CIRCUIT LOAD INFORMATION MAY BE OBTAINED BY CALLING THE CITY OF HENDERSON STREETLIGHTING AND TRAFFIC MAINTENANCE AT (702) 565-2148.
9. CONTRACTORS ARE NOT ALLOWED TO HAVE ANY EQUIPMENT OR PERSONNEL WITHIN 10' OF POWER LINES. CONTACT NEVADA POWER COMPANY FIVE (5) WORKING DAYS IN ADVANCE TO SCHEDULE CREWS TO ASSIST IF WITHIN 10' OF POWER LINES.
10. ALL WALLS OR OTHER OBSTRUCTIONS ARE NOT ALLOWED WITHIN 24" OF THE CENTER OF THE STREETLIGHT POLE PER CLARK COUNTY STANDARD DRAWING NO. 3204.

REVISED 2/38

TRAFFIC NOTES

1. ANY EXISTING TRAFFIC CONTROL DEVICES AND/OR SIGNS SHALL BE MAINTAINED DURING THE PERIOD OF CONSTRUCTION, AND SHALL BE REPOSITIONED AS REQUIRED, PER THE M.U.T.C.D. AND CITY STANDARDS, UPON COMPLETION OF THE PROJECT.
2. DEVELOPERS/CONTRACTORS ARE RESPONSIBLE FOR SUBMITTING TRAFFIC CONTROL/BARRICADING PLANS NOT LESS THAN THREE (3) WORKING DAYS BEFORE OBSTRUCTING AND BEGINNING OF CONSTRUCTION WITHIN THE PUBLIC RIGHT OF WAY, INCLUDING SIDEWALKS. BEFORE ANY WORK IS STARTED IN THE RIGHT OF WAY, THE CONTRACTOR WILL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR WILL INSTALL "TEMPORARY GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND WILL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. LOCATION AND DESCRIPTION OF NEW AND EXISTING TRAFFIC CONTROL DEVICES, STREET STRIPING, MEDIAN ISLANDS, DRIVEWAYS AND TRAFFIC SIGNALS MUST BE SHOWN ON PLANS SUBMITTED TO THE CITY FOR APPROVAL. ALL NEW TRAFFIC SIGNS WILL BE FABRICATED WITH HIGH INTENSITY GRADE (CLASS 4) REFLECTIVE SHEETING. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME SIGNS, WILL HAVE "F-CAL" OR 3M SERIES 1150 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE FILM.
4. LOCATION AND DESCRIPTION OF NEW AND EXISTING STREET NAME SIGNS MUST BE SHOWN ON PLANS SUBMITTED TO THE CITY FOR APPROVAL. STREET NAME SIGNS WILL COMPLY WITH CLARK COUNTY STANDARD DRAWINGS NO. 249, 250 AND 251. ALL STREET NAME SIGNS WILL BE FABRICATED WITH DIAMOND GRADE HIP (CLASS 8) REFLECTIVE SHEETING. ALL INTERSECTIONS WITH 100' OR GREATER R/W ROADWAYS WILL HAVE THE CITY OF HENDERSON TRAFFIC SHOP THREE (3) WORKING DAYS IN ADVANCE, MONDAY THROUGH THURSDAY, AT 565-2148 TO RECEIVE LOGO TO BE APPLIED BY THE CONTRACTOR TO THE STREET NAME PANELS PER CITY OF HENDERSON STANDARD DETAIL.
5. BLUE REFLECTORIZED PAVEMENT MARKINGS MUST BE INSTALLED AND CURB MUST BE PAINTED AT EVERY FIRE HYDRANT LOCATION PER CITY OF HENDERSON FIRE DEPARTMENT STANDARDS.
6. ALL CONSTRUCTION SIGNING, BARRICADING AND PAVEMENT MARKINGS WILL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK - 1988 AND TO THE M.U.T.C.D. LATEST EDITION WITH ANY ADDENDAS AND REVISIONS.
7. WHERE STREETS END AT THE PROJECT BOUNDARY, THREE (3) 18" DIAMOND (MINIMUM), RETROREFLECTORIZED, RED PANELS SHALL BE INSTALLED AT THE END OF THE ROADWAY AND MAINTAINED UNTIL ADJOINING PROJECT IS BUILT.
8. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING WILL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.

CITY OF HENDERSON WATER NOTES

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE AGENCY. FOLLOWING WATER PLAN APPROVAL, 48 HOUR NOTICE SHALL BE GIVEN TO THE CITY'S QUALITY CONTROL SECTION PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 P.M. OF THE BUSINESS DAY PRIOR TO ANY AGENCY INSPECTION SUBSEQUENT TO THE START OF CONSTRUCTION.
2. ALL WORK SHALL CONFORM TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS 1ST EDITION 1995, INCLUDING CITY OF HENDERSON ADDENDA.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE AGENCY.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER OR TUBE SIZE POLYETHYLENE PIPE WITH AGENCY APPROVED SERVICE SADDLES UNLESS OTHERWISE APPROVED.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF CATCHBASINS, VALLEY AND CURB GUTTERS.
8. 14 GAUGE SOLID COPPER WIRE FOR LINE LOCATION SHALL BE REQUIRED UNDER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN ACCORDANCE WITH STANDARD PLATE NO. 27. (SEE CITY OF HENDERSON ADDENDA.)
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE AGENCY'S DISTRIBUTION SYSTEM.
10. ALL METERS SHALL BE PAID FOR BY OWNER/BUILDER AND PROVIDED BY THE CITY. THE ONLY EXCEPTION IS COMBINATION FIRE AND DOMESTIC SERVICES 8" AND LARGER. THOSE METERS SHALL ONLY BE THOSE LISTED ON CURRENT APPROVED MATERIALS LIST. METERS 3" AND LARGER PROVIDED BY THE CITY WILL BE DELIVERED TO SITE BY THE CITY AND INSTALLED BY THE CONTRACTOR. DELIVERY AND/OR SETTING OF METERS IS SCHEDULED THROUGH CUSTOMER SERVICES AT 565-2110.
11. ALL FLANGED FITTINGS TO BE COATED WITH EC-244 AND WRAPPED WITH 120 MIL THICK POLYETHYLENE.
12. ALL VALVE BOXES SHALL HAVE CONCRETE COLLARS AT SURFACE OF PAVED AREAS PER CLARK COUNTY AREA UNIFORM STANDARD DRAWING NUMBER 317.
13. NO OTHER UTILITY LINES MAY BE PLACED IN THE SAME TRENCH WITH WATER LINES.
14. BLUE REFLECTORS AT CENTERLINE OF DRIVING LANE NEAREST TO HYDRANT AND PERPENDICULAR TO ALL FIRE HYDRANTS SHALL BE REQUIRED.
15. ALL WATER LINES INSTALLED ON PROJECT SHALL BE MINIMUM CLASS 150.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL MATERIAL SPILLED ON EXISTING ROADWAYS ON A DAILY BASIS.
17. ANY CONFLICT WITH EXISTING UTILITIES SHALL BE IMMEDIATELY CALLED TO THE ATTENTION OF THE ENGINEER.
18. ALL ONSITE PIPING 4 INCHES IN DIAMETER AND LARGER SHALL BE EITHER PVC C-900 OR DUCTILE IRON PIPE. ALL ONSITE PIPING 2 INCHES IN DIAMETER AND LESS SHALL BE EITHER TUBE SIZE POLYETHYLENE PIPE WITH A 160 PSI WORKING PRESSURE RATING OR COPPER PIPE (EXCEPT SINGLE FAMILY).
19. LANDSCAPING AND IRRIGATION ADJACENT TO VAULTS SHALL BE DRAINED AWAY FROM VAULTS.
20. CONTRACTOR SHALL PROVIDE APPURTENANCES TO PERFORM PRESSURE, TEST AND DISINFECTION AS REQUIRED BY UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS.
21. CONSTRUCTION SHALL NOT INTERRUPT SERVICE WITHOUT PRIOR CITY APPROVAL AND PROPER NOTIFICATION. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT AGENCY REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR APPROVAL.
22. ALL CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE AGENCY'S APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

FIRE NOTES - PRIVATE SERVICE

1. A PRIVATE FIRE SERVICE MAIN IS THAT PIPE AND ITS APPURTENANCES ON PRIVATE PROPERTY:
   A. BETWEEN A SOURCE OF WATER AND THE BASE OF THE RISER (NOT OVER 8 IN. ABOVE FLOOR) FOR WATER-BASED FIRE PROTECTION SYSTEMS.
   B. BETWEEN A SOURCE OF WATER AND THE BASE ELBOW OF PRIVATE HYDRANTS OR MONITOR NOZZLES.
   C. THE NEVADA STATE FIRE MARSHAL HAS DETERMINED THAT THE UNDERGROUND PORTIONS OF A SPRINKLER SYSTEM ARE DEFINED AS: THAT PORTION OF THE PIPE BETWEEN A SOURCE OF PUBLIC WATER (USUALLY IN A PUBLIC STREET) AND THE BASE OF THE SPRINKLER RISER (NOT OVER 8 IN. ABOVE THE FLOOR).
2. THE UNDERGROUND CONTRACTOR INSTALLING THE PRIVATE FIRE SERVICE MAIN SUPPLYING ANY AUTOMATIC FIRE SPRINKLER SYSTEM MUST BE LICENSED BY THE STATE OF NEVADA, STATE FIRE MARSHAL DIVISION, FOR THE UNDERGROUND INSTALLATION OF SPRINKLER PIPING.
3. THE INSPECTION AND TESTING OF ALL PRIVATE FIRE SERVICE MAINS SHALL BE WITNESSED AND APPROVED BY THE FIRE PREVENTION DIVISION.
4. ALL VALVES CONTROLLING CONNECTIONS TO WATER SUPPLIES AND TO SPRINKLER PIPING SHALL BE LISTED INDICATING VALVES OR AS APPROVED BY THE FIRE PREVENTION DIVISION.
5. ALL VALVES CONTROLLING CONNECTIONS TO WATER SUPPLIES AND TO SPRINKLER PIPING SHALL BE PROTECTED FROM FREEZING WHEN EXPOSED TO TEMPERATURES LESS THAN 40° F. FREEZE PROTECTION SHALL BE PROVIDED IN SUCH A MANNER THAT IT WILL LAST THE LIFETIME OF THE VALVE.
6. ALL VALVES CONTROLLING THE FLOW OF WATER THROUGH A PRIVATE FIRE SERVICE MAIN SUPPLYING WATER FOR AUTOMATIC FIRE SPRINKLER SYSTEMS SHALL BE ELECTRICALLY SUPERVISED WHEN REQUIRED BY THE UNIFORM FIRE CODE. WHEN REQUIRED, VALVE SUPERVISION AND TROUBLE SIGNALS SHALL BE CONNECTED TO A FIRE ALARM PANEL FOR RETRANSMISSION TO AN APPROVED CENTRAL STATION.
7. ALL FIRE DEPARTMENT CONNECTIONS (FDC) FOR FIRE SPRINKLER SYSTEMS SHALL BE LOCATED WITHIN 10.0 FEET OF FIRE HYDRANT.
8. ALL WORK SHALL BE IN ACCORDANCE WITH NFPA 24, STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES.

CITY OF HENDERSON FIRE HYDRANT SPACING AND LAYOUT

ALL FIRE HYDRANT SYSTEMS SHALL BE INSTALLED IN SUCH A MANNER AS TO PROVIDE THE MAXIMUM PROTECTION AS INTENDED IN THE UNIFORM FIRE CODE. ALL INTERSECTIONS SHALL HAVE A MINIMUM OF ONE (1) HYDRANT INSTALLED A MAXIMUM OF TWENTY (20) FEET FROM A CORNER OF THE INTERSECTION. THIS LOCATION SHALL BE MEASURED FROM THE INTERSECTION OF TWO LINES DRAWN ALONG THE FACE OF THE CURB SECTIONS PERPENDICULAR TO EACH OTHER. ONCE THESE POSITIONS ARE LOCATED, ADDITIONAL HYDRANTS SHALL BE ADDED TO DEVELOP A GRID WITH A MAXIMUM SPACING OF FIVE HUNDRED (500) FEET BETWEEN HYDRANTS IN AREAS OF SINGLE FAMILY DETACHED HOMES ON SIX THOUSAND (6000) SQUARE FEET OR LARGER LOTS. ALL OTHER AREAS SHALL HAVE A MAXIMUM SPACING OF THREE HUNDRED (300) FEET BETWEEN HYDRANTS. ALL HYDRANTS SHALL BE INSTALLED PER THE SPECIFICATIONS IN THE "UNIFORM STANDARD DRAWINGS", LATEST EDITION, DRAWING No. 518, PAGE 1/01, AS ADOPTED BY THE CITY OF HENDERSON.

EXCEPTION: ANY INTERSECTION THAT MEASURES TWO HUNDRED (200) FEET OR LESS APART MAY HAVE ONE (1) HYDRANT SET AT THE MID POINT BETWEEN THE TWO INTERSECTIONS.

LEGEND

- EX. W — EXISTING WATERLINE
- EX. SS — EXISTING SEWERLINE
- W — PROPOSED WATERLINE
- SS — PROPOSED SEWERLINE
- 1" WATER SERVICE LATERAL W/ 3/4" METER PER UOACS PLATE 1C
- 4" SEWER LATERAL
- 48" SEWER MANHOLE
- EXISTING SEWER MANHOLE
- EXISTING FIRE HYDRANT ASSEMBLY
- FIRE HYDRANT ASSEMBLY (INCLUDES 12"x6" OR 8"x6" TEE & 6" GATE VALVE)
- GATE VALVE
- SLOW-OFF ASSEMBLY
- NO. 3 PULLBOX
- STREET LIGHT
- EX. STREET LIGHT
- 1 1/4" CONDUIT
  SERVICE POINT
- CENTERLINE
  EXISTING ℄ & ℊ
  PROPOSED ℄ & ℊ
- RIGHT OF WAY
- 1 FOOT EXISTING GROUND CONTOUR
- 5 FOOT EXISTING GROUND CONTOUR
- 1580 — 2 FOOT GOLF COURSE CONTOUR
- INTERDRAIN
- PHASE LINE
- RETAINING/SCREEN WALL
- SLOPE
- 14 — LOT #
- FF=100.00 — FINISHED FLOOR ELEVATION
- P=100.00 — PAD ELEVATION
- (1) — BLOCK NUMBER
- 100 — ELEVATION DESCRIPTION
- 1.0% — PERCENTAGE AND DIRECTION OF SLOPE
- 99.99 — LOT/LINE T.C. ELEVATION
  99.99 — LOT/LINE STA.
- DRIVEWAY

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(NEVADA POWER COMPANY OR SIERRA NEVADA DEPARTMENT)

FIRE DEPARTMENT GENERAL NOTES:

FIRE HYDRANTS:

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH UNIFORM FIRE CODE APPENDIX III-B, FIRE HYDRANT LOCATIONS AND DISTRIBUTIONS, AS AMENDED.
2. FIRE HYDRANTS SHALL BE IN MAINTAINED IN AN OPERATIVE CONDITION AT ALL TIMES WITH THE REQUIRED WATER SUPPLY AND SHALL BE ACCEPTED BY PUBLIC WORKS DEPARTMENT.
3. FIRE HYDRANT SHALL HAVE PERMANENT MARKINGS IDENTIFYING MANUFACTURER, SIZE OF THE MAIN VALVE OPENING, YEAR OF MANUFACTURE, MODEL NUMBER, DIRECTION OF OPENING AND BURY DEPTH. ALL HYDRANTS SHALL MEET THE REQUIREMENTS OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS.
4. ALL PUBLIC FIRE HYDRANTS SHALL HAVE A SIX DIGIT NUMBER (AS DESIGNATED BY PUBLIC WORKS) FASTENED ON THE BARREL BY THE HYDRANT INSTALLER. THE NUMBER SHALL BE IN 1" HIGH BLOCK NUMBERS USING BLACK ENAMEL PAINT. ALL NUMBERS SHALL MATCH APPROVED PLANS.
5. ALL FIRE DEPARTMENT CONNECTIONS (FDC) FOR FIRE SPRINKLER OR STANDPIPE SYSTEMS SHALL BE LOCATED WITHIN 100 FEET OF A FIRE HYDRANT. THE 100 FEET SHALL BE MEASURED BY AN APPROVED UNOBSTRUCTED ROUTE. THE FDC SHALL BE LOCATED IN AN APPROVED LOCATION ON THE STREET OR FIRE LANE SIDE OF THE BUILDING BEING PROTECTED.
6. FIRE HYDRANTS SHALL BE IN CONFORMANCE WITH THE FIRE PREVENTION DIVISIONS UNIFORM GUIDELINES.

UNDERGROUND PIPING & VALVES:

7. PRIOR TO CLOSING ANY WATER SUPPLY CONTROL VALVE OR PLACING ANY FIRE HYDRANT OUT OF SERVICE, THE HENDERSON FIRE DEPARTMENT DISPATCH CENTER (565-1214) SHALL BE CONTACTED.
8. ALL SECTIONAL CONTROL VALVES CONTROLLING WATER SUPPLIES ON PRIVATE FIRE SERVICE MAINS SHALL BE LISTED POST INDICATING VALVES (PIV).
   EXCEPTION: APPROVED DESIRS "LOCKOUT" CAPS MAY BE USED WHEN TH

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GRAPHIC SCALE

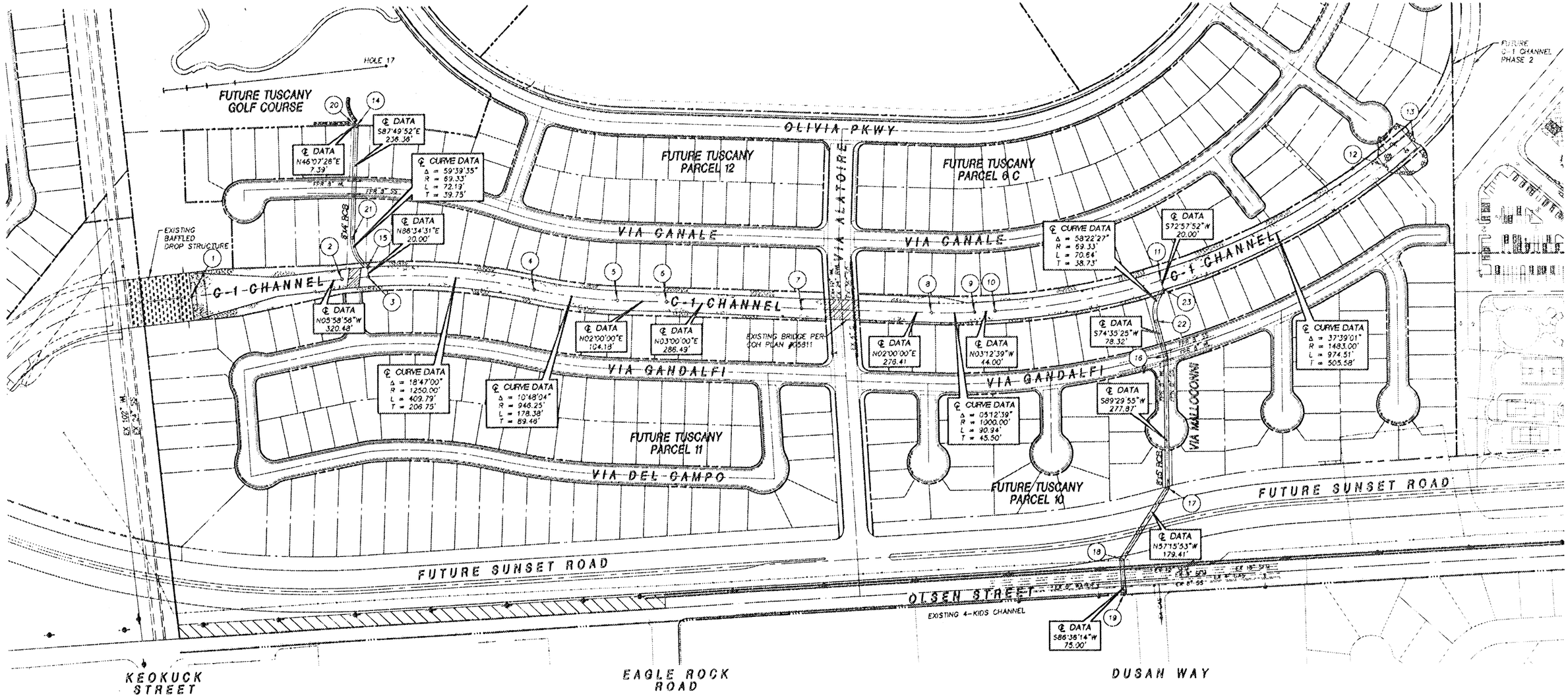
100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft

COORDINATE TABLE (CHANNEL CENTERLINE)

	NORTHING	EASTING		NORTHING	EASTING
1	6790.3933	9562.4933	13	9381.4531	9242.0594
2	7109.1256	9529.0931	14	7140.4594	9207.2709
3	7184.7273	9524.5183	15	7163.5325	9504.5540
4	7516.3624	9553.3550	16	8856.2735	9698.7132
5	7692.9985	9576.2980	17	8858.7045	9976.5710
6	7797.1136	9579.9338	18	8761.6894	10127.4827
7	8083.2144	9594.9277	19	8766.1325	10202.3510
8	8359.4580	9604.5743	20	7135.3370	9201.9435
9	8450.3656	9603.8138	21	7131.5138	9443.4660
10	8494.2966	9601.1494	22	8835.4616	9823.2060
11	8845.7064	9538.4071	23	8851.5658	9557.5295
12	9317.1834	9294.5937			


HOLE 17
FUTURE TUSCANY GOLF COURSE
OLIVIA PKWY
FUTURE TUSCANY PARCEL 12
FUTURE TUSCANY PARCEL 6C
VIA ALATOIRE
VIA GANALE
VIA GANALE
FUTURE C-1 CHANNEL PHASE 2
EXISTING BAFFLED DROP STRUCTURE
C-1 CHANNEL
C-1 CHANNEL
C-1 CHANNEL
VIA GANDALFI
VIA GANDALFI
VIA DEL CAMPO
FUTURE TUSCANY PARCEL 11
FUTURE TUSCANY PARCEL 10
VIA MALLOCCHIO
FUTURE SUNSET ROAD
FUTURE SUNSET ROAD
OLSEN STREET
EXISTING 4-KIDS CHANNEL
KEOKUCK STREET
EAGLE ROCK ROAD
DUSAN WAY
℄ DATA N46°07'26"E 7.39'
℄ DATA S87°49'52"E 236.36'
℄ CURVE DATA Δ = 59°39'35" R = 69.33' L = 72.19' T = 39.75'
℄ DATA N86°34'31"E 20.00'
℄ DATA N05°58'56"W 320.48'
℄ CURVE DATA Δ = 18°47'00" R = 1250.00' L = 409.79' T = 206.75'
℄ DATA N02°00'00"E 104.18'
℄ CURVE DATA Δ = 10°48'04" R = 946.25' L = 178.38' T = 89.48'
℄ DATA N03°00'00"E 286.49'
EXISTING BRIDGE PER COH PLAN #5811
℄ CURVE DATA Δ = 58°22'27" R = 69.33' L = 70.64' T = 38.73'
℄ DATA S72°57'52"W 20.00'
℄ DATA N02°00'00"E 276.41
℄ DATA N03°12'39"W 44.00'
℄ CURVE DATA Δ = 05°12'39" R = 1000.00' L = 90.94' T = 45.50'
℄ DATA S74°35'25"W 78.32'
℄ DATA S89°29'55"W 277.87'
℄ CURVE DATA Δ = 37°39'01" R = 1483.00' L = 974.51' T = 505.58'
℄ DATA N57°15'53"W 179.41'
℄ DATA S86°35'14"W 75.00'
EX 8" SS
EX 18" SD
EX 8" SS
EX 8" SS
EX 18" SD
EX 8" SS
EX 8" SS
EX 8" SS

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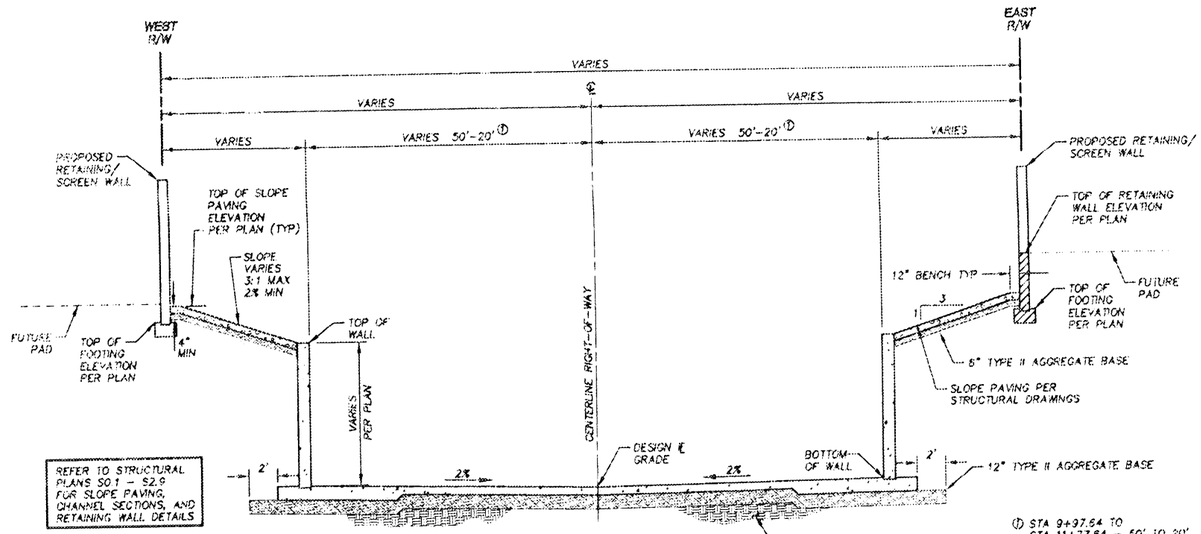


① STA 9+97.64 TO STA 11+77.64 – 50' TO 20'

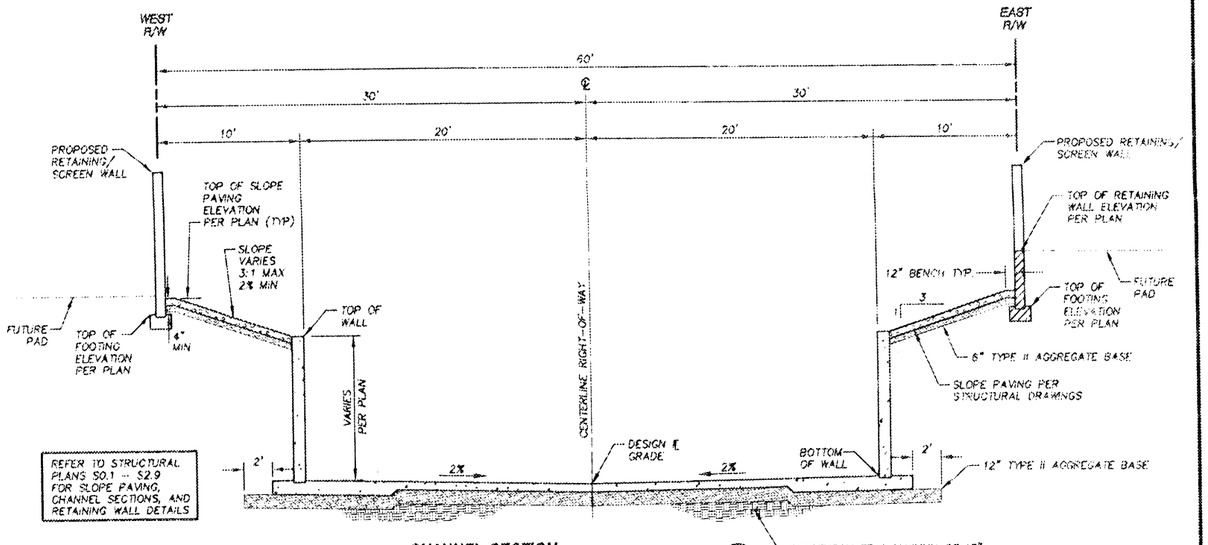
STA 11+77.64 TO STA 13+18.12 – 20'

NOTE: 6' CHAINLINK FENCE SHALL BE INSTALLED IN LIEU OF RETAINING/SCREEN WALL FROM STA 9+92.80 (LT & RT) TO STA 10+44.01 (RT) AND STA 10+92.98 (LT)

CHANNEL SECTION

(STA 9+97.64 TO STA 13+18.12)
NOT TO SCALE

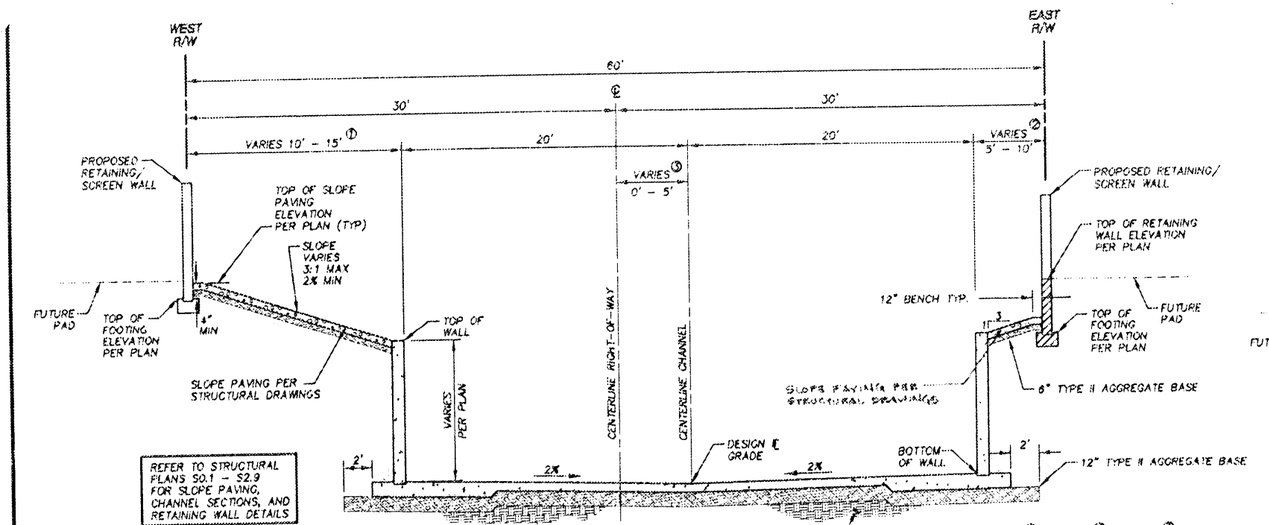
A / C4



CHANNEL SECTION

(STA 13+18.12 TO 20+10.47)
NOT TO SCALE

B / C4



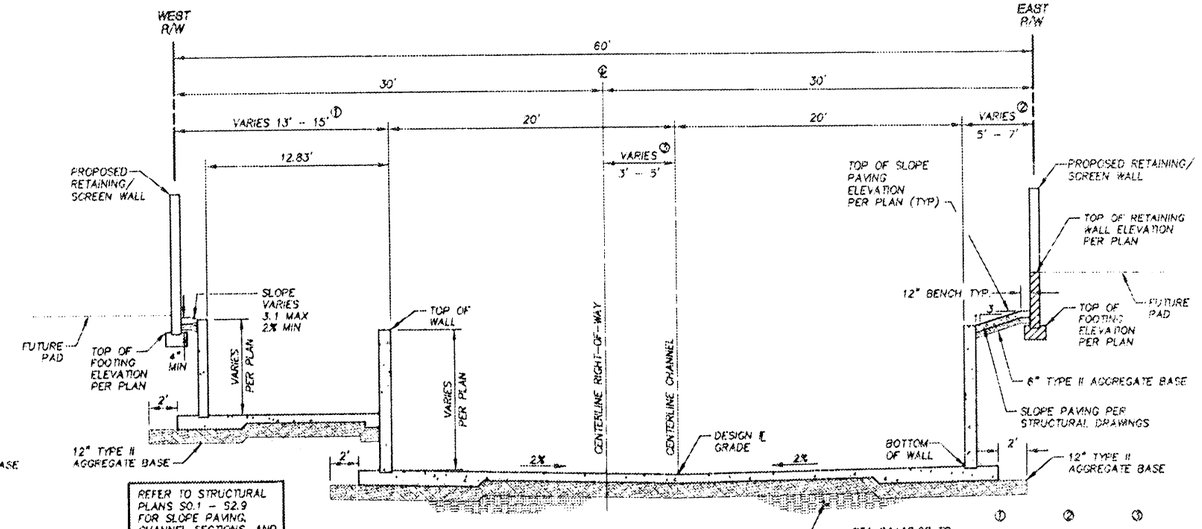
NOTE: CHAIN LINK FENCE SHALL BE INSTALLED IN LIEU OF RETAINING/SCREEN WALL FROM STA 35+64.33 TO STA 36+05.85 (RT SIDE ONLY) AND FROM STA 34+71.54 TO STA 36+12.36 (LT SIDE ONLY)

CHANNEL SECTION

(STA 20+10.47 TO 23+46.96 AND STA 27+08.32 TO 35+99.82)
NOT TO SCALE

C / C4

	①	②	③
STA 20+10.47 TO STA 22+98.96	10' TO 15'	10' TO 5'	0' TO 5'
STA 22+98.96 TO STA 23+46.96	15'	5'	5'
STA 27+08.32 TO STA 35+99.82	13'	7'	3'



CHANNEL SECTION

(STA 24+19.28 TO STA 27+08.32)
NOT TO SCALE

D / C4

	①	②	③
STA 24+19.28 TO STA 25+73.38	15'	5'	5'
STA 25+73.38 TO STA 27+08.32	15' TO 13'	5' TO 7'	5' TO 3'

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-104
SCALE: HORIZ.: 1" = 5'
VERT.: 1" = 5'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200

SEAL: STATE OF NEVADA — PROFESSIONAL ENGINEER — LEE C. FARRIS — No. 13691

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

TYPICAL CHANNEL SECTIONS

XXXX

DRAWING NO. C4

4 / 33

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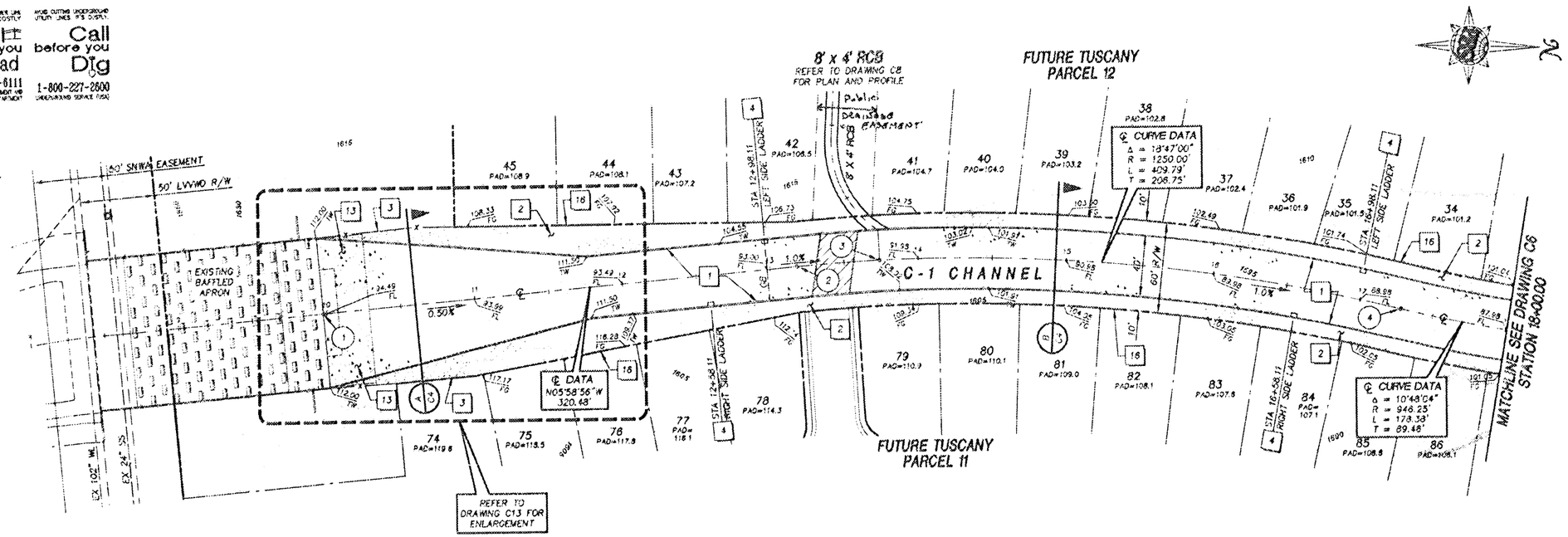

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C16
5. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
6. INSTALL 8'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
7. INSTALL 10'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
8. INSTALL TYPE 'B' DROP INLET INTO TOP OF RCB PER USD #412
9. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.5
10. CONSTRUCT RCB TYPE II HEADWALL PER NDOT STD DWG B-20.1.4 DRAWING C17
11. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 10 DRAWING S2.5
12. 3 (MIN) THICK GROUTED HEAVY RIP-RAP D_{50}=18" W/ FILTER FABRIC UNDER ALL UNEXPOSED SURFACES (TYPICAL)
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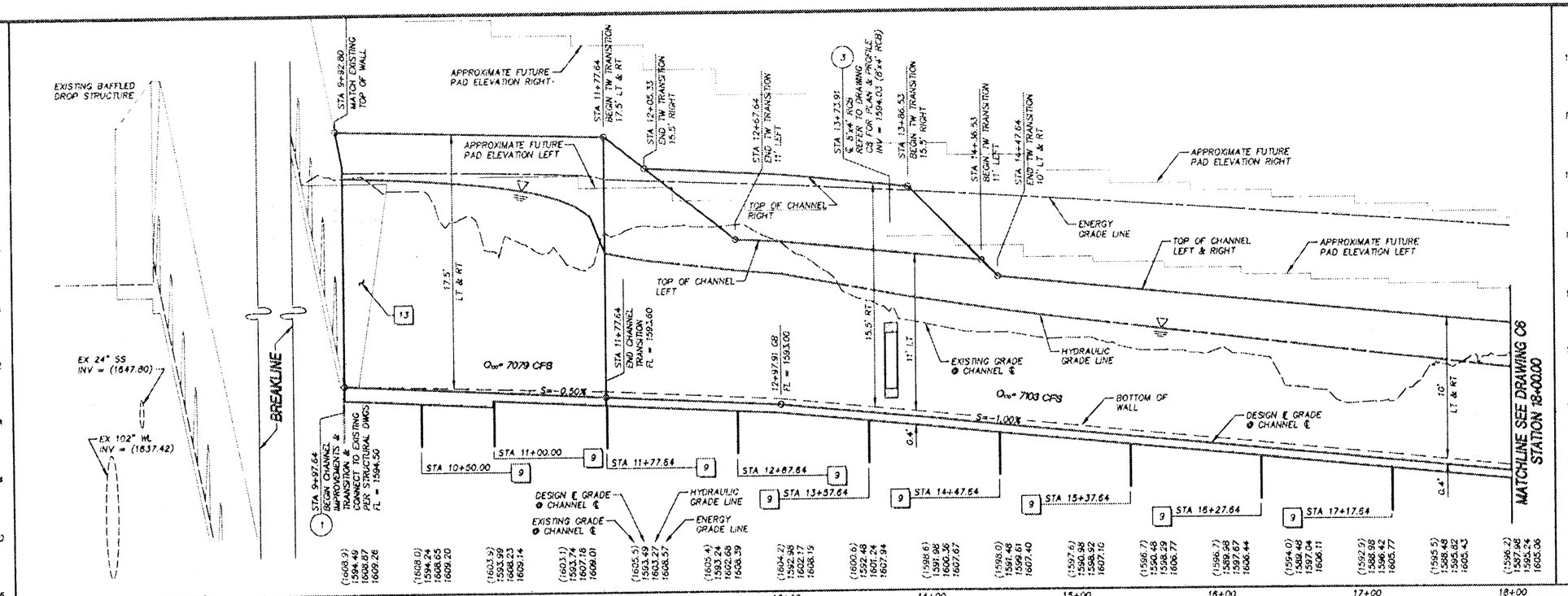
14. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C16
15. INSTALL 12" STEEL SLEEVE FOR FUTURE UTILITY
16. RETAINING / SCREEN WALL – REFER TO PLAN & PROFILE DRAWINGS C10 THROUGH C12

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.



APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

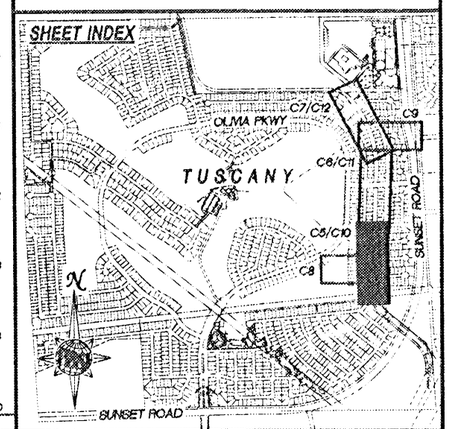
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY July 1, 2003

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
HORZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 2201 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.155 = 1667.368 FEET – C.O.H. (NAD '88)
CONVERSION FACTOR: METERS X 1937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

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DRAWING NO.: 1197C1-105
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBSJ
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7275 Fax: 702/263-7300
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

SEAL — LEE A. FARRIS — No. 13691 — 4/18/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

C-1 CHANNEL PLAN AND PROFILE STA 8+00.00 TO STA 18+00.00

XXXX

DRAWING NO. C5 — 5/33

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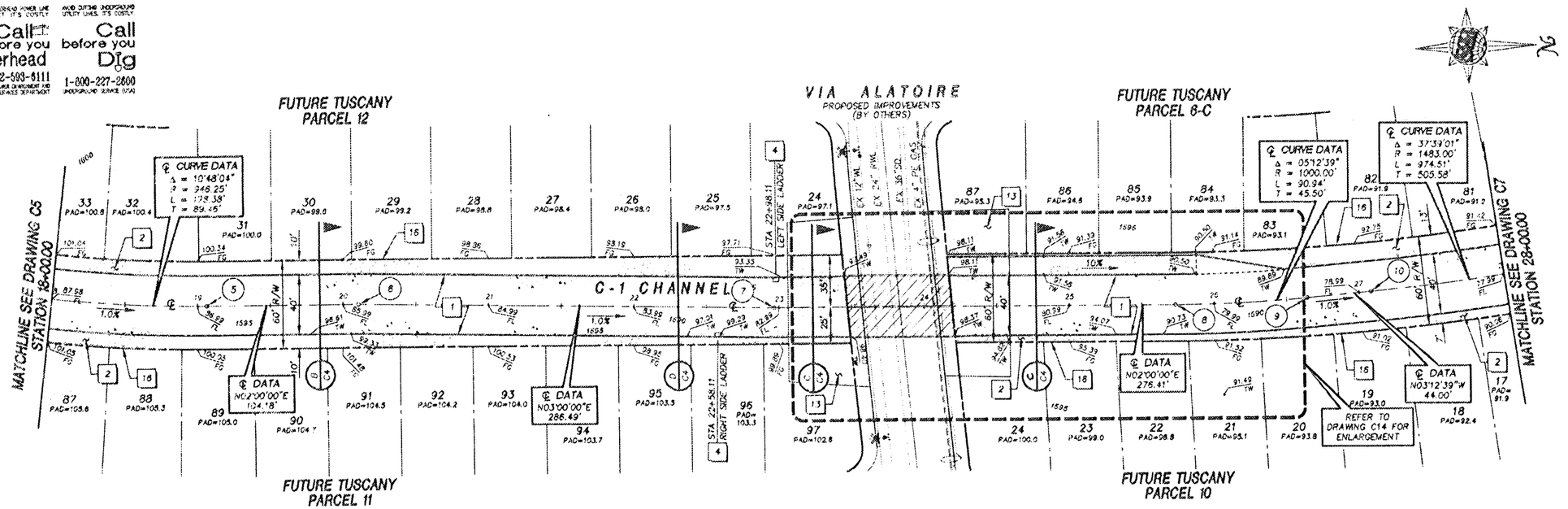

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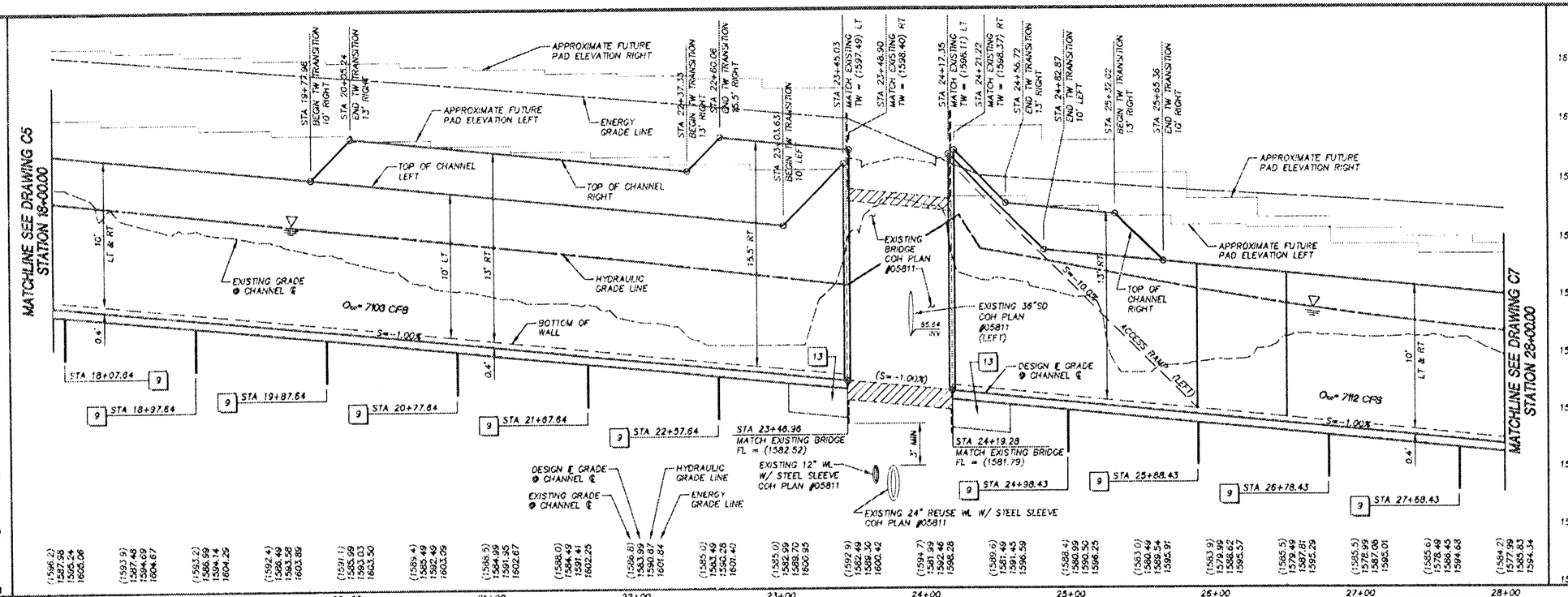

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(IN FEET)

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VERT 1 inch = 4 ft.

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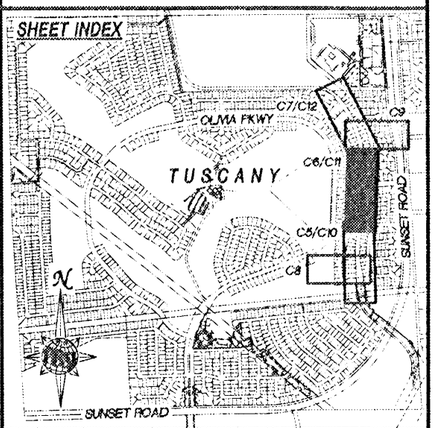
CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET ELEVATION IN METERS 508.195 = 1667.303 FEET – C.O.H. NAVD '88 CONVERSION FACTOR METERS X 3.2771200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-108
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
901 North Green Valley Pkwy Suite 100 Henderson, Nevada 89014 Telephone 702/263-7275 Fax 702/263-7200

SEAL: LEE C. FARRIS No. 13697 4/18/02

City of Henderson, Nevada

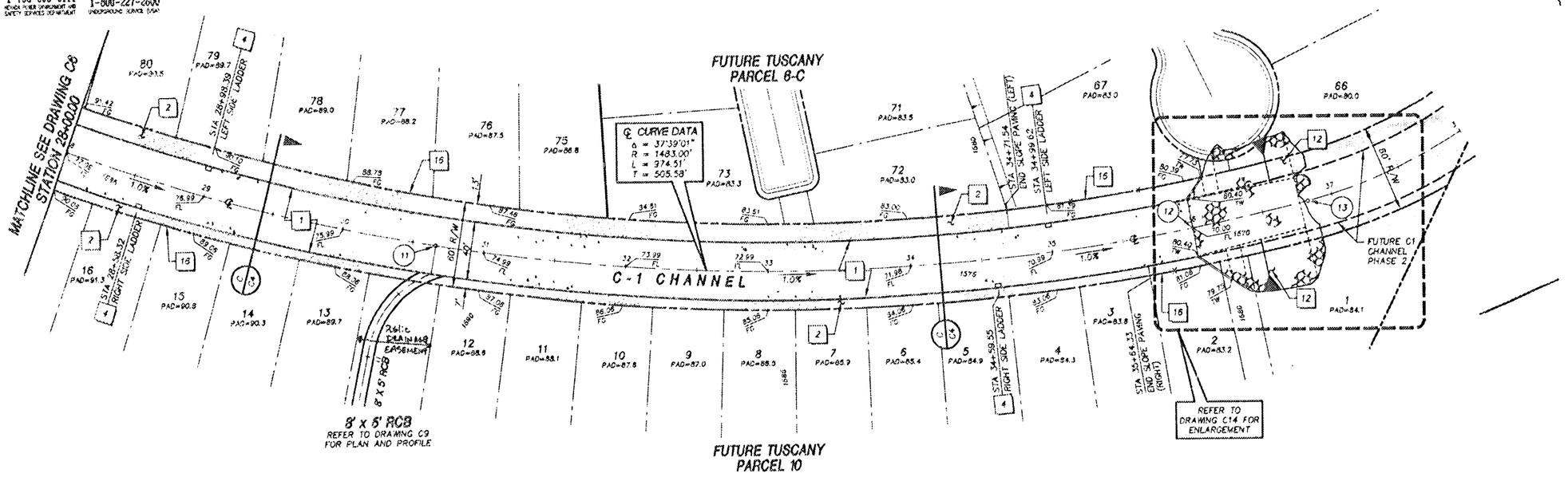
TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS - C-1 CHANNEL PLAN AND PROFILE STA 18+00.00 TO STA 28+00.00

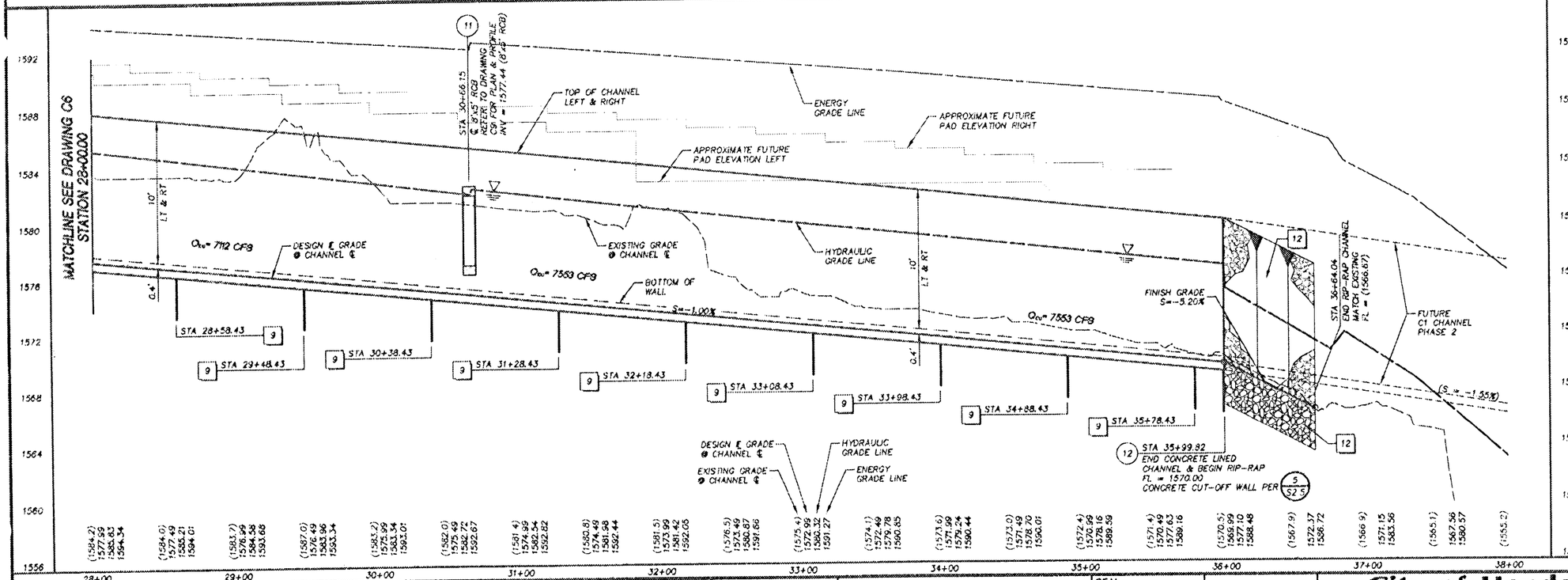
XXXX

DRAWING NO. C6 | 6/33

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-8111
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)





KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 1 DRAWING C16
5. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
6. INSTALL 8'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
7. INSTALL 10'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
8. INSTALL TYPE 'B' DROP INLET INTO TOP OF RCB PER USD #412
9. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.5
10. CONSTRUCT RCB TYPE II HEADWALL PER NDOT STD DWG B-20.1.4 DRAWING C17
11. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 10 DRAWING S2.5
12. 3' THICK (MIN) GROUTED HEAVY RIP-RAP D_{50}=18" W/ FILTER FABRIC UNDER ALL UNEXPOSED SURFACES (TYPICAL)
13. EXISTING RIP-RAP TO BE REMOVED PRIOR TO CONSTRUCTION
14. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C16
15. INSTALL 12" STEEL SLEEVE FOR FUTURE UTILITY
16. RETAINING / SCREEN WALL - REFER TO PLAN & PROFILE DRAWINGS C10 THROUGH C12

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.

APPROVAL

NEW DEVELOPMENT ENGINEER - KEN KOSHIO, P.E. — DATE

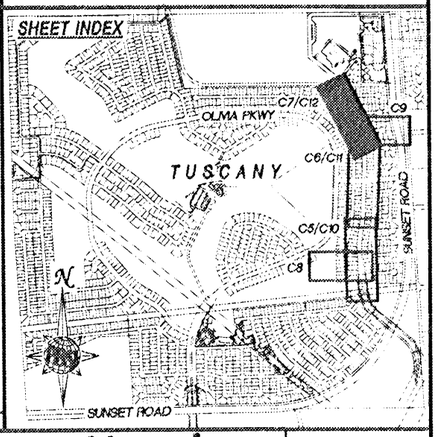
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY July 1, 2002

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 - BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 308.135 = 1597.303 FEET - C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-107
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
701 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7275 Fax: 702/263-7200

SEAL — PROFESSIONAL ENGINEER — LEE C. FARRIS — 9306 — 1563 — 4/18/02

THE CITY OF HENDERSON

City of Henderson, Nevada

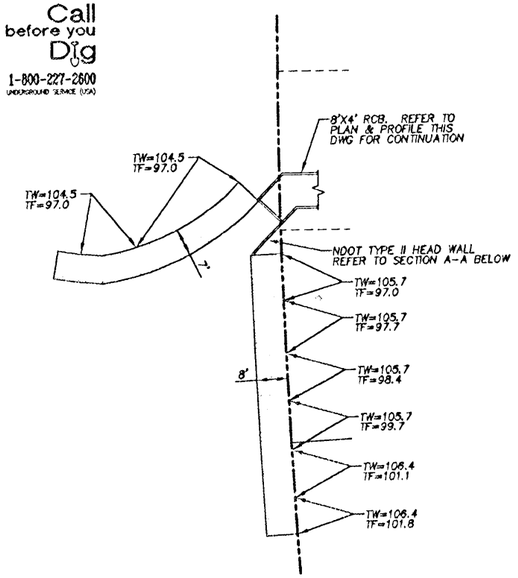
TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS - C-1 CHANNEL PLAN AND PROFILE STA 28+00.00 TO STA 38+00.00

XXXX

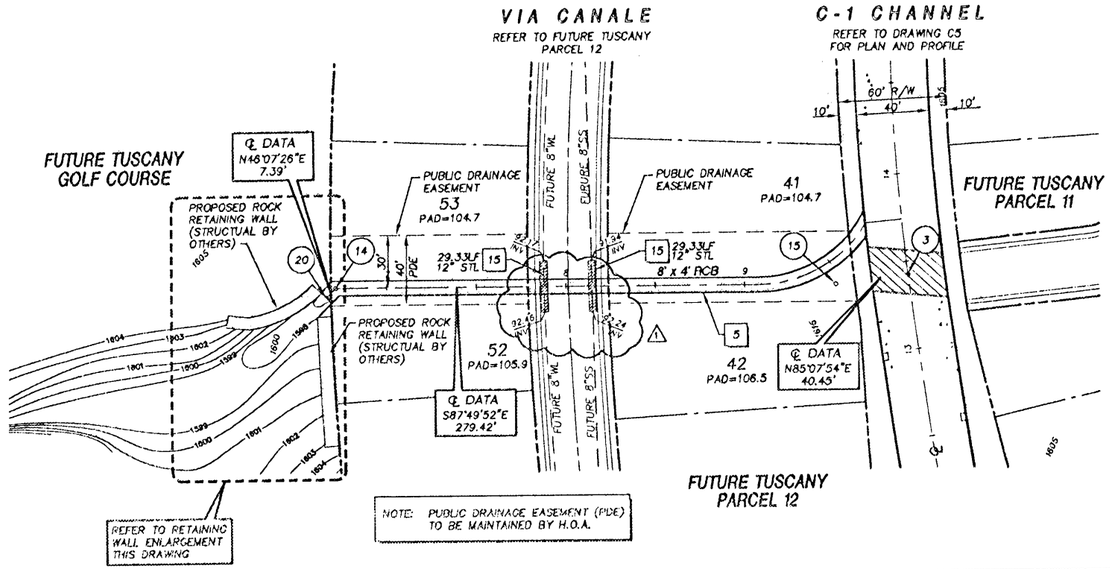
DRAWING NO. C7 — 7/33

Call before you Overhead
1-702-593-6111
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT
MORE OVERHEAD POWER LINE CONTACT IT'S COSTLY

Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)
MORE CUTTING UNDERGROUND UTILITY LINES, IT'S COSTLY



RETAINING WALL ENLARGEMENT
NOT TO SCALE



KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C16
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7. INSTALL 10'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
8. NOT USED. ⚠1
9. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.5
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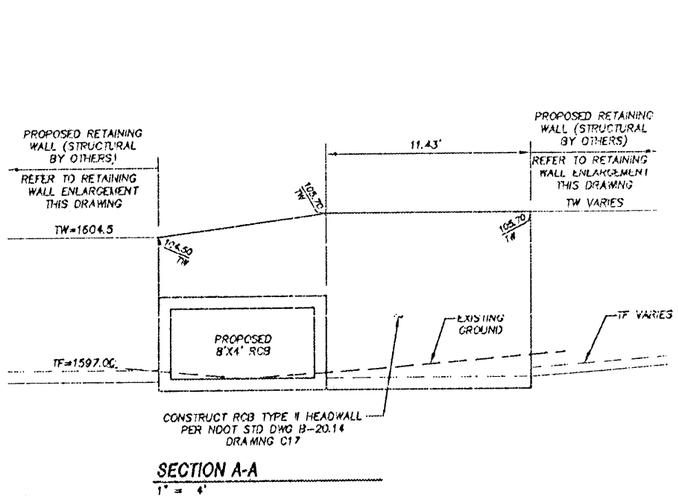
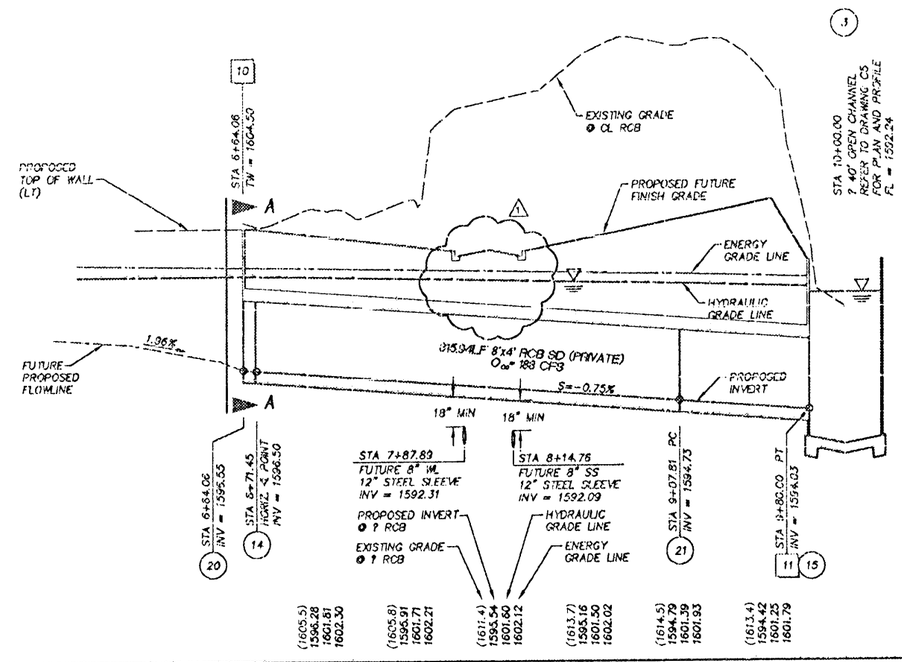
GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.



SECTION A-A
1" = 4'



APPROVAL

NEW DEVELOPMENT ENGINEER – KEN NOSHPO, P.E. — DATE 2-19-03

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY February 19, 2004

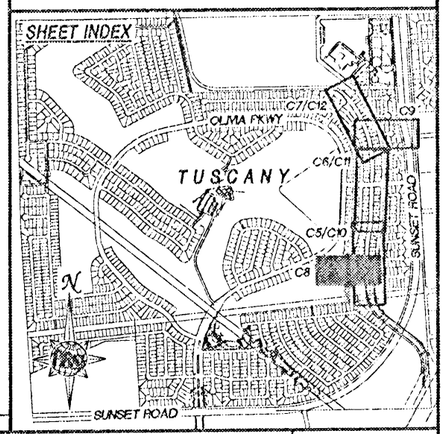
GRAPHIC SCALE

40 0 20 40 80 100
(IN FEET)
HORZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL
⚠1	REMOVED DROP INLETS FROM PLANS, NOT NEEDED PER PARCEL 12 DRAINAGE STUDY.	RMW	2/17/03	KAK 2-19-03

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-108
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7273 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER – STATE OF NEVADA – LEE C. FARRIS – Exp 6/30/03 CIVIL – No. 01369

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -
8' x 4' RCB
PLAN AND PROFILE STA 6+72.74 TO STA 9+80.00

XXXX

DRAWING NO. C8 — 8 / 33

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY!
Call before you Overhead
1-702-593-8111
NEVADA POWER CO. (BOULDER) AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
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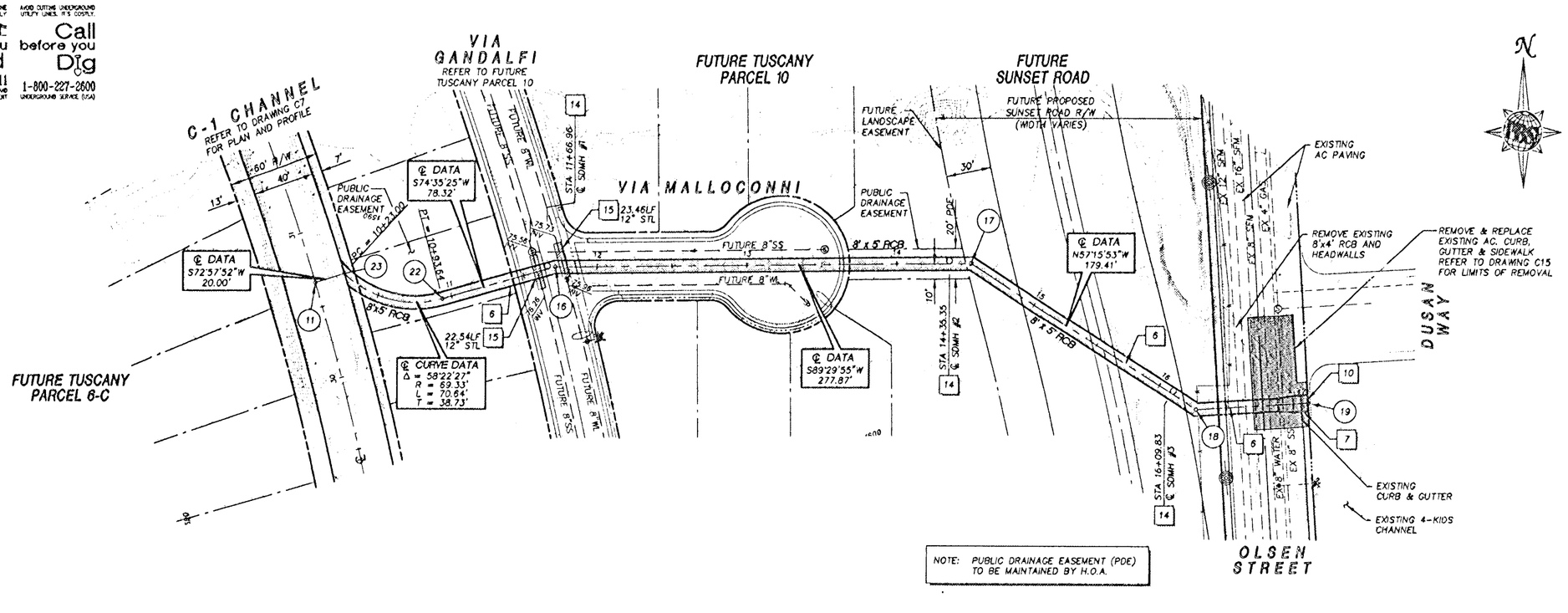
UNDERGROUND SERVICE (USA)



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GENERAL NOTES

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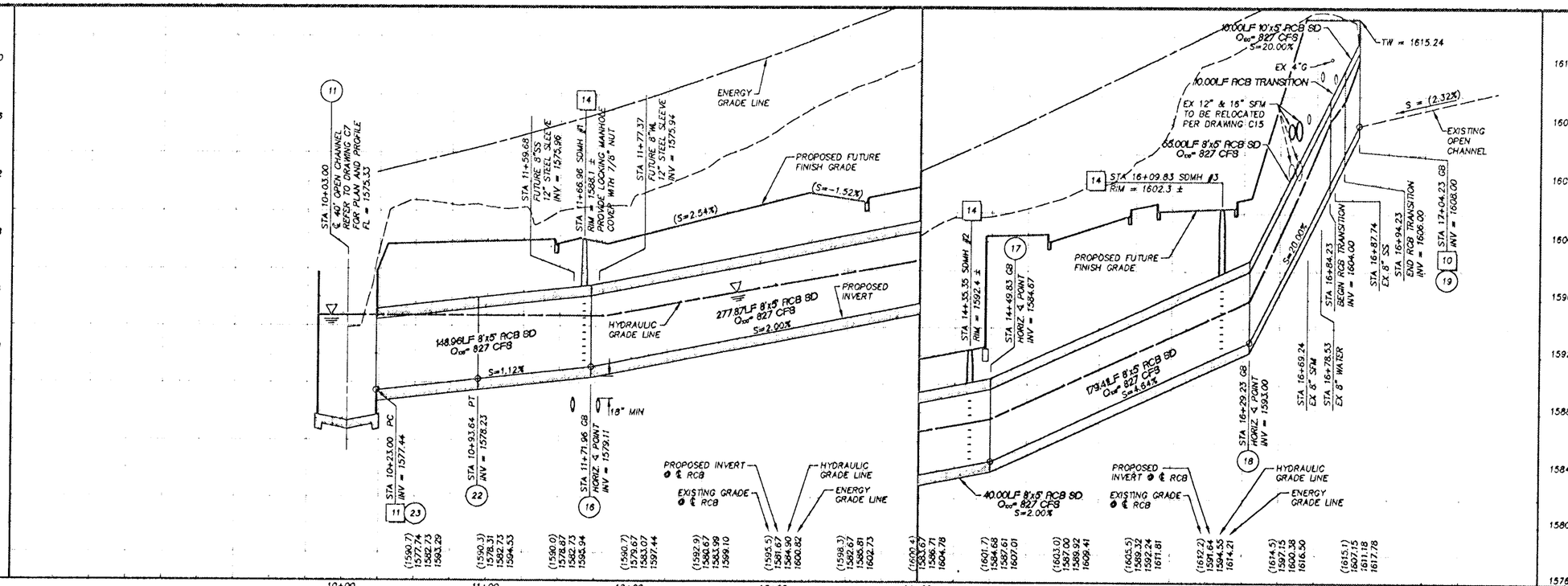


APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE 7-5-02

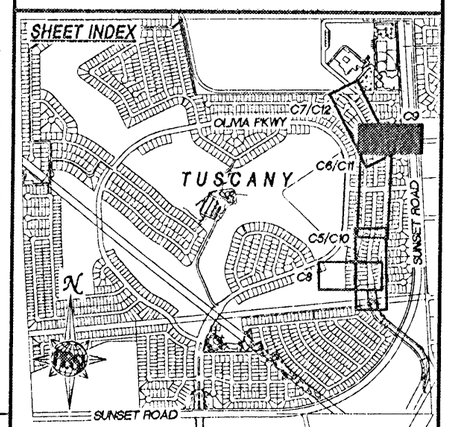
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY July 1, 20 03

GRAPHIC SCALE
(IN FEET)
HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-109
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBSJ
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7275 Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL — PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS CIVIL No. 13691 — 7/19/02

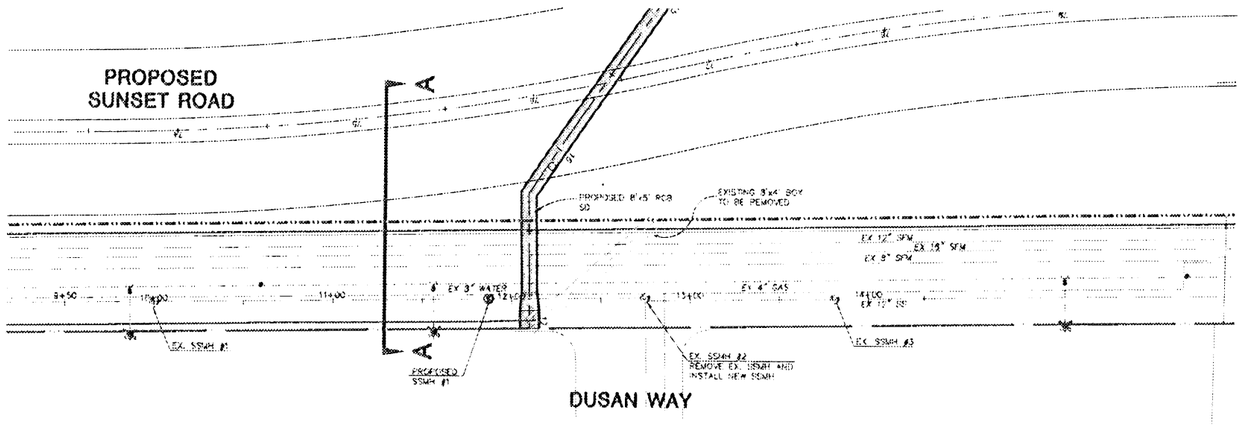
THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS - 8' x 5' RCB PLAN AND PROFILE STA 10+23.00 TO STA 16+94.41

XXXX

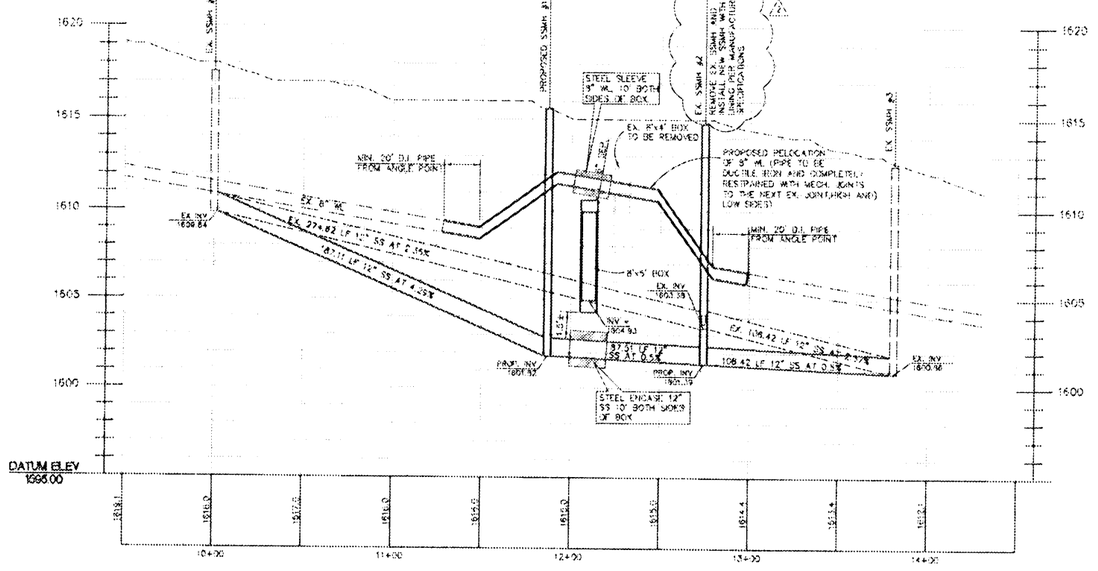
DRAWING NO. C9 — 9/33



OLSEN STREET - PLAN VIEW

HORIZONTAL SCALE: 1" = 40'

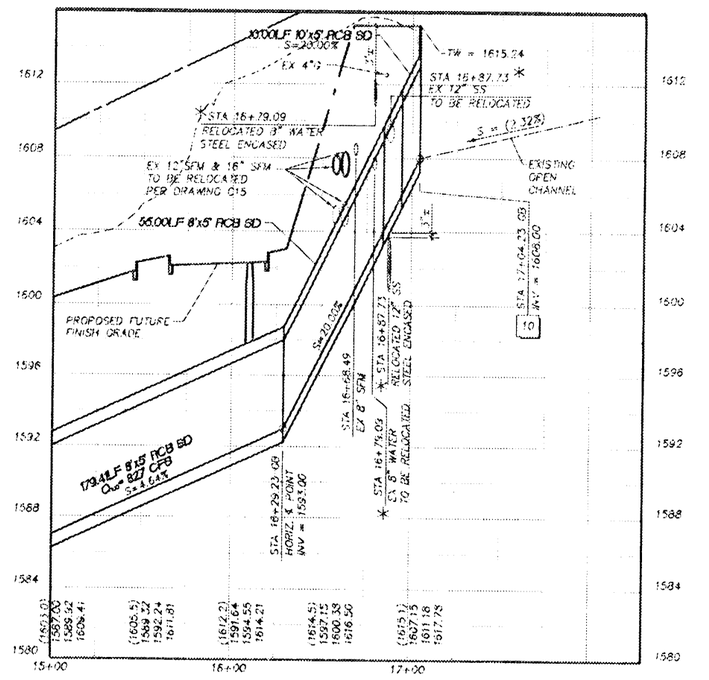
NOTE: * EX 12" SANITARY SEWER AND EX. 8" WATER TO BE RELOCATED PER THIS SHEET



NOTE:
OLSEN STREET PROFILE STATIONING BASED ON CENTERLINE OF EXISTING 12" SANITARY SEWER

OLSEN STREET - PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



SECTION A-A

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
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3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
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8. NOT USED.
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GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED

APPROVAL

NEW DEVELOPMENT ENGINEER - KEN KUSHNER P.E. (715 of 2)

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY June 30, 2003

GRAPHIC SCALE

(IN FEET)

HORIZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 - BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.305 FEET - C.O.H. NAVD '88
CONVERSION FACTOR METERS X 3937/1200 = U.S. FEET
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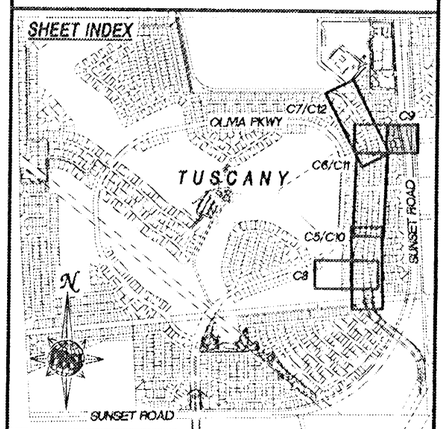
SHEET INDEX



REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL
1	ADDED SHEET	RMM	11/20/02	
2	REVISED MANHOLE LINING	RMM	3/14/03	KAK 3/20/03

DESIGNED BY: RMM
DRAWN BY: RMM
CHECKED BY: L. FARRIS
DATE: NOVEMBER 13, 2001

JOB NO.: 51197
DRAWING NO.: 1197C1-109A
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone 702/263-7275
Fax 702/263-7291
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL

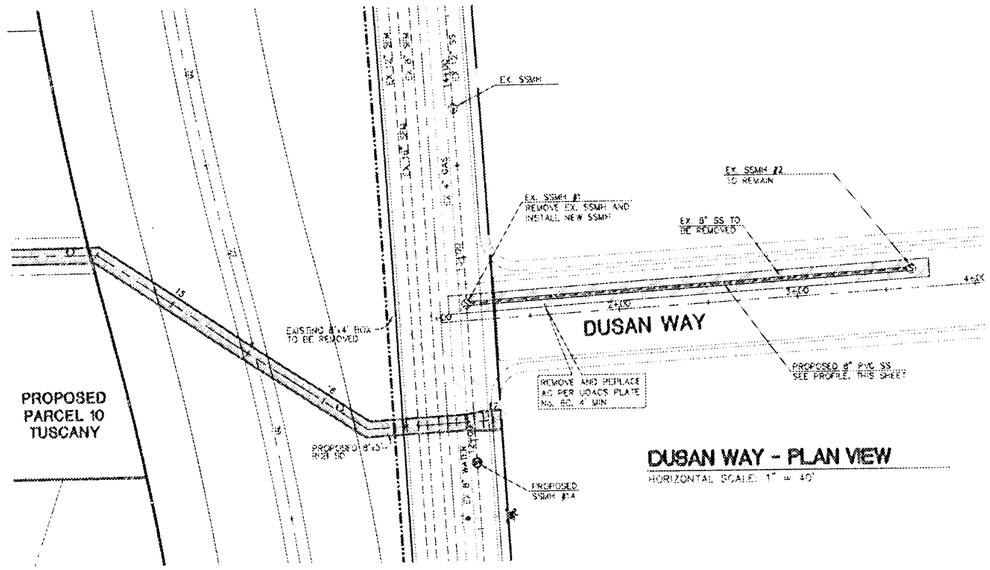
City of Henderson, Nevada

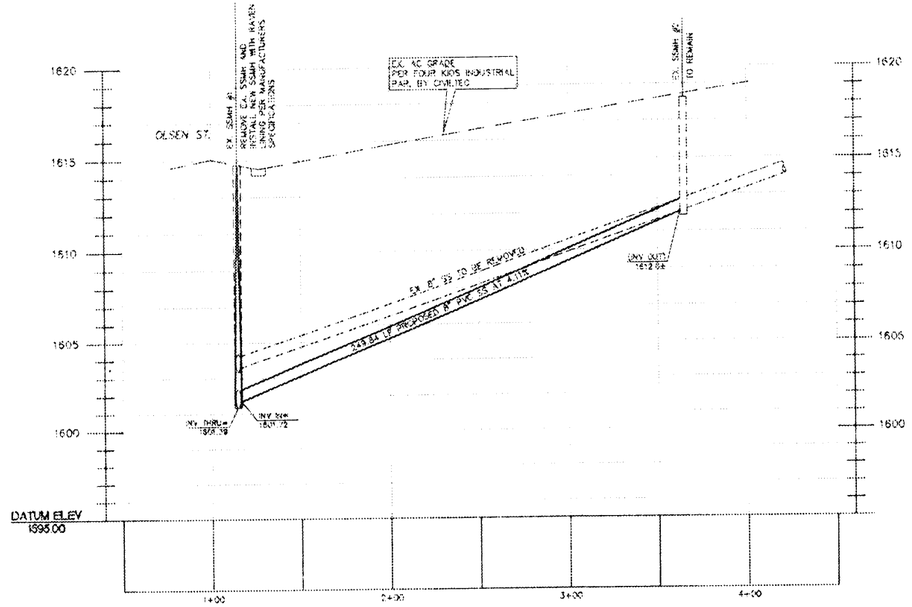
TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

OLSEN STREET
8'x5' RCB UTILITY CROSSINGS

XXXX

DRAWING NO. 9A





DUSAN WAY - PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

NOTE: EXISTING UTILITY LINES ARE SHOWN IN APPROXIMATE LOCATIONS BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. THESE DRAWINGS MAY NOT INDICATE ALL EXISTING UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL EXERCISE GREAT CARE DURING EXCAVATION IN ORDER TO AVOID MAKING CONTACT WITH ANY EXISTING UTILITY LINES. CONTRACTOR SHALL VERIFY EXISTING UTILITY INFORMATION PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY THE ENGINEER IF ANY CONFLICT BETWEEN THE EXISTING AND PROPOSED DESIGN ARE REVEALED.

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.6
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C16
5. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
6. INSTALL 8'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
7. INSTALL 10'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
8. NOT USED.
9. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.5
10. CONSTRUCT RCB TYPE II HEADWALL PER NDOT STD DWG B-20.1.4 DRAWING C17
11. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 10 DRAWING S2.5
12. 3' THICK (MIN) GROUTED HEAVY RIP-RAP D_{50}=18" W/ FILTER FABRIC UNDER ALL UNEXPOSED SURFACES (TYPICAL)
13. EXISTING RIP-RAP TO BE REMOVED PRIOR TO CONSTRUCTION
14. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C16
15. INSTALL 12" STEEL SLEEVE FOR FUTURE UTILITY
16. RETAINING / SCREEN WALL - REFER TO PLAN & PROFILE DRAWINGS C10 THROUGH C10

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.

APPROVAL

NEW DEVELOPMENT ENGINEER - KENT KOSHIRO, P.E. (1-16-03) DATE

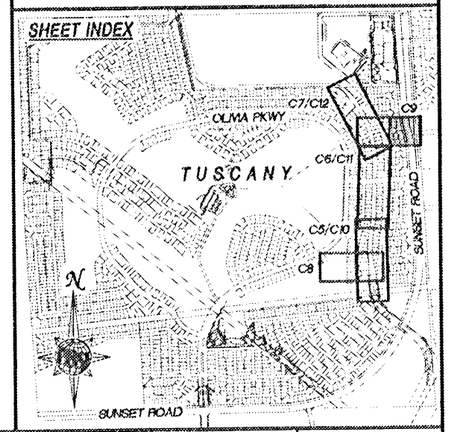
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY January 2, 2004

GRAPHIC SCALE
(IN FEET)
HORIZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 - BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND HEDRICK STREET
ELEVATION IN METERS: 508.785 = 1667.905 FEET - C.O.H. NAVD 88
CONVERSION FACTOR METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL
1	ADDED SHEET	RMM	3/14/03	Lek 3-20-03

DESIGNED BY: RMM
DRAWN BY: RMM
CHECKED BY: L. FARRIS
DATE: FEB. 12, 2003

JOB NO.: 51197
DRAWING NO.: 1197C1-109B
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7275 Fax: 702/263-7200

SEAL
NEVADA REGISTERED ENGINEER STATE OF LEE G. FARRIS Exp. 6/30/03 CIVIL No. 07369 3/19/03

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -
DUSAN WAY
SANITARY SEWER REMOVAL AND REPLACEMENT

XXXX

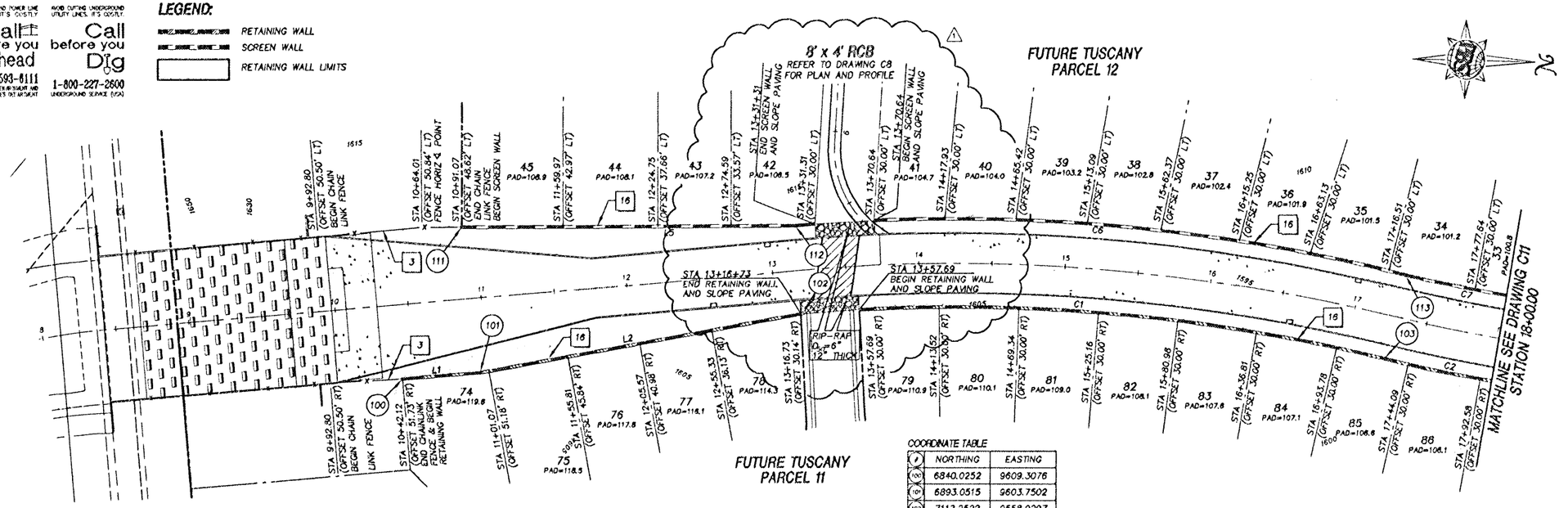
DRAWING NO. C9B | 9B / 338

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-8111
NEVADA POWER (OH/UG) AND SAFETY SERVICES (ST LIGHTS)

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

LEGEND:

- RETAINING WALL
- SCREEN WALL
- RETAINING WALL LIMITS



NOTE: FOR RETAINING / SCREEN WALL DETAILS REFER TO STRUCTURAL DRAWING C2.9

COORDINATE TABLE

	NORTHING	EASTING
(9)	6840.0252	9609.3076
(10)	6893.0515	9603.7502
(10)	7112.2522	9558.9297
(10)	7509.7153	9582.6094
(11)	6878.2508	9504.3956
(11)	7105.9990	9499.2565
(12)	7523.0095	9524.1007

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	18°47'00"	1220.00'	399.96'	201.79'
C2	10°48'04"	976.25'	184.04'	92.29'
C6	18°47'00"	1280.00'	419.63'	211.71'
C7	10°48'04"	916.25'	172.73'	86.62'

LINE TABLE

LINE	BEARING	DISTANCE
L1	S05°58'59"E	53.32'
L2	N11°33'22"W	223.74'
L5	N01°17'34"W	227.81'

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C16
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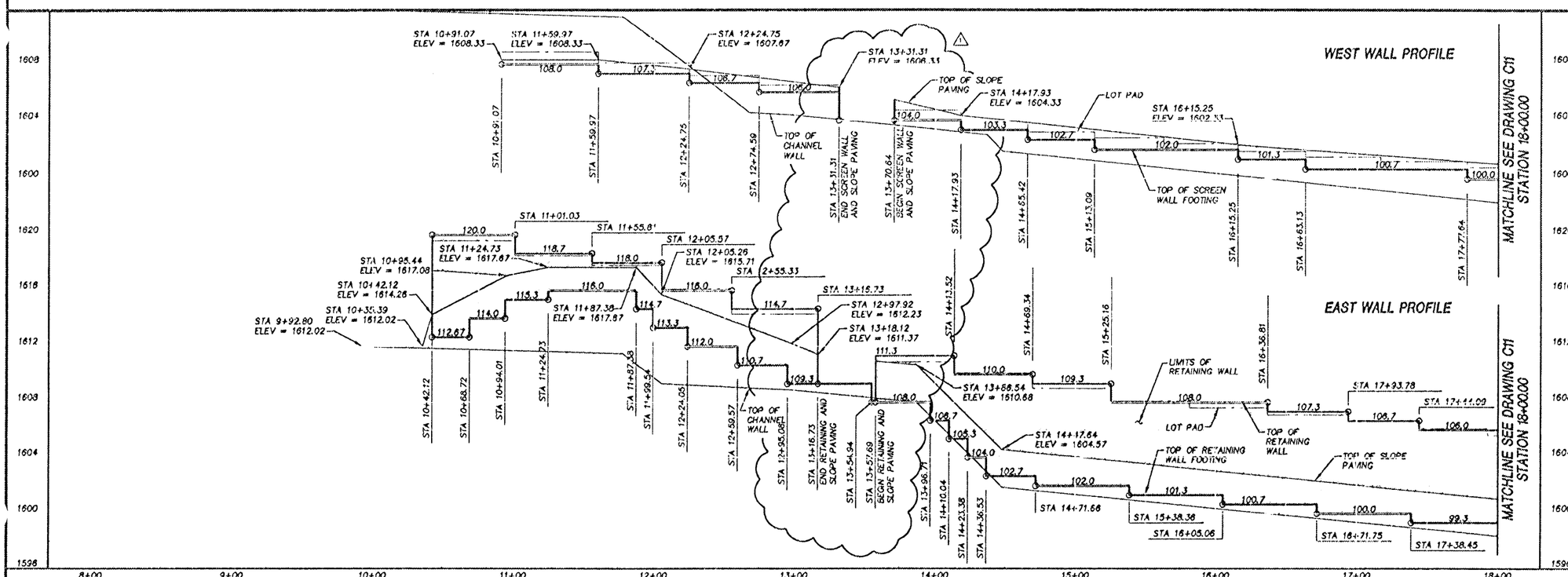
15. INSTALL 12" STEEL SLEEVE FOR FUTURE UTILITY
16. RETAINING / SCREEN WALL – REFER TO PLAN & PROFILE DRAWINGS C10 THROUGH C12

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.



APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY ____, 20__.

GRAPHIC SCALE

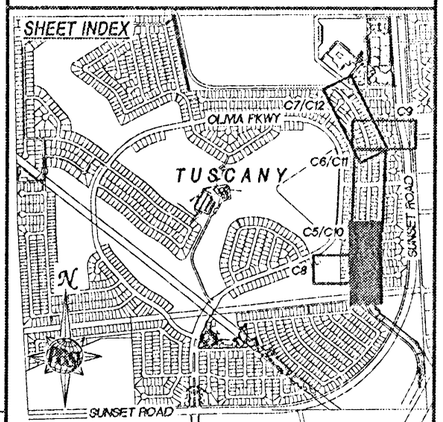
(IN FEET)

HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL
⚠	PROVIDE OPENING IN WALLS FOR BRIDGE, TEMPORARY RIP-RAP	RMM	2/17/03	

DESIGNED BY: A. SPATA
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-110
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7273 Fax 702/263-7200

SEAL
LEE C. FARRIS Exp. 6/30/03 CIVIL No. 013891 STATE OF NEVADA PROFESSIONAL ENGINEER
2/17/03

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION
- PHASE 1 IMPROVEMENTS -
C-1 CHANNEL - RETAINING WALLS
PLAN AND PROFILE STA 8+00.00 TO STA 18+00.00

XXXX

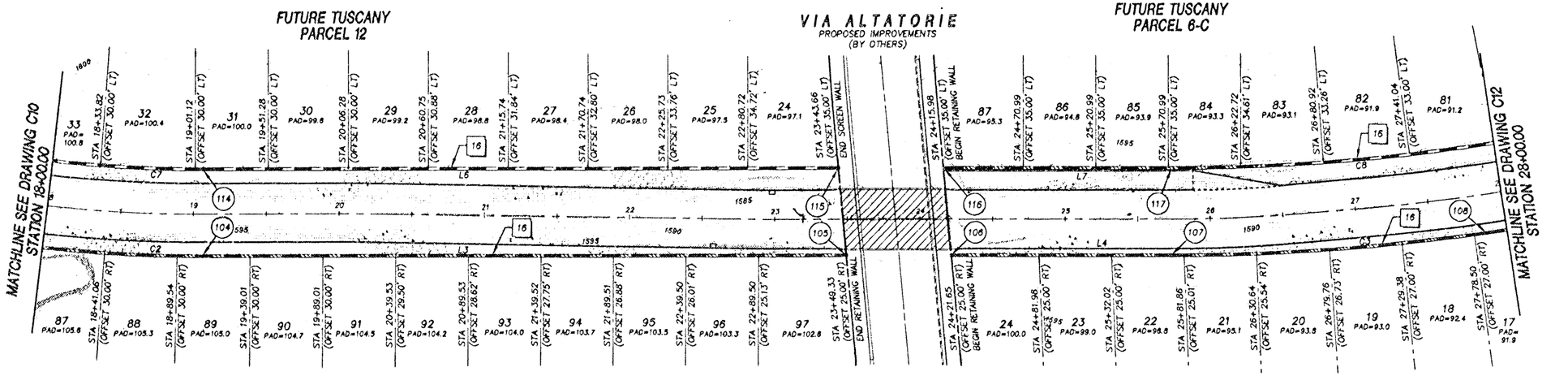
DRAWING NO. C10 — 10/33

Call before you Overhead
1-702-593-6111
NEVADA POWER CO. IN UNDERSERVED SAFETY SERVICES DEPARTMENT

Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

LEGEND:

- RETAINING WALL
- SCREEN WALL
- RETAINING WALL LIMITS



COORDINATE TABLE

#	NORTHING	EASTING
104	7691.9516	9606.2797
105	8134.6714	9621.7398
106	8206.9479	9624.2638
107	8358.5383	9629.5574
108	8575.3599	9621.5314

COORDINATE TABLE

#	NORTHING	EASTING
114	7694.0455	9546.3152
115	8131.1014	9561.5786
116	8203.3779	9564.1025
117	8360.6323	9569.5940

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C2	10°48'04"	975.25'	184.04'	92.29'
C3	08°14'23"	1510.00'	217.16'	108.77'
C7	10°48'04"	916.25'	172.73'	86.62'
C8	36°14'27"	1450.00'	917.15'	474.50'

LINE TABLE

LINE	BEARING	DISTANCE
L3	S02°00'00"W	442.99'
L4	S02°00'00"W	151.68'
L6	S02°00'00"W	437.32'
L7	S02°00'00"W	157.35'

NOTE: FOR RETAINING / SCREEN WALL DETAILS REFER TO STRUCTURAL DRAWING S2.9

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
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GENERAL NOTES

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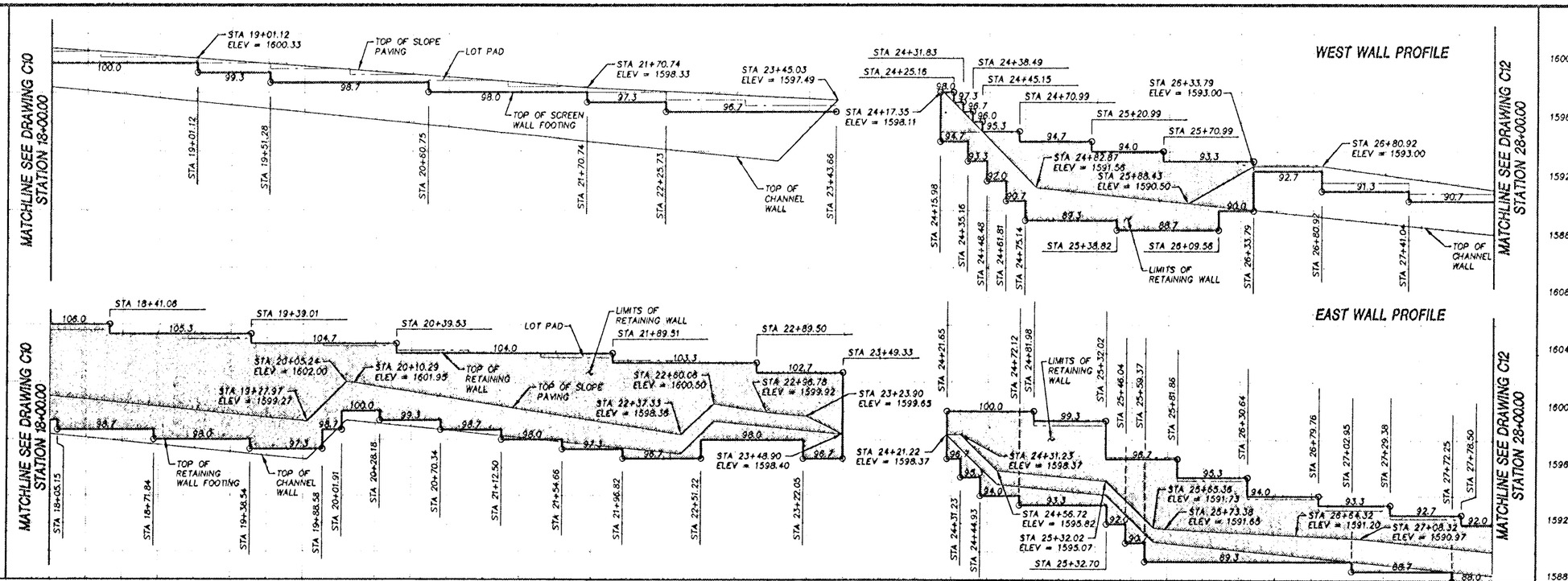

APPROVAL

NEW DEVELOPMENT ENGINEER - KEN KOSHIRO, P.E. — DATE

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GRAPHIC SCALE

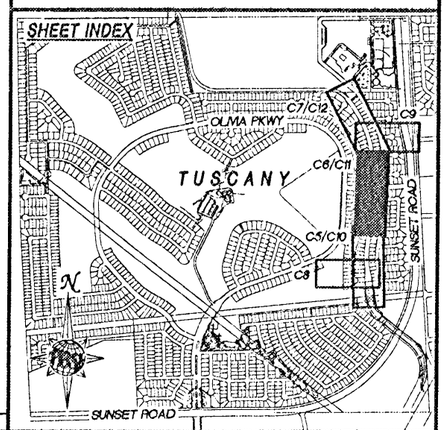
(IN FEET)

HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 - BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.155 = 1667.303 FEET - C.O.H. NAVD '88 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: A. SPATA
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-111
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
901 North Green Valley Pkwy. Suite 100
Henderson, Nevada 89014
Telephone 702/263-7273
Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL — PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS - C-1 CHANNEL - RETAINING WALLS PLAN AND PROFILE STA 18+00.00 TO STA 28+00.00

XXXX

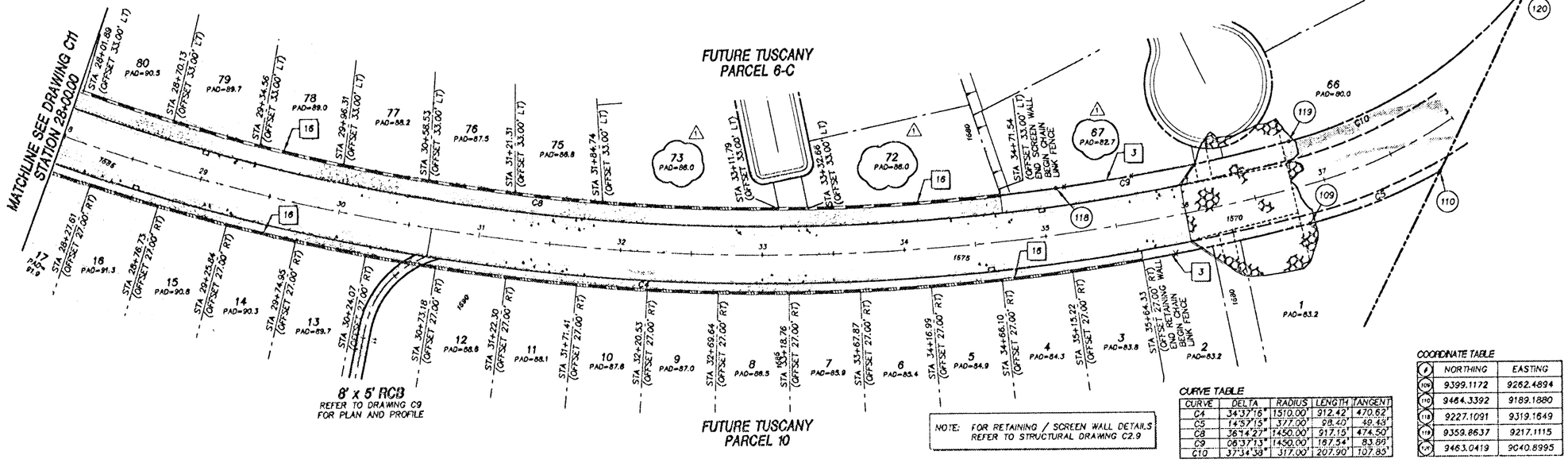
DRAWING NO. C11 — 11/33

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-6111
NEVADA POWER CO./SIERRA PAC. POWER CO./CITY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

LEGEND:

- RETAINING WALL
- SCREEN WALL
- RETAINING WALL LIMITS



CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C4	34°37'16"	1510.00'	912.42'	470.62'
C5	14°57'15"	377.00'	98.40'	49.43'
C8	36°14'27"	1450.00'	917.15'	474.50'
C9	06°37'13"	1450.00'	167.54'	83.89'
C10	37°34'38"	317.00'	207.90'	107.85'

COORDINATE TABLE

#	NORTHING	EASTING
109	9399.1172	9262.4894
110	9464.3392	9189.1880
118	9227.1091	9319.1649
119	9359.8637	9217.1115
120	9463.0419	9040.8995

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
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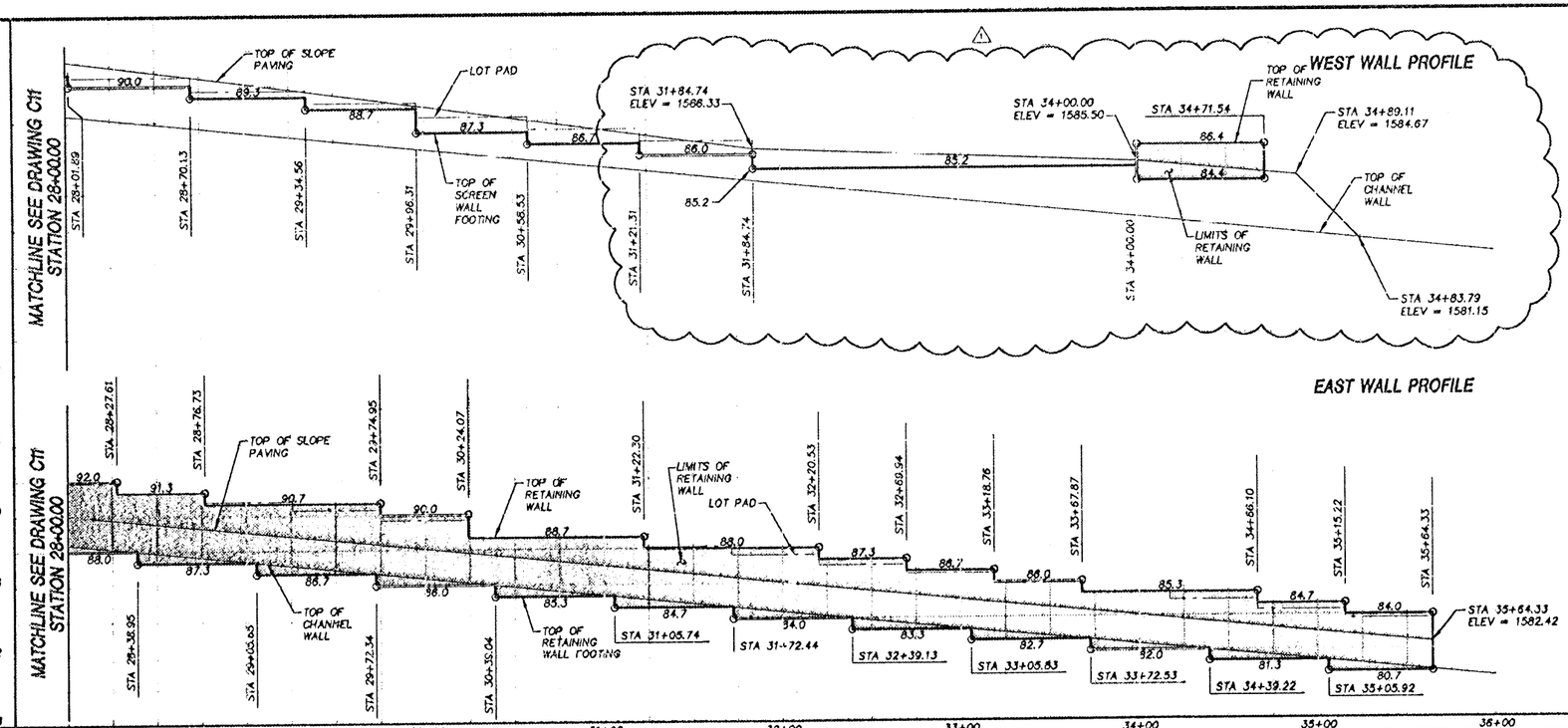
GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.



APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY 7-5 20 03

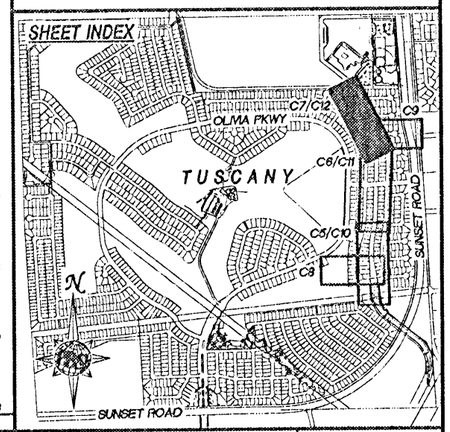
GRAPHIC SCALE

(IN FEET)
HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL
1	REVISED RETAINING WALL AND PAD ELEVATIONS	RMM	10/28/02	

DESIGNED BY: A. SPATA
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS

JOB NO.: 511197
DRAWING NO.: 1197C1-112
SCALE: HORIZ.: 1"=40'

PBS&J
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

C-1 CHANNEL - RETAINING WALLS PLAN AND PROFILE STA 28+00.00 TO STA 38+00.00

XXXX

DRAWING NO. 12
C12

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY

Call before you Overhead

1-702-593-8111

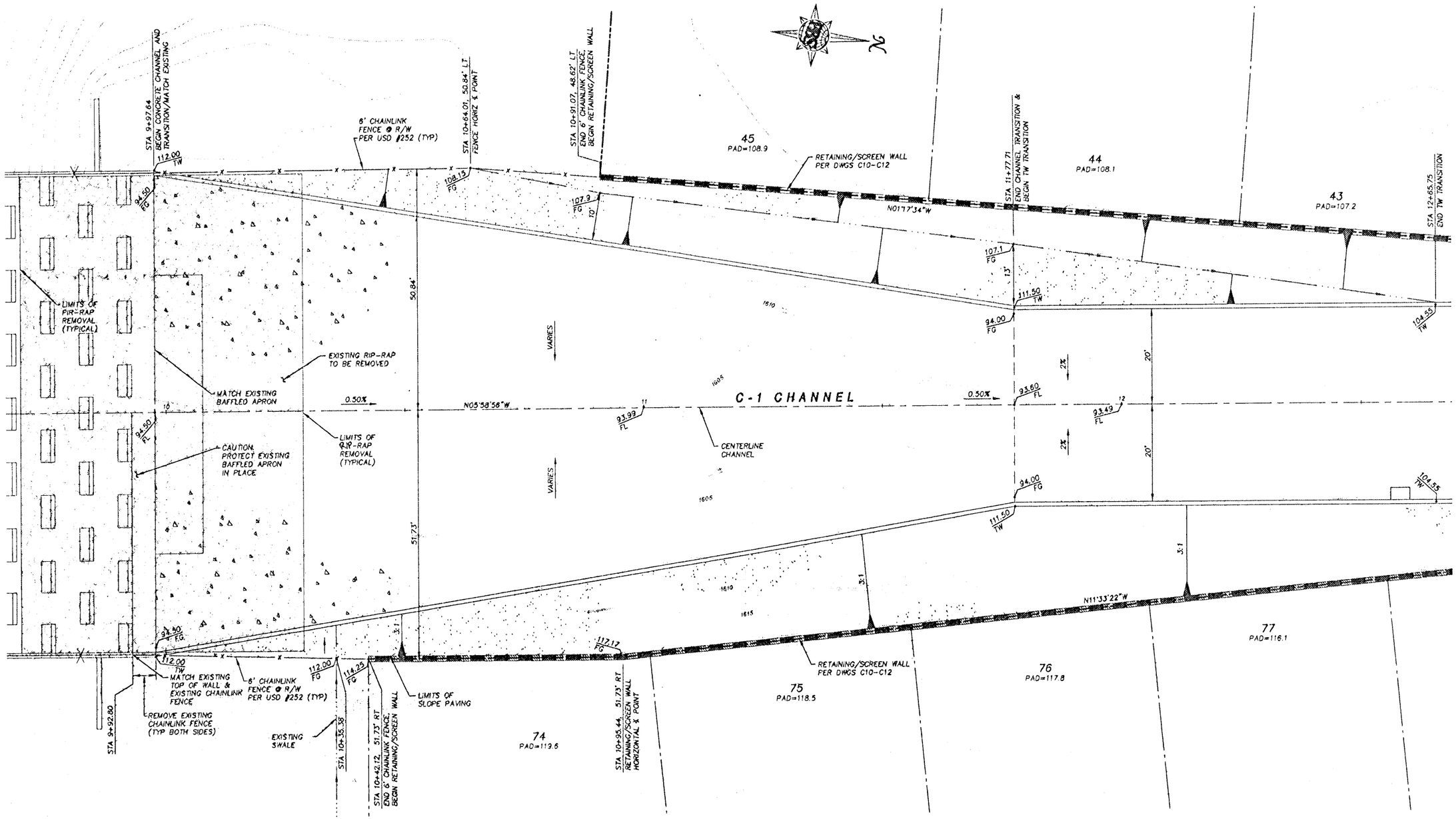
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY

Call before you Dig

1-800-227-2600

UNDERGROUND SERVICE (USA)



REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-113
SCALE: HORIZ.: 1"=10'
VERT.:

PBS&J
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone 702/263-7273
Fax 702/263-7200
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SEAL

PROFESSIONAL ENGINEER STATE OF NEVADA LEE FARRIS No. 13691 6/1/06

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

C-1 CHANNEL AREA ENLARGMENT

XXXX

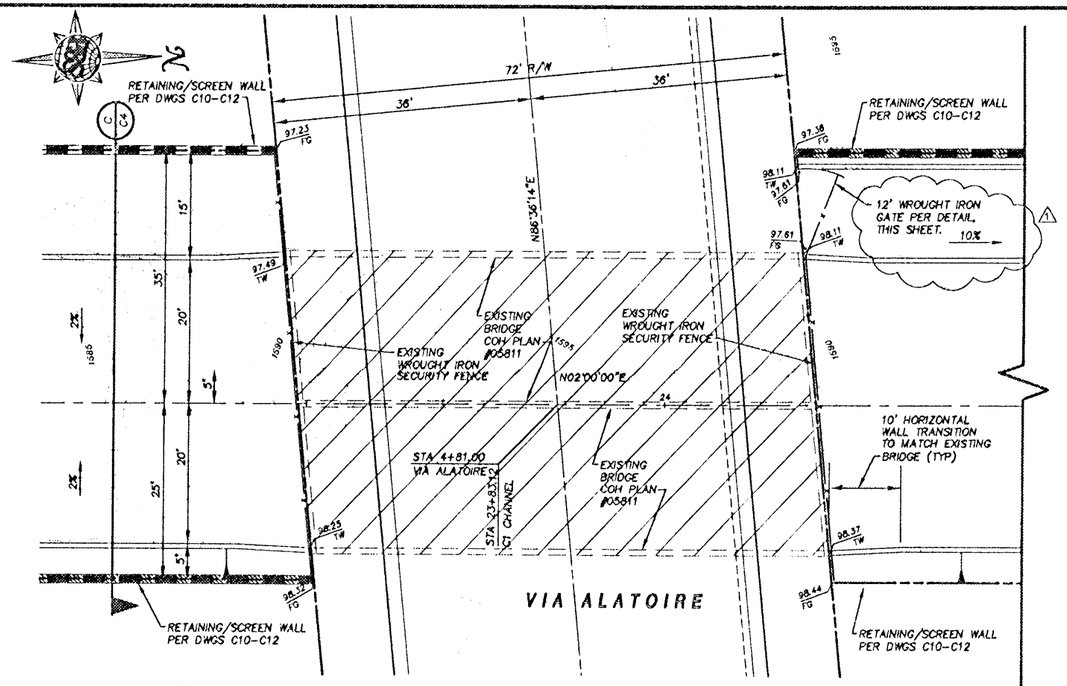
DRAWING NO. 13

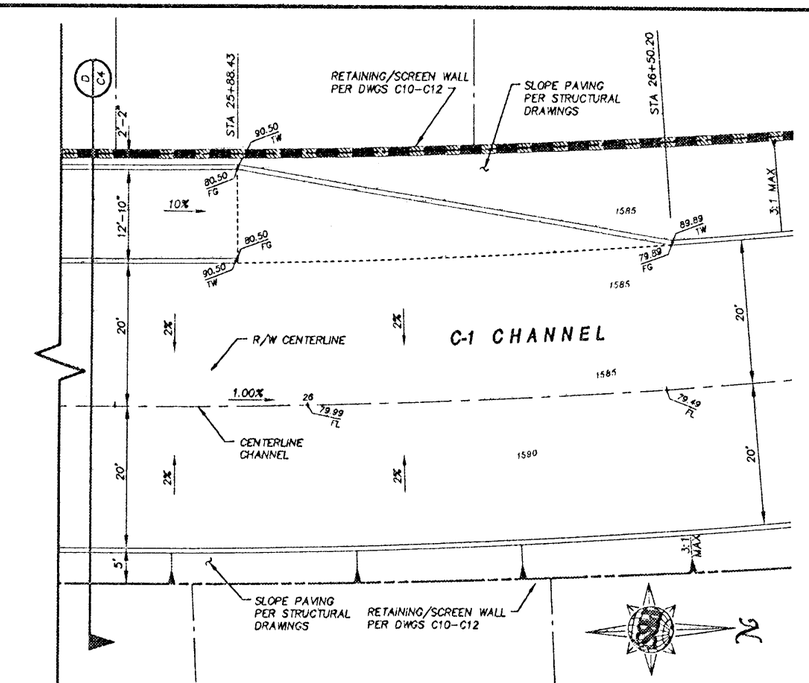
C13

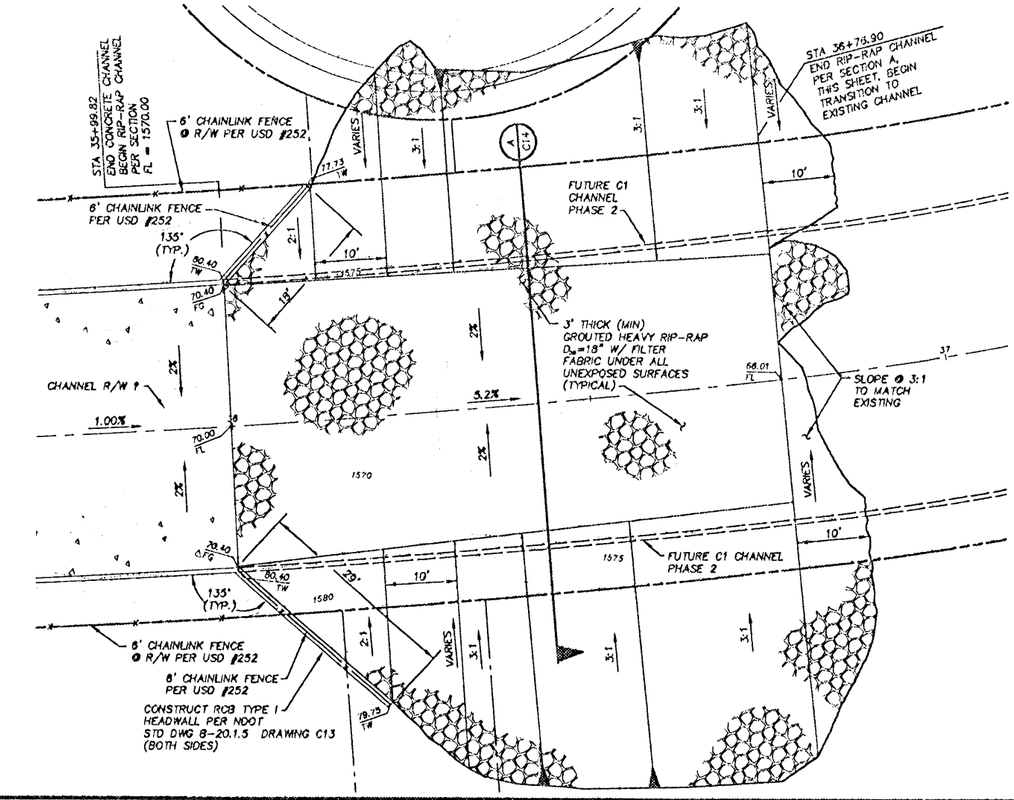
33

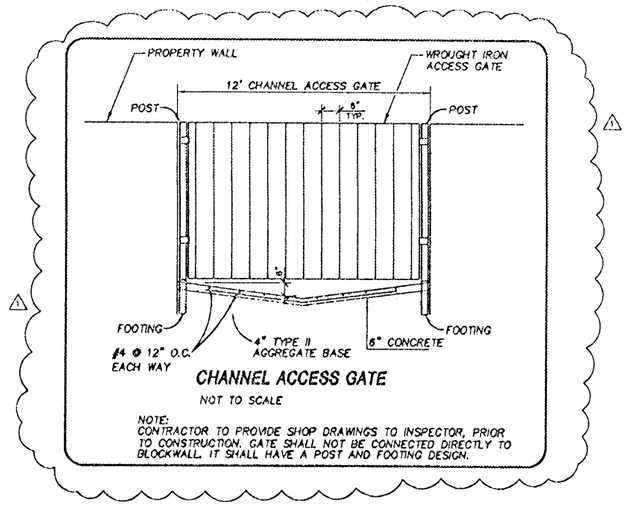
AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY
Call before you Overhead
1-702-593-6111
NEVADA POWER CO/REGIMONT AND SAFETY SERVICES DEPARTMENT

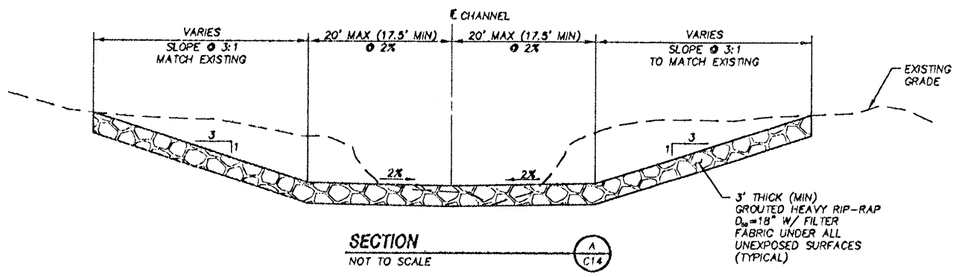
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)











REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL
1	REVISED GATE / ADDED DETAIL	RMM	9/25/02	

DESIGNED BY: C. LUQUETTE
DRAWN BY: A. SPATA
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-114
SCALE: HORIZ.: 1"=10' VERT.:

PBS&J
901 North Green Valley Pkwy. Suite 100
Henderson, Nevada 89014
Telephone 702/263-7275
Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
Professional Engineer State of Nevada — Lee E. Farris — Exp. 4/30/03 — Civil — No. 013691 — 10/2/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -

C-1 CHANNEL AREA ENLARGMENTS

XXXX

DRAWING NO. 14

C14

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY

Call before you Overhead

1-702-593-6111

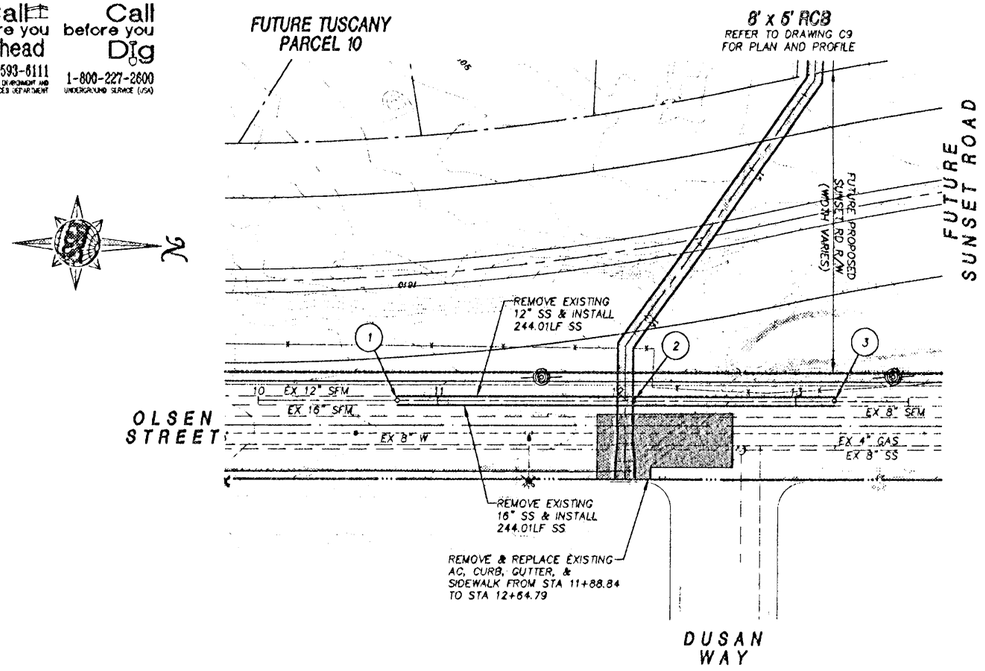
REVISE POWER DEVELOPMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY

Call before you Dig

1-800-227-2600

UNDERGROUND SERVICE (USA)



COORDINATE TABLE

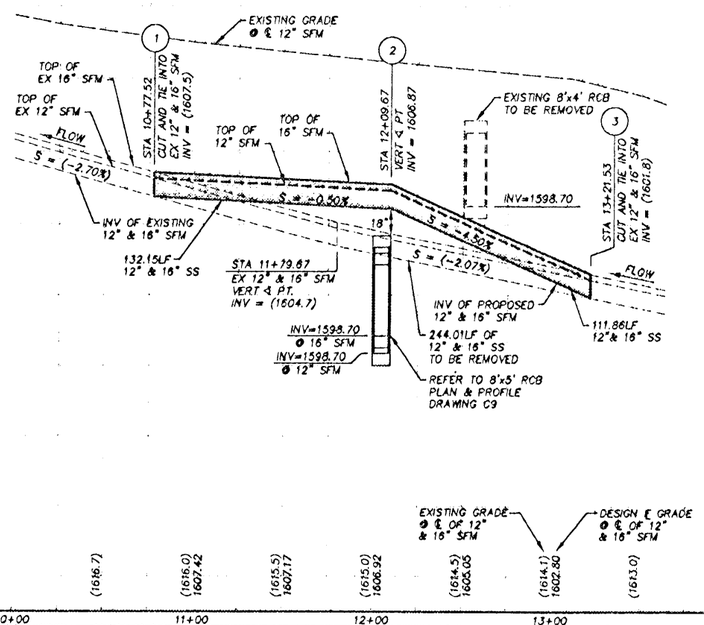
	NORTHING	EASTING
1	8636.5992	10165.9608
2	8768.1877	10158.1516
3	8880.1807	10151.5054

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 THROUGH S2.8
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
4. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C16
5. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
6. INSTALL 8'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
7. INSTALL 10'x5' RCB PER NDOT STD DWG B-20.1.2 DRAWING C17
8. INSTALL TYPE 'B' DROP INLET INTO TOP OF RCB PER USD #412
9. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.5
10. CONSTRUCT RCB TYPE II HEADWALL PER NDOT STD DWG B-20.1.4 DRAWING C17
11. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 10 DRAWING S2.5
12. 3' THICK (MIN) GROUTED HEAVY RIP-RAP D_{50}=18" W/ FILTER FABRIC UNDER ALL UNEXPOSED SURFACES (TYPICAL)
13. EXISTING RIP-RAP TO BE REMOVED PRIOR TO CONSTRUCTION
14. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C15
15. INSTALL 12" STEEL SLEEVE FOR FUTURE UTILITY
16. RETAINING / SCREEN WALL - REFER TO PLAN & PROFILE DRAWINGS C10 THROUGH C12

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.



APPROVAL

Ken Kosh 7-5-02

NEW DEVELOPMENT ENGINEER - KEN KOSHIRO, P.E. DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY July 5 20 03.

GRAPHIC SCALE

40 0 20 40 80 160

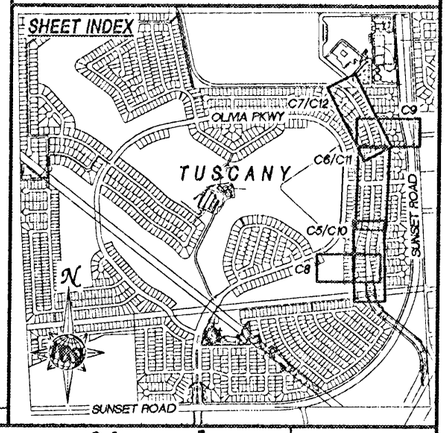
(IN FEET)

HORZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 - BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND PEDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET - C.O.H. NAVD '88 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-115
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7275 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL

LEE D. FARRIS (CIVIL) NEVADA CERTIFICATE NO. 13691 2/11/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS - UTILITY RELOCATION

XXXX

DRAWING NO. C15

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY

Call before you Overhead

1-702-593-6111

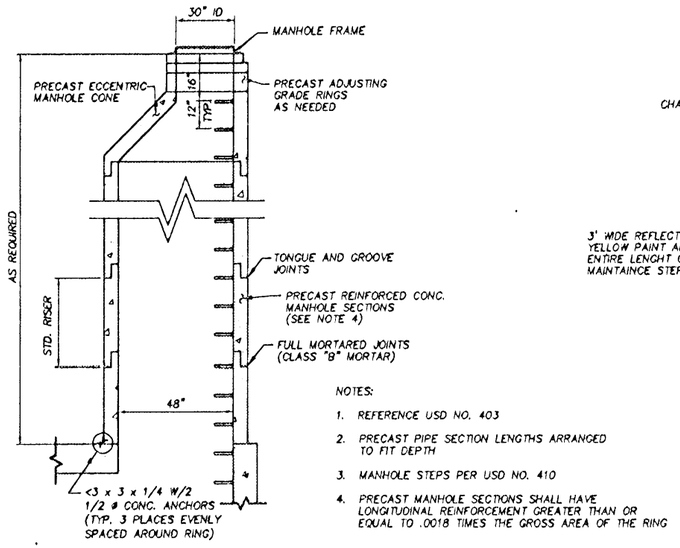
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600

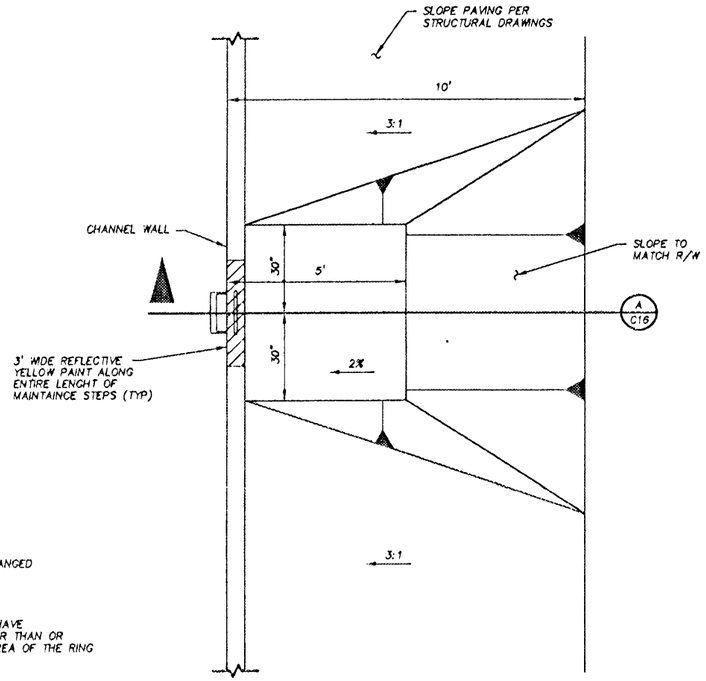
UNDERGROUND SERVICE (USA)



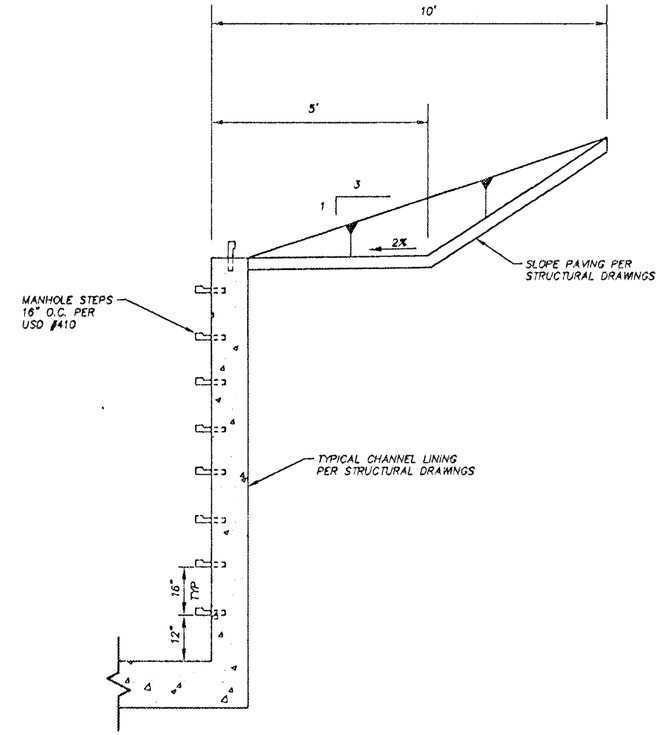
NOTES:

1. REFERENCE USD NO. 403
2. PRECAST PIPE SECTION LENGTHS ARRANGED TO FIT DEPTH
3. MANHOLE STEPS PER USD NO. 410
4. PRECAST MANHOLE SECTIONS SHALL HAVE LONGITUDINAL REINFORCEMENT GREATER THAN OR EQUAL TO .0018 TIMES THE GROSS AREA OF THE RING

48" MANHOLE RISER DETAIL (1/C16)
NOT TO SCALE



CHANNEL ACCESS LADDER DETAIL (2/C16)
NOT TO SCALE



CHANNEL ACCESS LADDER SECTION (A/C16)
NOT TO SCALE

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: D. JOHNSON
CHECKED BY: L. FARRIS
DATE: FEBRUARY 01, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-116
SCALE: HORIZ.: AS SHOWN
VERT.: AS SHOWN

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Henderson, Nevada 89014
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ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
LEE A. FARRIS CIVIL
No. 13691
2/11/02

THE CITY OF HENDERSON

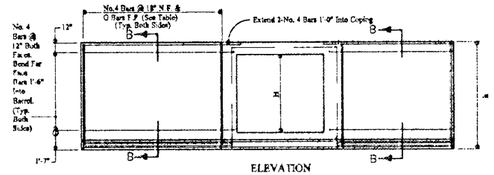
City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 1 IMPROVEMENTS -
MISCELLANEOUS DETAILS

XXXX

DRAWING NO. C16

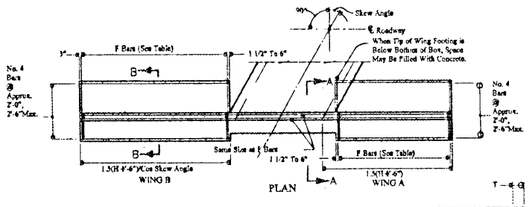
16/33

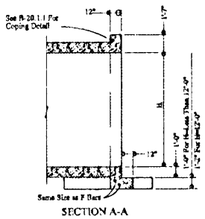


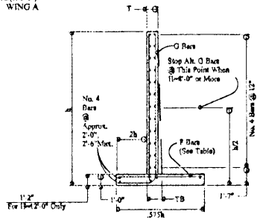
ELEVATION

TABLE

H = HEIGHT IN INCHES	G BARS SIZE NO.	G BARS SPACE IN.	F BARS SIZE NO.	F BARS SPACE IN.
24	#4 @ 5	9 1/2	4	12
30	#4 @ 5	9	4	12
36	#4 @ 5	8 1/2	4	12
42	#4 @ 5	8	4	12
48	#4 @ 5	7 1/2	4	12
54	#4 @ 5	7	4	12
60	#4 @ 5	6 1/2	4	12
66	#4 @ 5	6	4	12
72	#4 @ 5	5 1/2	4	12
78	#4 @ 5	5	4	12
84	#4 @ 5	4 1/2	4	12
90	#4 @ 5	4	4	12
96	#4 @ 5	3 1/2	4	12
102	#4 @ 5	3	4	12
108	#4 @ 5	2 1/2	4	12
114	#4 @ 5	2	4	12
120	#4 @ 5	1 1/2	4	12
126	#4 @ 5	1	4	12
132	#4 @ 5	1/2	4	12
138	#4 @ 4	8 1/2	4	10
144	#4 @ 4	8	4	9 1/2







NOTES:

1. FOR GENERAL NOTES SEE SHEET B-20.1.1
2. FOR QUANTITIES SEE SHEET B-20.1.4.1

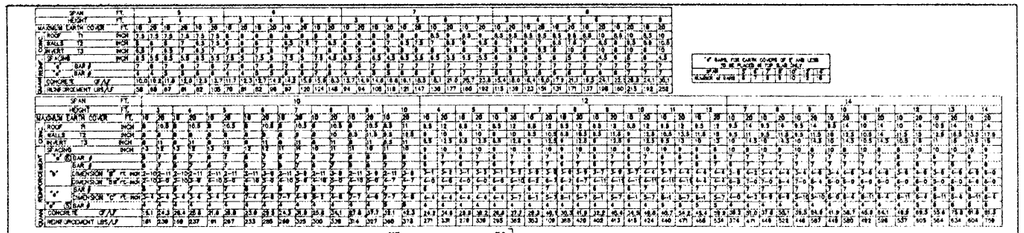
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
TYPE II HEADWALLS

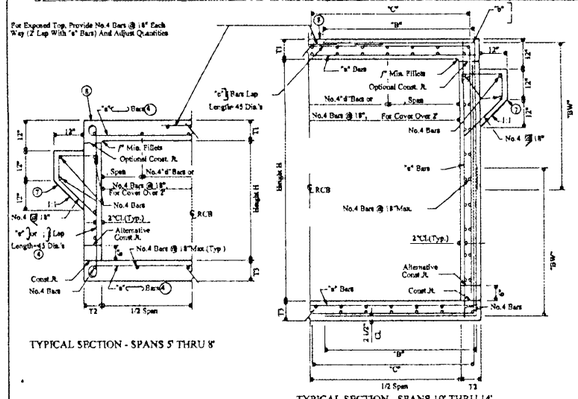
B-38.1.4 (303)
ADOPTED 11-98 | REVISION 1-99

CHIEF ENGINEER OR DESIGN ENGINEER

SHEET 1 OF 2

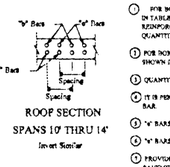


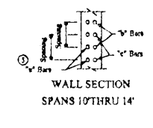
For Exposed Top, Provide No.4 Bars @ 18" Each Way (2' Lap With "e" Bars) And Adjust Quantities



NOTES:

1. FOR BOXES WITH SPAN OR HEIGHT LESS THAN ANY OF THOSE SHOWN IN TABLE, USE NEXT GREATER SIZE BOX CONCRETE DIMENSIONS AND REINFORCEMENT. MAKE NECESSARY CHANGES IN BAR LENGTHS AND QUANTITIES.
2. FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
3. QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
4. IT IS PERMISSIBLE TO ELIMINATE THE 180° HOOKS ON EVERY OTHER BAR.
5. "e" BARS ARE AT HALF SPACING.
6. "e" BARS ARE AT HALF SPACING.
7. PROVIDE PAVING NOTICE WHEN TOP IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST THE QUANTITIES.
8. WHEN TOP IS EXPOSED, THE TOP SLAB CONCRETE SHALL BE "SA", FY=100 PSI, OR "A", FY=60 PSI, AS DETERMINED BY THE ENGINEER. IF "SA" CONCRETE IS TO BE USED, THE TOP SLAB REINFORCING STEEL SHALL HAVE AN EPOXY COATING.





STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

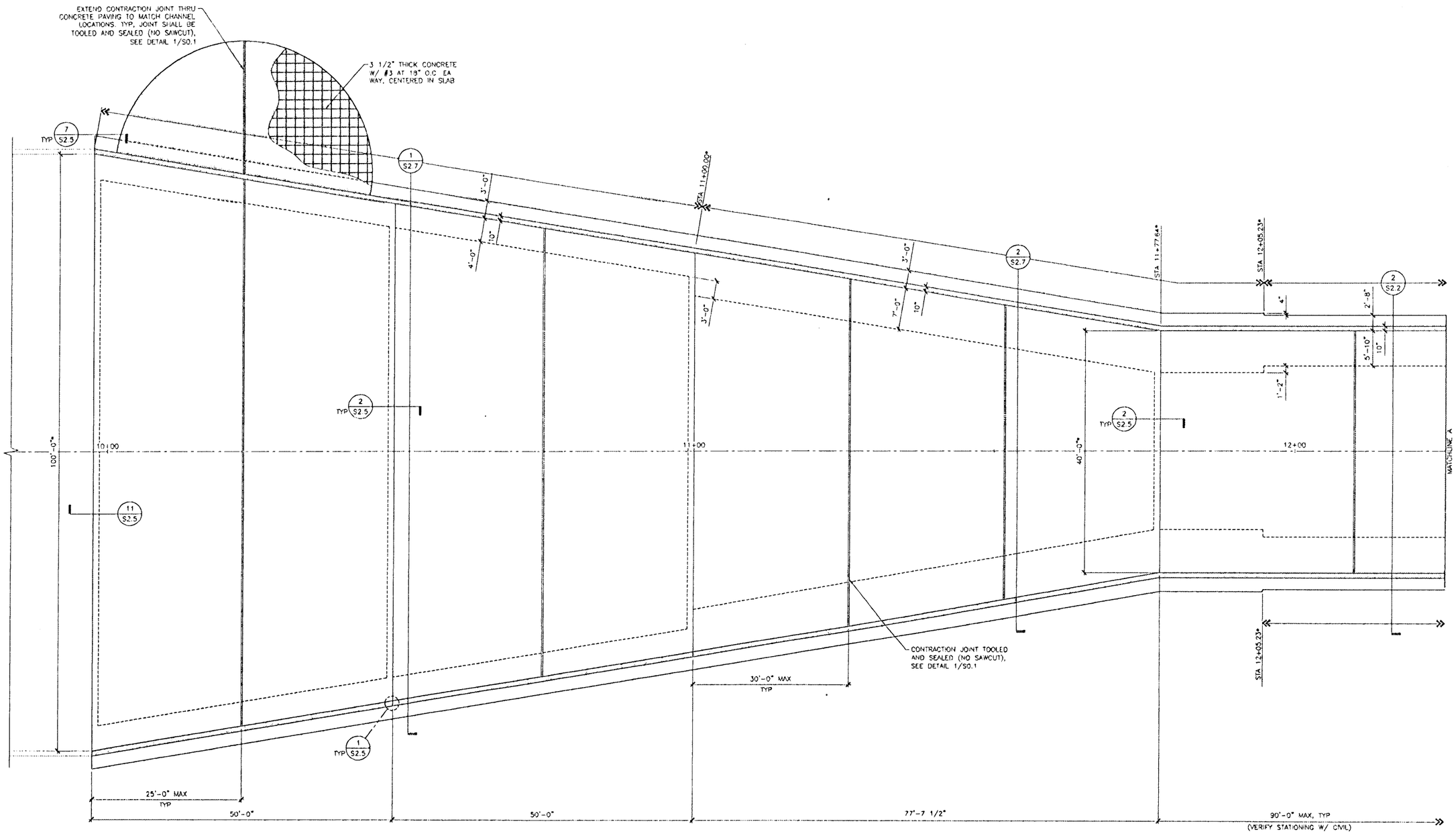
SINGLE
RCB CULVERTS

B-38.1.3 (303)
ADOPTED 11-98 | REVISION 1-99

CHIEF ENGINEER OR DESIGN ENGINEER

TYPE I: HEADWALL DIMENSIONS AND REINFORCING STEEL

Headings in Feet (H = Inside Height of Box)	0° SKEW																		15° SKEW																		30° SKEW																		45° SKEW																		Headings in Feet (H = Inside Height of Box)
	WINGS A&B																		WING A				WING B														WING A				WING B														WING A				WING B														
																			G BARS		F BARS		G BARS		F BARS												G BARS		F BARS		G BARS		F BARS												G BARS		F BARS		G BARS		F BARS												



PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

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SEAL: ENGINEER STATE OF NEVADA DOUGLAS H. SINCOCK No. 15111 — FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

SSEDC
Specialty Structures Engineering & Design Company
E-mail@SSEDC.com, 1353 E. Lincoln Rd. Idaho Falls, ID 83401
Phone 208-524-0800 Fax: 208-552-9502

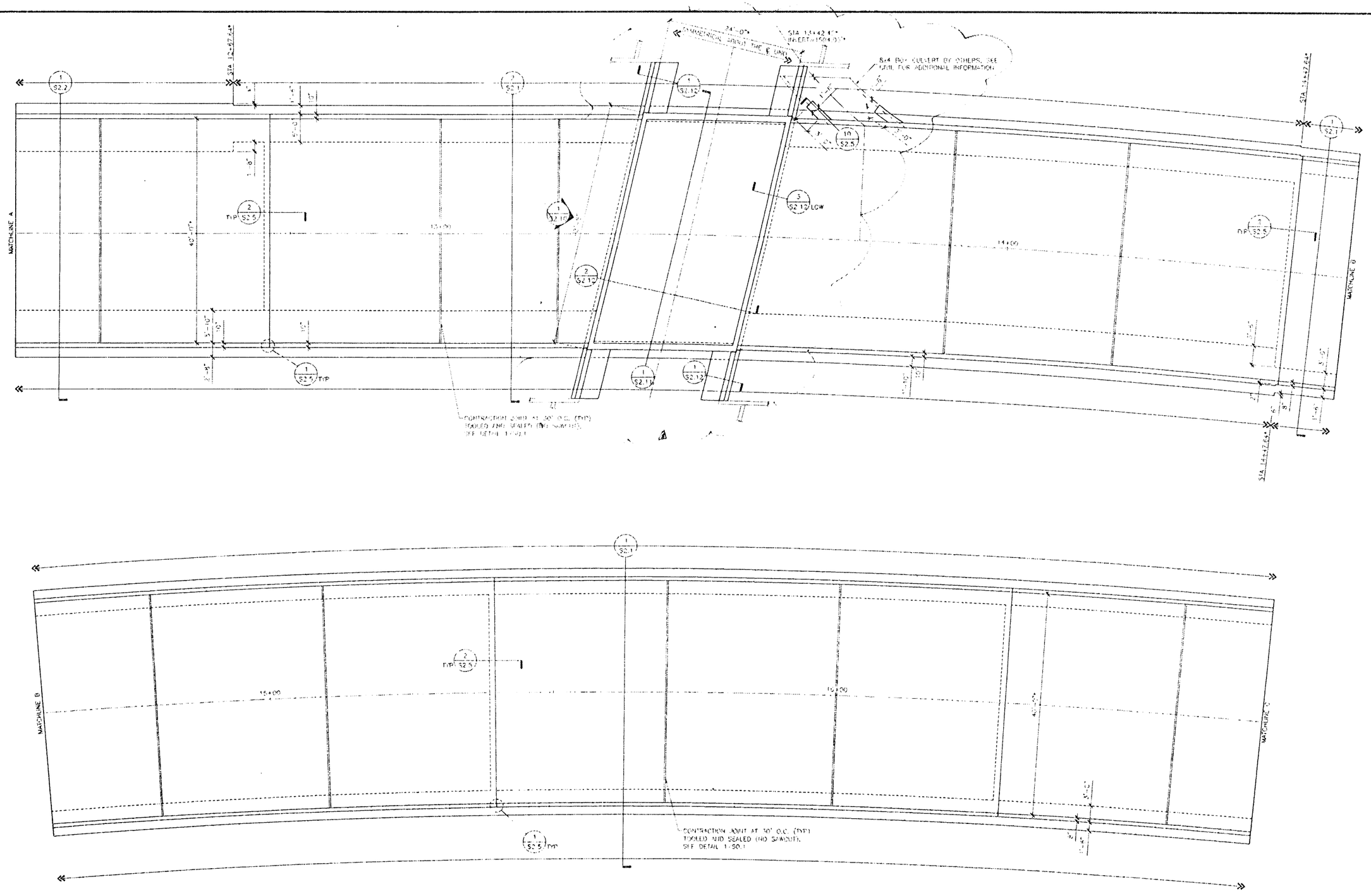
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

DATE	DESCRIPTION	REV.
2/21/02	SUBMITTED FOR CONSTRUCTION	
1/31/02	SUBMITTED FOR CONSTRUCTION	
12/19/01	SUBMITTED FOR APPROVAL	
9/13/01	SUBMITTED FOR APPROVAL	
9/4/01	SUBMITTED FOR APPROVAL	

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.1 9/55



PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

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SEAL OF ENGINEER, STATE OF NEVADA, DOUGLAS H. WEGNER, Civil, No. 7517

DESIGNED	JS	APPROVED:	WM
DRAWN:	KH		
CHECKED:	DW		

Specialty Structures Engineering & Design Company
E-mail:info@SSEDCo.com, 1551 E. Lincoln Rd, Idaho Falls, ID 83401
Phone: 208-745-0800 Fax: 208-535-9302

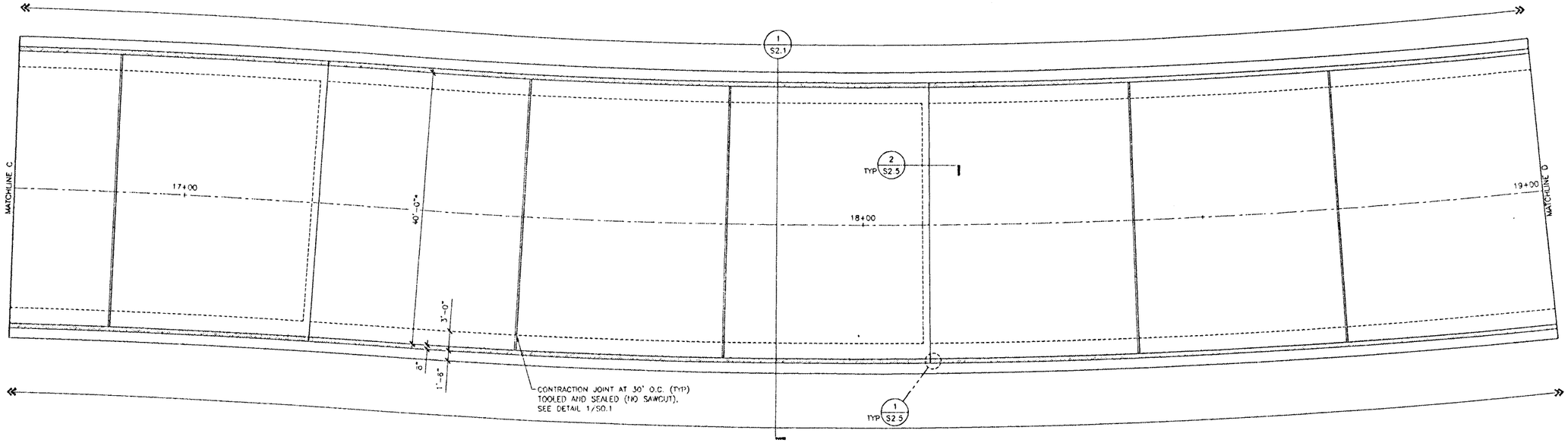
HYDRO-ARCH
BY PHOENIX GUNITE
CALIFORNIA NEVADA NEW MEXICO UTAH
ARIZONA
9601 ALTA CREST RD. SUITE B
LAS CRUCES, NM 88011

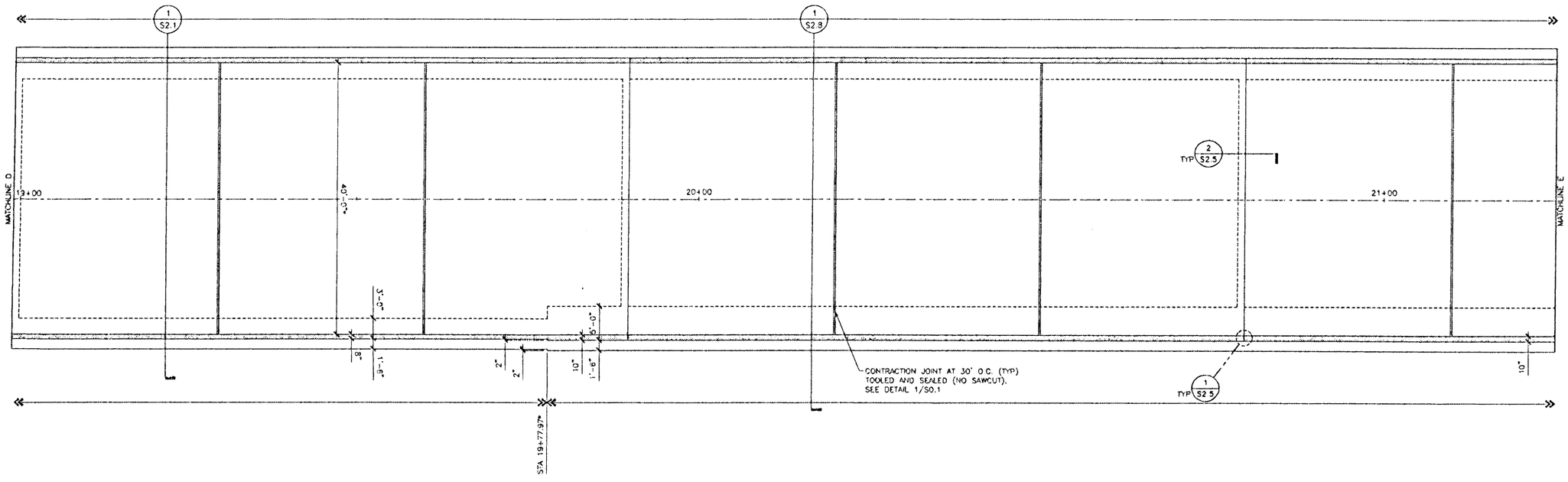
PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
4	SUBMITTED FOR CONSTRUCTION	8/19/02
	SUBMITTED FOR CONSTRUCTION	8/8/02
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.2
20
33





PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

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SEAL: REGISTERED STATE OF NEVADA DOUGLAS H. WYATT No. 15171 PROFESSIONAL ENGINEER FEB 21 2002

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

SSEDCO
Specialty Structures Engineering & Design Company
E-mail@SSEDCO.com, 1555 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-9660 Fax: 208-535-9582

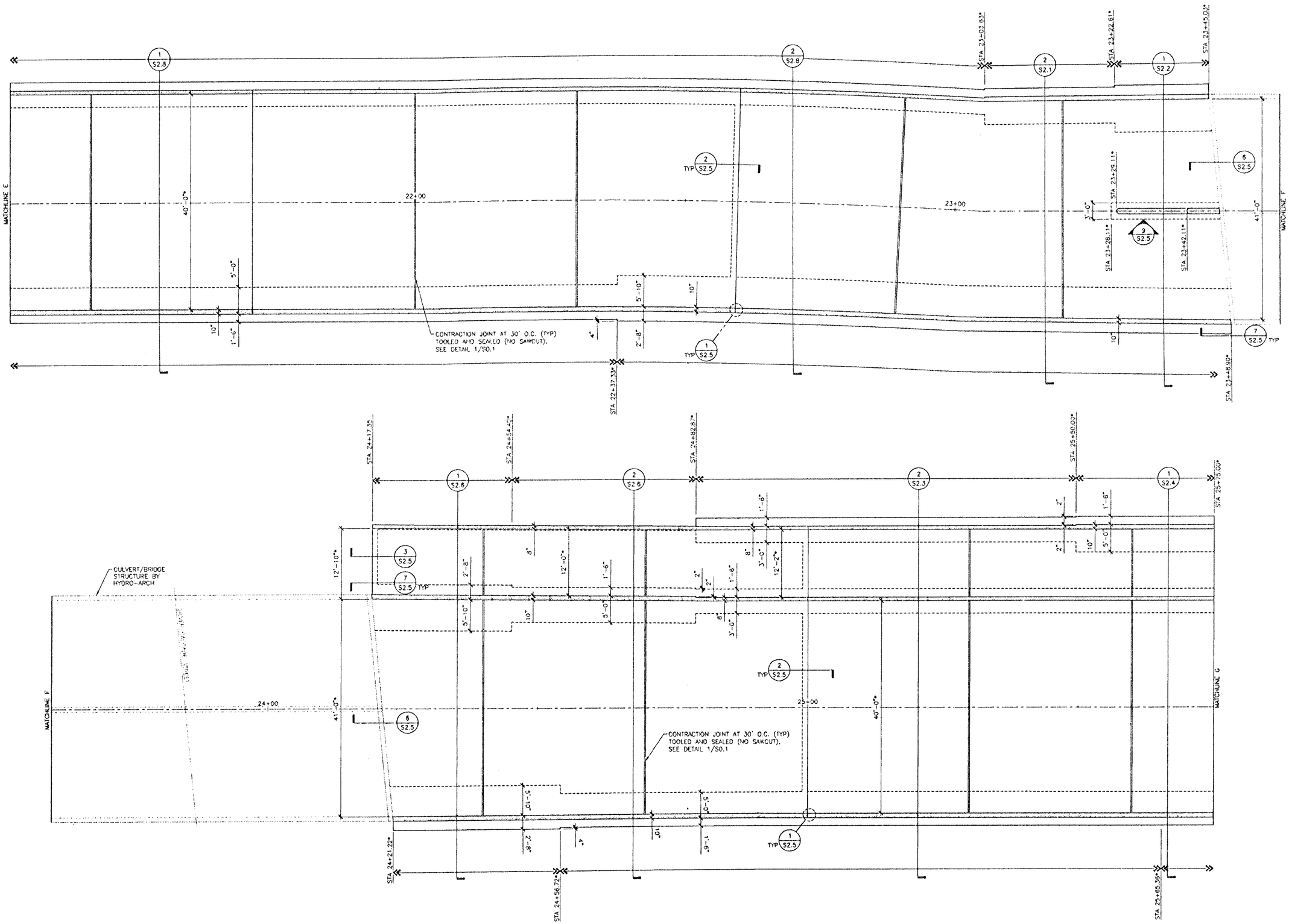
HYDRO-ARCH
CALIFORNIA NEVADA BY PHOENIX GUNITE ARIZONA NEW MEXICO UTAH
980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.3 8/33



PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL: REGISTERED STATE OF NEVADA — DOUGLAS H. WOLFE — No. 13171 — FEB 21 2002

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

SSEDCO
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E-mail@SSEDCO.com, 1551 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9302

HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
9980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.4 23/33

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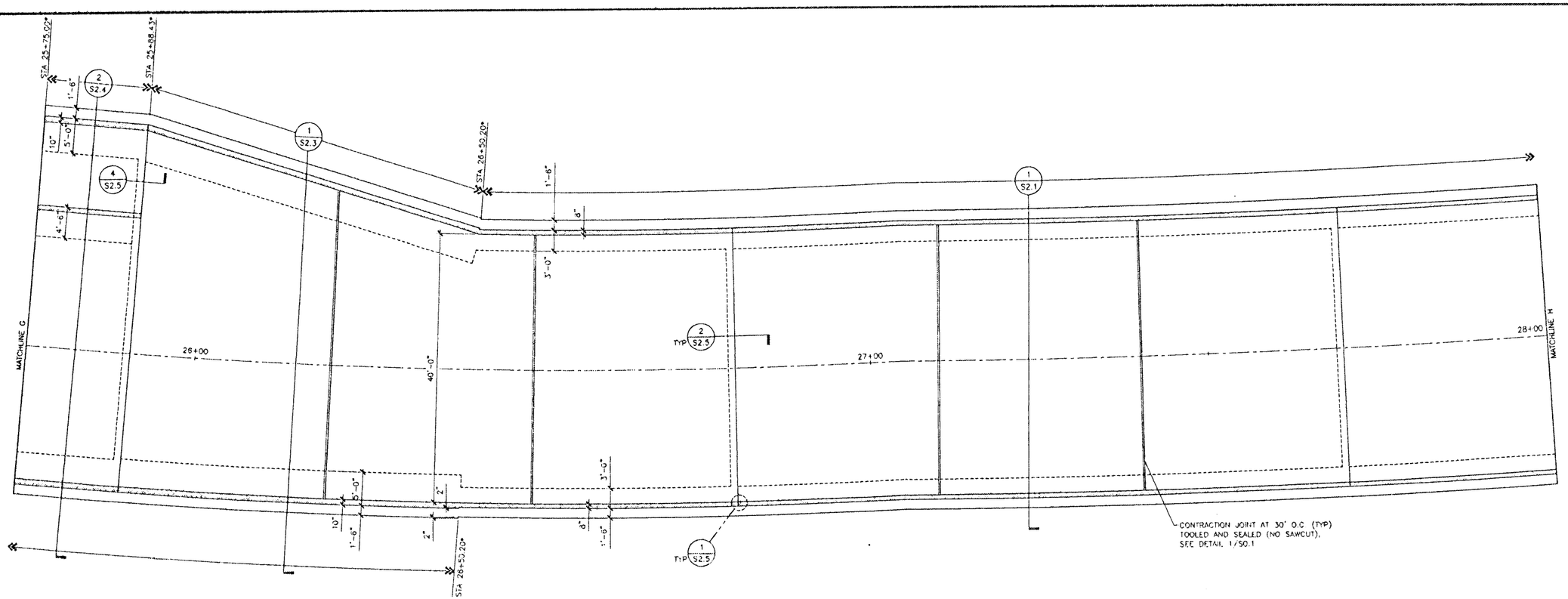

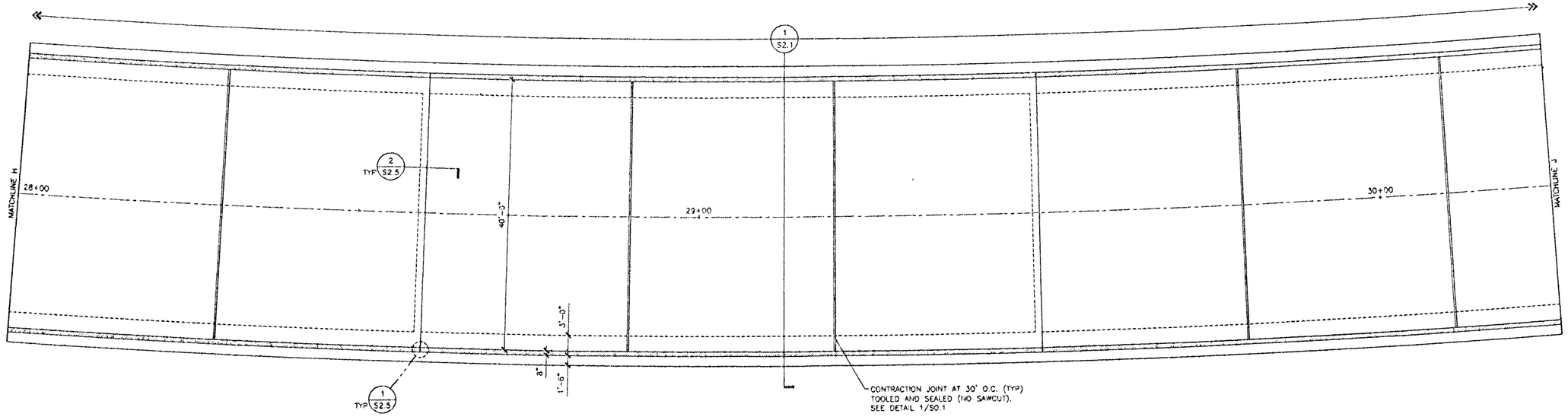

PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

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SEAL: ENGINEER STATE OF NEVADA DOUGLAS H. [illegible] No 15117 FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: | APPROVED: DW WM

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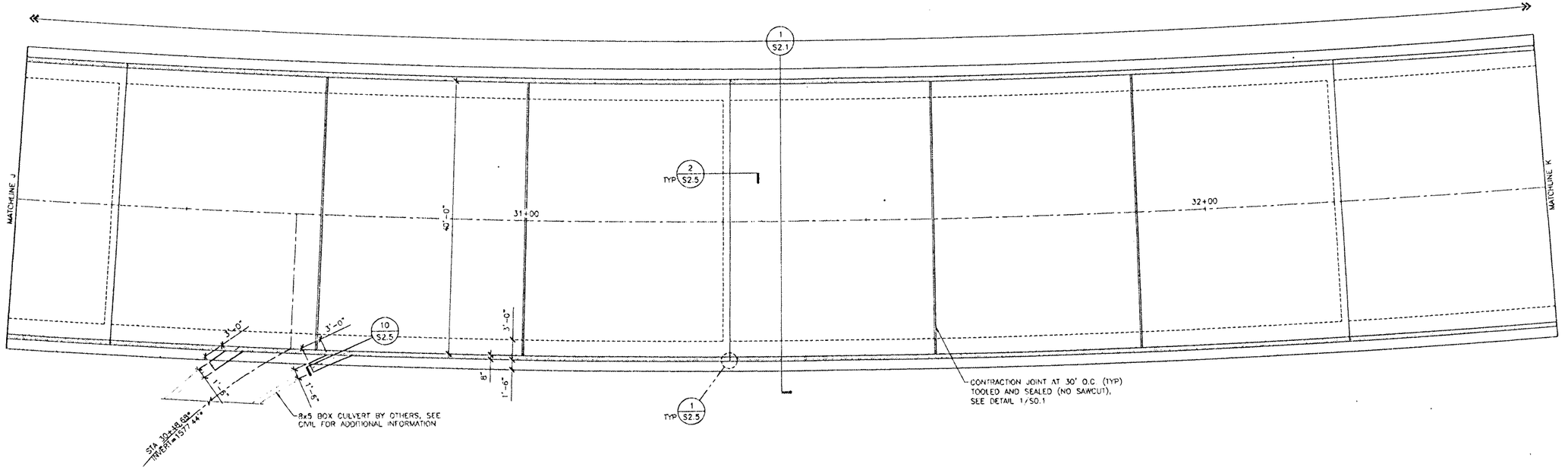
HYDRO-ARCH
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
MARY CREST ROAD, UNIT B
HENDERSON, NV 89014
BY PHOENIX GUNITE

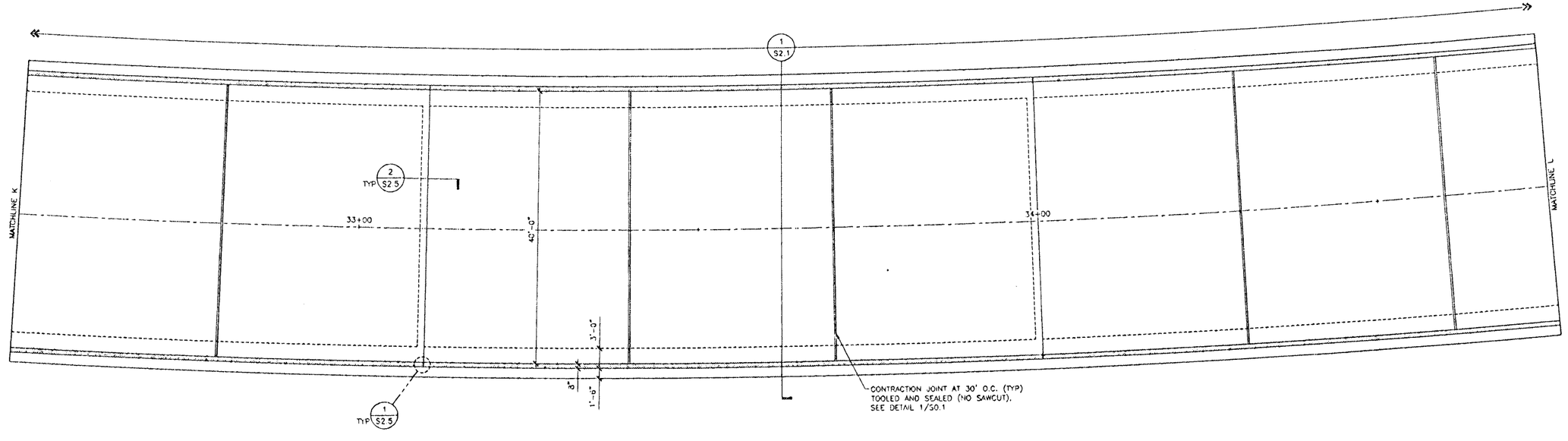
PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.5 23/53





PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL:

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: VTM

SSEDCO
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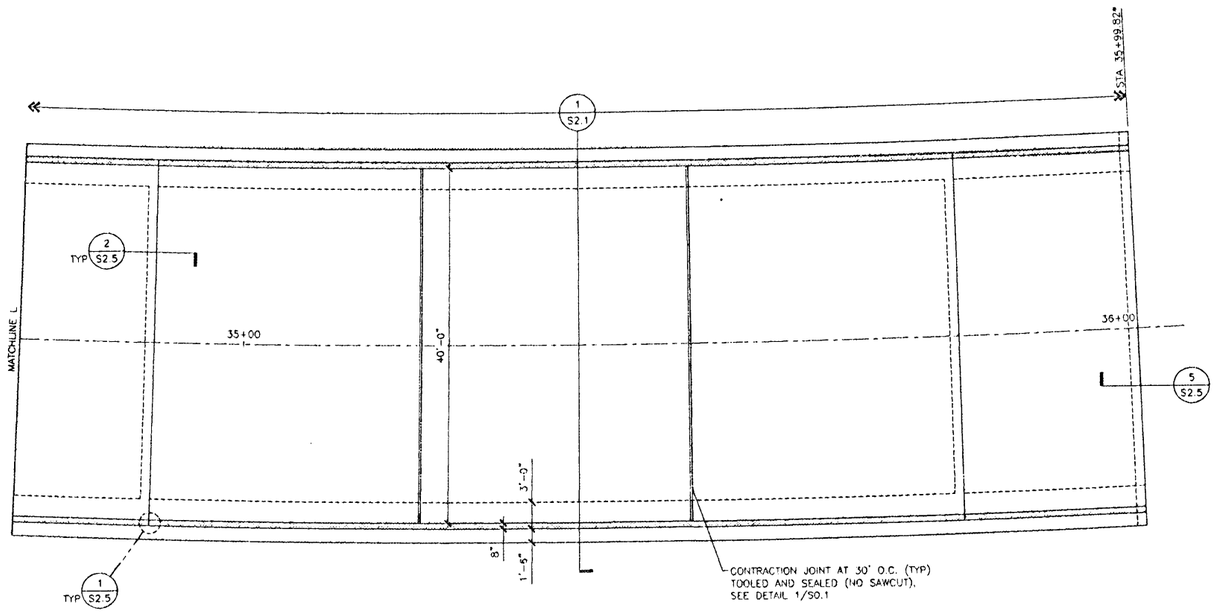
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.6 24/33



PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

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SEAL: REGISTERED PROFESSIONAL ENGINEER, STATE OF NEVADA, DOUGLAS H. SWEET, No. 13171, FEB 21 2002

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

SSEDCO
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E-mail@SSEDCO.com, 1553 E. Lincoln Rd. Idaho Falls, ID 83401
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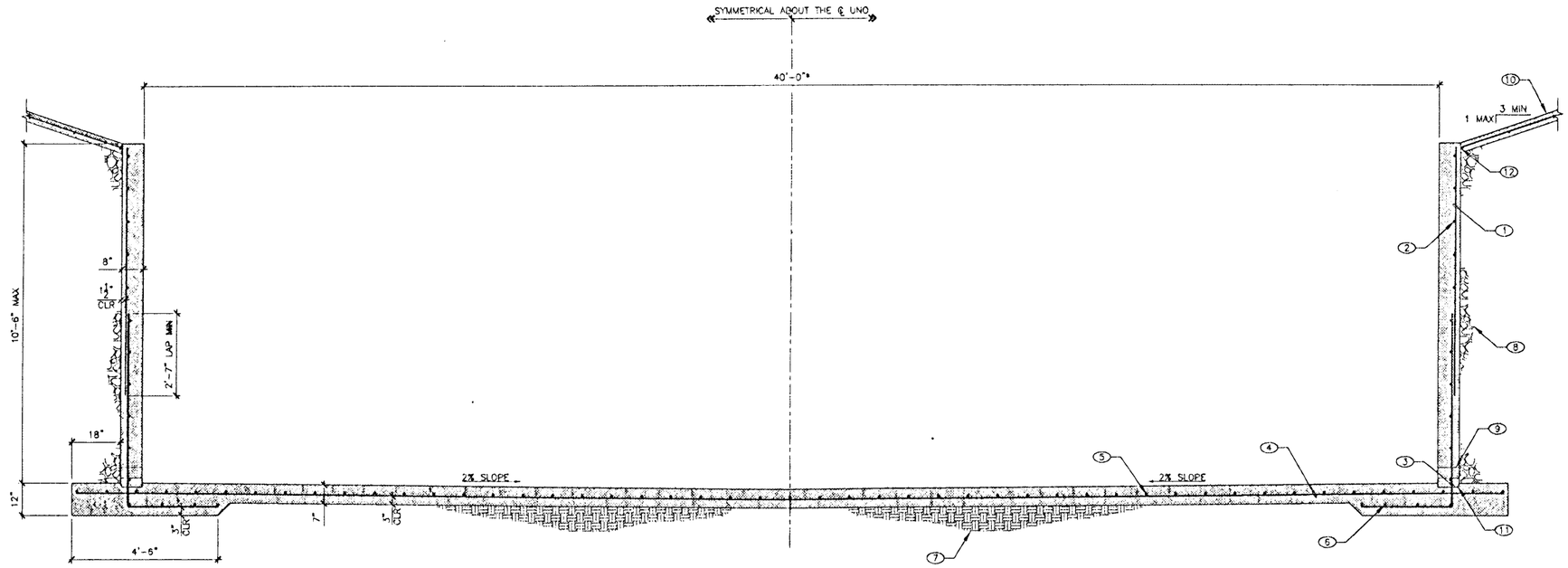
HYDRO-ARCH
BY PHOENIX GUNITE
CALIFORNIA NEVADA NEW MEXICO UTAH ARIZONA
980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S1.7 25/33



1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

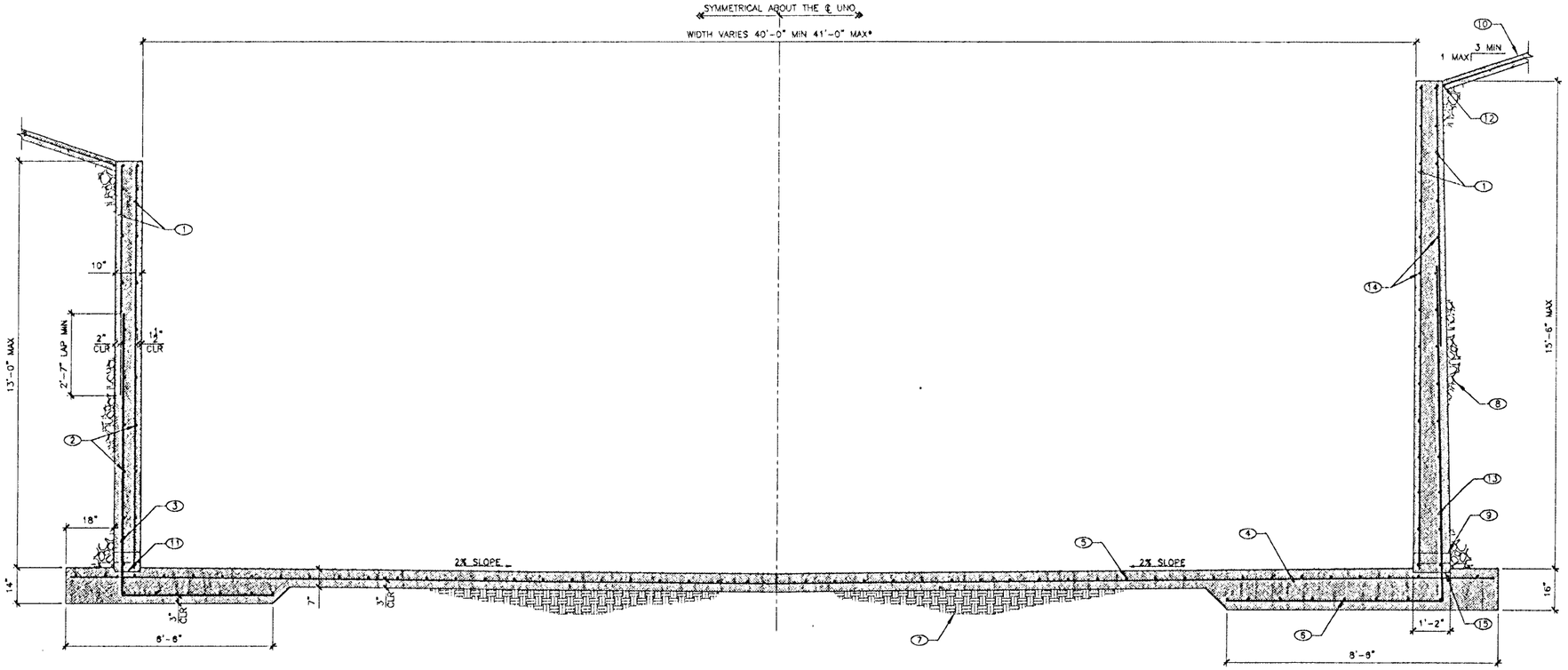
1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 5" O.C.
   72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x7 1/2" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 5" O.C.
   109" / 57"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PPROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 9 3/4" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #5 DOWEL AT 4" O.C.
    130" / 82"
14. #4 AT 14" O.C. HORIZ
15. 1 1/2" DEEP x 12 1/2" KEY

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 13 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA DOUGLAS H. WEBER No. 7841 CIVIL FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

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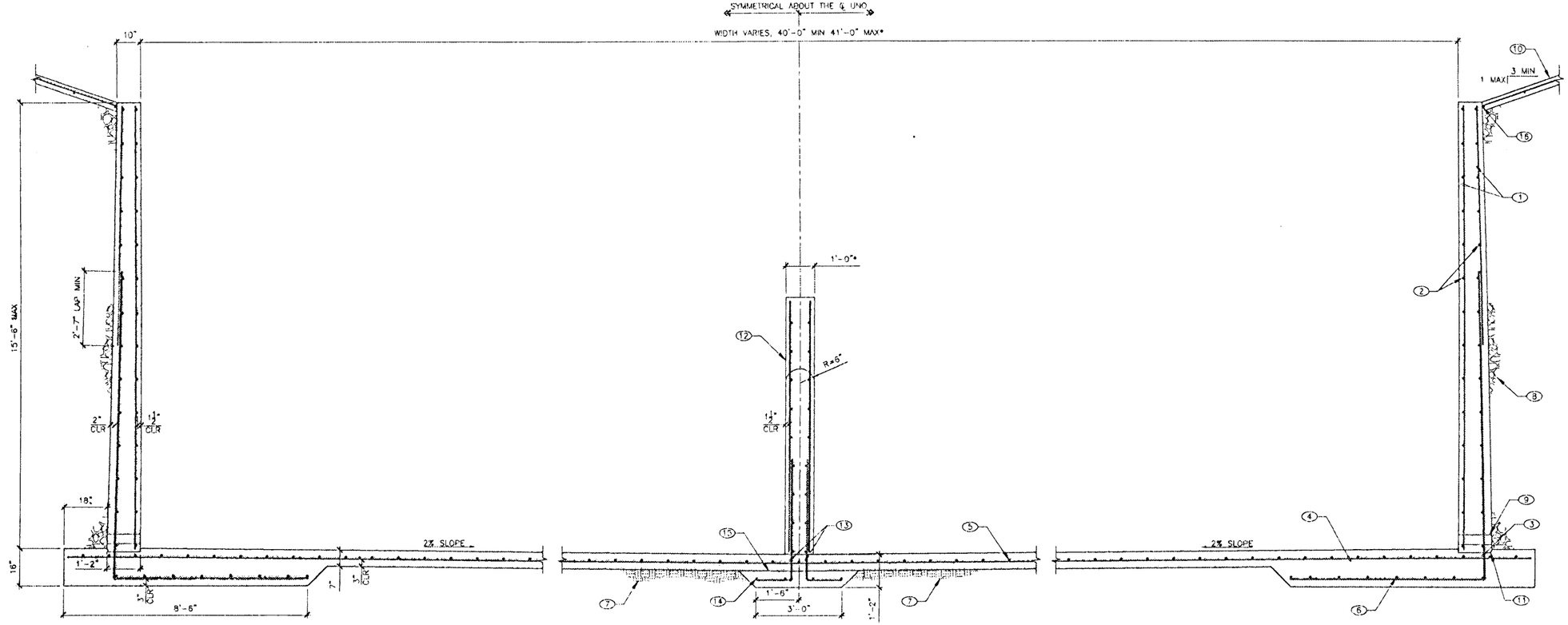
HYDRO-ARCH
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 MAGIC CREST ROAD, UNIT B
HENDERSON, NV 89014
BY PHOENIX GUNITE

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER:
S2.1 26/33



KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 14" O.C. HORIZ
3. #6 DOWEL AT 4" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/SO.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 12 1/2" KEY
12. DEBRIS CATCHER AT STA 23+29.11 W/ #5 AT 12" O.C. VERT AND #4 AT 12" O.C. EA FACE
13. #5 VERT DOWEL AT 12" O.C. EA FACE W/ 14" HOOK AT BASE
14. #4 AT 12" O.C. LONGITUDINAL
15. COLD JOINT AT CONTRACTORS OPTION
16. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

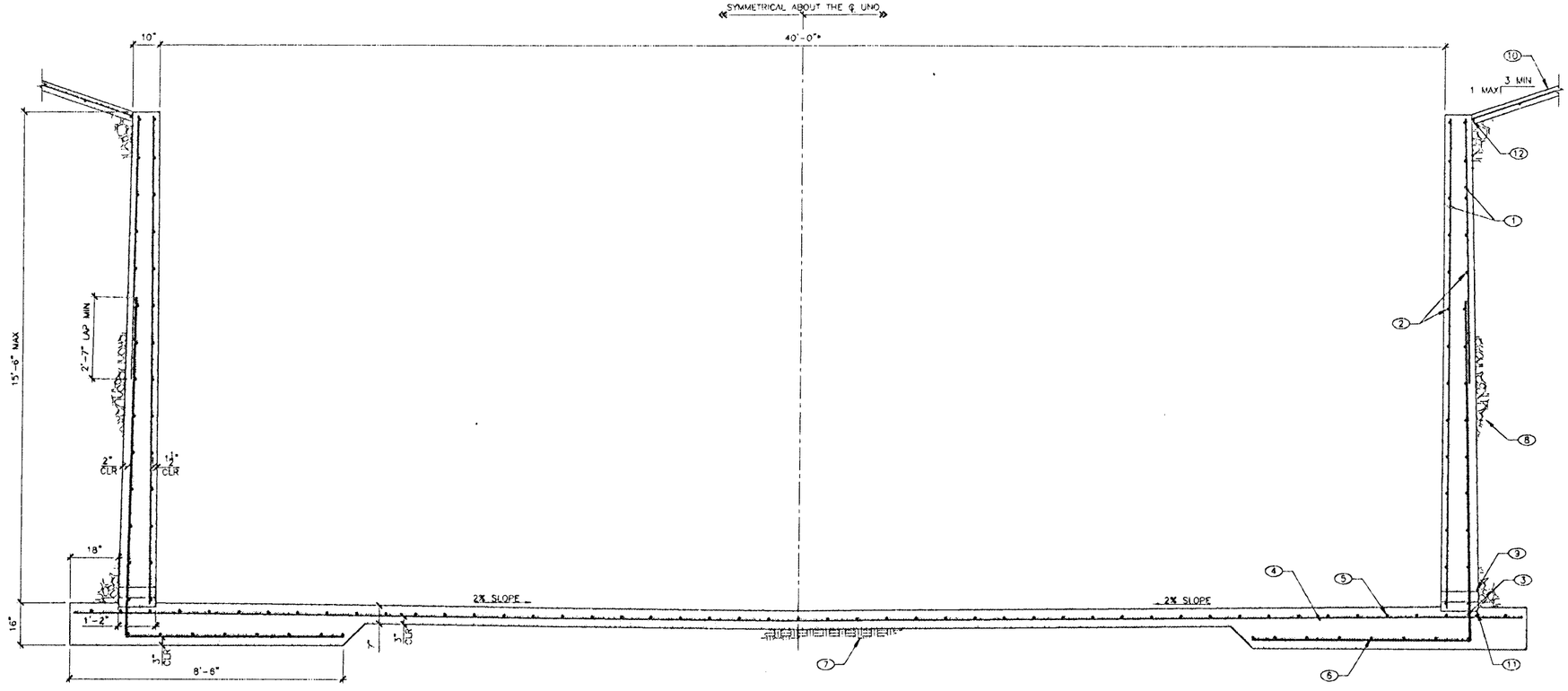
A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF LAPPING PER KEYNOTE 1 MAY BE ELIMINATED

B. TAPERED WALLS SHALL BE SHOTCRETED

C. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

D. CHAMFER ALL EXTERIOR CONCRETE EDGES

1 DRAINAGE CHANNEL RETAINING WALLS 13'-1" MIN THRU 15'-6" MAX
NO SCALE



KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 14" O.C. HORIZ
3. #6 DOWEL AT 4" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/SO.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 12 1/2" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF LAPPING PER KEYNOTE 1 MAY BE ELIMINATED

B. TAPERED WALLS SHALL BE SHOTCRETED

C. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

D. CHAMFER ALL EXTERIOR CONCRETE EDGES

2 DRAINAGE CHANNEL RETAINING WALLS 13'-1" MIN THRU 15'-6" MAX
NO SCALE

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SEAL: ENGINEER, STATE OF NEVADA, DOUGLAS H. JENSEN, No. 15171, FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WJH

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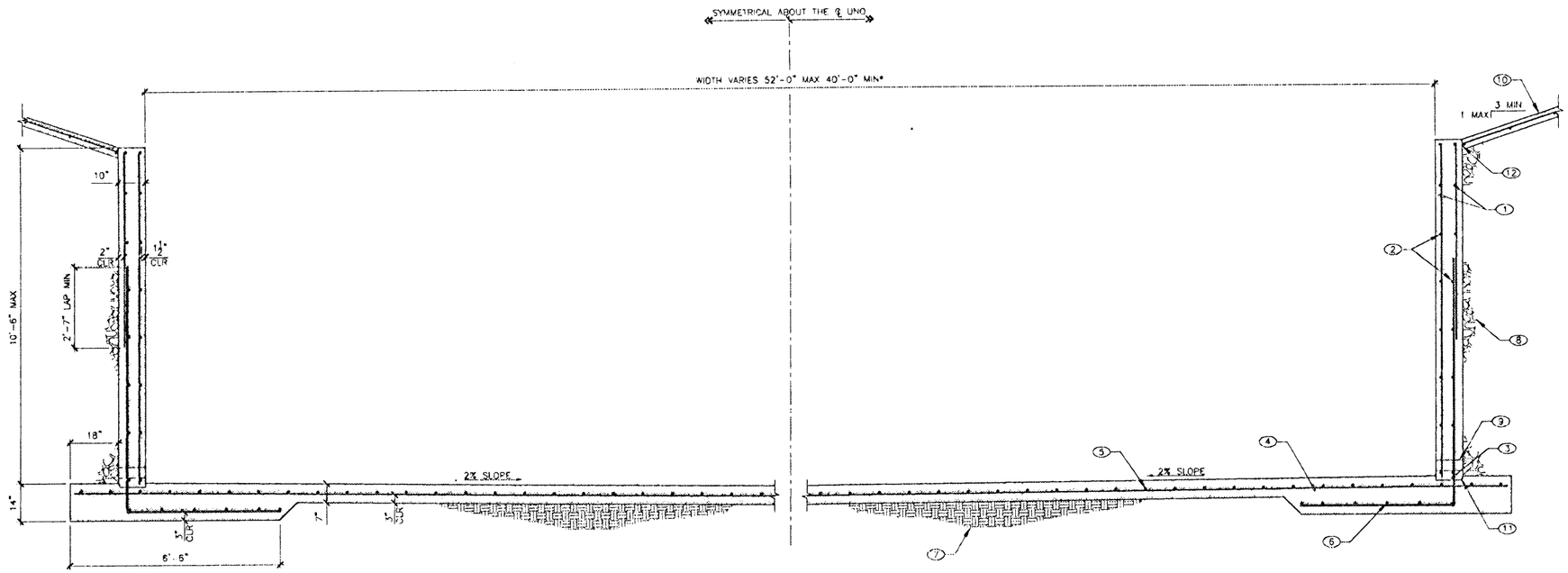
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 HARRY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/1/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.2 27/33



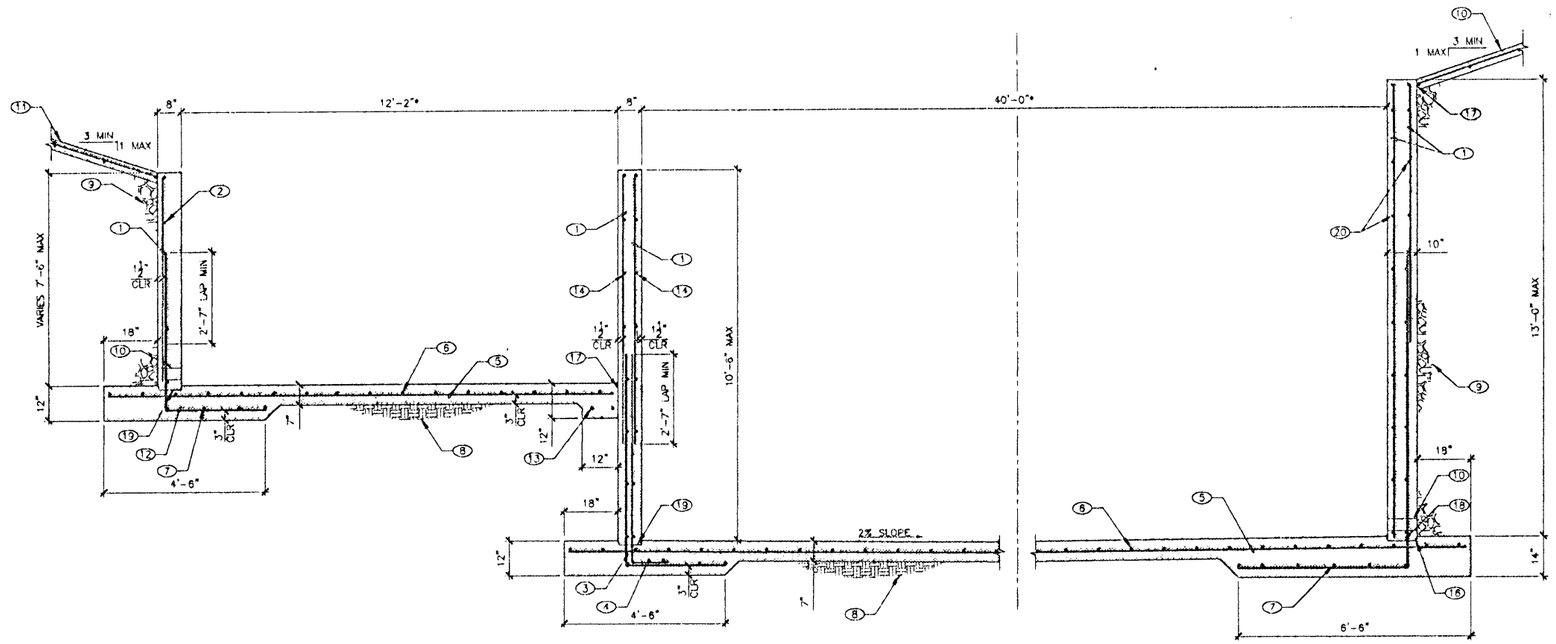
1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #6 DOWEL AT 5" O.C. 93" / 57"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 9 3/4" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF LAPPING PER KEYNOTE 1 MAY BE ELIMINATED
B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS 10'-6" MAX AND 13'-6" MAX AT RAMP WITH 7'-6" MAX RAMP WALL
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 15" O.C. 42" / 34"
4. #5 DOWEL AT 5" O.C. 72" / 12"
5. #4 AT 11" O.C. TRANSVERSE
6. #5 AT 11" O.C. LONGITUDINAL
7. #5 AT 12" O.C. LONGITUDINAL
8. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
9. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
10. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
11. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
12. #5 DOWEL AT 7" O.C. 54" / 34"
13. (2) #4 CONT HORIZ
14. #4 AT 18" O.C. HORIZ
15. #4 AT 18" O.C. HORIZ 72" / 34"
16. 1 1/2" DEEP x 9 3/4" KEY
17. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
18. #5 DOWEL AT 5" O.C. 109" / 57"
19. 1 1/2" DEEP x 7 1/2" KEY
20. #4 AT 18" O.C. HORIZ

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

SEAL: ENGINEER - STATE OF NEVADA - DOUGLAS W. HUNT - No. 15111 - PROFESSIONAL ENGINEER - CIVIL - 12-31-2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

SSEDCO — Specialty Structures Engineering & Design Company — E-mail@SSEDCo.com, 1353 E. Lincoln Rd, Idaho Falls, ID 83401 — Phone: 208-524-0800 — Fax: 208-552-3305

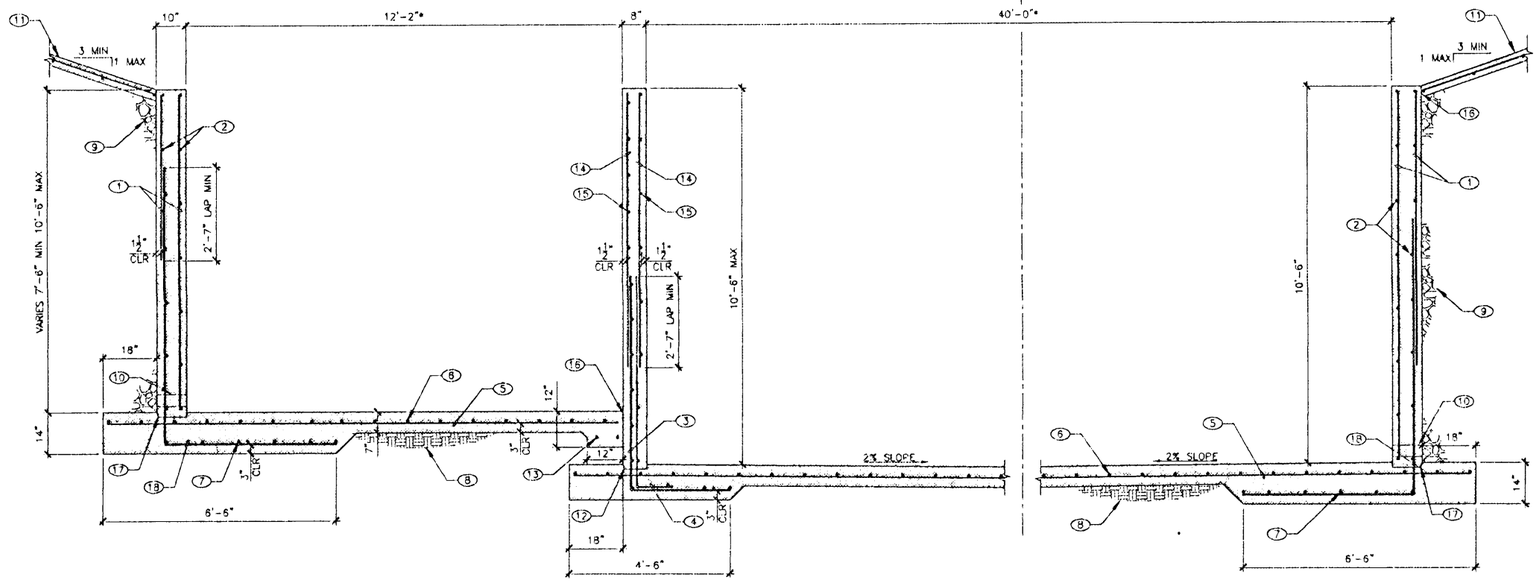
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 RALPH J. TRESTI ROAD UNIT B, ALBUQUERQUE, NM 87114

PROJECT:
PALM CITY CI CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2.21.02
	SUBMITTED FOR CONSTRUCTION	1.31.02
	SUBMITTED FOR APPROVAL	12.19.01
	SUBMITTED FOR APPROVAL	9.13.01
	SUBMITTED FOR APPROVAL	9.4.01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.3 of 33



1 DRAINAGE CHANNEL RETAINING WALLS 10'-6" MAX AT RAMP WITH 7'-6" MIN 10'-6" MAX RAMP WALL
1/2 SCALE

KEYNOTES:

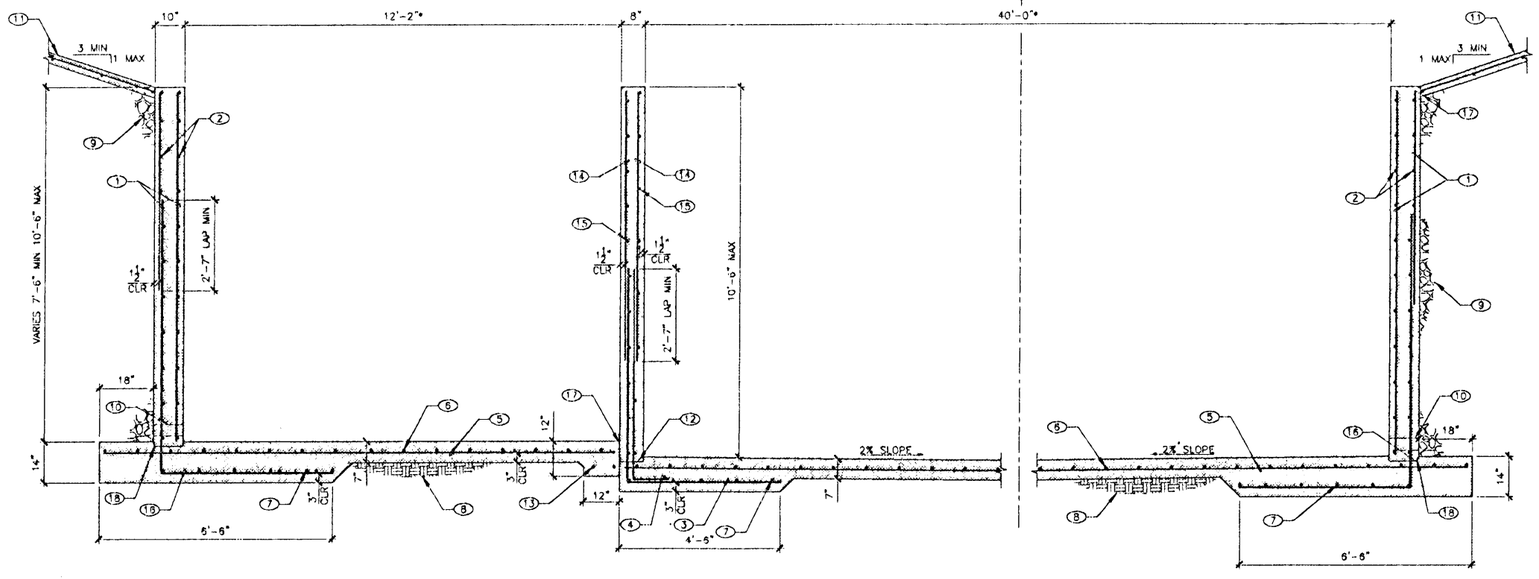
1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 5" O.C. 72" / 34"
4. #5 DOWEL AT 5" O.C. 72" / 12"
5. #4 AT 11" O.C. TRANSVERSE
6. #5 AT 11" O.C. LONGITUDINAL
7. #5 AT 12" O.C. LONGITUDINAL
8. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
9. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
10. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
11. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
12. 1 1/2" DEEP x7 1/2" KEY
13. (2) #4 CONT HORIZ
14. #4 AT 18" O.C. VERT
15. #4 AT 18" O.C. HORIZ
16. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
17. 1 1/2" DEEP x 9 3/4" KEY
18. #6 DOWEL AT 5" O.C. 93" / 57"

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS 10'-6" MAX AT RAMP WITH 7'-6" MIN 10'-6" MAX RAMP WALL
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 5" O.C. 72" / 52"
4. #5 DOWEL AT 5" O.C. 72" / 12"
5. #4 AT 11" O.C. TRANSVERSE
6. #5 AT 11" O.C. LONGITUDINAL
7. #5 AT 12" O.C. LONGITUDINAL
8. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
9. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
10. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
11. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
12. 1 1/2" DEEP x7 1/2" KEY
13. (2) #4 CONT HORIZ
14. #4 AT 18" O.C. VERT
15. #4 AT 18" O.C. HORIZ
16. #6 DOWEL AT 5" O.C. 93" / 57"
17. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
18. 1 1/2" DEEP x 9 3/4" KEY

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: ENGINEER, STATE OF NEVADA, DOUGLAS M. PRATHER, No. 11911, REGISTERED PROFESSIONAL — FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

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Phone: 208-524-0080 Fax: 208-552-9302

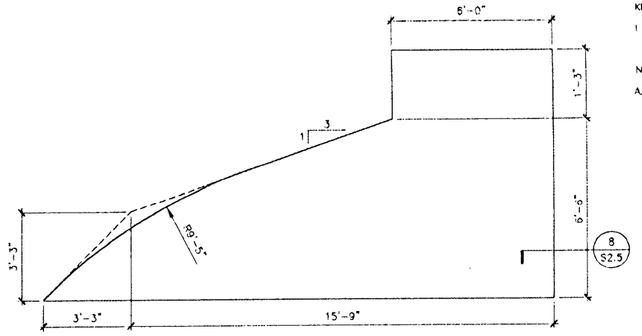
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
500 MARKET ROAD #1 SUITE B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.4 28/33



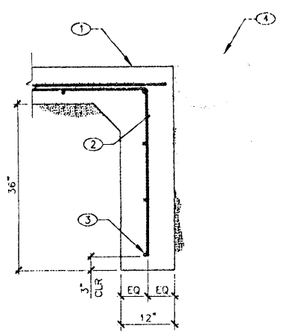
KEYNOTES:

1. DEBRIS CATCHER, SEE DETAIL 1/S2.2 AND 8/S2.5 FOR ADDITIONAL INFORMATION

NOTE:

A. REINF NOT SHOWN FOR CLARITY

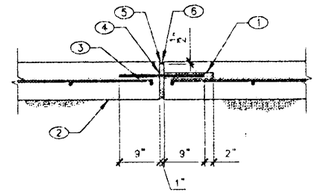
9 DEBRIS CATCHER AT EXISTING BRIDGE STRUCTURE BY HYDRO-ARCH
NO SCALE



KEYNOTES:

1. TOP OF CHANNEL BOTTOM SEE SECTIONS FOR ADDITIONAL REQUIREMENTS
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. GROUTED RIP-RAP, SEE CIVIL DRAWINGS

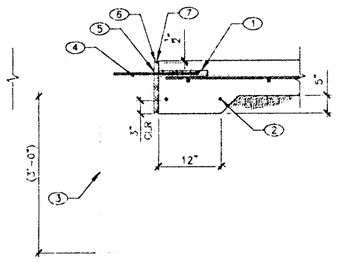
5 CUTOFF WALL AT CHANNEL OUTLET
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. OUTSIDE FACE OF WALL
3. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
4. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
5. BOND BREAKER TAPE
6. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

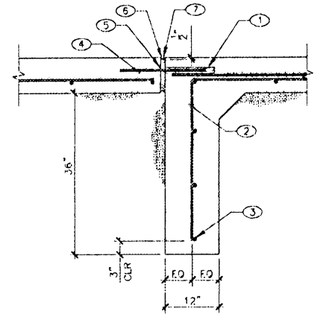
1 EXPANSION JOINT AT CHANNEL WALL
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. (2) #4 AT 12" O.C. CONT HORIZ
3. EXISTING CUT OFF WALL
4. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

6 EXPANSION JOINT AT CHANNEL BOTTOM
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

NOTE:

4. JOINTS SHALL OCCUR AT 90'-0" O.C. MAX

2 EXPANSION JOINT AT CHANNEL BOTTOM
NO SCALE

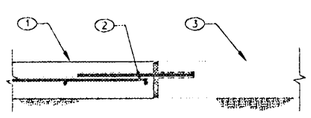
KEYNOTES:

1. #3 TIES AT 10" O.C.
2. BOX CULVERT BY OTHERS, SEE CIVIL FOR ADDITIONAL INFORMATION
3. (4) #5 EA FACE AT CONCRETE STIFFENER, PROVIDE 5" MIN EMBEDMENT INTO BOX CULVERT
4. #4 DOWEL x 24" LONG DRILL AND EPOXY EMBED MIN 8"
5. #4 DOWEL x 24" LONG AT 18" O.C. AROUND PERIMETER OF R.C.B. DRILL AND EPOXY MIN 8" EMBED

NOTE:

FOR ITEMS SHOWN BUT NOT NOTED SEE DETAIL 1/S2.1 AND 2/S2.1

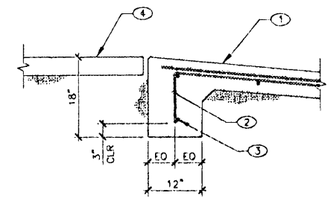
10 BOX CULVERT AT DRAINAGE CHANNEL RETAINING WALL
NO SCALE



KEYNOTES:

1. INSIDE FACE OF CHANNEL WALL, SEE SECTIONS FOR ADDITIONAL REQUIREMENTS
2. DRILL AND EPOXY #4x24" DOWEL AT 12" O.C. W/ 8" EMBEDMENT
3. EXISTING STRUCTURE WALL

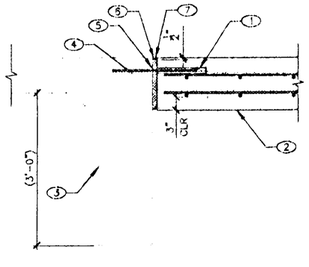
7 EXPANSION JOINT AT EXISTING STRUCTURE
NO SCALE



KEYNOTES:

1. ENTRANCE RAMP SEE DETAILS FOR ADDITIONAL REQUIREMENTS
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 10" O.C. CONT HORIZ
4. CIVIL FLATWORK, SEE CIVIL DRAWINGS

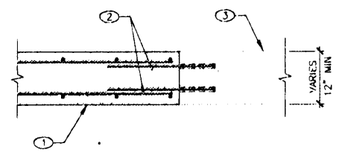
3 TURN DOWN AT RAMP ENTRANCE
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. THICKNESS AND REINF PER SECTION 1/S2.7
3. EXISTING CUT OFF WALL
4. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

11 EXPANSION JOINT AT CHANNEL BOTTOM
NO SCALE



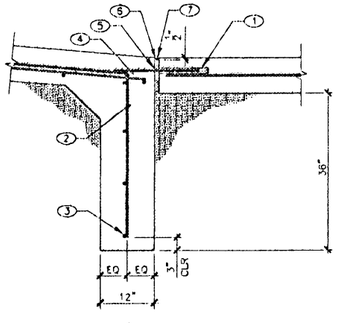
KEYNOTES:

1. DEBRIS CATCHER, SEE DETAIL 1/S2.2 FOR ADDITONAL INFORMATION
2. DRILL AND EPOXY #4x24" DOWEL AT 12" O.C. EA FACE, W/ 8" EMBEDMENT
3. EXISTING BRIDGE STRUCTURE BY HYDRO-ARCH

NOTE:

A. SEE DETAIL 9/S2.5 FOR ADDITIONAL INFORMATION

8 DEBRIS CATCHER AT EXISTING BRIDGE STRUCTURE BY HYDRO-ARCH
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

4 TURN DOWN AT RAMP OUTLET
NO SCALE

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SEAL: DOUGLAS H. JOHNSON — STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — No. 7515

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

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E-mail@SSDCo.com, 1553 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-557-9302

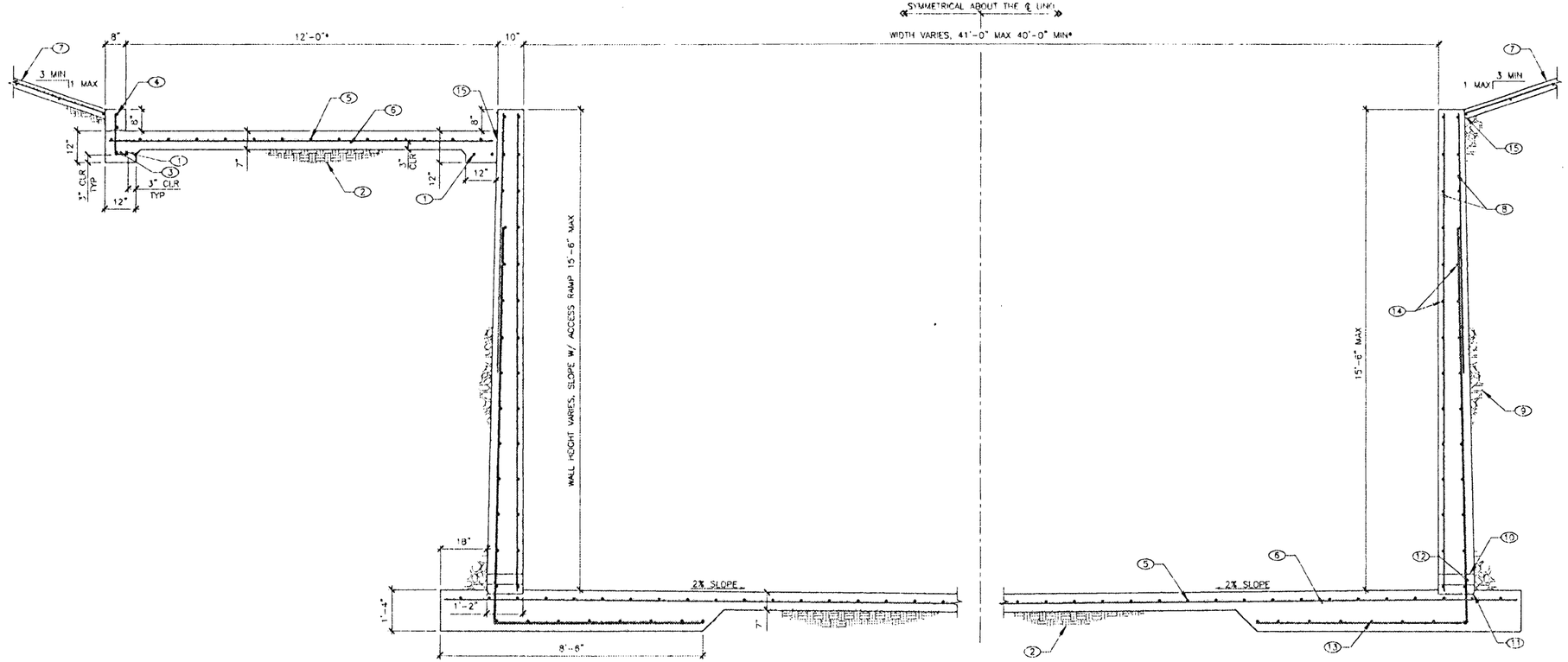
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
3960 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT: PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: DETIALS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/21/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.5 30 33



1 DRAINAGE CHANNEL RETAINING WALLS 13'-1" MIN THRU 15'-6" MAX
NO SCALE

KEYNOTES:

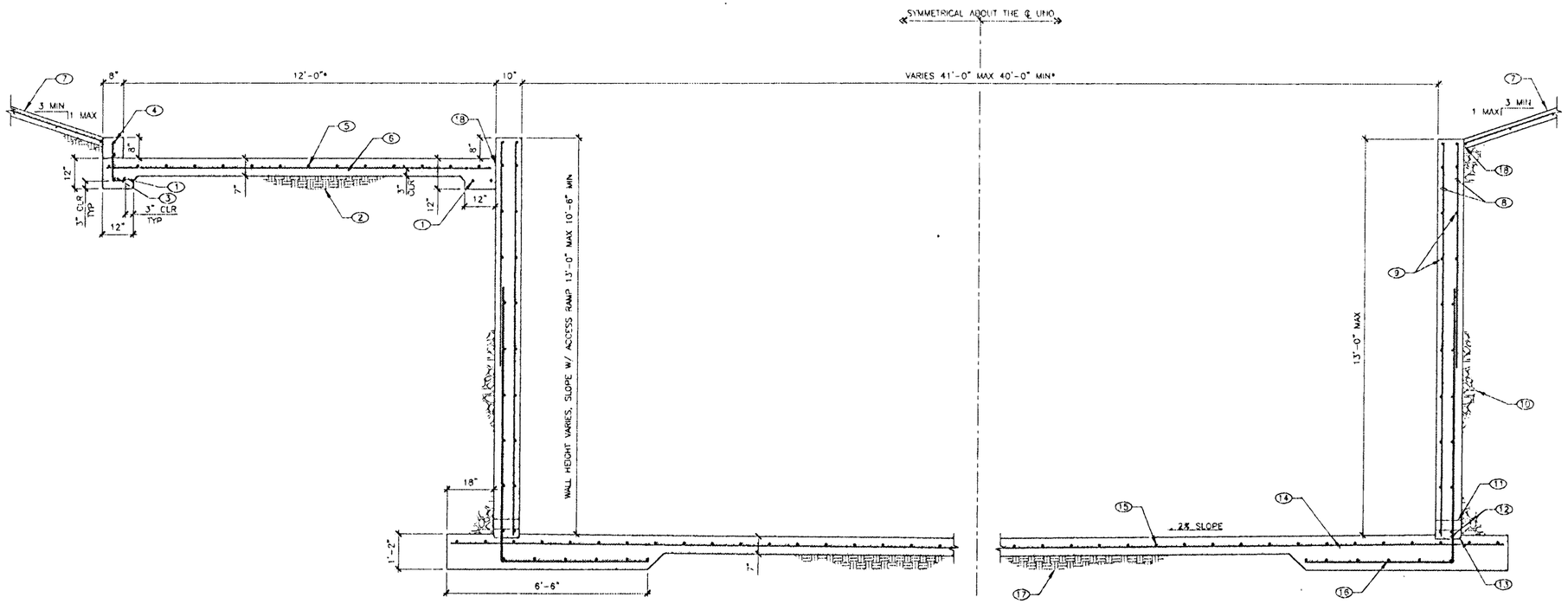
1. (2) #4 CONT HORIZ
2. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
3. #4 VERT DOWEL AT 12" O.C. W/ STANDARD HOOK AT BASE
4. #4 TOP AND BOTTOM CENTERED IN CURB
5. #5 AT 11" O.C. LONGITUDINAL
6. #4 AT 11" O.C. TRANSVERSE
7. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
8. #4 AT 18" O.C. VERT
9. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
10. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
11. 1 1/2" DEEP x7 1/2" KEY
12. #6 DOWEL AT 4" O.C.
    154"
    78"
13. #5 AT 12" O.C. LONGITUDINAL
14. #4 AT 14" O.C. HORIZ
15. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. TAPERED WALLS SHALL BE SHOTCRETED

B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS 10'-0" MIN THRU 13'-0" MAX
NO SCALE

KEYNOTES:

1. (2) #4 CONT HORIZ
2. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
3. #4 VERT DOWEL AT 12" O.C. W/ STANDARD HOOK AT BASE
4. #4 TOP AND BOTTOM CENTERED IN CURB
5. #5 AT 11" O.C. LONGITUDINAL
6. #4 AT 11" O.C. TRANSVERSE
7. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
8. #4 AT 18" O.C. VERT
9. #4 AT 18" O.C. HORIZ
10. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
11. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
12. #6 DOWEL AT 5" O.C.
    108"
    57"
13. 1 1/2" DEEP x 9 3/4" KEY
14. #4 AT 11" O.C. TRANSVERSE
15. #5 AT 11" O.C. LONGITUDINAL
16. #5 AT 12" O.C. LONGITUDINAL
17. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
18. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

B. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: DOUGLAS H. WEISS, STATE OF NEVADA, REGISTERED PROFESSIONAL ENGINEER, No. 13171, FEB 21 2002

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

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Phone: 208-524-0888 Fax: 208-522-5905

HYDRO-ARCH
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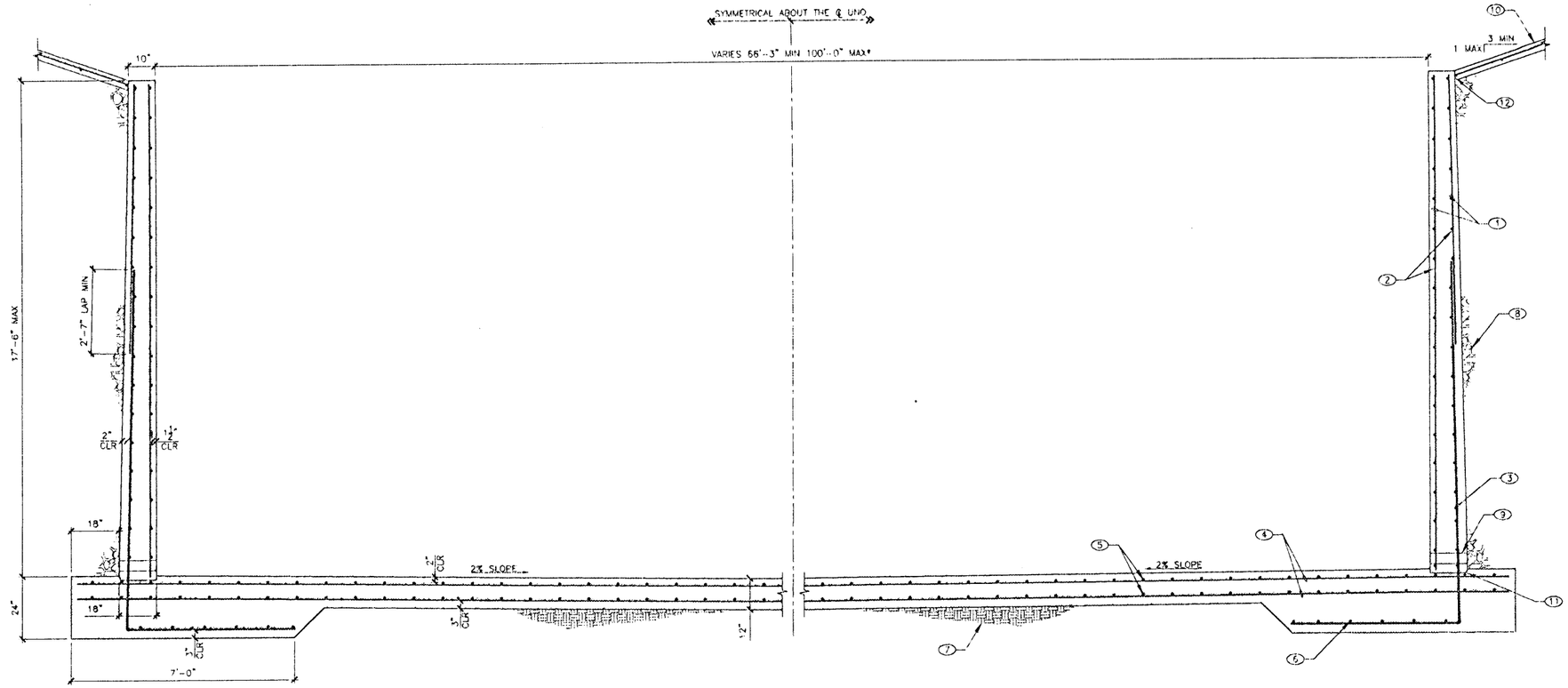
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
5960 MISSION GRID ROAD UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

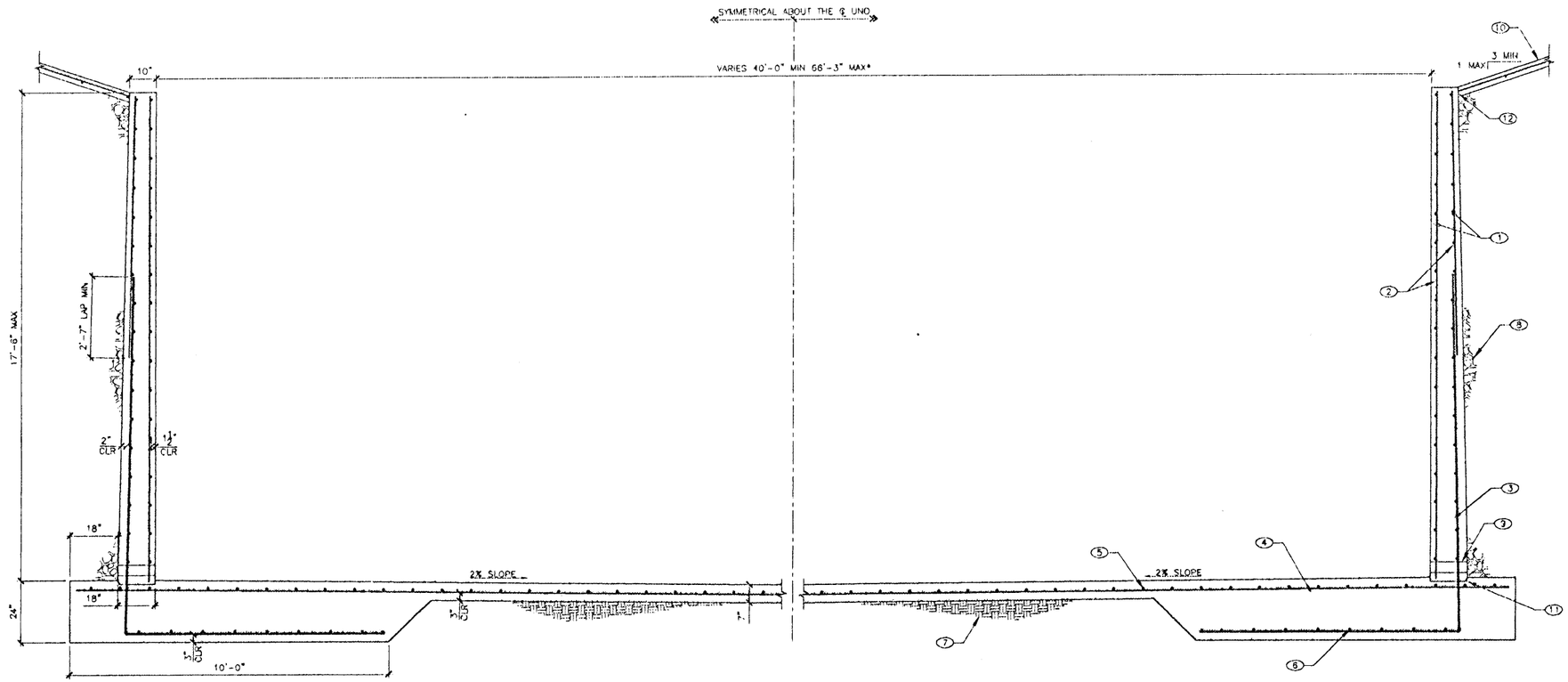
SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2/1/02
	SUBMITTED FOR CONSTRUCTION	1/31/02
	SUBMITTED FOR APPROVAL	12/19/01
	SUBMITTED FOR APPROVAL	9/13/01
	SUBMITTED FOR APPROVAL	9/4/01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.6 31/33



1 DRAINAGE CHANNEL RETAINING WALLS 13'-1" MIN THRU 15'-6" MAX
NO SCALE



2 DRAINAGE CHANNEL RETAINING WALLS 10'-0" MIN THRU 13'-0" MAX
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 11" O.C. HORIZ
3. #6 DOWEL AT 4" O.C.
4. #4 AT 12" O.C. TRANSVERSE, TOP AND BOTTOM
5. #5 AT 12" O.C. LONGITUDINAL, TOP AND BOTTOM
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 15 1/2" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF LAPPING PER KEYNOTE 1 MAY BE ELIMINATED
B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 11" O.C. HORIZ
3. #6 DOWEL AT 4" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 15 1/2" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF LAPPING PER KEYNOTE 1 MAY BE ELIMINATED
B. "*" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

SEAL: STATE OF NEVADA — No. 15174 — PROFESSIONAL ENGINEER — DOUGLAS K. SWANSON — 12-21-01

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

SYSTEMS
Specialty Structure Engineering & Design Company
E-mail@SSKIDS.com 1535 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9302

HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
940 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	2.21.02
	SUBMITTED FOR CONSTRUCTION	1.31.02
	SUBMITTED FOR APPROVAL	12.19.01
	SUBMITTED FOR APPROVAL	9.13.01
	SUBMITTED FOR APPROVAL	9.4.01

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.7 32/33

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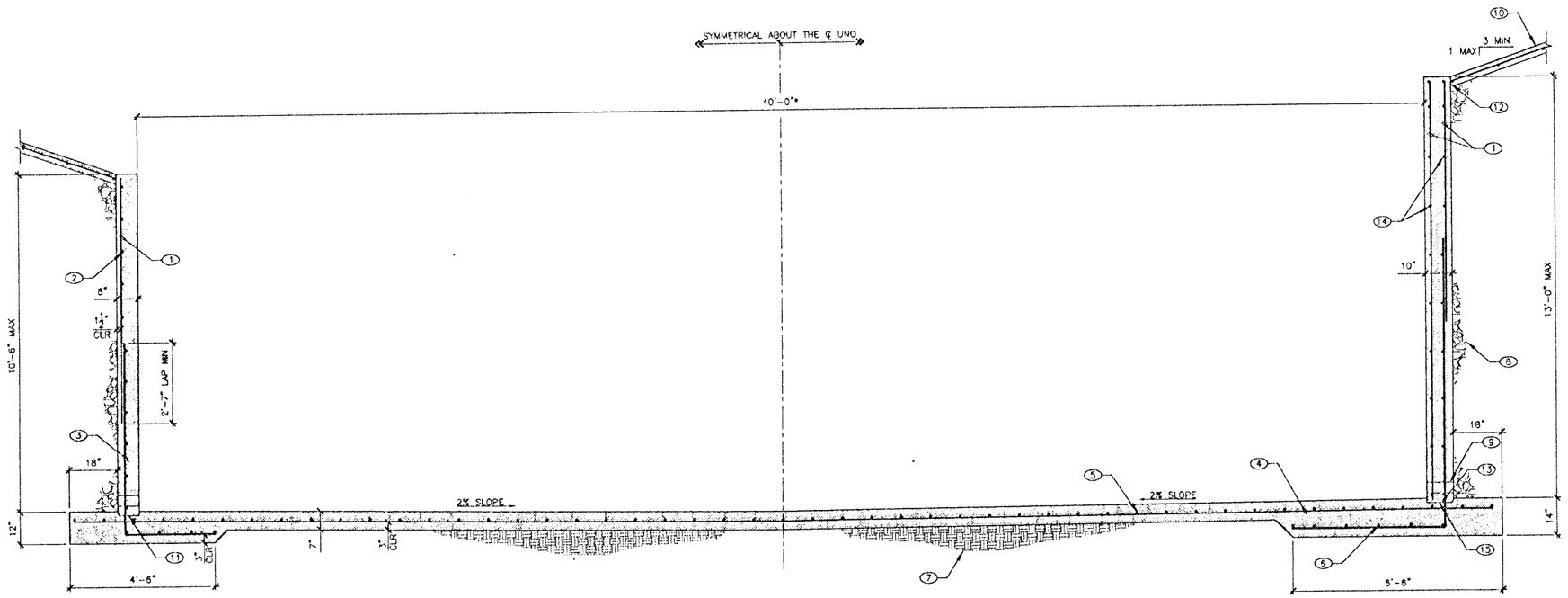


KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 5" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x7 1/2" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #6 DOWEL AT 5" O.C.
14. #4 AT 18" O.C. HORIZ
15. 1 1/2" DEEP x 9 3/4" KEY

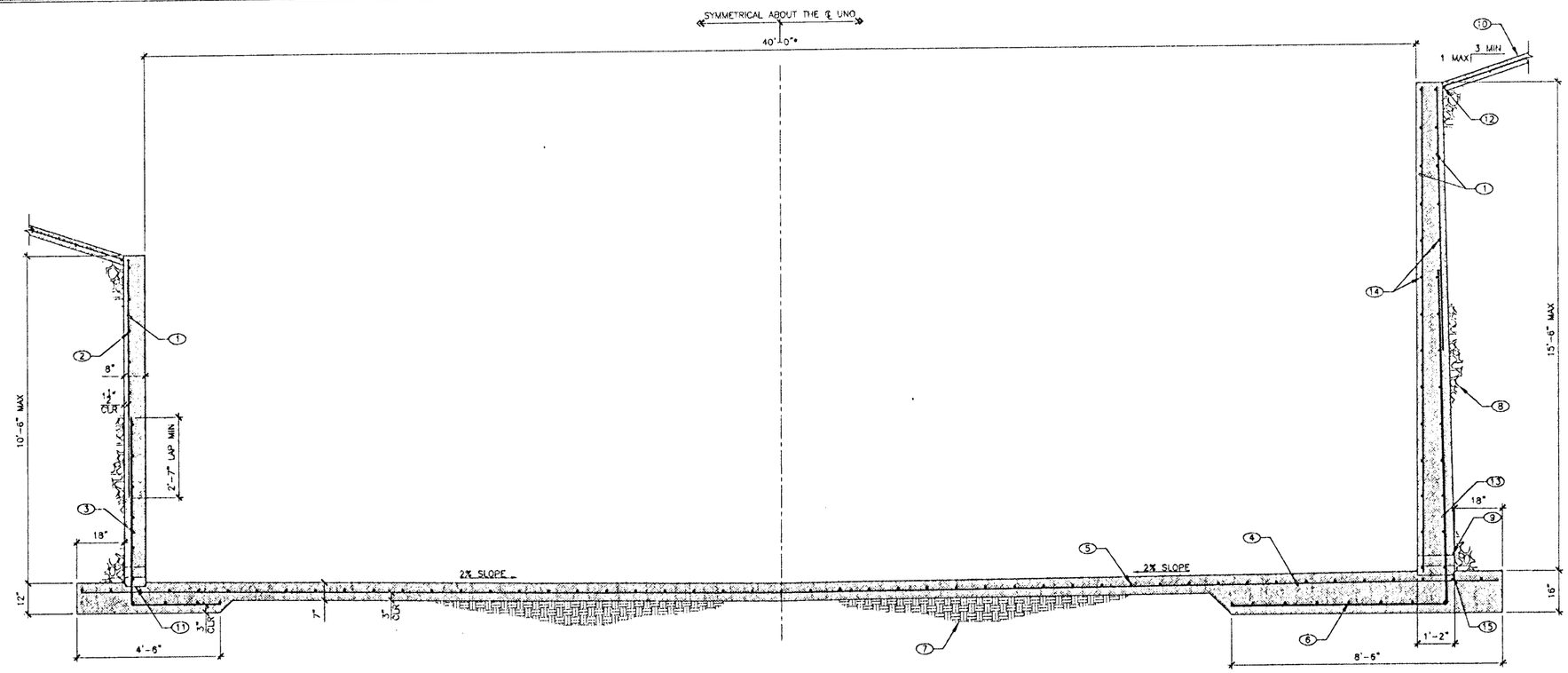
NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 13 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES

1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE



KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 5" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 9 3/4" KEY
12. SEE DETAIL 1/S2.5 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #6 DOWEL AT 4" O.C.
14. #4 AT 14" O.C. HORIZ
15. 1 1/2" DEEP x 12 1/2" KEY

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 13 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES

2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

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SEAL: STATE OF NEVADA — JAMES S. DOUGLASH — No. 15171 — REGISTERED PROFESSIONAL ENGINEER — 12-21-01

DESIGNED	DRAWN	CHECKED	APPROVED
JS	KH	DW	WM

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HYDRO-ARCH
BY PHOENIX GUNITE
CALIFORNIA NEVADA NEW MEXICO UTAH
ARIZONA
9980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY CI CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/21/02

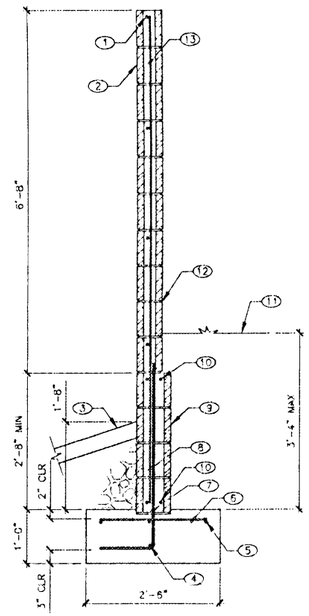
DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER:
S2.8 33/33

KEYNOTES:

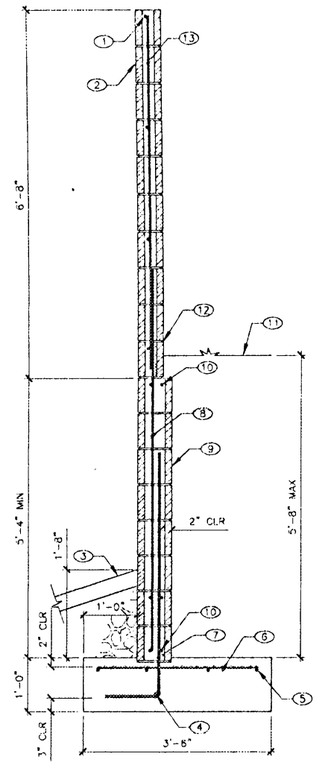
1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (3) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 24" O.C. (CENTERED) 40" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

NOTE:

A. RETAINING MAY BE ON EITHER SIDE OF WALL



4 MASONRY RETAINING WALL 3'-4" MAX
NO SCALE



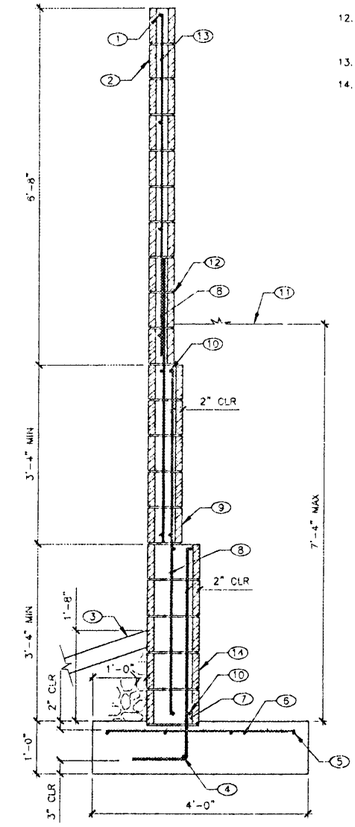
2 MASONRY RETAINING WALL 5'-9" MAX
NO SCALE

KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 8" O.C. 55" / 12"
8. #4 AT 24" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 48" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 8" O.C. 47" / 12"
8. #4 AT 24" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 40" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)
14. 12" CMU GROUTED SOLID BELOW GRADE



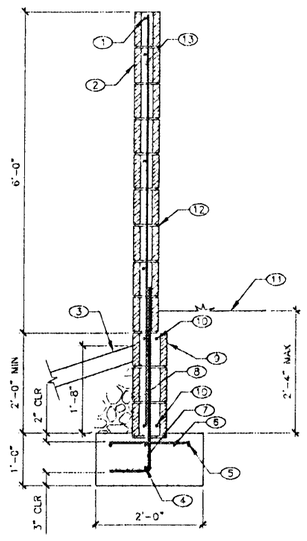
1 MASONRY RETAINING WALL 7'-4" MAX
NO SCALE

KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (3) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #4 DOWELS AT 24" O.C (CENTERED) 40" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

NOTE:

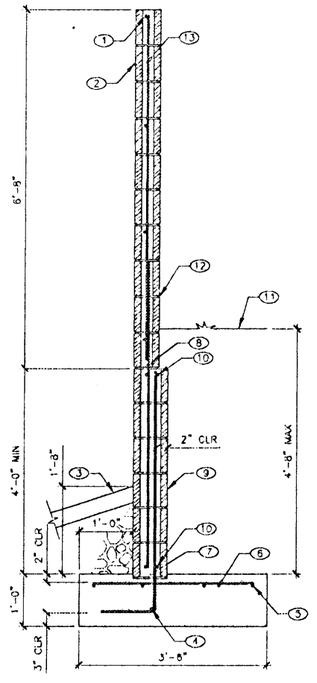
A. RETAINING MAY BE ON EITHER SIDE OF WALL



5 MASONRY SCREEN WALL W/ RETAINING WALL 2'-4" MAX
NO SCALE

KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #4 DOWELS AT 16" O.C. 55" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 48" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)



3 MASONRY RETAINING WALL 4'-8" MAX
NO SCALE

SEAL:

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

SSEDCO
Specialty Structural Engineering & Design Company
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HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA UTAH
940 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
DETAILS

REV.	DESCRIPTION	DATE

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER:
S2.9 33a/33

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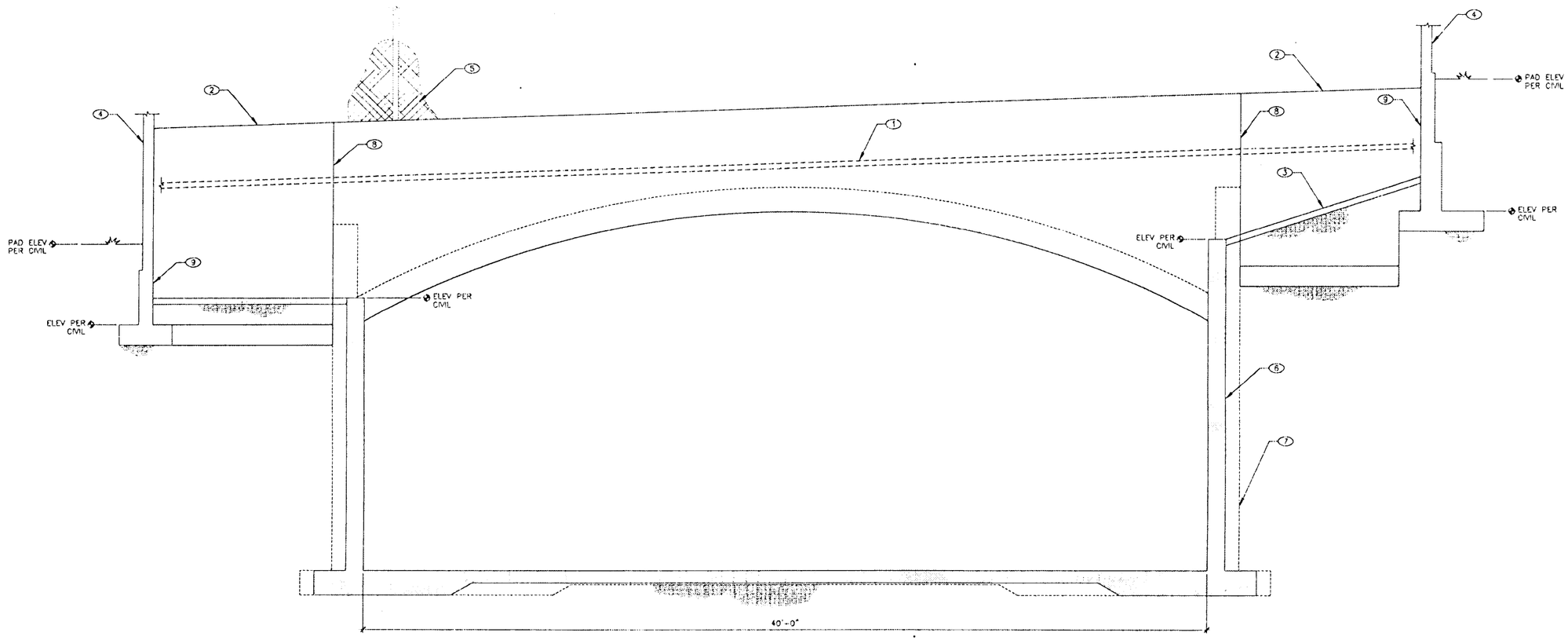
KEYNOTES:

1. ROAD SURFACE BEYOND
2. RETAINING WALL CONSTRUCTION NOT BY HYDROARCH
3. SLOPE PAVING PER CIVIL
4. MASONRY HEAD WALL CONSTRUCTION NOT BY HYDROARCH
5. CHAIN LINK FENCE PER DETAIL 2/SO.1
6. CHANNEL PER PALM CITY PHASE 1 DWG.
7. BRIDGE BEYOND
8. AT RETAINING WALL-HEAD WALL CONNECTION PROVIDE #4 DOWEL x 24" LONG AT 18" O.C. EACH FACE DRILL AND EPOXY MIN. 8" EMBED
9. AT RETAINING WALL-FENCE WALL CONNECTION PROVIDE #4 DOWEL x 24" LONG AT 18" O.C. CENTERED DRILL AND EPOXY MIN. 8" EMBED



1 FIRE ACCESS BRIDGE ELEVATION
NO SCALE

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SEAL: REGISTERED STATE OF NEVADA PROFESSIONAL ENGINEER DOUGLAS H. WAGNER CIVIL

DESIGNED: JS
DRAWN: KH
CHECKED: DW
APPROVED: WM

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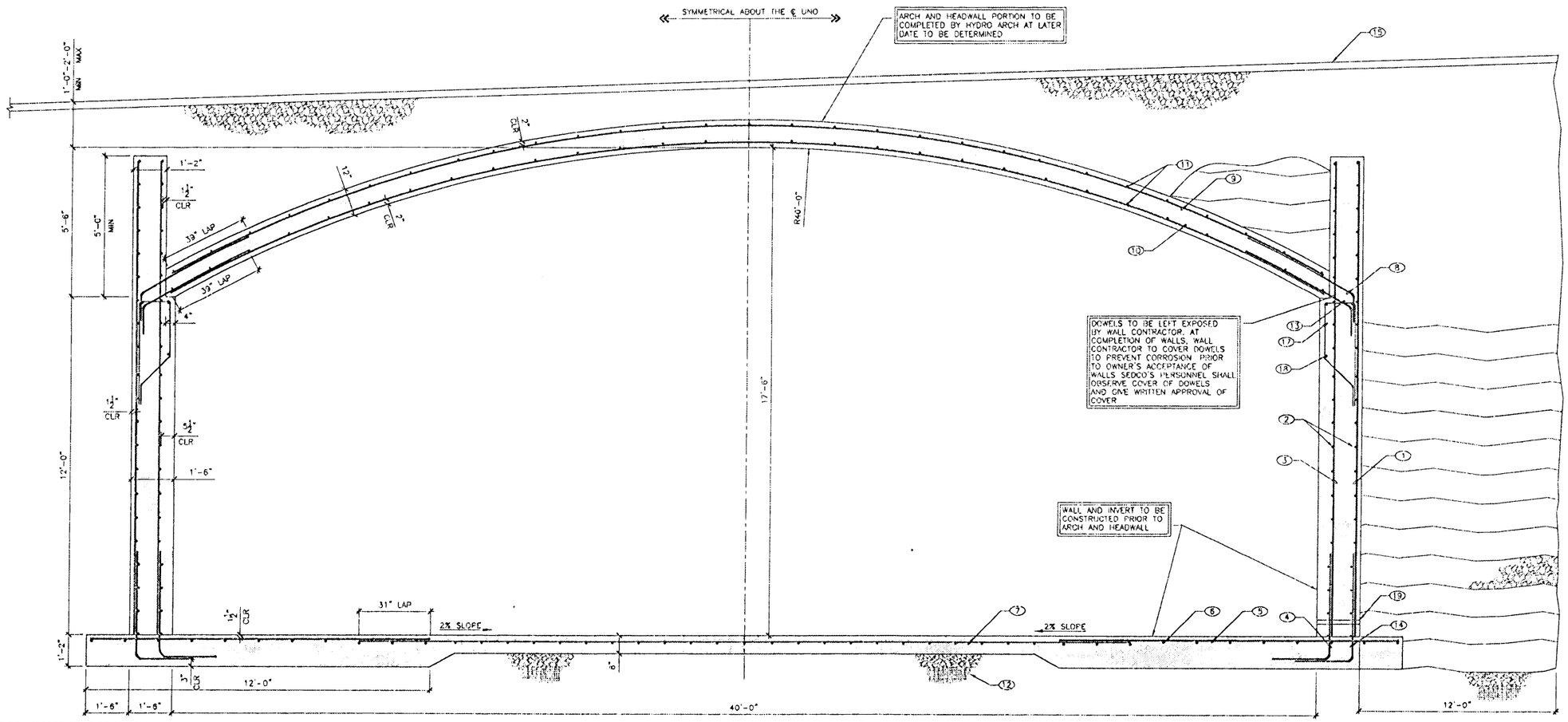
HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
960 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT:
PALM CITY CI CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
ELEVATION

REV.	DESCRIPTION	DATE
1	Added Shotcrete To Plans	9/12/02
	SUBMITTED FOR CONSTRUCTION	8/19/02
	SUBMITTED FOR CONSTRUCTION	8/8/02

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.10
33b
33



1 FIRE ACCESS BRIDGE SECTION
NO SCALE

KEYNOTES:

1. #6 AT 5" O.C. VERT
2. #4 AT 10" O.C. HORIZ
3. #5 AT 9" O.C. VERT
4. #5 DOWEL AT 9" O.C.

36"
24"

5. #6 AT 7" O.C. TRANS
6. #5 AT 10" O.C. LONG
7. #5 AT 8" O.C. TRANS
8. #5 DOWEL AT 12" O.C. W / STANDARD HOOK
9. #5 AT 12" O.C. TRANS (LAP SPLICE 39" MIN)
10. #5 AT 9" O.C. TRANS (LAP SPLICE 39")
11. #4 AT 12" O.C. LONG
12. CULVERT BEDDING PER GSN
13. #5 DOWEL AT 18" O.C. W / STANDARD HOOK
14. #6 DOWEL AT 10" O.C.

36"
24"

15. ROAD SURFACE PER CIVIL
16. BACKFILL ZONE LINES INDICATE LAYERS COMPACTED IN LIFTS
17. #3 TIES AT 12" O.C.
18. (3)#5 CONT
19. 2"ø WEEP HOLE AT 8'-0" O.C. MAX SEE GSN FOR DETAIL

NOTES:

A. BACKFILL SHALL CONSIST OF TYPE II MATERIAL PER CLARK CO. SPECIFICATIONS

B. FILL SHALL BE PLACED IN 8" LIFTS AND COMPACTED TO 95% OF MAX DRY DENSITY WITHIN THE ZONE SHOWN. FILL SHALL BE PLACED SYMMETRICALLY ALONG THE LENGTH OF THE ABUTMENT. FILL ALONG EACH ABUTMENT SHALL BE PLACED SIMULTANEOUSLY. A VERTICAL DIFFERENTIAL OF NO MORE THAN 1'-6" SHALL OCCUR BETWEEN FILL PLACED AT ABUTMENTS.

C. FILL PLACED OVER ARCH SHALL START AT ABUTMENTS AND BE PLACED SIMULTANEOUSLY IN LIFTS AS DESCRIBED IN NOTE B

D. SHORING UNDER ARCH SHALL REMAIN IN PLACE FOR 7 DAYS AFTER CONCRETE PLACEMENT AND FILL OVER ARCH MAY BE PLACED.

E. FILL OVER ARCH MAY BE PLACED 10 DAYS AFTER CONCRETE PLACEMENT

F. WALL CONTRACTOR TO COORDINATE W/ EXCAVATION CONTRACTOR AND PROVIDE INFORMATION AS REQ TO ACHIVE BACKFILL SPECIFICATIONS HERE WITHIN

SEAL: REGISTERED STATE OF NEVADA — DOUGLAS K. WEEH — CIVIL — No. 15177

DESIGNED: JS | DRAWN: KH | CHECKED: DW | APPROVED: WM

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Specialty Structures Engineering & Design Company
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Phone: 208-524-0900 Fax: 208-557-9302

HYDRO-ARCH
BY PHOENIX GUNITE
ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 MARY CREST ROAD, UNIT B
HENDERSON, NV 89014

PROJECT
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
SECTION

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	8/19/02
	SUBMITTED FOR CONSTRUCTION	8/30/02

DATE: SEPTEMBER 4, 2001
PROJECT NUMBER: 01216
SHEET NUMBER: S2.11 33c

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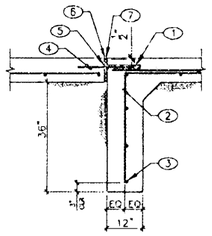
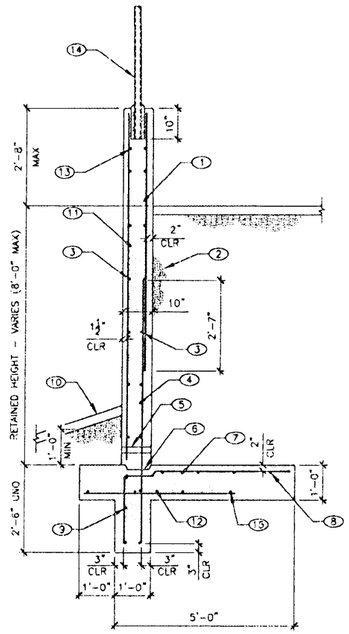


KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. 5/8"ø x 19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

3 EXPANSION JOINT AT BRIDGE-CHANNEL BOTTOM
NO SCALE



KEYNOTES:

1. #4 VERT AT 14" O.C. INSIDE FACE LAP 31"
2. BACKFILL MATERIAL SHALL BE GRANULAR NON COHENSIVE PLACED IN 8" LIFTS. PROVIDE 12" MIN FREE DRAIN GRANULAR BACKFILL DIRECTLY BEHIND FULL HEIGHT OF WALL
3. #4 HORIZ AT 18" O.C. EF
4. #4 VERT x 7'-6" LONG AT 7" O.C.
5. 2"ø WEEP HOLE AT 8'-0" O.C. MAX SEE GSN FOR DETAIL
6. 1 1/2" DEEP x 5 1/2"
7. #4 TRANS AT 10" O.C.
8. #4 CONT AT 12" O.C.
9. #4 CONT AT 12" O.C. EF
10. PAVING PER CIVIL DWGS
11. #4 VERT AT 18" O.C. OUTSIDE FACE
12. #4 TRANS x 4'-0" AT 18" O.C.
13. (2) #4 CONTINOUS AT TOP OF WALL 3" BELOW BOTTOM OF FENCE POST
14. POST EMBEDMENT PER DETAIL 2/S0.1
15. #4 AT 18" O.C.

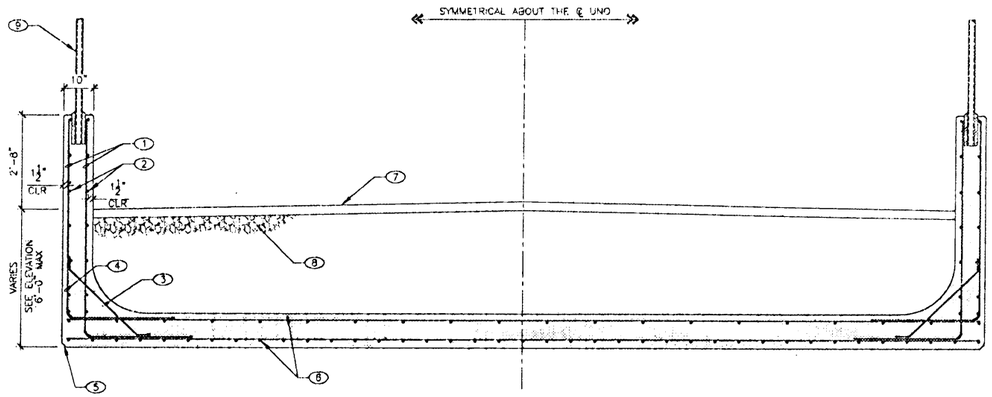
NOTE:

AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 4 MAY BE EXTENDED FULL WALL HEIGHT AND REINF PER NOTE 1 ELIMINATED

1 RETAINING WALL SECTION (FUTURE)
NO SCALE

KEYNOTES:

1. #4 AT 10" O.C. W/ 36" HOOK AT BASE
2. #4 AT 12" O.C. EACH FACE
3. #4 AT 10" O.C. PLACE RADIALLY AROUND ARCH
4. #4 AT 12" O.C. W/ 36" HOOK AT BASE
5. 2" CHAMFER
6. REINF PER SECTION S3.1
7. SLOPE PAVING PER CIVIL
8. FILL PER GSN AND SECTION S3.1
9. POST EMBEDMENT PER DETAIL 3/S0.1. SEE CIVIL FOR ADDITIONAL REQUIREMENTS



2 BRIDGE CROSS SECTION (FUTURE)
NO SCALE

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SEAL
STATE OF NEVADA
DOUGLAS H. WEIGEL
CIVIL

DESIGNED JS
DRAWN KH
CHECKED DW
APPROVED WM

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HYDRO-ARCH
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ARIZONA CALIFORNIA NEVADA NEW MEXICO UTAH
980 MARKET CREEK, SUITE B
HENDERSON, NV 89014

PROJECT:
PALM CITY C1 CHANNEL
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV
FOR
HYDRO-ARCH

SHEET TITLE:
SECTIONS

REV.	DESCRIPTION	DATE
1	SUBMITTED FOR CONSTRUCTION	8/15/02
2	SUBMITTED FOR CONSTRUCTION	8/5/02

DATE: SEPTEMBER 4, 2001
DRAWING NUMBER: 01216
SHEET NUMBER: S2.12
33d 33

PHASE II

C-1 Channel Extension Phase II Improvement Plans per PBS&J

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY

Call before you Overhead

1-702-593-6111

NEVADA POWER CO./SIERRA PACIFIC POWER CO. SAFETY SERVICES DEPARTMENT

AVOID OUTAGE UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600

UNDERGROUND SERVICE (USA)

TUSCANY IMPROVEMENT PLANS
C-1 CHANNEL EXTENSION
PHASE 2 IMPROVEMENTS

A PORTION OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST
MOUNT DIABLO MERIDIAN, CITY OF HENDERSON, CLARK COUNTY, NEVADA

LEGAL DESCRIPTION

A PORTION OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST, M.D.M., CITY OF HENDERSON, CLARK COUNTY, NEVADA.

BASIS OF BEARING

SOUTH 89°37'49" WEST – BEING THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE1/4) OF SECTION 32, TOWNSHIP 21 SOUTH, RANGE 63 EAST, M.D.M., CITY OF HENDERSON, CLARK COUNTY, NEVADA AS SHOWN ON THE MAP THEREOF IN FILE 57 OF SURVEYS, PAGE 88, OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93
DESC: CITY OF HENDERSON BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET.
ELEVATION IN METERS: 508.195 = 1667.303 FEET
C.O.H. NAVD '88
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

OWNER / DEVELOPER

OWNER

CONTACT: JEFF THOMPSON
COMMERCE ASSOCIATES, LLC
2920 N. GREEN VALLEY PKWY
HENDERSON, NV 89014
(702) 456-8744

DEVELOPER

CONTACT: JEFF THOMPSON
COMMERCE ASSOCIATES, LLC
2920 N. GREEN VALLEY PKWY
HENDERSON, NV 89014
(702) 456-8744

ENGINEER / CONSULTANT

CIVIL

CONTACT: LEE C. FARRIS, P.E.
PBS&J, INC. 901 N. GREEN VALLEY PKWY.
SUITE 100, HENDERSON, NEVADA 89074
(702) 263-7275

STRUCTURAL

CONTACT: JASON P. SOUTH, P.E.
SPECIALTY STRUCTURES ENGINEERING AND DESIGN COMPANY
1553 E. LINCOLN ROAD
IDAHO FALLS, IDAHO 83401
(208) 524-0800

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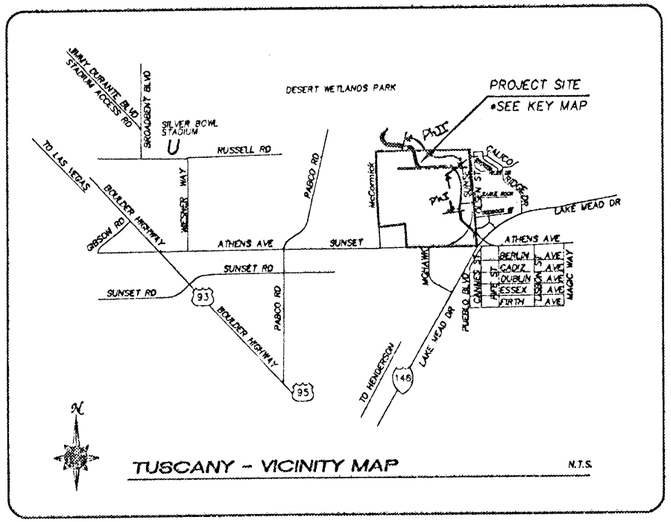

TUSCANY
Vintage Golf Course Living

THE CITY OF HENDERSON

APPROVALS

KURT SEGLER, P.E. — DATE 5/3/02
DIRECTOR, UTILITY SERVICES DEPARTMENT
CITY OF HENDERSON

MICHAEL W. BOUSE — DATE 6/12/02
DIRECTOR OF BUILDING AND SAFETY
CITY OF HENDERSON

JOHN E. BARTELS, P.E. — DATE 6-5-02
CITY TRAFFIC ENGINEER
CITY OF HENDERSON

JAMES MADDEN — DATE 6-11-02
FIRE MARSHAL
CITY OF HENDERSON

CURT CHANDLER, P.E. — DATE 6/6/02
FLOOD CONTROL COORDINATOR
CITY OF HENDERSON

NEVADA POWER COMPANY — DATE 5-9-02

NOTE:
EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: 1 (800) 227-2600.

SOUTHWEST GAS CORPORATION — DATE 5-9-02

SPRINT — DATE 5-9-02

NOTE:
THE AFFIXED SPRINT NEVADA APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUES, AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

SOUTHERN NEVADA WATER AUTHORITY — DATE N/A

COX COMMUNICATIONS LAS VEGAS, INC — DATE 5-9-02

APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE 7-1-02

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY June 30 02

THIS SET OF IMPROVEMENT PLANS IS CERTIFIED TO CONFORM TO THE REQUIREMENTS OF THE TRAFFIC STUDY ACCEPTANCE LETTER.

N/A
LEE C. FARRIS — P.E. NO. 13691 — DATE

"APPROVAL OF THESE PLANS BY THE CITY OF HENDERSON IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY IDENTIFIED AS "DEVIATIONS FROM STANDARDS". THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATIONS FROM STANDARDS" IN FAVOR OF THE UNIFORM STANDARDS DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA".

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 09, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-201
SCALE: HORIZ.: NONE
VERT.: NONE

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7300

SEAL — PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691 — 5/1/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION
- PHASE 2 IMPROVEMENTS -
COVER SHEET

XXXX

DRAWING NO. C1

1/35

CITY OF HENDERSON GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION, AND THE UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION.
2. APPLICATION FOR INSPECTION BY THE CITY OF HENDERSON PUBLIC WORKS SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE THE INSPECTION SERVICES WILL BE REQUIRED, 565-2136 OR 565-2140.
3. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE COMPLETED WITHOUT DELAY SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
4. THE CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTIES FROM ANY AND ALL DAMAGE THAT MAY OCCUR FROM STORM WATER RUNOFF AND/OR DEPOSITION OF DEBRIS RESULTING FROM ANY AND ALL WORK IN CONNECTION WITH SUBDIVISION CONSTRUCTION.
5. PRIOR TO FINAL ACCEPTANCE, BOND RELEASES AND A CERTIFICATE OF OCCUPANCY, A CERTIFIED LEGIBLE AS-BUILT DRAWING MUST BE SUBMITTED TO THE CITY OF HENDERSON. AS-BUILT MUST SHOW ALL CHANGES AND ACTUAL FIELD LOCATIONS. IN THE ABSENCE OF CHANGES, A COPY OF APPROVED DRAWINGS WILL BE REQUIRED, STATING "INSTALLED AS PER DRAWINGS", AND CERTIFIED AS SUCH BY THE DEVELOPER'S ENGINEER.
6. APPROVAL OF THESE PLANS IS FOR THE CONSTRUCTION OF OFFSITE IMPROVEMENTS ONLY. ALL ONSITE IMPROVEMENTS, AS DEFINED BY THE CITY OF HENDERSON, INCLUDING BLOCK WALLS, MUST BE APPROVED BY THE BUILDING AND PLANNING DIVISIONS OF THE CITY OF HENDERSON.
7. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITION BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND INGRESS AND EGRESS TO SAID CONSTRUCTION. EXTENT OF TRANSITIONS TO BE DETERMINED BY THE CITY ENGINEER.
8. EXISTING UTILITIES ARE LOCATED ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR THE PROTECTION OF UTILITIES AND THE ENGINEER BEARS NO RESPONSIBILITY FOR UTILITIES NOT SHOWN ON THE PLANS OR NOT IN THE LOCATION SHOWN ON THE PLANS. THIS INCLUDES ALL SERVICE LATERALS OF ANY KIND.
9. POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION BASED ON PROPOSED IMPROVEMENTS SHOWN WILL BE RELOCATED AT NO EXPENSE TO THE CITY OF HENDERSON.
10. WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING No. 235, EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY A CITY INSPECTOR, OR AS SHOWN ON PLAN.
11. CURB AND GUTTER WITH A GRADE OF LESS THAN FIVE-TENTHS OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTING AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
12. ALL GRADING SHALL CONFORM TO THE SOILS REPORT:
    ENGINEER: GEOTEK, INC.-NEVADA
    DATE: MAY 1, 1998
    JOB NUMBER: 1538-LV
13. EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PRELIMINARY GEOTECHNICAL REPORT.
14. ALL STREET STRUCTURAL SECTIONS SHALL BE PER THE RECOMMENDATIONS OF THE SOILS ENGINEER, BASED ON CBR OR R-VALUES. NO PAVING OR BASE WORK SHALL COMMENCE UNTIL A STREET STRUCTURAL SECTION IS APPROVED BY THE CITY ENGINEER, CITY OF HENDERSON.
15. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING PUBLIC STREETS IMMEDIATELY AFTER THE FIRST GRADING WORK IS ACCOMPLISHED AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "NEVADA TRAFFIC CONTROL MANUAL" - CURRENT EDITION AND TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" - CURRENT EDITION AND BE APPROVED BY THE CITY OF HENDERSON BEFORE CONSTRUCTION BEGINS.
16. WHERE EXISTING PAVEMENT IS CUT TO INSTALL UTILITY SERVICE LINES, BACKFILL AND PAVEMENT REPLACEMENT SHALL BE DONE PER STANDARD DRAWING No. 502 AND SECTIONS 209, 207, AND 208 OF THE STANDARD SPECIFICATION ISSUE, LATEST EDITION.
17. ALL STATIONING IS REFERENCED TO CENTERLINE.
18. EXACT LOCATION OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY A CITY OF HENDERSON INSPECTOR.
19. PROTECTION AND REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES NOT DELINEATED ON THE CONTRACT DRAWINGS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES SHALL BE DONE TO THE CITY OF HENDERSON SURVEY SECTION'S SATISFACTION.
20. AFFECTED UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
21. CALL BEFORE YOU DIG: 1-800-227-2600.
22. MODIFICATIONS TO EXISTING UTILITIES SHALL CONFORM TO THE OWNERS' UTILITY STANDARDS AND SPECIFICATIONS.
23. THE CONTRACTOR SHALL TAKE REASONABLE MEASURES TO PROTECT EXISTING IMPROVEMENTS FROM DAMAGE. ALL SUCH IMPROVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED TO THE ENGINEER'S SATISFACTION AT THE EXPENSE OF THE CONTRACTOR.
24. CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY _____, 20____.
25. ALL OFFSITE AND ONSITE WATER AND SEWER FACILITIES UP TO WITHIN FIVE (5) FEET OF BUILDINGS SHALL BE CONSTRUCTED TO PUBLIC WORKS STANDARDS.
26. IF SEWER OR WATER LINES WITHIN THE PUBLIC UTILITY EASEMENTS REQUIRE REPAIRS, ALL SUCH REPAIRS WILL BE DONE IN ACCORDANCE WITH PUBLIC WORKS DEPARTMENT STANDARDS. CURBS AND GUTTERS AND SPECIAL PAVING REPAIRS SHALL BE THE RESPONSIBILITY OF THE HOMEOWNER'S ASSOCIATION.
27. IF SIGNS ARE PRESENT ON THIS CONSTRUCTION SITE, PLEASE CONTACT SIGN COMPANY LISTED ON THE SIGN 24 HOURS PRIOR TO COMMENCING CONSTRUCTION IN THE SIGN'S LOCATION. CITY OWNED AND CITY SPONSORED SIGNS (WOOSIES) SHALL BE REMOVED AND REPLACED FOLLOWING CONSTRUCTION IN THEIR ORIGINAL LOCATION IN LIKE-NEW CONDITION AT CONSTRUCTION CONTRACTOR'S EXPENSE. ANY CONTRACTOR HAVING TO REMOVE A SIGN WHICH WAS DAMAGED PRIOR TO THE CONTRACTOR OCCUPYING THE SITE SHALL ARRANGE FOR VERIFICATION OF THE SIGN'S CONDITION BY A CITY INSPECTOR PRIOR TO REMOVAL. ALL SIGNS NOT PREVIOUSLY VERIFIED BY A CITY INSPECTOR SHALL BE ASSUMED TO BE IN LIKE-NEW CONDITION PRIOR TO REMOVAL.

CONDUIT NOTE

ALL CONDUIT (BOX CULVERT, REINFORCED CONCRETE PIPE, CAST-IN-PLACE PIPE, AND/OR CORRUGATED METAL PIPE) SHOWN ON THESE PLANS ARE DESIGNED FOR STANDARD HIGHWAY LOADINGS. THE STANDARD SATISFACTORY IN COVERAGE REQUIREMENTS AS ESTABLISHED BY THE CONDUIT MANUFACTURER MAY NOT ALWAYS BE ADEQUATE DURING CONSTRUCTION. WHEN CONSTRUCTION EQUIPMENT FREQUENTLY HEAVIER THAN TRAFFIC LOADS FOR WHICH CONDUIT HAS BEEN DESIGNED, IS TO BE DRIVEN OVER OR CLOSE TO THE BURIED CONDUIT, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE THE ADDITIONAL COVERAGE REQUIRED TO AVOID DAMAGE TO THE CONDUIT. THE ADEQUACY OF THE COVERAGE REQUIREMENTS FOR CONDUITS SHALL BE ANALYZED AND CHECKED BY THE CONTRACTOR TO ADDRESS LOADING CONDITIONS IMPOSED BY CONSTRUCTION ACTIVITIES. ANY CONDUIT DAMAGE BY CONSTRUCTION ACTIVITY SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

CITY OF HENDERSON STREET LIGHT REQUIREMENTS

STREETLIGHTS SHALL GENERALLY CONFORM WITH CLARK COUNTY STANDARD DRAWINGS (1988), UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY, AREA (1986), THE NATIONAL ELECTRIC CODE INCLUDING ALL ADDENDAS AND REVISIONS AND THE FOLLOWING:

1. STREETLIGHT POLES SHALL BE NOMINAL 30' LONG, STEEL SHEET 11 GAUGE, FACTORY GALVANIZED INSIDE AND OUTSIDE AS PER ASTM A123, ARMS SHALL BE 8' LONG, 2" STEEL PIPE WITH RISE FOR A LUMINAIRE MOUNTING HEIGHT OF 31'-9". FOUNDATION WILL BE NOT LESS THAN 48" DEEP. POLES SHALL BE VALMONT TYPE 400.1 OR APPROVED EQUIVALENT.

2. HIGH PRESSURE SODIUM LUMINARIES SHALL HAVE AN INTEGRAL CONSTANT WATTAGE BALLAST, 240 VAC AND SHALL BE:

A. FOR 51' OR LESS R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 100-WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M2RR10SJM1CMS2.

B. FOR 80' OR 68' R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 150-WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M2RR15SJM1CMS3.

C. FOR 100' OR MORE R/W STREETS: M.S. TYPE II IES/ANSI DISTRIBUTION, 250 WATT HPS LAMP, WITH GLASS REFRACTOR EQUIVALENT TO "G.E." NO. M4RR25SJM1CMS3.

3. THE STREETLIGHTING CIRCUIT SHALL BE 240V, 1 PHASE, 2 WIRE (2 NO. 4 AND 1 NO. 8 GROUND WIRES IN 1-1/4" CONDUIT). A NO. 10 GREEN WIRE (GROUND) SHALL CONNECT THE LUMINARIES TO THE POLES GROUND LUG AT THE BASE.

4. STREETLIGHTS SHALL BE LOCATED BEHIND THE SIDEWALK OR IN THE MEDIAN ISLAND. ALTERNATIVE LOCATIONS MAY BE REQUESTED BY THE DEVELOPER AND SHALL BE SHOWN ON THE PLANS SUBMITTED TO THE CITY FOR APPROVAL. SPACING AND LOCATION OF LIGHTS SHALL CONFORM TO THE CLARK COUNTY STANDARD DRAWINGS NO. 300 THROUGH 313, AND 320A WITH ANY ADDENDAS AND REVISIONS AS AMENDED BY THE CITY OF HENDERSON. FINAL LAYOUT MUST BE APPROVED BY THE CITY. FIELD LOCATIONS MUST BE INSPECTED AND APPROVED BY THE CITY PRIOR TO DIGGING THE FOUNDATIONS AND TRENCHING FOR CONDUITS.

5. THE DEVELOPER SHALL INSTALL PAD MOUNTED SERVICE POINTS PER CLARK COUNTY STANDARD DRAWINGS NO. 330, 331 LOCATED BEHIND THE SIDEWALK AND 332 PHOTOCELL (TORK NO. 3000 OR APPROVED EQUIVALENT) MUST BE MOUNTED ON THE SIDE WITHIN THE ENCLOSURE. PROPOSED LOCATION OF SERVICE POINTS MUST BE SHOWN ON THE DRAWINGS, SUBJECT TO BE REVISED BY NEVADA POWER COMPANY. DESIGN OF SERVICE POINTS SHALL INCLUDE CONNECTION TO NEVADA POWER COMPANY. THE SERVICE RUN SHALL BE 120/240V, 1 PHASE, 3 WIRE. CIRCUIT BREAKER SECTION WILL BE:

A. 125 AMP SERVICE PEDESTAL:
   a.) 60 AMP DOUBLE POLE/240V - STREETLIGHT CIRCUIT "A".
   b.) 60 AMP DOUBLE POLE/240 V - STREETLIGHT CIRCUIT "B".
   c.) 15 AMP SINGLE POLE/120V - PHOTOCELL.

B. 200 AMP SERVICE PEDESTAL:
   a.) 60 AMP SINGLE POLE/120V - TRAFFIC SIGNAL
   b.) 30 AMP SINGLE POLE/120V - INTERSECTION LIGHTS.
   c.) 60 AMP DOUBLE POLE/240V- STREETLIGHT CIRCUIT "A".
   d.) 80 AMP DOUBLE POLE/240V - STREETLIGHT CIRCUIT "B".
   e.) 15 AMP SINGLE POLE/120V - PHOTOCELL.

6. ALL WIRES SHALL BE THHN/THWN OR THW STRANDED COPPER.

7. STREETLIGHTS MUST BE OPERATING BEFORE A CERTIFICATE OF OCCUPANCY IS ISSUED. NEW STREETLIGHTS CANNOT BE CONNECTED TO EXISTING STREETLIGHTING CIRCUITS UNTIL AFTER NEW STREET LIGHTS AND THEIR RELATED WIRING ARE ACCEPTED BY THE CITY.

8. WHEN STREETLIGHTS ARE TO BE CONNECTED TO AN EXISTING CIRCUIT, THE DESIGN ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD. EXISTING AND PROPOSED CIRCUIT LOADING MUST BE SHOWN ON THE PLANS. EXISTING CIRCUIT LOAD INFORMATION MAY BE OBTAINED BY CALLING THE CITY OF HENDERSON STREETLIGHTING AND TRAFFIC MAINTENANCE AT (702) 565-2148.

9. CONTRACTORS ARE NOT ALLOWED TO HAVE ANY EQUIPMENT OR PERSONNEL WITHIN 10' OF POWER LINES. CONTACT NEVADA POWER COMPANY FIVE (5) WORKING DAYS IN ADVANCE TO SCHEDULE CREWS TO ASSIST IF WITHIN 10' OF POWER LINES.

10. ALL WALLS OR OTHER OBSTRUCTIONS ARE NOT ALLOWED WITHIN 24" OF THE CENTER OF THE STREETLIGHT POLE PER CLARK COUNTY STANDARD DRAWING NO. 320A.

REVISED 2/98

TRAFFIC NOTES

1. ANY EXISTING TRAFFIC CONTROL DEVICES AND/OR SIGNS SHALL BE MAINTAINED DURING THE PERIOD OF CONSTRUCTION, AND SHALL BE REPOSITIONED AS REQUIRED, PER THE M.U.T.C.D. AND CITY STANDARDS, UPON COMPLETION OF THE PROJECT.
2. DEVELOPERS/CONTRACTORS ARE RESPONSIBLE FOR SUBMITTING TRAFFIC CONTROL/BARRICADING PLANS NOT LESS THAN THREE (3) WORKING DAYS BEFORE OBSTRUCTING AND BEGINNING CONSTRUCTION WITHIN THE PUBLIC RIGHT OF WAY, INCLUDING SIDEWALKS. BEFORE ANY WORK IS STARTED IN THE RIGHT OF WAY, THE CONTRACTOR WILL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR WILL INSTALL TEMPORARY GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND WILL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. LOCATION AND DESCRIPTION OF NEW AND EXISTING TRAFFIC CONTROL DEVICES, STREET STRIPING, MEDIAN ISLANDS, DRIVEWAYS AND TRAFFIC SIGNALS MUST BE SHOWN ON PLANS SUBMITTED TO THE CITY FOR APPROVAL. ALL NEW TRAFFIC SIGNS WILL BE FABRICATED WITH HIGH INTENSITY GRADE (CLASS 4) REFLECTIVE SHEETING. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME SIGNS, WILL HAVE "F-CAL" OR 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE FILM.
4. LOCATION AND DESCRIPTION OF NEW AND EXISTING STREET NAME SIGNS MUST BE SHOWN ON PLANS SUBMITTED TO THE CITY FOR APPROVAL. STREET NAME SIGNS WILL CONFORM WITH CLARK COUNTY STANDARD DRAWINGS NO. 249, 250 AND 251. ALL STREET NAME SIGNS WILL BE FABRICATED WITH DIAMOND GRADE VIP (CLASS 6) REFLECTIVE SHEETING. ALL INTERSECTIONS WITH 100' OR GREATER R/W ROADWAYS WILL HAVE THE CITY OF HENDERSON TRAFFIC SHOP THREE (3) WORKING DAYS IN ADVANCE, MONDAY THROUGH THURSDAY, AT 565-2148 TO RECEIVE LOGO TO BE APPLIED BY THE CONTRACTOR TO THE STREET NAME PANELS PER CITY OF HENDERSON STANDARD DETAIL.
5. BLUE REFLECTORIZED PAVEMENT MARKINGS MUST BE INSTALLED AND CURB MUST BE PAINTED AT EVERY FIRE HYDRANT LOCATION PER CITY OF HENDERSON FIRE DEPARTMENT STANDARDS.
6. ALL CONSTRUCTION SIGNING, BARRICADING AND PAVEMENT MARKINGS WILL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK - 1988 AND TO THE M.U.T.C.D. LATEST EDITION WITH ANY ADDENDAS AND REVISIONS.
7. WHERE STREETS END AT THE PROJECT BOUNDARY, THREE (3) 18" DIAMOND (MINIMUM), REFLECTORIZED, RED PANELS SHALL BE INSTALLED AT THE END OF THE ROADWAY AND MAINTAINED UNTIL ADJOINING PROJECT IS BUILT.
8. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKINGS, SUCH PAVEMENT MARKING WILL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.

CITY OF HENDERSON WATER NOTES

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE AGENCY. FOLLOWING WATER PLAN APPROVAL, 48 HOUR NOTICE SHALL BE GIVEN TO THE CITY'S QUALITY CONTROL SECTION PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 P.M. OF THE BUSINESS DAY PRIOR TO ANY AGENCY INSPECTION SUBSEQUENT TO THE START OF CONSTRUCTION.
2. ALL WORK SHALL CONFORM TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS 1ST EDITION 1995, INCLUDING CITY OF HENDERSON ADDENDA.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE AGENCY.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER OR TUBE SIZE POLYETHYLENE PIPE WITH AGENCY APPROVED SERVICE SADDLES UNLESS OTHERWISE APPROVED.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. 14 GAUGE SOLID COPPER WIRE FOR LINE LOCATION SHALL BE REQUIRED UNDER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN (ACCORDANCE WITH STANDARD PLATE NO. 27 (SEE CITY OF HENDERSON ADDENDA.)
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE AGENCY'S DISTRIBUTION SYSTEM.
10. ALL METERS SHALL BE PAID FOR BY OWNER/BUILDER AND PROVIDED BY THE CITY. THE ONLY EXCEPTION IS COMBINATION FIRE AND DOMESTIC SERVICES 8" AND LARGER. THOSE METERS SHALL ONLY BE THOSE LISTED ON CURRENT APPROVED MATERIALS LIST. METERS 3" AND LARGER PROVIDED BY THE CITY WILL BE DELIVERED TO SITE BY THE CITY AND INSTALLED BY THE CONTRACTOR. DELIVERY AND/OR SETTING OF METERS IS SCHEDULED THROUGH CUSTOMER SERVICES AT 565-2110.
11. ALL FLANGED FITTINGS TO BE COATED WITH EC-244 AND WRAPPED WITH 120 MIL THICK POLYETHYLENE.
12. ALL VALVE BOXES SHALL HAVE CONCRETE COLLARS AT SURFACE OF PAVED AREAS PER CLARK COUNTY AREA UNIFORM STANDARD DRAWING NUMBER 517.
13. NO OTHER UTILITY LINES MAY BE PLACED IN THE SAME TRENCH WITH WATER LINES.
14. BLUE REFLECTORS AT CENTERLINE OF DRIVING LANE NEAREST TO HYDRANT AND PERPENDICULAR TO ALL FIRE HYDRANTS SHALL BE REQUIRED.
15. ALL WATER LINES INSTALLED ON PROJECT SHALL BE MINIMUM CLASS 150.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL MATERIAL SPILLED ON EXISTING ROADWAYS ON A DAILY BASIS.
17. ANY CONFLICT WITH EXISTING UTILITIES SHALL BE IMMEDIATELY CALLED TO THE ATTENTION OF THE ENGINEER.
18. ALL ONSITE PIPING 4 INCHES IN DIAMETER AND LARGER SHALL BE EITHER PVC C-900 OR DUCTILE IRON PIPE. ALL ONSITE PIPING 2 INCHES IN DIAMETER AND LESS SHALL BE EITHER TUBE SIZE POLYETHYLENE PIPE WITH A 160 PSI WORKING PRESSURE RATING OR COPPER PIPE (EXCEPT SINGLE FAMILY).
19. LANDSCAPING AND IRRIGATION ADJACENT TO VAULTS SHALL BE DRAINED AWAY FROM VAULTS.
20. CONTRACTOR SHALL PROVIDE APPURTENANCES TO PERFORM PRESSURE TEST AND DISINFECTION AS REQUIRED BY UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS.
21. CONSTRUCTION SHALL NOT INTERRUPT SERVICE WITHOUT PRIOR CITY APPROVAL AND PROPER NOTIFICATION. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT AGENCY REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR AGENCY APPROVAL.
22. ALL CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE AGENCY'S APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

FIRE NOTES - PRIVATE SERVICE

1. A PRIVATE FIRE SERVICE MAIN IS THAT PIPE AND ITS APPURTENANCES ON PRIVATE PROPERTY:
   A. BETWEEN A SOURCE OF WATER AND THE BASE OF THE RISER (NOT OVER 6 IN. ABOVE FLOOR) FOR WATER-BASED FIRE PROTECTION SYSTEMS.
   B. BETWEEN A SOURCE OF WATER AND THE BASE ELBOW OF PRIVATE HYDRANTS OR MONITOR NOZZLES.
   C. THE NEVADA STATE FIRE MARSHAL HAS DETERMINED THAT THE UNDERGROUND PORTIONS OF A SPRINKLER SYSTEM ARE DEFINED AS: THAT PORTION OF THE PIPING BETWEEN A SOURCE OF PUBLIC WATER (USUALLY IN A PUBLIC STREET) AND THE BASE OF THE SPRINKLER RISER (NOT OVER 6 IN. ABOVE THE FLOOR).
2. THE UNDERGROUND CONTRACTOR INSTALLING THE PRIVATE FIRE SERVICE MAIN SUPPLYING ANY AUTOMATIC FIRE SPRINKLER SYSTEM MUST BE LICENSED BY THE STATE OF NEVADA, STATE FIRE MARSHAL DIVISION, FOR THE UNDERGROUND INSTALLATION OF SPRINKLER PIPING.
3. THE INSPECTION AND TESTING OF ALL PRIVATE FIRE SERVICE MAINS SHALL BE WITNESSED AND APPROVED BY THE FIRE PREVENTION DIVISION.
4. ALL VALVES CONTROLLING CONNECTIONS TO WATER SUPPLIES AND TO SPRINKLER PIPING SHALL BE LISTED INDICATING VALVES OR AS APPROVED BY THE FIRE PREVENTION DIVISION.
5. ALL VALVES CONTROLLING CONNECTIONS TO WATER SUPPLIES AND TO SPRINKLER PIPING SHALL BE PROTECTED FROM FREEZING WHEN EXPOSED TO TEMPERATURES LESS THAN 40° F. FREEZE PROTECTION SHALL BE PROVIDED IN SUCH A MANNER THAT IT WILL LAST THE LIFETIME OF THE VALVE.
6. ALL VALVES CONTROLLING THE FLOW OF WATER THROUGH A PRIVATE FIRE SERVICE MAIN SUPPLYING WATER FOR AUTOMATIC FIRE SPRINKLER SYSTEMS SHALL BE ELECTRONICALLY SUPERVISED WHEN REQUIRED BY THE UNIFORM FIRE CODE. WHEN REQUIRED, VALVE SUPERVISION AND TROUBLE SIGNALS SHALL BE CONNECTED TO A FIRE ALARM PANEL FOR RETRANSMISSION TO AN APPROVED CENTRAL STATION.
7. ALL FIRE DEPARTMENT CONNECTIONS (FDC) FOR FIRE SPRINKLER SYSTEMS SHALL BE LOCATED WITHIN 100 FEET OF FIRE HYDRANT.
8. ALL WORK SHALL BE IN ACCORDANCE WITH NFPA 24, STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES.

CITY OF HENDERSON FIRE HYDRANT SPACING AND LAYOUT

ALL FIRE HYDRANT SYSTEMS SHALL BE INSTALLED IN SUCH A MANNER AS TO PROVIDE THE MAXIMUM PROTECTION AS INTENDED IN THE UNIFORM FIRE CODE. ALL INTERSECTIONS SHALL HAVE A MINIMUM OF ONE (1) HYDRANT INSTALLED A MAXIMUM OF TWENTY (20) FEET FROM A CORNER OF THE INTERSECTION. THIS LOCATION SHALL BE MEASURED FROM THE INTERSECTION OF TWO LINES DRAWN ALONG THE FACE OF THE CURB SECTIONS PERPENDICULAR TO EACH OTHER. ONCE THESE POSITIONS ARE LOCATED, ADDITIONAL HYDRANTS SHALL BE ADDED TO DEVELOP A GRID WITH A MAXIMUM SPACING OF FIVE HUNDRED (500) FEET BETWEEN HYDRANTS IN AREAS OF SINGLE FAMILY DETACHED HOMES ON SIX THOUSAND (6000) SQUARE FEET OR LARGER LOTS. ALL OTHER AREAS SHALL HAVE A MAXIMUM SPACING OF THREE HUNDRED (300) FEET BETWEEN HYDRANTS. ALL HYDRANTS SHALL BE INSTALLED PER THE SPECIFICATIONS IN THE "UNIFORM STANDARD DRAWINGS", LATEST EDITION, DRAWING No. 518, PAGE 130, AS ADOPTED BY THE CITY OF HENDERSON.

EXCEPTION: ANY INTERSECTION THAT MEASURES TWO HUNDRED (200) FEET OR LESS APART MAY HAVE ONE (1) HYDRANT SET AT THE MID POINT BETWEEN THE TWO INTERSECTIONS.

LEGEND

EX. WL	EXISTING WATERLINE
EX. SS	EXISTING SEWERLINE
W	PROPOSED WATERLINE
SS	PROPOSED SEWERLINE
	1" WATER SERVICE LATERAL W/ 3/4" METER PER UOACS PLATE 1C
	4" SEWER LATERAL
S	48" SEWER MANHOLE
S	EXISTING SEWER MANHOLE
	EXISTING FIRE HYDRANT ASSEMBLY
	FIRE HYDRANT ASSEMBLY (INCLUDES 12"x6" OR 8"x6" TEE & 6" GATE VALVE)
	GATE VALVE
	BLOW-OFF ASSEMBLY
	NO. 3 PULLBOX
	STREET LIGHT
	EX. STREET LIGHT
	1 1/4" CONDUIT
	SERVICE POINT
	CENTERLINE
	EXISTING C & G
	PROPOSED C & G
	RIGHT OF WAY
	1 FOOT EXISTING GROUND CONTOUR
	5 FOOT EXISTING GROUND CONTOUR
1580	2 FOOT GOLF COURSE CONTOUR
	INTERDRAIN
	PHASE LINE
	RETAINING/SCREEN WALL
	SLOPE
14	LOT #
FF=00.00 / P= 00.00	FINISHED FLOOR ELEVATION / PAD ELEVATION
1	BLOCK NUMBER
1500 / T.C.	ELEVATION / DESCRIPTION
1.0%	PERCENTAGE AND DIRECTION OF SLOPE
00.00 / 00+50.00	LOTLINE T.C. ELEVATION / LOTLINE STATION
	DRIVEWAY

FIRE DEPARTMENT GENERAL NOTES:

FIRE HYDRANTS:

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH UNIFORM FIRE CODE APPENDIX III-B, FIRE HYDRANT LOCATIONS AND DISTRIBUTIONS, AS AMENDED.
2. FIRE HYDRANTS SHALL BE IN MAINTAINED IN AN OPERATIVE CONDITION AT ALL TIMES WITH THE REQUIRED WATER SUPPLY AND SHALL BE ACCEPTED BY PUBLIC WORKS DEPARTMENT.
3. FIRE HYDRANT SHALL HAVE PERMANENT MARKINGS IDENTIFYING MANUFACTURER, SIZE OF THE MAIN VALVE OPENING, YEAR OF MANUFACTURE, MODEL NUMBER, DIRECTION OF OPENING AND BURY DEPTH. ALL HYDRANTS SHALL MEET THE REQUIREMENTS OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS.
4. ALL PUBLIC FIRE HYDRANTS SHALL HAVE A SIX DIGIT NUMBER (AS DESIGNATED BY PUBLIC WORKS) PAINTED ON THE BARREL BY THE HYDRANT INSTALLER. THE NUMBER SHALL BE IN 1" HIGH BLOCK NUMBERS USING BLACK ENAMEL PAINT. ALL NUMBERS SHALL MATCH APPROVED PLANS.
5. ALL FIRE DEPARTMENT CONNECTIONS (FDC) FOR FIRE SPRINKLER OR STANDPIPE SYSTEMS SHALL BE LOCATED WITHIN 100 FEET OF A FIRE HYDRANT. THE 100 FEET SHALL BE MEASURED BY AN APPROVED UNOBSTRUCTED ROUTE. THE FDC SHALL BE LOCATED IN AN APPROVED LOCATION ON THE STREET OR FIRE LANE SIDE OF THE BUILDING BEING PROTECTED.
6. FIRE HYDRANTS SHALL BE IN CONFORMANCE WITH THE FIRE PREVENTION DIVISIONS UNIFORM GUIDELINES.

UNDERGROUND PIPING & VALVES:

7. PRIOR TO CLOSING ANY WATER SUPPLY CONTROL VALVE OR PLACING ANY FIRE HYDRANT OUT OF SERVICE, THE HENDERSON FIRE DEPARTMENT DISPATCH CENTER (565-1214) SHALL BE CONTACTED.
8. ALL SECTIONAL CONTROL VALVES CONTROLLING WATER SUPPLIES ON PRIVATE FIRE SERVICE MAINS SHALL BE LISTED POST INDICATING VALVES (PIV).
   EXCEPTION: APPROVED DEBRIS "LOCKOUT" CAPS MAY BE USED WHEN THE VALVE IS LOCATED WITHIN A ROADWAY.
9. A POST INDICATING VALVE (PIV) SHALL BE PROVIDED FOR ALL SPRINKLER SYSTEMS A MINIMUM OF 5 FEET FROM THE BUILDING FOOTING.
10. ALL VALV

AVOID OVERHEAD POWER LINE CONTACT IT'S COSTLY

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1-702-593-6111

NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600

UNDERGROUND SERVICE (USA)

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

COORDINATE TABLE

	NORTHING	EASTING	C-1 STATION		NORTHING	EASTING	C-1 STATION
1	9317.1834	9294.5937	35+99.82	10	10422.1829	6994.6899	66+33.38
2	9381.4531	9242.0694	36+82.83	11	10427.3092	7021.0339	
3	9502.4608	8974.3026	39+86.07	12	10430.0877	7013.4356	
4	9489.3112	7471.2818	54+89.14	13	10425.7214	6993.9181	66+37.00
5	9451.8601	7131.6299		14	10689.9579	6694.3919	70+63.92
6	9558.2349	7192.0422		15	10733.9856	6232.8373	75+27.77
7	9607.0824	7185.0756		16	10738.7315	6182.8631	75+77.77
8	9619.4278	7200.8107	58+00.00	17			
9	9758.6082	7135.7371	59+54.98	18			

N

VIA CANALE

VIA STRETTO

FUTURE TUSCANY PARCEL 10

FUTURE TUSCANY PARCEL 6-C

FUTURE TUSCANY PARCEL 6-B

FUTURE TUSCANY PARCEL 6-A

VIA DEL DUOMO

VIA SAN PIETRO

STRADA OPISTATO

STRADA STRETTO

VIA DI PELLEGRINI

℄ CURVE DATA
Δ = 03°12'28"
R = 1483.00'
L = 83.01'
T = 41.52'

℄ CURVE DATA
Δ = 49°38'25"
R = 350.00'
L = 303.24'
T = 161.87'

℄ DATA
N89°29'53"E
1503.08

℄ CURVE DATA
Δ = 75°25'11"
R = 100.00'
L = 131.63'
T = 77.32'

℄ DATA
N08°07'00"W
49.34'

℄ CURVE DATA
Δ = 78°30'09"
R = 340.00'
L = 465.84'
T = 277.80'

℄ DATA
N12°00'00"W
678.40'

℄ DATA
N84°33'12"W
513.85'

℄ CURVE DATA
Δ = 72°33'12"
R = 340.00'
L = 430.54'
T = 249.54'

FUTURE SCHOOL SITE

UNDEVELOPED

FUTURE WASTE WATER PUMPING STATION

UNDEVELOPED

EXISTING 90" WATERLINE

EXISTING 90" WATERLINE

1530

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 119701-203
SCALE: HORIZ.: 1"=100' VERT.: NONE

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Henderson, Nevada 89014
Telephone 702/263-7273
Fax 702/263-7300
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL

PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691

5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

SURVEY CONTROL PLAN

XXXX

DRAWING NO. C3 3/35

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NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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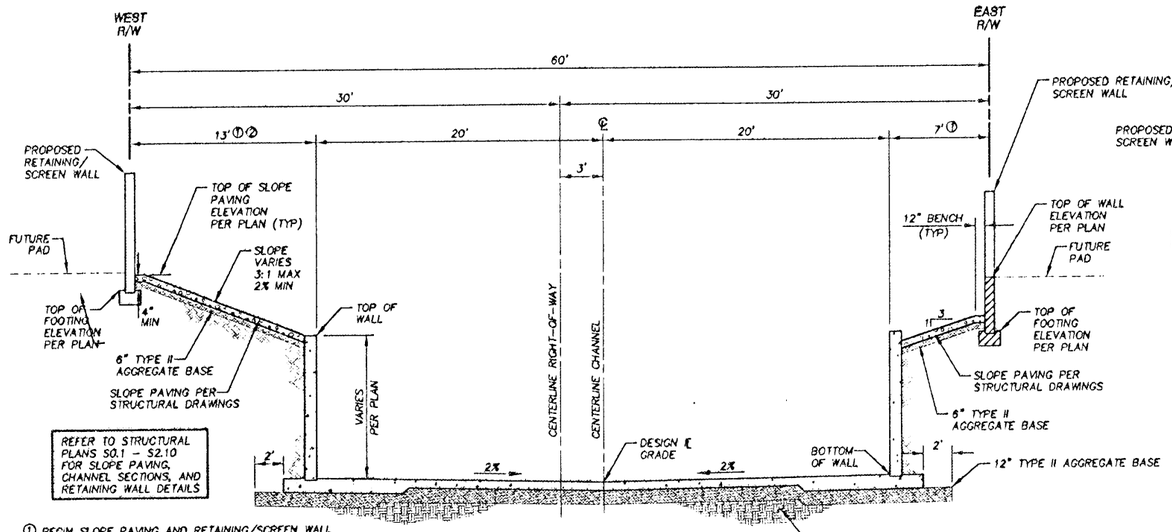
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

GENERAL FILL NOTE

FILL MATERIAL FOR CHANNEL WILL BE PLACED IN 8" LIFTS AND COMPACTED TO 90% OF THE MAXIMUM DRY DENSITY WITH MOISTURE CONTENT OF 2% TO 4% ABOVE OPTIMUM MOISTURE. ALSO REFER TO GEOTECHNICAL EVALUATION PROVIDED BY NINYO & MOORE DATED APRIL 18, 2001 AND LETTER PROVIDED BY AMTI W.O. 02-1178 DATED MAY 16, 2002.



REFER TO STRUCTURAL PLANS S0.1 – S2.10 FOR SLOPE PAVING, CHANNEL SECTIONS, AND RETAINING WALL DETAILS

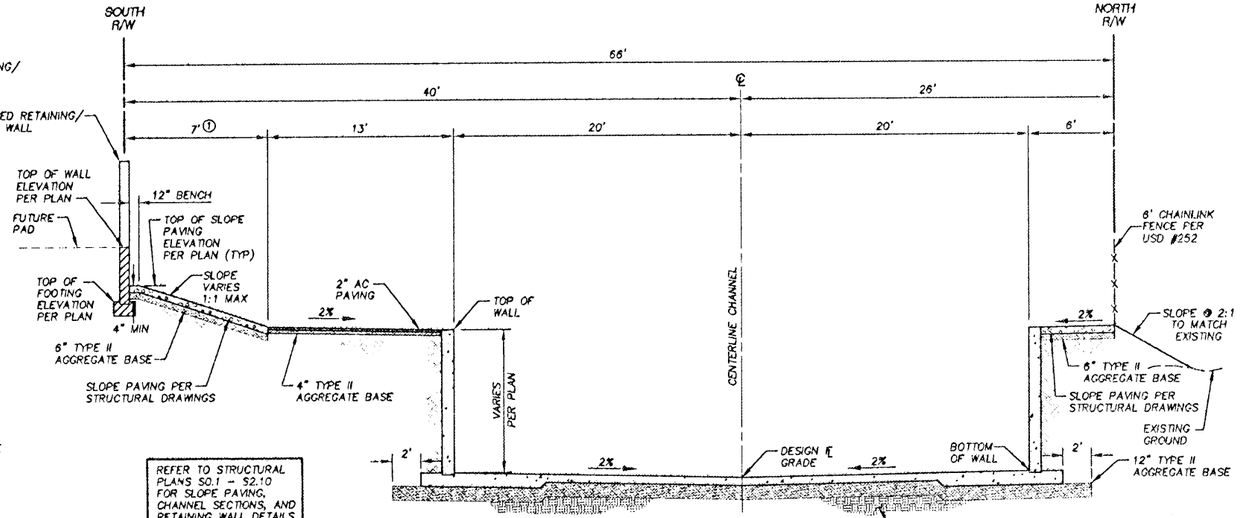
① BEGIN SLOPE PAVING AND RETAINING/SCREEN WALL AT STA 34+71.54 (LEFT) AND STA 35+64.33 (RIGHT) ADJACENT TO EXISTING CHANNEL.

② FROM STA 39+12.38 TO STA 39+86.07 TRANSITION TO MATCH SECTION B/C4

CHANNEL SECTION

A / C4

SCALE: 1" = 5'
(STA 35+99.82 TO 39+86.07 WEST OF ℄)
(STA 35+99.82 TO 37+74.18 EAST OF ℄)



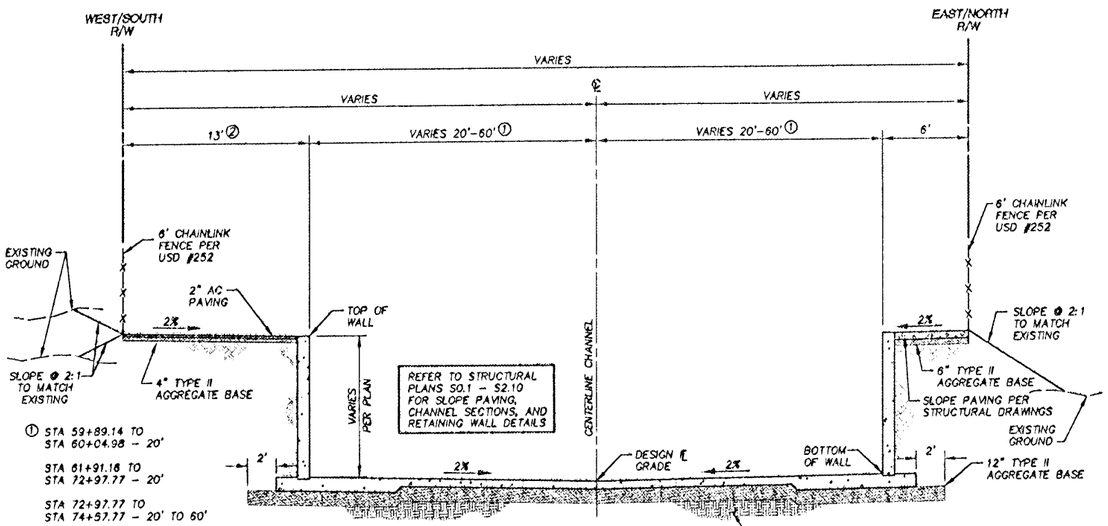
REFER TO STRUCTURAL PLANS S0.1 – S2.10 FOR SLOPE PAVING, CHANNEL SECTIONS, AND RETAINING WALL DETAILS

① CONTINUE SLOPE PAVING TO STA 55+90.08 VARY DIMENSION TO MATCH SCREEN WALL

CHANNEL SECTION

B / C4

SCALE: 1" = 5'
(STA 39+86.07 TO STA 54+89.14 SOUTH OF ℄)
(STA 37+74.18 TO STA 54+89.14 NORTH OF ℄)



REFER TO STRUCTURAL PLANS S0.1 – S2.10 FOR SLOPE PAVING, CHANNEL SECTIONS, AND RETAINING WALL DETAILS

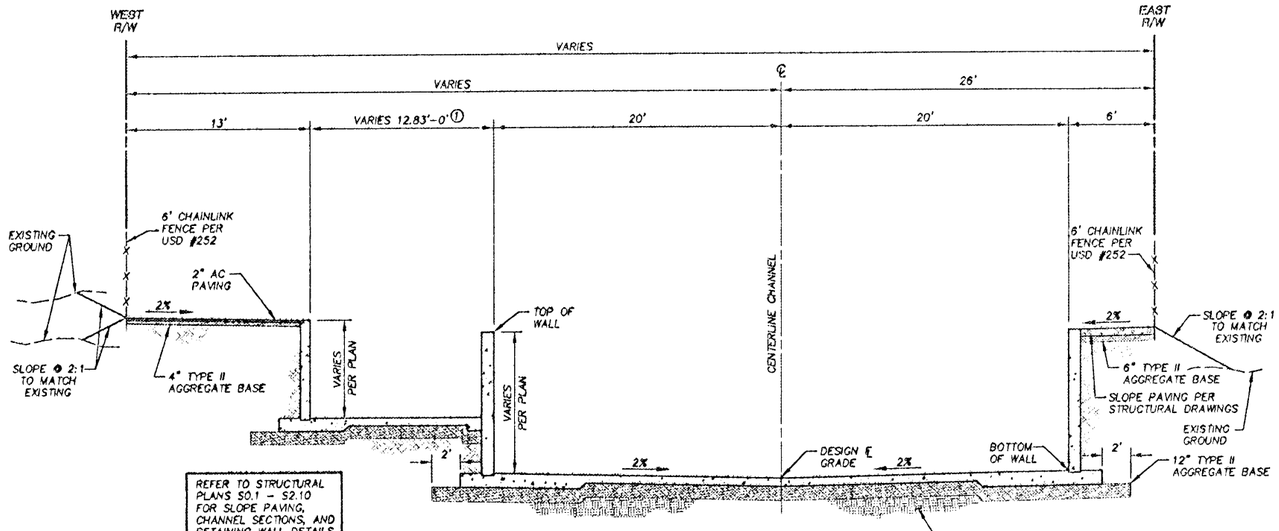
① STA 59+89.14 TO STA 60+04.98 – 20'
STA 61+91.18 TO STA 72+97.77 – 20'
STA 72+97.77 TO STA 74+57.77 – 20' TO 60'
STA 74+57.77 TO STA 75+27.77 – 60'

② STA 59+54.98 TO STA 60+04.98 – 25.83'
STA 74+58.17 TO STA 75+27.77 – 50'

CHANNEL SECTION

C / C4

SCALE: 1" = 5'
(STA 59+89.14 TO STA 60+04.98)
(STA 61+91.18 TO STA 75+27.77)



REFER TO STRUCTURAL PLANS S0.1 – S2.10 FOR SLOPE PAVING, CHANNEL SECTIONS, AND RETAINING WALL DETAILS

① STA 60+04.98 TO STA 61+39.84 – 12.83'
STA 61+39.84 TO STA 61+91.16 – 12.83' TO 0'

CHANNEL SECTION

D / C4

SCALE: 1" = 5'
(STA 60+04.98 TO STA 61+91.16)

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: MAY 13 , 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-204
SCALE: HORIZ.: 1"=5' VERT.: 1"=5'

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SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
LEE C. FARRIS
No. 13991
5/20/02

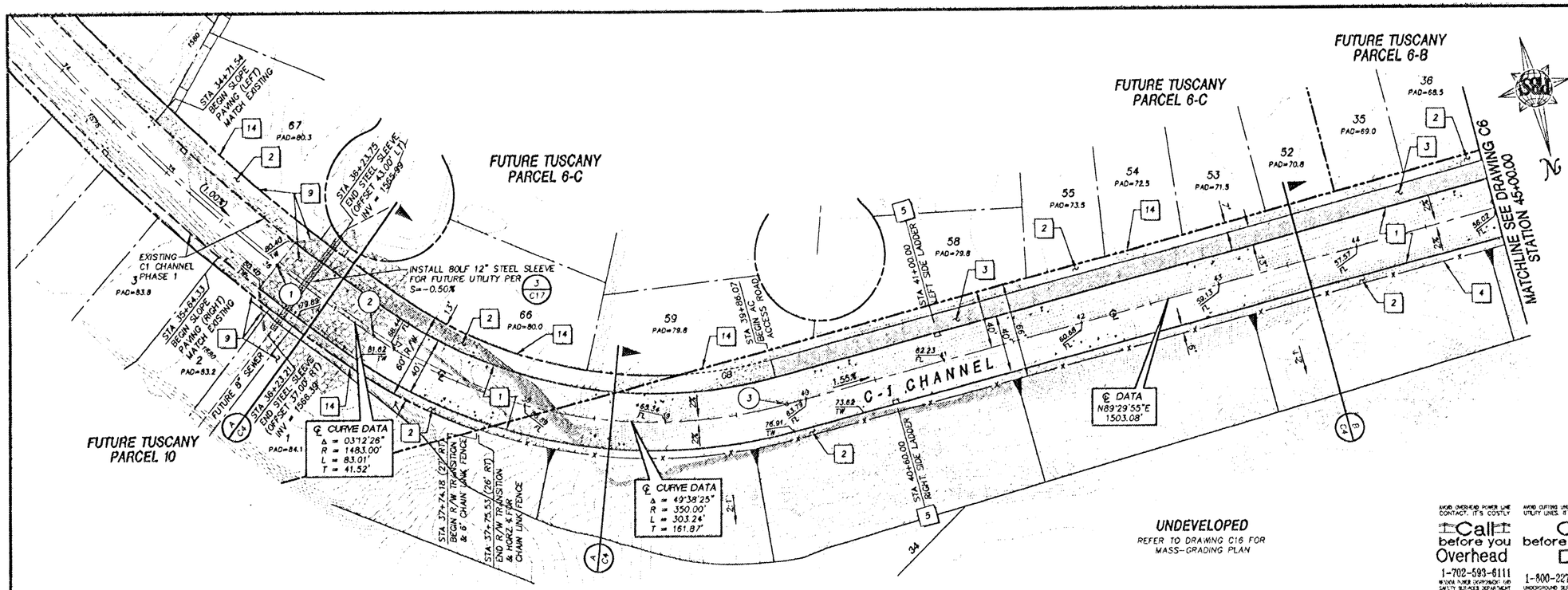
THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS - TYPICAL CHANNEL SECTIONS

XXXX

DRAWING NO. C4



KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 – S2.10
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. AC PAVING – 2" AC W/ 4" TYPE II BASE
4. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
5. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C17
6. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90° INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.9
7. 2' THICK (MIN) GROUTED RIP-RAP D_{50}=12" W/ 12" TYPE II AGGREGATE BASE
8. NOT USED
9. EXISTING RIP-RAP, HEADWALLS, AND CHAIN LINK FENCE TO BE REMOVED PRIOR TO CONSTRUCTION
10. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C17
11. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C18
12. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 7 DRAWING S2.9
13. 12' GATE PER USD #253
14. RETAINING / SCREEN WALL – REFER TO PLAN & PROFILE DRAWINGS C11 & C12 AND FOR STRUCTURAL DETAILS REFER TO DRAWING C2.10

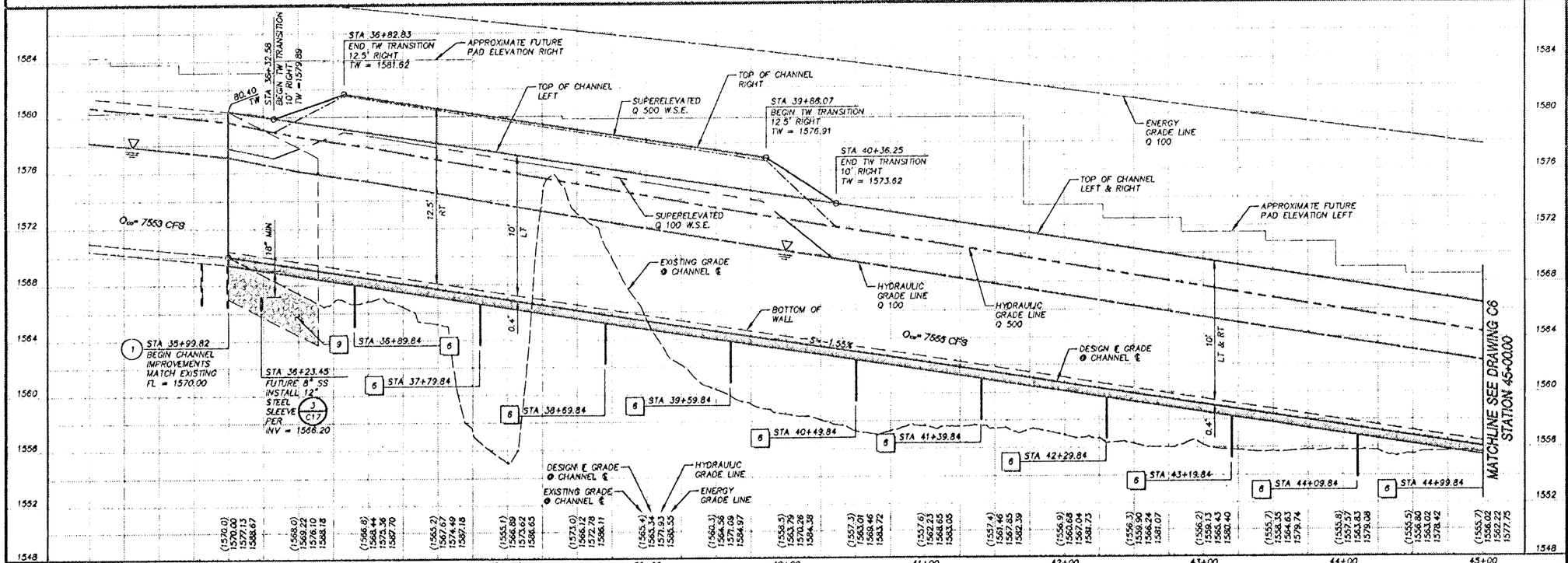
GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.

APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY ____, 20__.



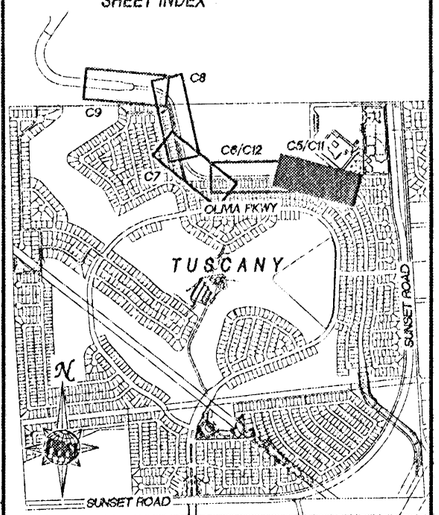
GRAPHIC SCALE

(IN FEET)
HORZ. 1 inch = 40 ft.
VERT. 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/07/95 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND PEDRICK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88. CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET. PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-205
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

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901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7273 Fax: 702/263-7200
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SEAL

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

C-1 CHANNEL PLAN AND PROFILE STA 34+71.54 TO STA 45+00.00

XXXX

DRAWING NO. C5 5/35

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY
Call before you Overhead
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NEVADA POWER CO/NPC/SPPC/NV ENERGY SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
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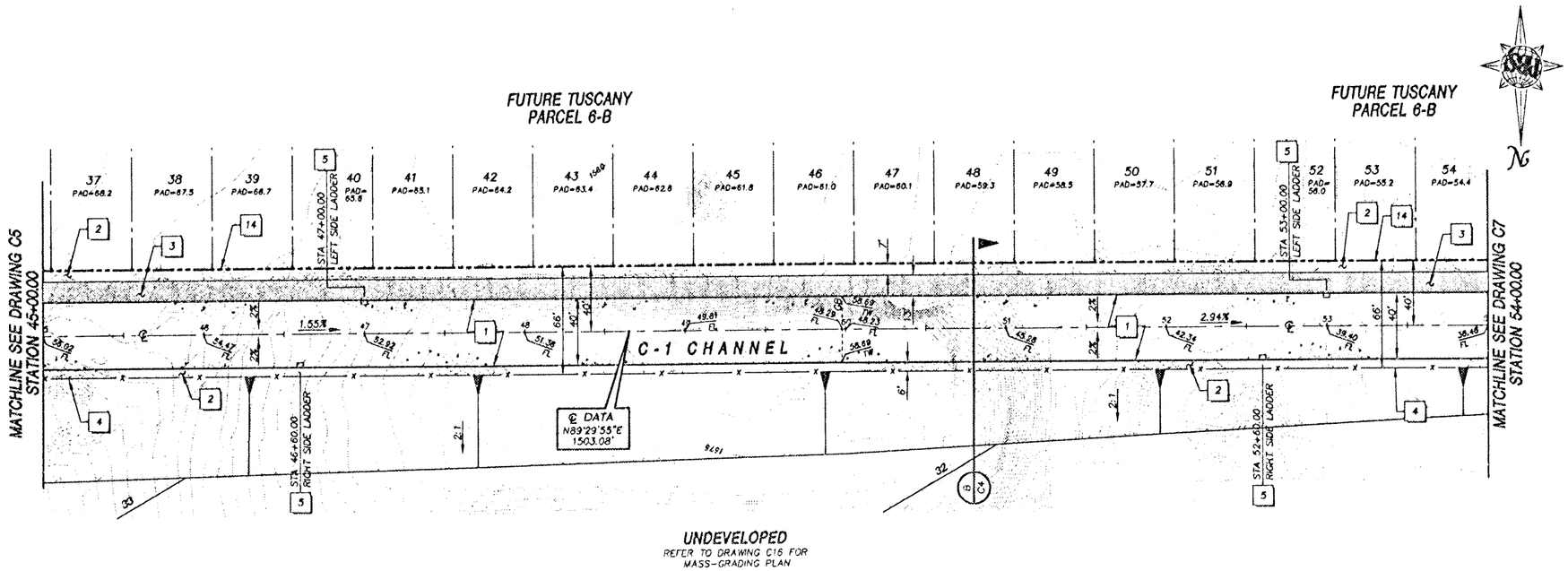
UNDERGROUND SERVICE (USA)



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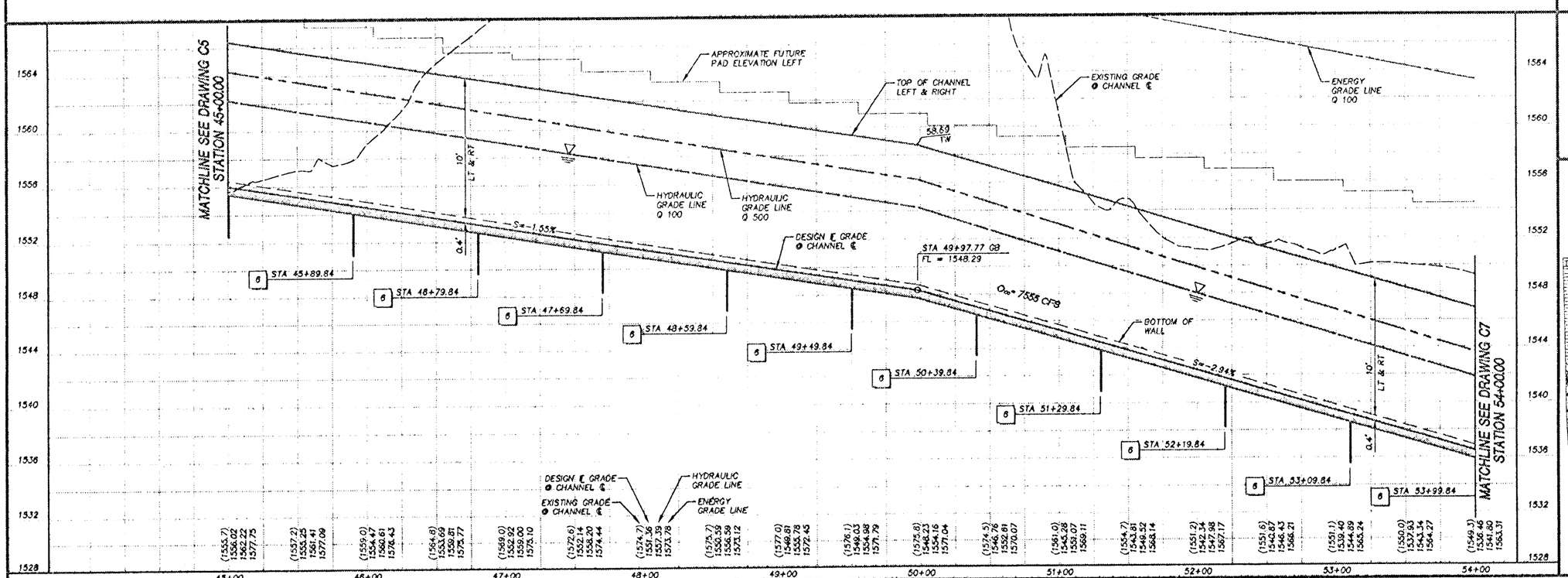
APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY _____, 20__.

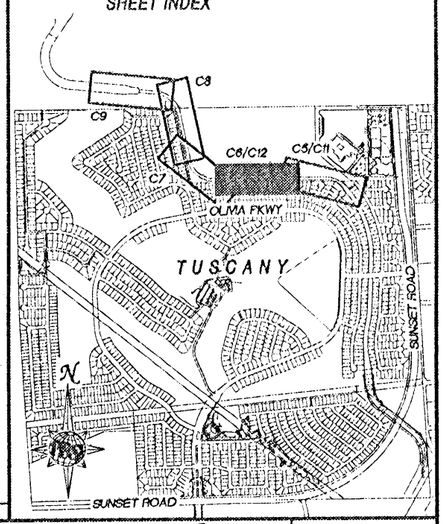


GRAPHIC SCALE
40 0 20 40 80 120
(IN FEET)
HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD '88 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997

SHEET INDEX



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-208
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES
301 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014
Telephone 702/263-7275 Fax 702/263-7200

SEAL — PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS CIVIL No. 13691 5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

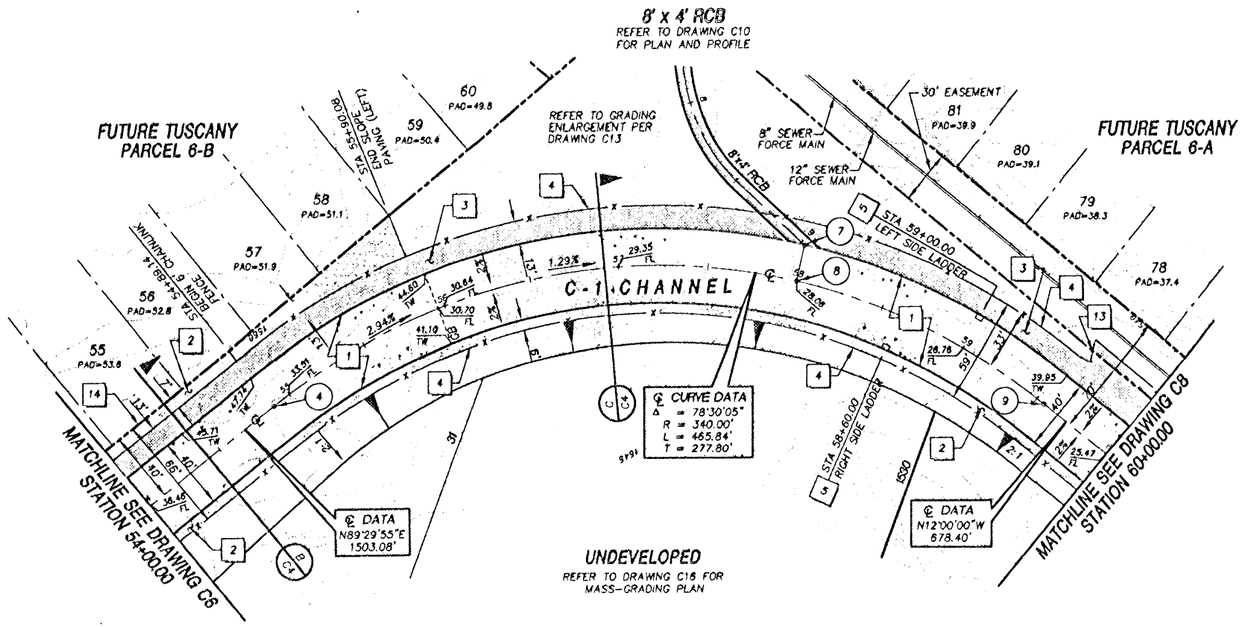
C-1 CHANNEL PLAN AND PROFILE STA 45+00.00 TO STA 54+00.00

XXXX

DRAWING NO. C6 6/35

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-6111
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)



KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 – S2.10
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3. AC PAVING – 2" AC W/ 4" TYPE II BASE
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GENERAL NOTES

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APPROVAL

2-1-03

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

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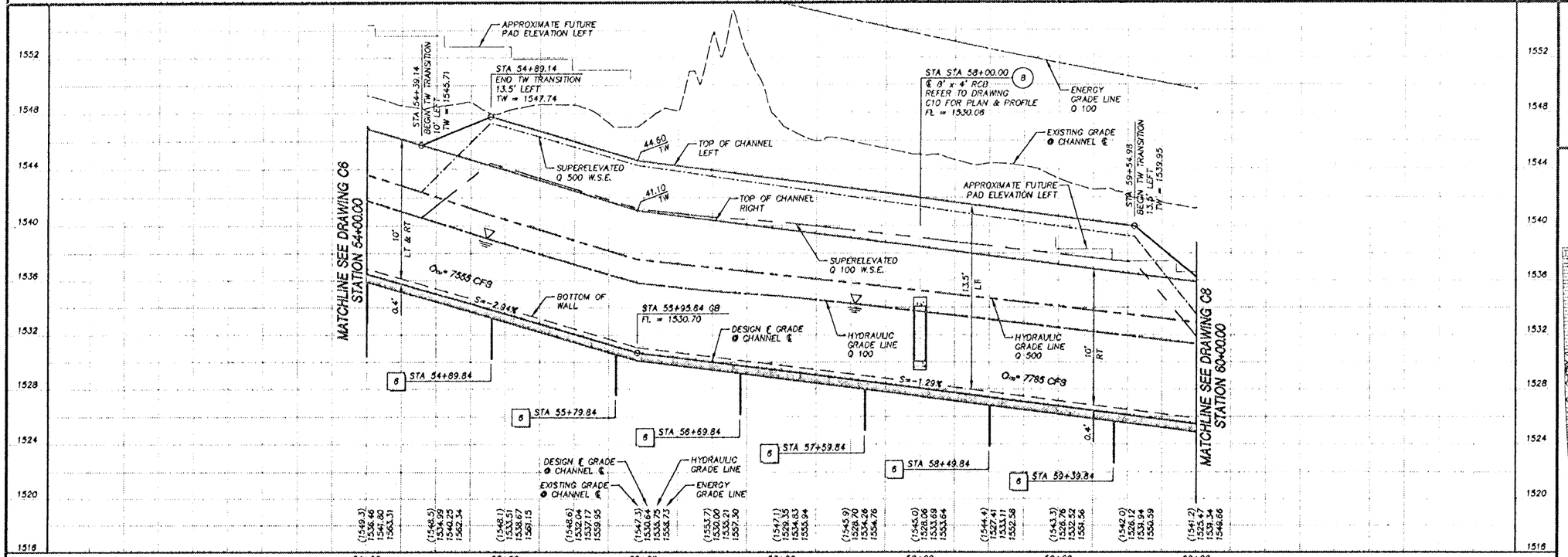

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(IN FEET)
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BENCHMARK

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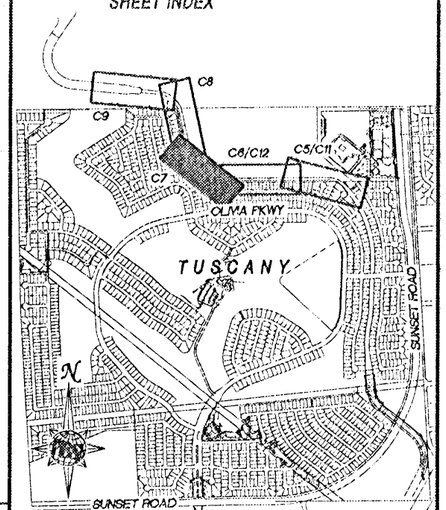

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DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-207
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
201 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7273 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA LEE FARRIS No. 12691

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

C-1 CHANNEL
PLAN AND PROFILE STA 54+00.00 TO STA 60+00.00

XXXX

DRAWING NO. C7 7/35

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NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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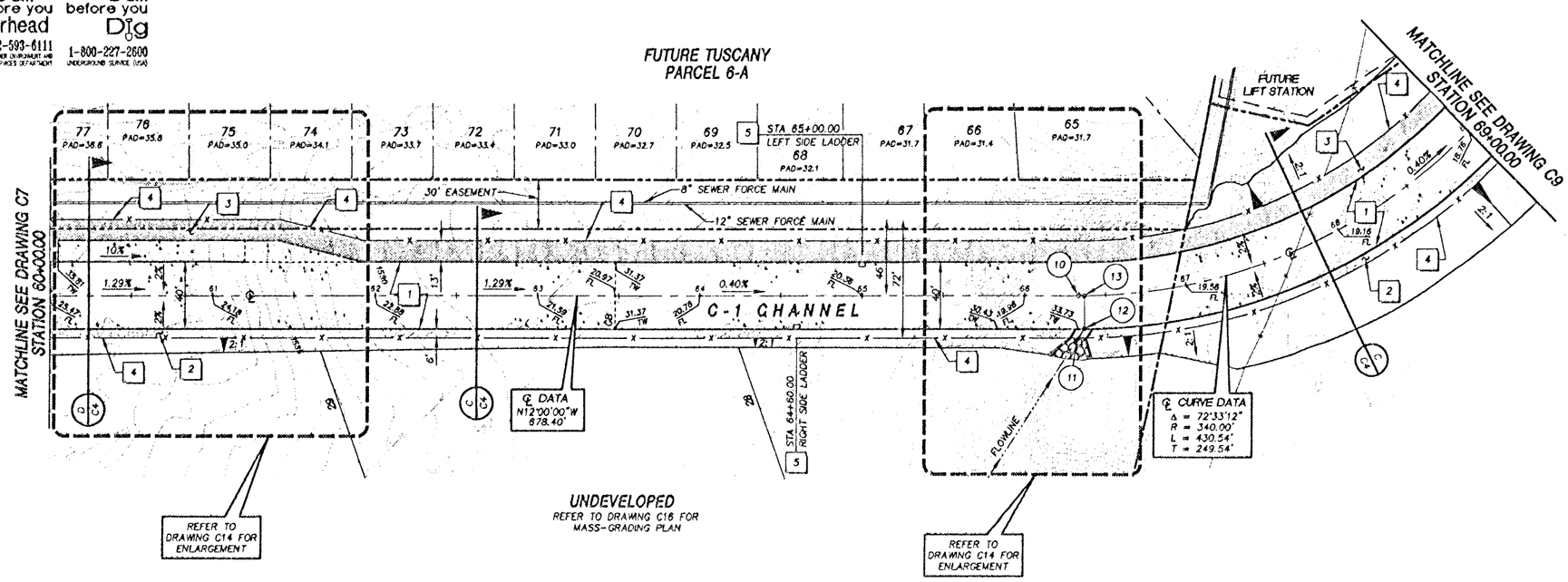

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APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

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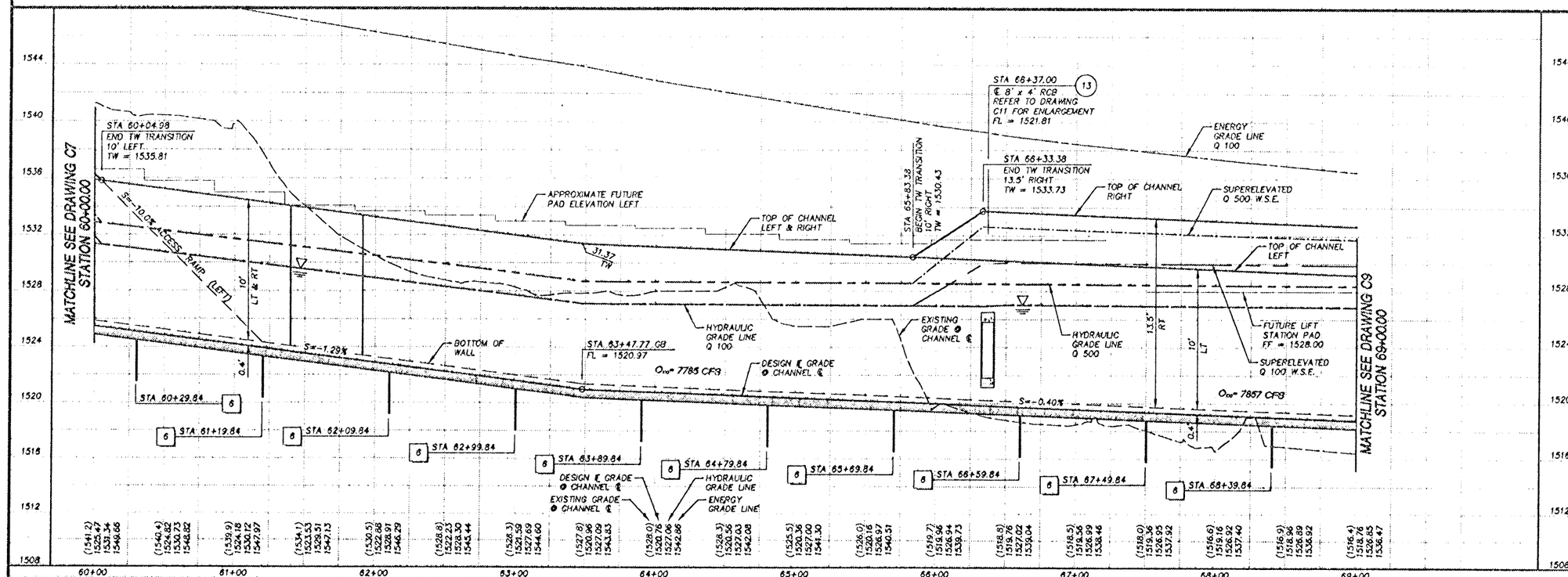

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BENCHMARK

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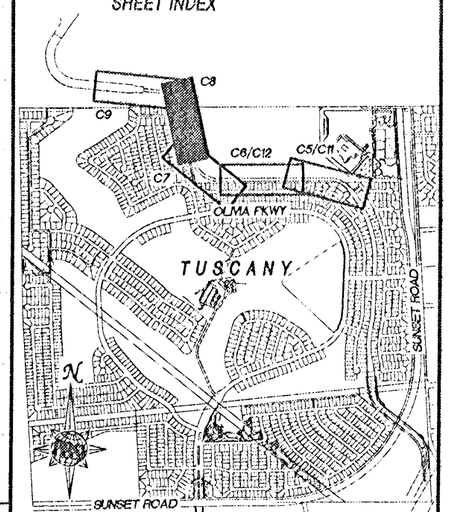
SHEET INDEX



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CHECKED BY: L. FARRIS
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DRAWING NO.: 1197C1-208
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBSJ
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7273 Fax: 702/263-7200
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SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA LEE FARRIS CARR No. 13891
5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

C-1 CHANNEL PLAN AND PROFILE STA 60+00.00 TO STA 69+00.00

XXXX

DRAWING NO. C8 8/35

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1-702-593-6111
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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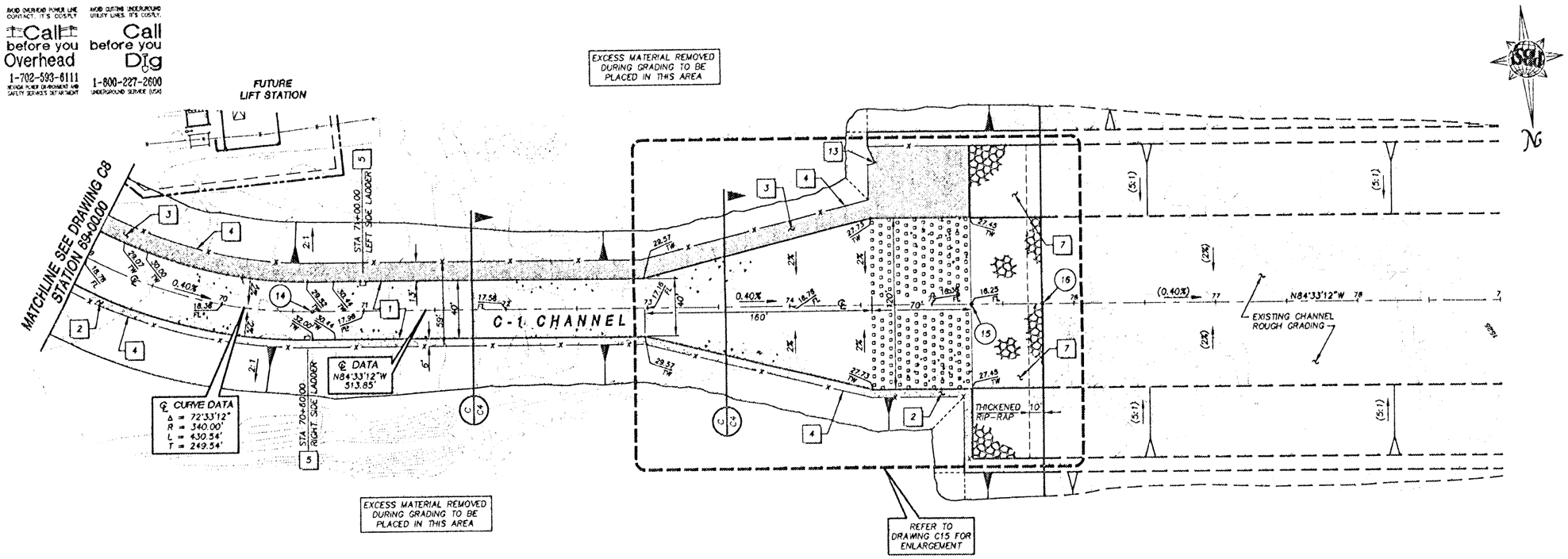

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APPROVAL

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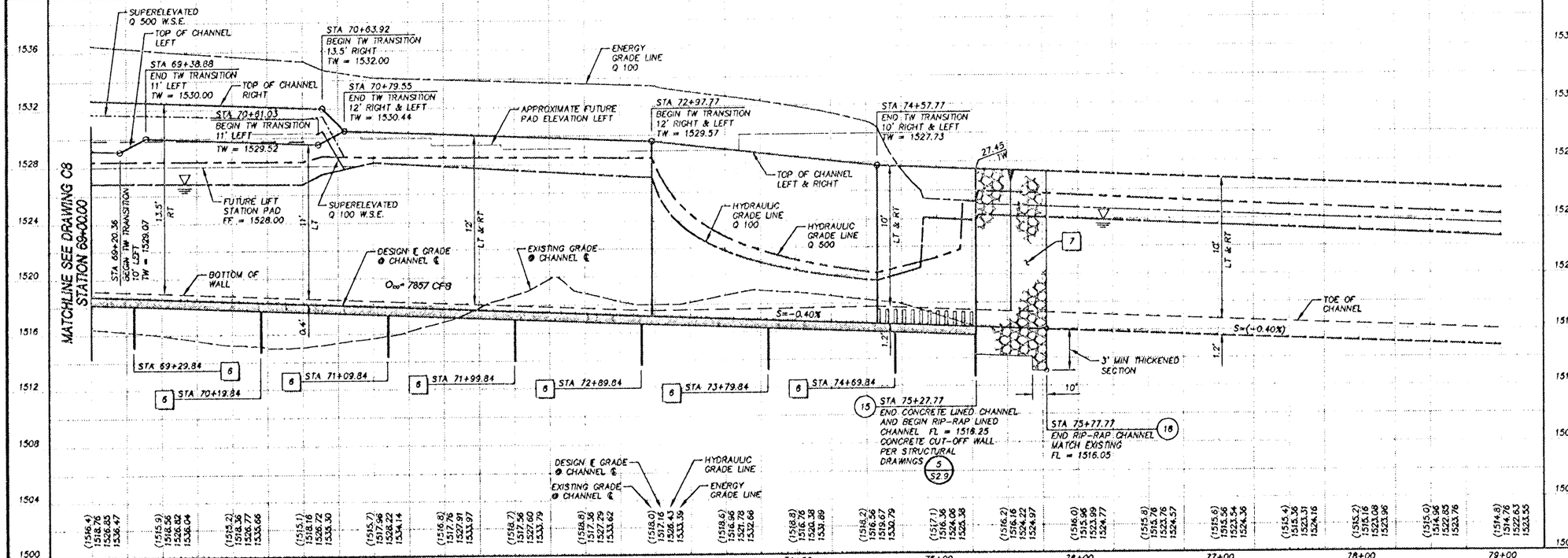

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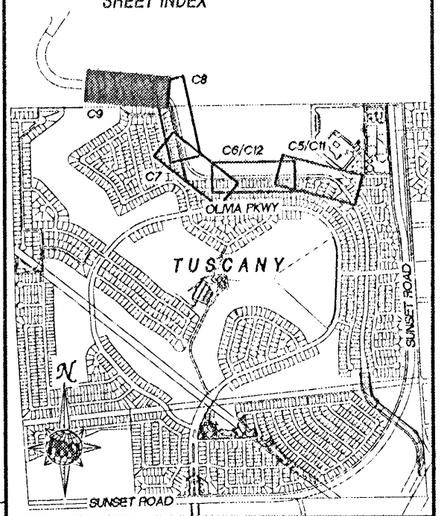

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DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-209
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBS&J
901 North Green Valley Pkwy. Suite 300 Henderson, Nevada 89014 Telephone: 702/253-7273 Fax: 702/263-7200
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691
5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

C-1 CHANNEL PLAN AND PROFILE STA 69+00.00 TO STA 75+77.77

XXXX

DRAWING NO. C9

NEVADA OVERHEAD POWER LINE CONTACT: IT'S COSTLY

Call before you Overhead

1-702-593-6111

NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

NEVADA OUTLINE UNDERGROUND UTILITY LINES: IT'S COSTLY

Call before you Dig

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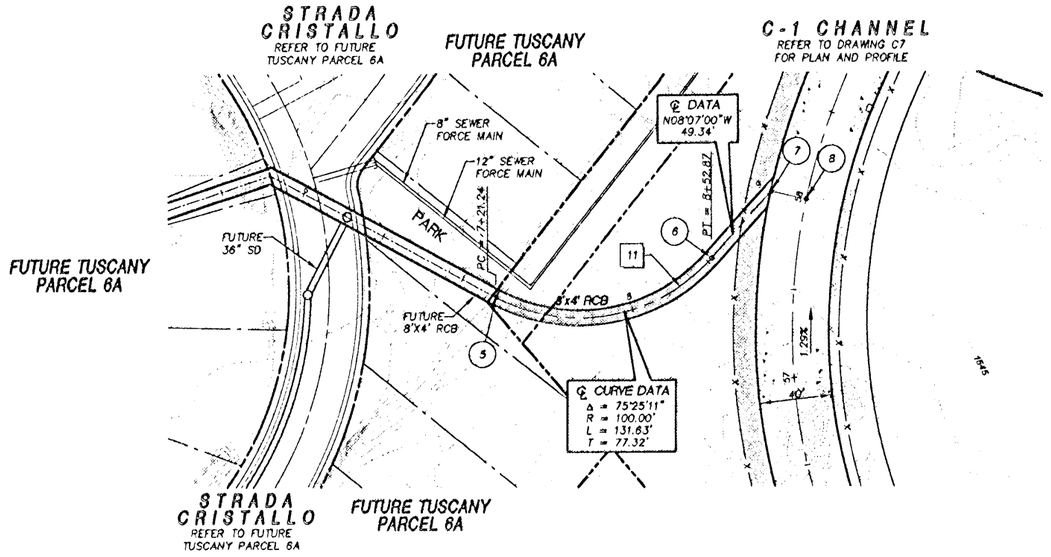
UNDERGROUND SERVICE (USA)



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APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. — DATE

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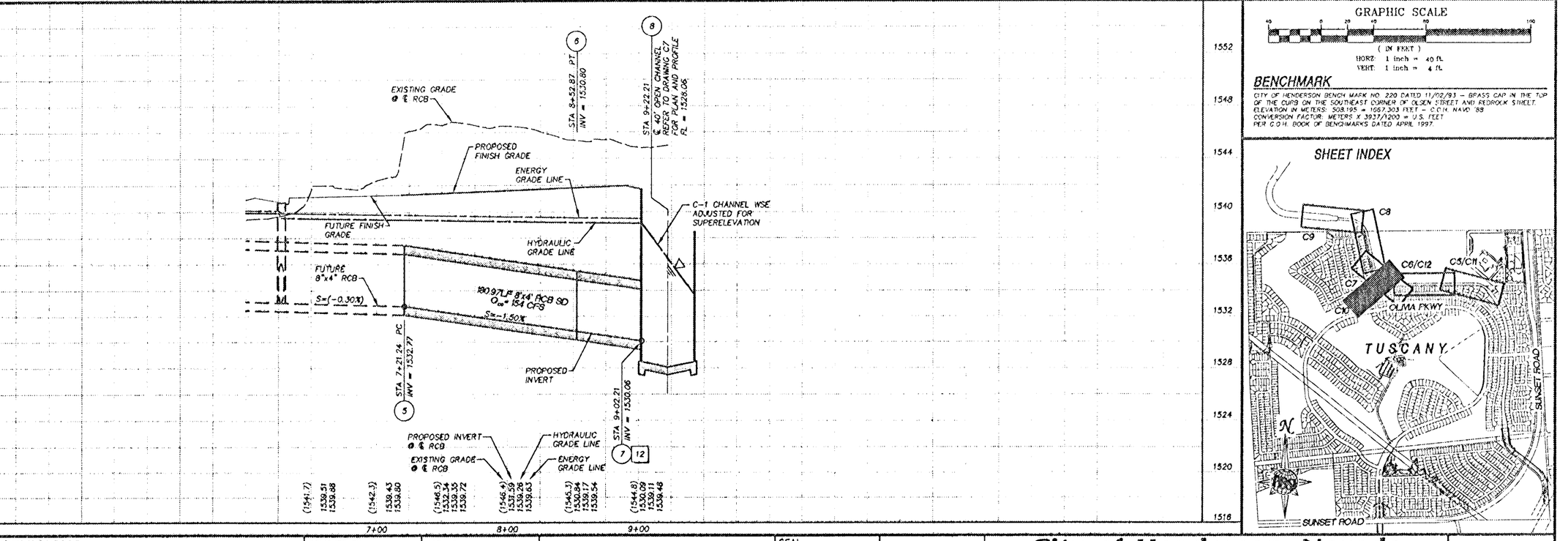

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CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
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PBS&J
201 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7272 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL — LEE G. FARRIS — No. 13691 — STATE OF NEVADA — PROFESSIONAL ENGINEER

THE CITY OF HENDERSON

City of Henderson, Nevada

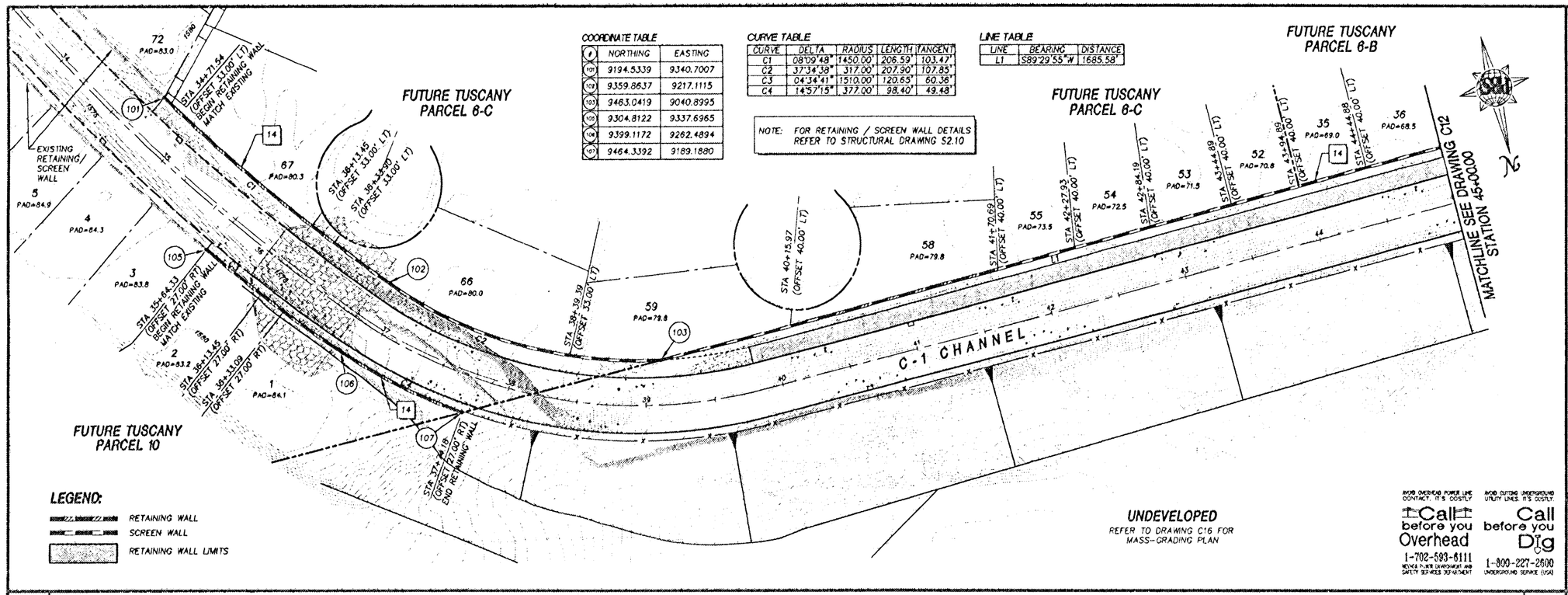
TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

8' x 4' RCB

PLAN AND PROFILE STA 7+21.24 TO STA 9+02.21

XXXX

DRAWING NO. C10 — 10/35



COORDINATE TABLE		
#	NORTHING	EASTING
101	9194.5339	9340.7007
102	9359.8637	9217.1115
103	9463.0419	9040.8995
104	9304.8122	9337.6965
105	9399.1172	9262.4894
107	9464.3392	9189.1880

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	08°09'48"	1450.00'	206.59'	103.47'
C2	37°34'38"	317.00'	207.90'	107.85'
C3	04°34'41"	1510.00'	120.65'	60.36'
C4	14°57'15"	377.00'	98.40'	49.48'

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S89°29'55"W	1685.58'

NOTE: FOR RETAINING / SCREEN WALL DETAILS REFER TO STRUCTURAL DRAWING S2.10

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY. Call before you Overhead 1-702-593-6111 NEVADA PUBLIC DEVELOPMENT AND SAFETY SERVICES DEPARTMENT

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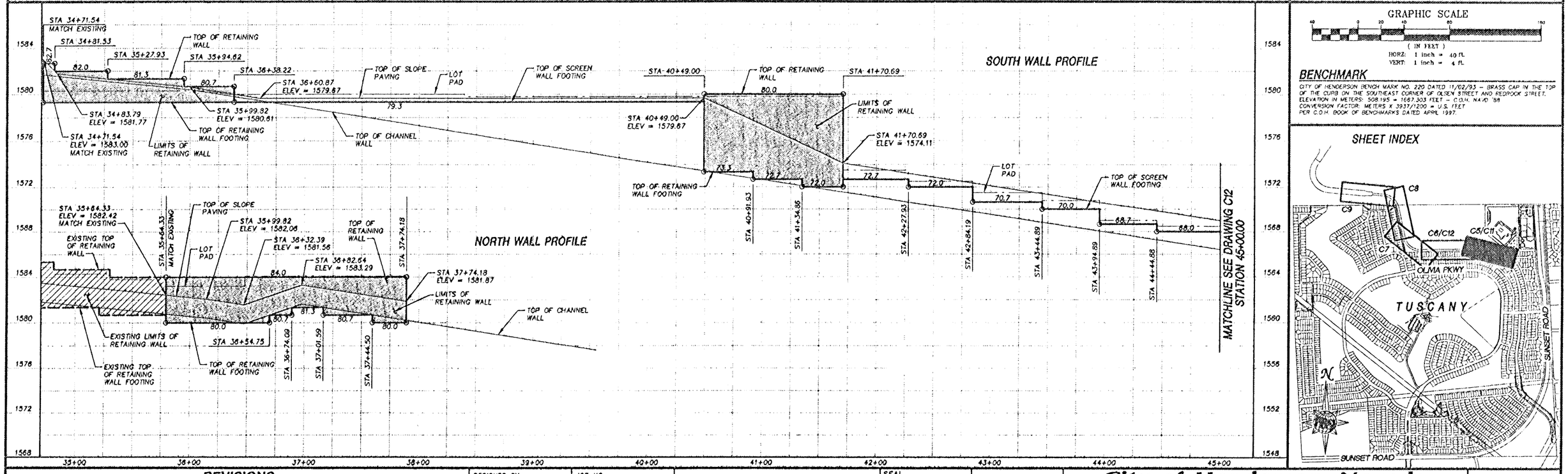

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PBS&J 901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7225 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL: PROFESSIONAL ENGINEER STATE OF NEVADA LEE D. FARRIS No. 13681 5/14/02

THE CITY OF HENDERSON

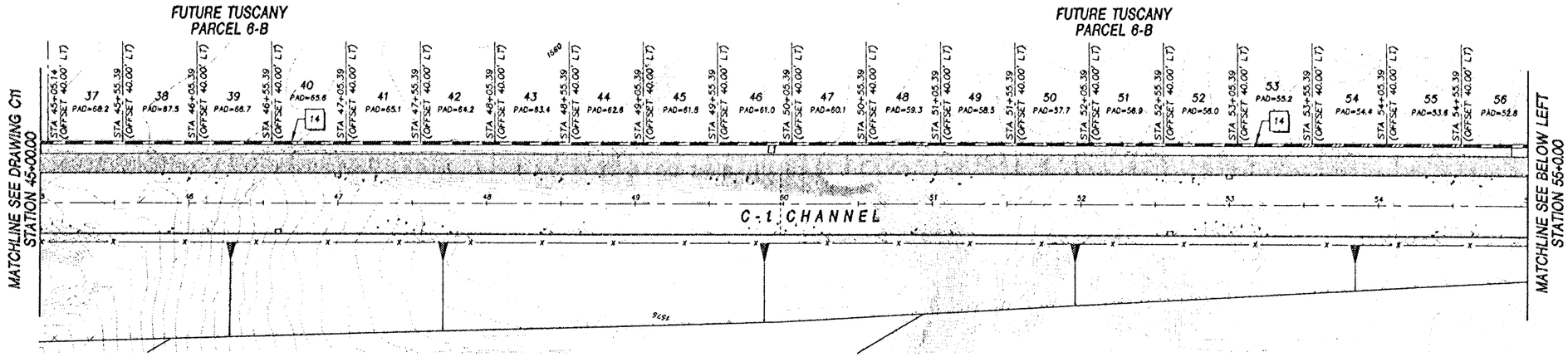
City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

RETAINING WALL PLAN AND PROFILE STA 34+71.54 TO STA 45+00.00

XXXX

DRAWING NO. C11 | 11/35



KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 – S2.10
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. AC PAVING – 2" AC W/ 4" TYPE II BASE
4. CONSTRUCT 6' HIGH CHAIN LINK FENCE PER USD #252
5. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C17
6. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90' INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.9
7. 2' THICK (MIN) GROUTED RIP-RAP D_{50} =12" W/ 12" TYPE II AGGREGATE BASE
8. NOT USED
9. EXISTING RIP-RAP, HEADWALLS, AND CHAIN LINK FENCE TO BE REMOVED PRIOR TO CONSTRUCTION
10. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C17
11. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C18
12. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 7 DRAWING S2.9
13. 12' GATE PER USD #253
14. RETAINING / SCREEN WALL – REFER TO PLAN & PROFILE DRAWINGS C11 & C12 AND FOR STRUCTURAL DETAILS REFER TO DRAWING C2.10

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.

NOTE: FOR RETAINING / SCREEN WALL DETAILS REFER TO STRUCTURAL DRAWING S2.10

LEGEND:

- RETAINING WALL
- SCREEN WALL
- RETAINING WALL LIMITS

COORDINATE TABLE

	NORTHING	EASTING
(4)	9448.2957	7355.3867

LINE TABLE

LINE	BEARING	DISTANCE
L1	S89°29'55"W	1685.58'

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY. Call before you Overhead 1-702-593-6111 NEVADA POWER DEPARTMENT OAR SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call before you Dig 1-800-227-2600 UNDERGROUND SERVICE (USA)

APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY _____, 20__.

GRAPHIC SCALE

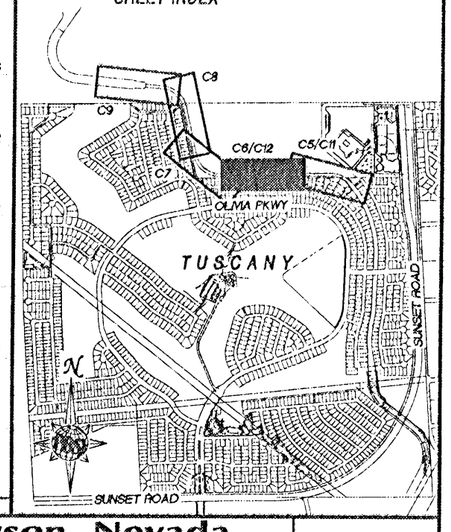
(IN FEET)

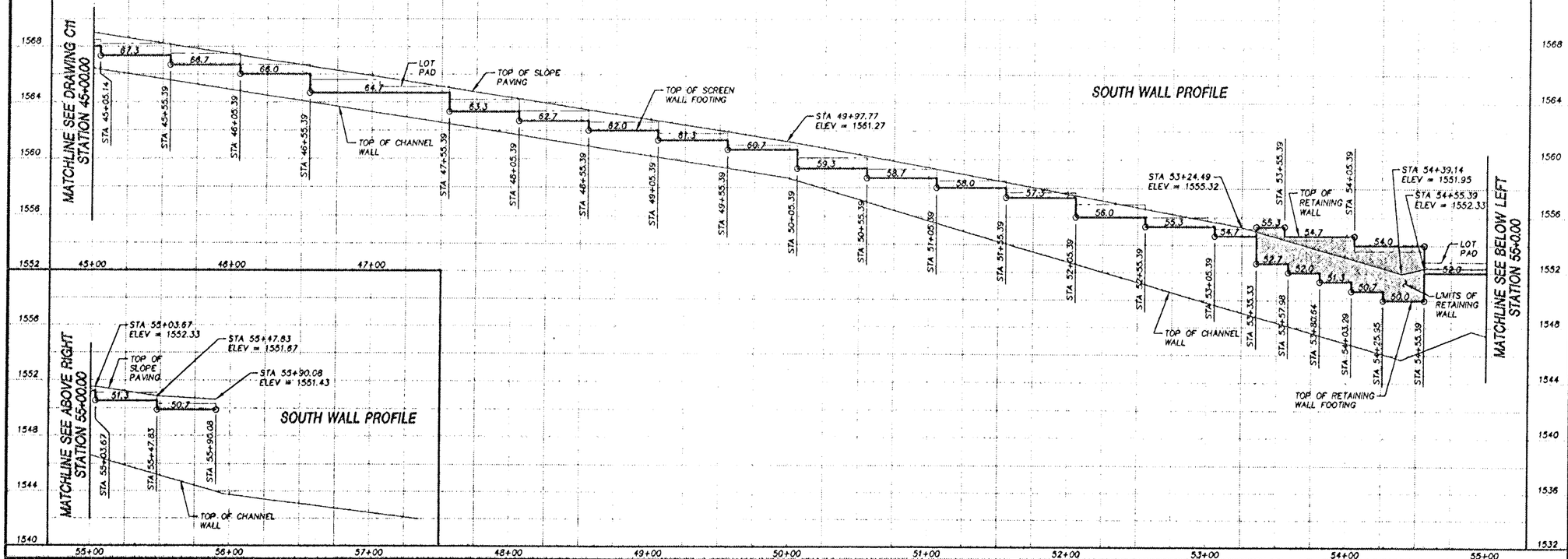
HORZ: 1 inch = 40 ft.
VERT: 1 inch = 4 ft.

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.195 = 1667.303 FEET – C.O.H. NAVD 83 CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX





REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-212
SCALE: HORIZ.: 1"=40' VERT.: 1"=4'

PBSJ
201 North Green Valley Pkwy. Suite 200 Henderson, Nevada 89014 Telephone: 702/263-7273 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL: PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691 5/24/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS -

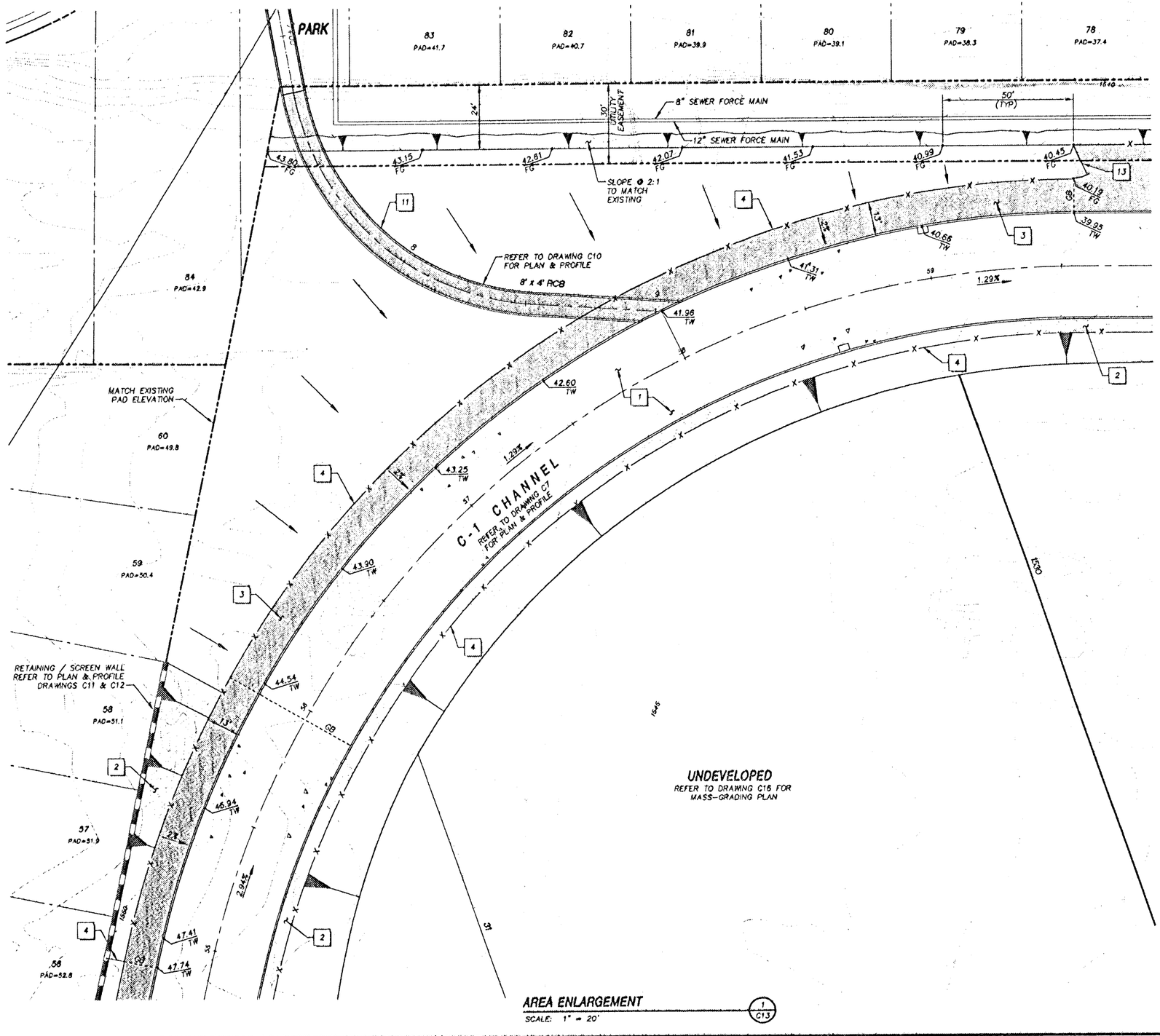
RETAINING WALL PLAN AND PROFILE STA 45+00.00 TO STA 55+90.08

XXXX

DRAWING NO. C12 12/35

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you Overhead
1-702-593-6111
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)



AREA ENLARGEMENT
SCALE: 1" = 20'
1 / C13

KEY NOTES

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER STRUCTURAL DRAWINGS S0.1 – S2.10
2. CONSTRUCT SLOPE PAVING PER STRUCTURAL DRAWINGS
3. AC PAVING – 2" AC W/ 4" TYPE II BASE
4. CONSTRUCT 8' HIGH CHAIN LINK FENCE PER USD #252
5. INSTALL CHANNEL ACCESS LADDER PER DETAIL 2 DRAWING C17
6. CONSTRUCT TRANSVERSE CONCRETE CUT-OFF WALL ACROSS THE ENTIRE BOTTOM OF CHANNEL @ 90° INTERVALS AND END OF DAY POINTS PER STRUCTURAL DETAIL 2 DRAWING S2.9
7. 2' THICK (MIN) GROUTED RIP-RAP D_{50}=12" W/ 12" TYPE II AGGREGATE BASE
8. NOT USED
9. EXISTING RIP-RAP, HEADWALLS, AND CHAIN LINK FENCE TO BE REMOVED PRIOR TO CONSTRUCTION
10. INSTALL (48") ACCESS MANHOLE W/ STEPS PER DETAIL 1 DRAWING C17
11. INSTALL 8'x4' RCB PER NDOT STD DWG B-20.1.2 DRAWING C18
12. CONNECT RCB TO CONCRETE CHANNEL PER STRUCTURAL DRAWINGS DETAIL 7 DRAWING S2.9
13. 12' GATE PER USD #253
14. RETAINING / SCREEN WALL – REFER TO PLAN & PROFILE DRAWINGS C11 & C12 AND FOR STRUCTURAL DETAILS REFER TO DRAWING C2.10

GENERAL NOTES

1. ADD 1500 TO PLAN ELEVATIONS
2. ALL STATIONING IS CENTERLINE OF CHANNEL UNLESS OTHERWISE NOTED.

APPROVAL

NEW DEVELOPMENT ENGINEER – KEN KOSHIRO, P.E. DATE 2-4-03

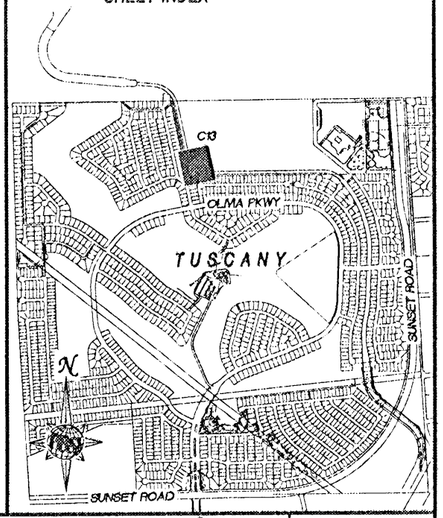
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY Feb 4 2004

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
HORZ: 1 inch = 20 ft.
VERT: NONE

BENCHMARK

CITY OF HENDERSON BENCH MARK NO. 220 DATED 11/02/93 – BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHEAST CORNER OF OLSEN STREET AND REDROCK STREET. ELEVATION IN METERS: 508.135 = 1667.303 FEET – C.O.H. NAVD '83
CONVERSION FACTOR: METERS X 3937/1200 = U.S. FEET
PER C.O.H. BOOK OF BENCHMARKS DATED APRIL 1997.

SHEET INDEX



REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-213
SCALE: HORIZ.: 1"=20' VERT.: NONE

PBSJ
201 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7273 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
CIVIL ENGINEER STATE OF NEVADA LICENSED No. 13691 5/30/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS - AREA ENLARGEMENTS

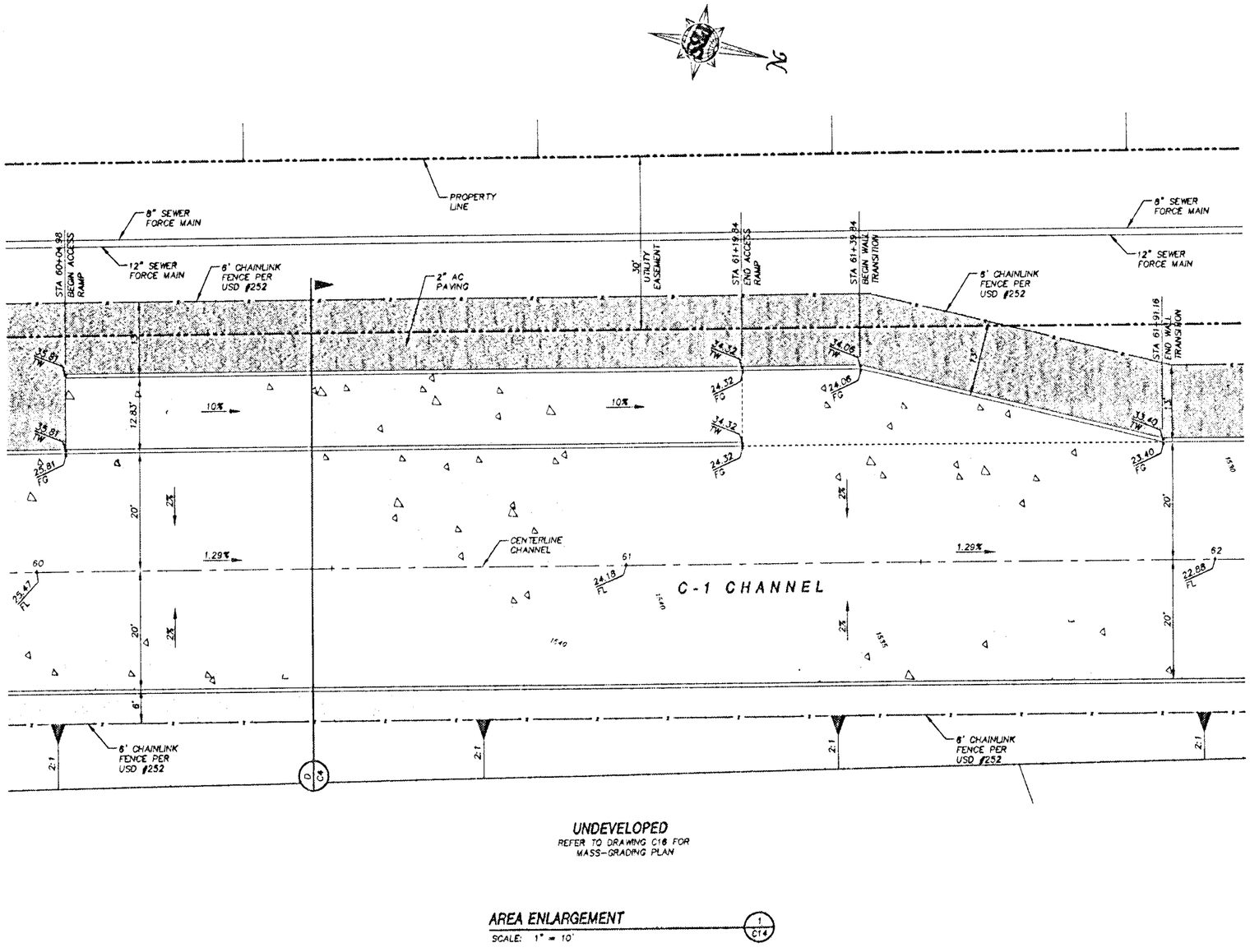
XXXX

DRAWING NO. 13 / C13

35

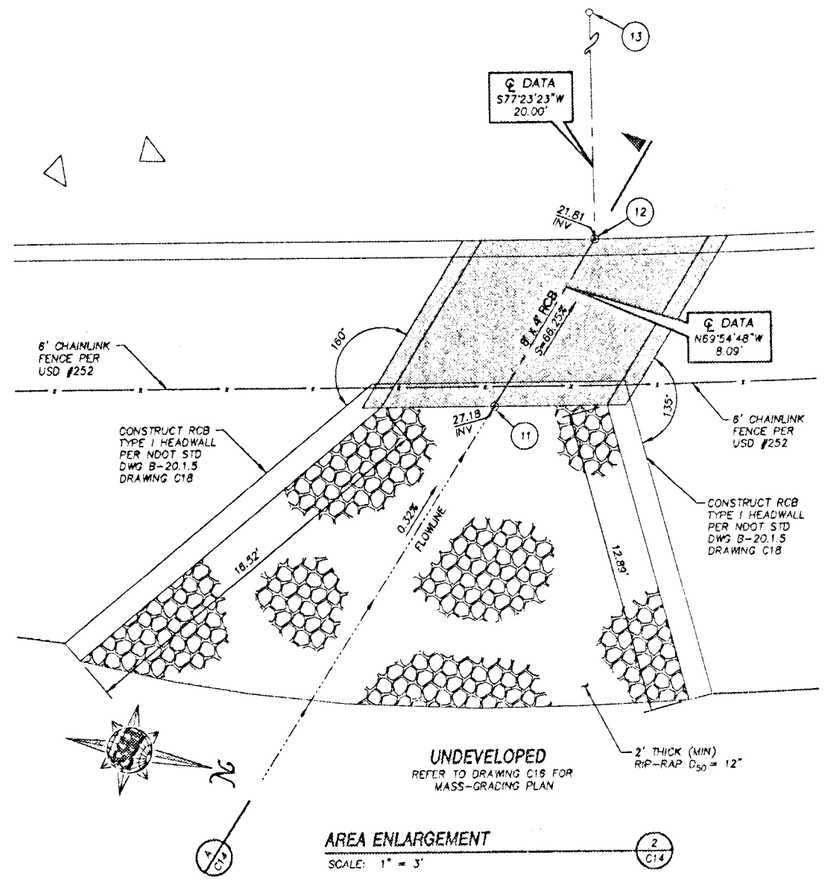
AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY!
Call before you Overhead
1-702-593-6111
NEVADA POWER CO. ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)



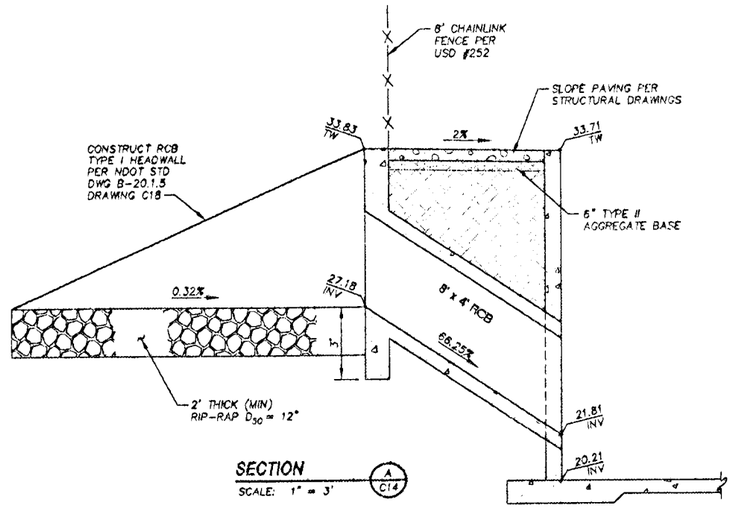
UNDEVELOPED
REFER TO DRAWING C16 FOR MASS-GRADING PLAN

AREA ENLARGEMENT (1/C14)
SCALE: 1" = 10'



UNDEVELOPED
REFER TO DRAWING C16 FOR MASS-GRADING PLAN

AREA ENLARGEMENT (2/C14)
SCALE: 1" = 3'



SECTION (A/C14)
SCALE: 1" = 3'

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-214
SCALE: HORIZ.: 1"=10' VERT.: NONE

PBS&J
901 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone: 702/263-7273 Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA LEE G. FARRIS No. 13661 5/20/02

LAS CITY OF HENDERSON

City of Henderson, Nevada

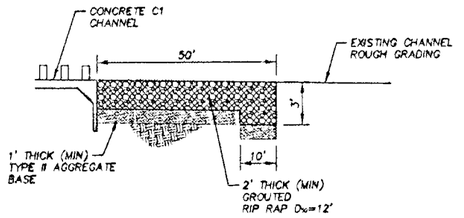
TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS - AREA ENLARGEMENTS

XXXX

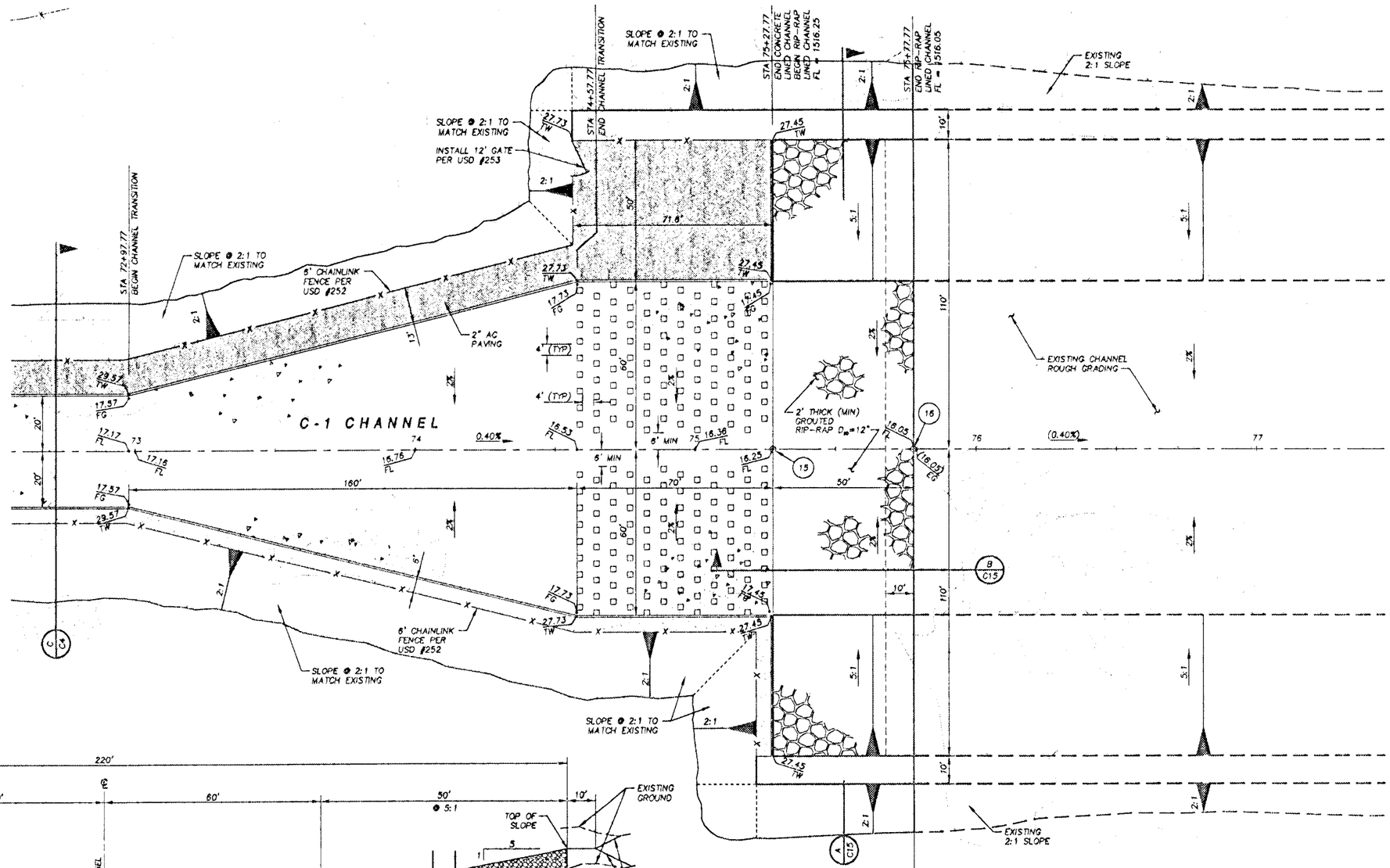
DRAWING NO. 14
C14
35

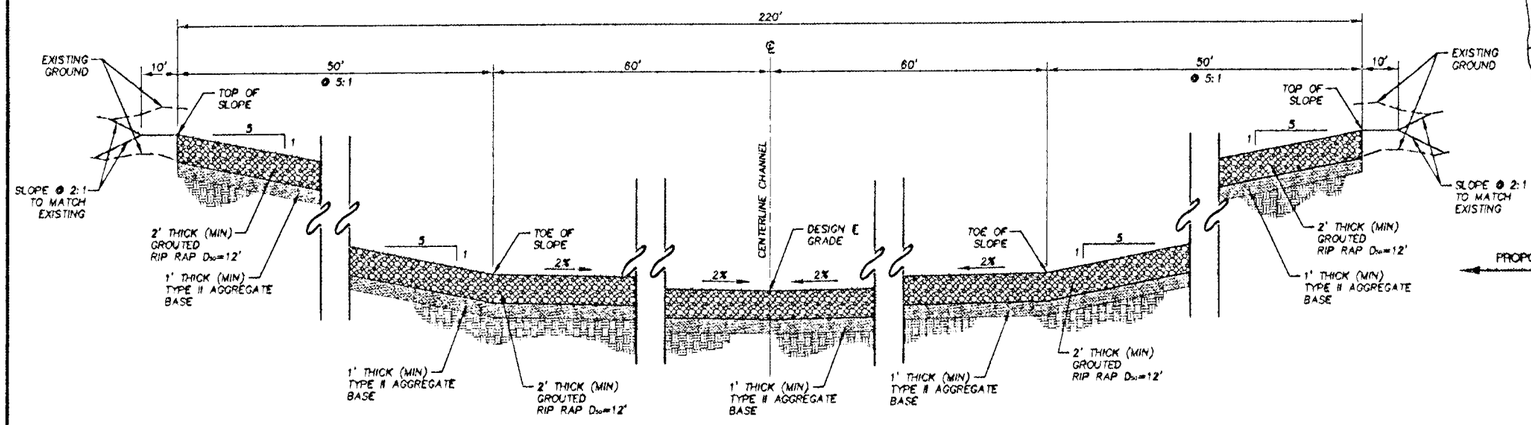
WOOD OVERHEAD POWER LINE CONTACT IT'S COSTLY
Call before you Overhead
1-702-593-6111
NEVADA POWER CO./NORTHERN NEVADA SAFETY SERVICES DEPARTMENT

WOOD OUTSIDE UNDERGROUND UTILITY LINES, IT'S COSTLY
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

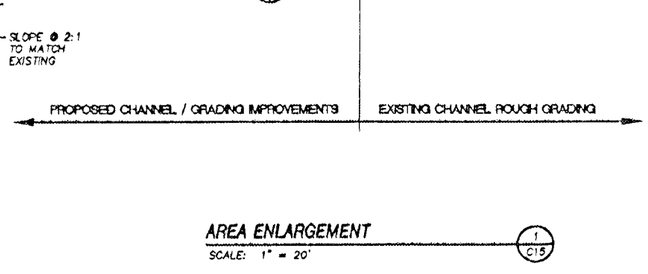


SECTION (B/C15)
NOT TO SCALE





CHANNEL SECTION (A/C15)
NOT TO SCALE



AREA ENLARGEMENT (1/C15)
SCALE: 1" = 20'

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-215
SCALE: HORIZ.: 1"=20' VERT.: NONE

PBSJ
901 North Green Valley Pkwy. Suite 100
Henderson, Nevada 89014
Telephone 702/263-7275
Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL: Professional Engineer, State of Nevada, Lee C. Farris, No. 13091, 5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS - AREA ENLARGEMENTS

XXXX

DRAWING NO. 15 / C15 / 35

NOTE: OVERHEAD POWER LINE CONTACT IT'S COSTLY

Call before you Overhead
1-702-593-6111
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

NOTE: CUTTING UNDERGROUND UTILITY LINES IT'S COSTLY

Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

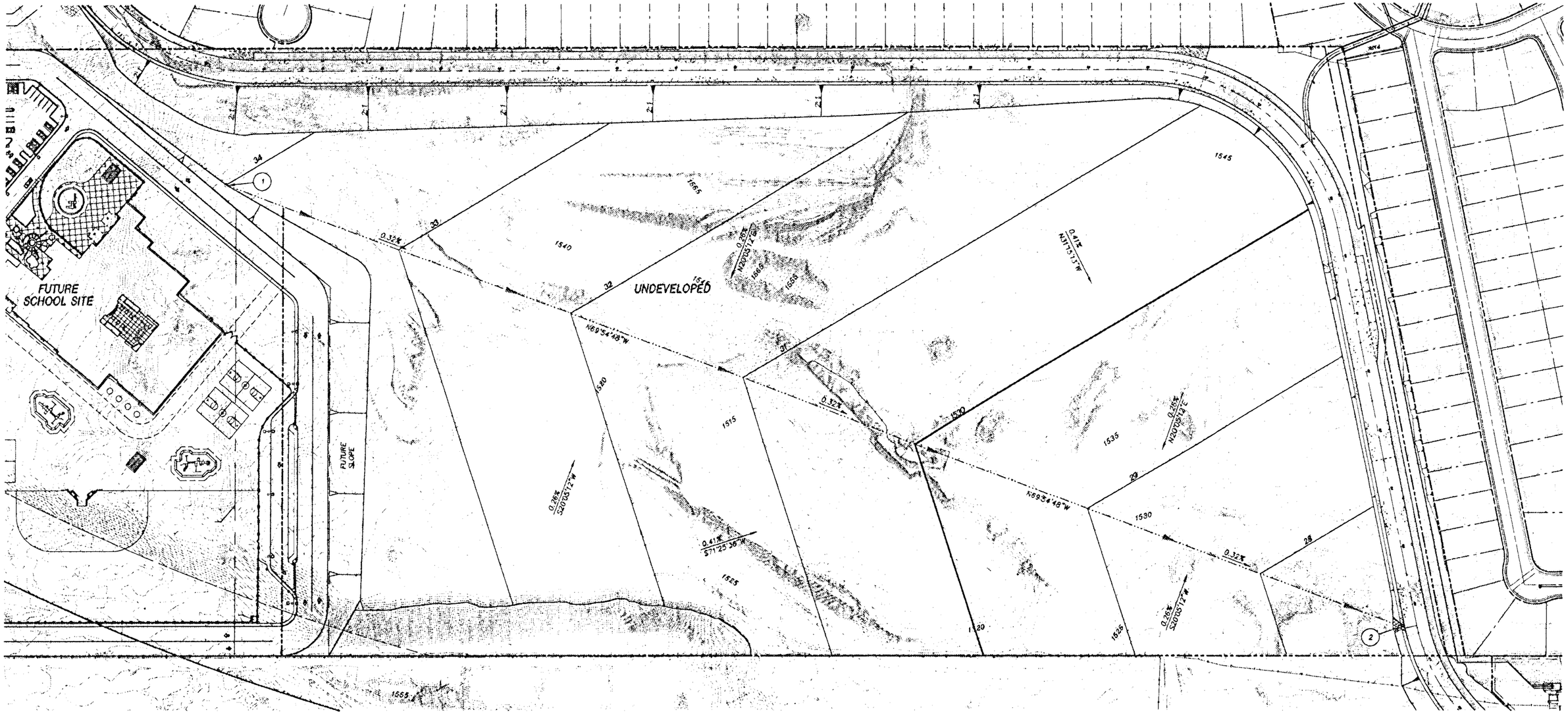
GRAPHIC SCALE

80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

COORDINATE TABLE

	NORTHING	EASTING	ELEVATION
1	9695.8850	9021.1975	1534.00
2	10427.3092	7021.0339	1527.18

N



REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-216
SCALE: HORIZ.: 1"=80' VERT.: NONE

PBSJ
201 North Green Valley Pkwy. Suite 200
Henderson, Nevada 89014
Telephone: 702/253-7279
Fax: 702/253-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA LEE C. FARRIS No. 13691 5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION - PHASE 2 IMPROVEMENTS - MASS-GRADING PLAN

XXXX

DRAWING NO. C16 | 16/35

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY

Call before you Overhead

1-702-593-6111

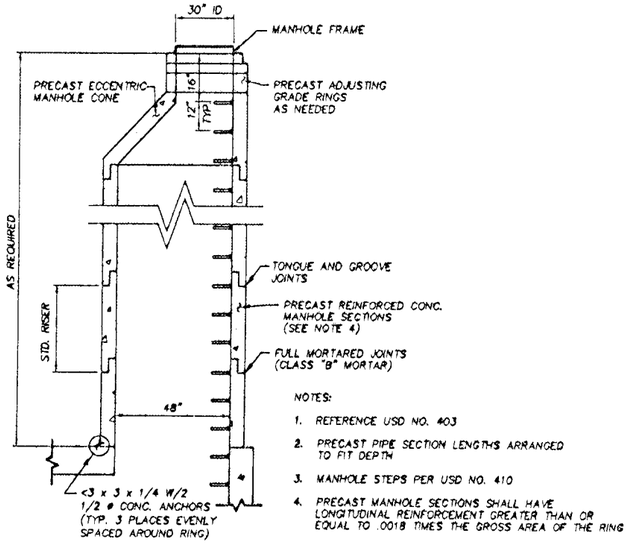
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID OUTAGE UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600

UNDERGROUND SERVICE (USA)

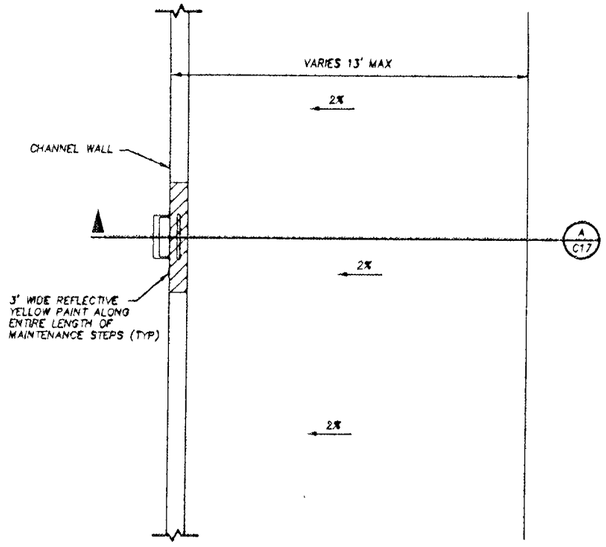


NOTES:

1. REFERENCE USD NO. 403
2. PRECAST PIPE SECTION LENGTHS ARRANGED TO FIT DEPTH
3. MANHOLE STEPS PER USD NO. 410
4. PRECAST MANHOLE SECTIONS SHALL HAVE LONGITUDINAL REINFORCEMENT GREATER THAN OR EQUAL TO .0018 TIMES THE GROSS AREA OF THE RING

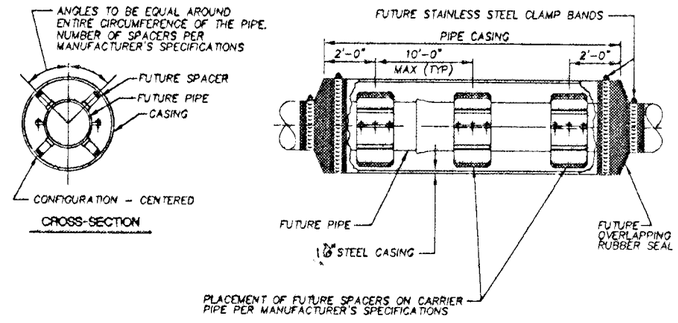
48" MANHOLE RISER DETAIL (1/C17)

NOT TO SCALE



CHANNEL ACCESS LADDER DETAIL (2/C17)

NOT TO SCALE

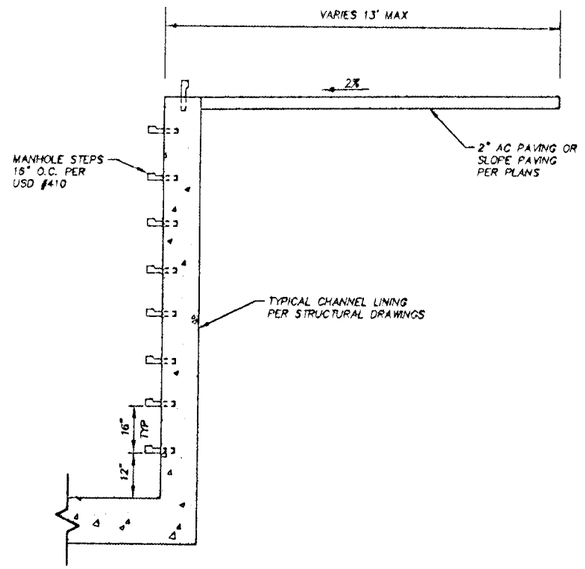


NOTES:

1. STEEL PIPE CASING SHALL BE FABRICATED FROM A MINIMUM OF 1/4" THICK STEEL PLATES, CONFORMING TO THE REQUIREMENTS OF ASTM A283, GRADE B, C, OR D. ALL JOINTS SHALL BE WELDED. INTERIOR JOINTS SHALL BE GROUND TO A SMOOTH FINISH. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AWWA C201, "AWWA STANDARD FOR FABRICATED ELECTRICALLY WELDED STEEL WATER PIPE." COATINGS FOR STEEL CASING ARE NOT REQUIRED.
2. PIPE CASING SHALL BE LAID TRUE TO LINE AND GRADE WITH NO BENDS OR CHANGES IN GRADE FOR THE FULL LENGTH OF THE CASING.
3. THE PIPE SHALL BE SUPPORTED AT EACH END OF EACH JOINT WITH SKIDS.
4. INTERIOR OF CASING TO BE GROUND SMOOTH AND LUBRICATED FOR SPACER INSTALLATION.

TYPICAL CASING SECTION (3/C17)

NOT TO SCALE



CHANNEL ACCESS LADDER SECTION (A/C17)

NOT TO SCALE

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: C. LUQUETTE
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-217
SCALE: HORIZ.: AS SHOWN
VERT.: AS SHOWN

PBSJ
201 North Green Valley Pkwy. Suite 100 Henderson, Nevada 89014 Telephone 702/263-7229 Fax 702/263-7205
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL

PROFESSIONAL ENGINEER STATE OF NEVADA LEE FARRIS CIVIL No. 13981

THE CITY OF HENDERSON

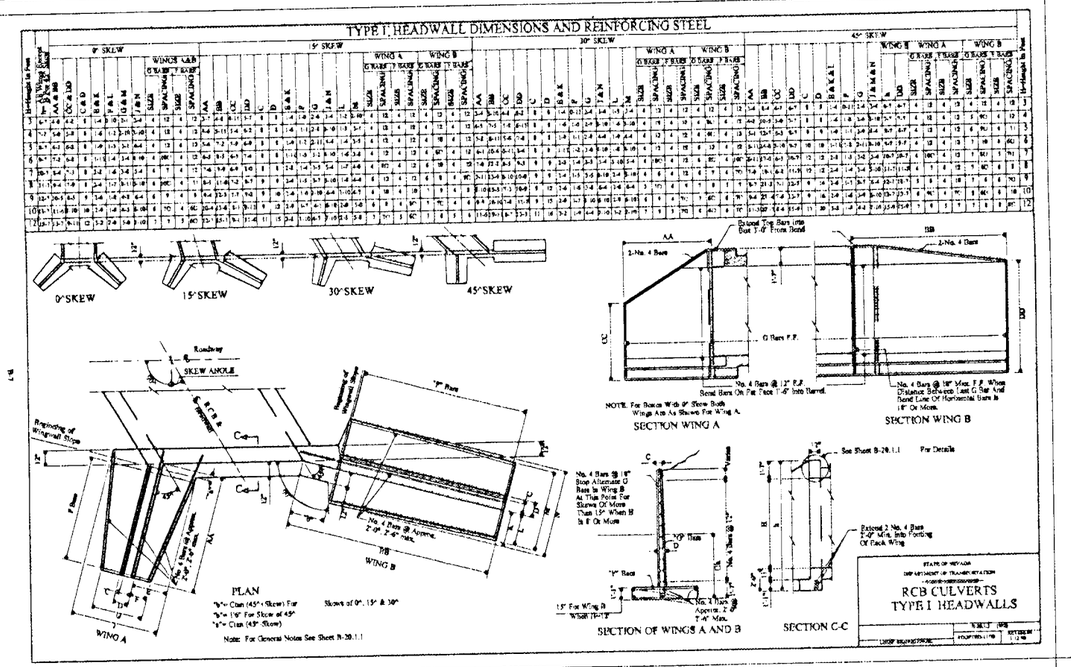
City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION
- PHASE 2 IMPROVEMENTS -
MISCELLANEOUS DETAILS

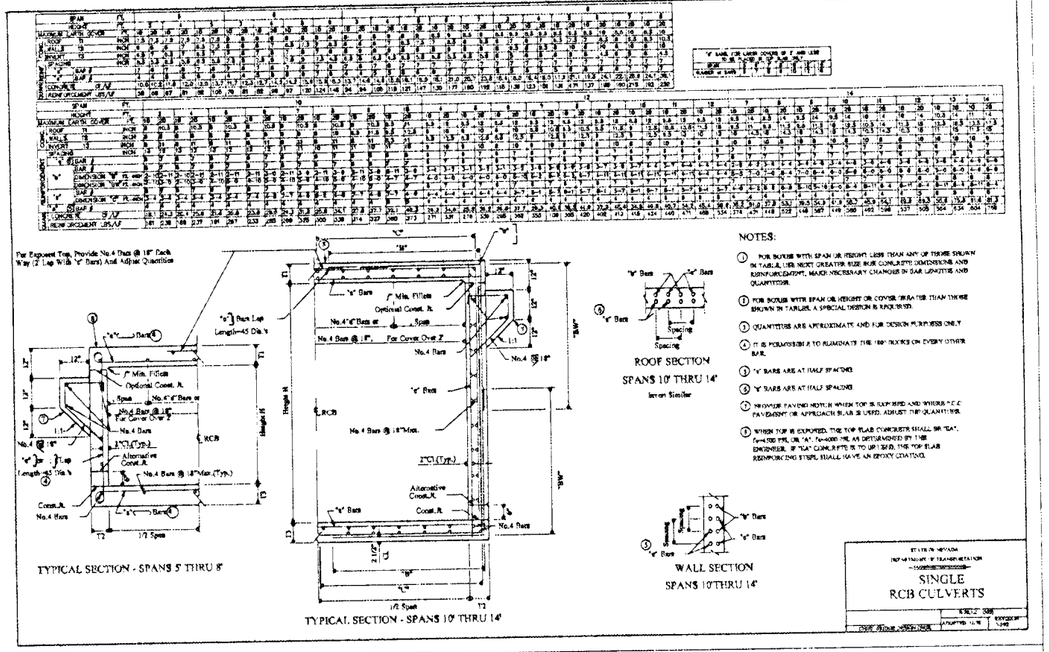
XXXX

DRAWING NO. C17 | 17/35

TYPE I HEADWALL DIMENSIONS AND REINFORCING STEEL



RCB CULVERTS
TYPE I HEADWALLS



NOTES:

1. FOR BOXES WITH SPAN OR HEIGHT OR COVER LESS THAN ANY OF THOSE SHOWN IN TABLE, USE NEXT GREATER SIZE BOX CONCRETE DIMENSIONS AND REINFORCEMENT. WHERE NECESSARY CHANGES IN BAR LENGTHS AND QUANTITIES.
2. FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
3. QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
4. IT IS PERMISSIBLE TO ELIMINATE THE "W" BARS ON EVERY OTHER BAR.
5. "A" BARS ARE AT HALF SPACING
6. "B" BARS ARE AT HALF SPACING
7. NO PAVING NOTCH WHEN TOP SLAB IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST TOP SLAB QUANTITIES.
8. WHEN TOP IS EXPOSED, THE TOP SLAB CONCRETE SHALL BE "SA". SA=THE PPL OR "A". TWO-INCH FILL AS DETERMINED BY THE ENGINEER. IF "SA" CONCRETE IS TO BE USED, THE TOP SLAB REINFORCING STEEL SHALL HAVE AN EPOXY COATING.

SINGLE
RCB CULVERTS

AVOID OVERHEAD POWER LINE CONTACT. IT'S DEADLY
Call before you Overhead
1-702-593-6111
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT

AVOID OUTDOOR UNDERGROUND UTILITY LINES. IT'S DEADLY
Call before you Dig
1-800-227-2600
UNDERGROUND SERVICE (USA)

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

DESIGNED BY: C. LUQUETTE
DRAWN BY: W. WITMER
CHECKED BY: L. FARRIS
DATE: MAY 13, 2002

JOB NO.: 511197
DRAWING NO.: 1197C1-218
SCALE: HORIZ.: NONE
VERT.: NONE

PBSJ
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone 702/263-7225
Fax 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA
LEE A. FARRIS
No. 13681
5/20/02

THE CITY OF HENDERSON

City of Henderson, Nevada

TUSCANY - C-1 CHANNEL EXTENSION
- PHASE 2 IMPROVEMENTS -
MISCELLANEOUS DETAILS

XXXX

DRAWING NO. C18 | 18 / 35

GENERAL STRUCTURAL NOTES

GENERAL REQUIREMENTS

1. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE STRUCTURAL ENGINEERS IN THIS OR SIMILAR LOCALITIES. THEY NECESSARILY ASSUME THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKMEN WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, IT IS UNDERSTOOD THAT THE CONTRACTOR WILL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR ALL MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.

2. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE SHORING, BRACING, FORM-WORK, ETC... AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. CONSTRUCTION MATERIALS SHALL BE UNIFORMLY SPREAD OUT SUCH THAT DESIGN LIVE LOAD PER SQUARE FOOT AS STATED HEREIN IS NOT EXCEEDED. VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES IN ACCORDANCE WITH THE LOCAL BUILDING DEPARTMENT. ALL WORK OR CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATIONS AND SAFETY REQUIREMENTS.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, CONDITIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE CIVIL ENGINEER AND/OR STRUCTURAL ENGINEER IN WRITING OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS. ANY SUCH DISCREPANCY, OMISSION, OR VARIATION NOT REPORTED BEFORE START OF CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. WHERE DISCREPANCIES OCCUR IN THESE DRAWINGS, NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS.

5. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

6. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION.

7. ALL INSPECTIONS REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS OR BY THESE PLANS SHALL BE PROVIDED BY AN INDEPENDENT INSPECTION COMPANY OR THE BUILDING DEPARTMENT. SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN INSPECTION, UNLESS SPECIFICALLY CONTRACTED FOR.

8. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL ITEMS. SHOP DRAWINGS ARE REVIEWED ONLY FOR GENERAL COMPLIANCE WITH THE STRUCTURAL DRAWINGS. REVIEW DOES NOT INDICATE THAT THE SHOP DRAWINGS ARE CORRECT OR COMPLETE. RESPONSIBILITY FOR CORRECTNESS SHALL REST WITH THE CONTRACTOR. ANY CHANGES, SUBSTITUTIONS, OR DEVIATIONS FROM CONTRACT DRAWINGS SHALL BE CLOUDED. ANY OF THE AFOREMENTIONED SHALL NOT BE CONSIDERED APPROVED AFTER ENGINEERS REVIEW UNLESS SPECIFICALLY NOTED ACCORDINGLY. THE SHOP DRAWINGS DO NOT SUPERSEDE OR REPLACE THE ORIGINAL CONTRACT DRAWINGS. ANY ENGINEERING PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF AN APPROPRIATELY REGISTERED ENGINEER. SSEDCO SHALL NOT BE RESPONSIBLE FOR THE ADEQUACY OF ENGINEERING DESIGNS PERFORMED BY THE OTHERS. ALLOW 5 WORKING DAYS FOR THE ENGINEER'S REVIEW. ONE COPY OF EACH SUBMITTAL WILL BE RETAINED.

DESIGN BASIS

1. PALM CITY C1 CHANNEL (PHASE 2): VARYING CONCRETE CHANNEL

2. CODE: 1997 UBC AND CLARK COUNTY REGIONAL FLOOD CONTROL

FOUNDATION

1. THE FOUNDATIONS FOR THE ABOVE REFERENCED PROJECT ARE DESIGNED WITH RECOMMENDATIONS FROM GEOTEK REPORT # 1538-LV DATED AUGUST 6, 1998. ALL RECOMMENDATIONS LISTED WITH IN THIS REPORT REGARDING SITE PREPARATION, GRADING, COMPACTION TESTS, INSPECTIONS ECT. SHALL BE FOLLOWED WITH STRICT ADHERENCE AND SHALL BE COMPLETED PRIOR TO CONSTRUCTION. SHOULD THE GEOTECHNICAL REPORT NOT RECOMMEND FOUNDATION PREPARATIONS THE FOLLOWING SPECIFICATIONS SHALL BE FOLLOWED: EXISTING SUB-BASE SHALL BE FREE OF COBBLES LARGER THAN A 12" SPHERE, AND SILT OR CLAY DEPOSITS. EXISTING SUBASE SHALL BE SCARIFIED FOR 1'-0" DEPTH AND COMPACTED TO 95% OF DRY DESTINY AND 87 OF WELL GRADED 3" MINUS GRANULAR MATERIAL (TYPE II) BE PLACE ON EXISTING COMPACTED SUBASE AND PROPERLY COMPACTED.

BACKFILL

1. ALL BACKFILL FOR THE ABOVE REFERENCED PROJECT SHALL CONSIST OF MATERIAL AS SPECIFIED IN THE ABOVE REFERENCED GEOTECHNICAL REPORT.

2. PLACEMENT OF THE FILL AT THE STEM WALLS MAY BEGIN WHEN THE CONCRETE STRENGTH HAS REACHED 2800 psi COMPRESSIVE STRENGTH.

3. FILL SHALL BE PLACED IN 8" MAXIMUM VERTICAL LIFTS AND COMPACTED TO 95% OF DRY DENSITY.

CONCRETE

1. MIN. 28 DAY COMPRESSIVE STRENGTH, f'c, SHALL BE ACCORDING TO THE FOLLOWING:
   - WALLS, FOOTINGS, AND SLABS: 4000 PSI

2. CEMENT SHALL BE TYPE V.

3. ALL CONCRETE SHALL BE NORMAL WEIGHT USING HARDROCK AGGREGATES.

4. MECHANICALLY VIBRATE ALL POURED CONCRETE WHEN PLACED. SLABS ON GRADE NEED NOT BE VIBRATED. REMOVE ALL DEBRIS FROM FORMS BEFORE PLACING CONCRETE. CONCRETE SHALL NOT BE DROPPED THROUGH REINFORCING STEEL SO AS TO CAUSE SEGREGATION OF AGGREGATES. UNCONFINED FALL OF CONCRETE SHALL NOT EXCEED 5 FEET.

5. ALL ITEMS TO BE CAST IN CONCRETE SUCH AS REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC., SHALL BE SECURELY POSITIONED PRIOR TO CONCRETE PLACEMENT.

6. SHOTCRETE PROPORTIONS SHALL BE SELECTED THAT ALLOW SUITABLE PLACEMENT PROCEDURES USING THE DELIVERY EQUIPMENT SELECTED AND SHALL RESULT IN FINISHED IN-PLACE HARDENED SHOTCRETE MEETING THE STRENGTH REQUIREMENTS STATED HEREIN. COARSE AGGREGATE, IF USED, SHALL NOT EXCEED 3/4 INCH (19). ANY REBOUND OR ACCUMULATED LOOSE AGGREGATE SHALL BE REMOVED FROM THE SURFACES TO BE COVERED PRIOR TO PLACING THE INITIAL OR ANY SUCCEEDING LAYERS OF SHOTCRETE. REBOUND SHALL NOT BE REUSED AS AGGREGATE.

7. TESTING REQUIREMENTS SHALL BE IN ACCORDANCE WITH ACI 318 AND ASTM 42 STANDARDS.

REINFORCING STEEL

1. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. REINFORCING SHALL BE GRADE 60 (FY = 60 KSI) DEFORMED BARS FOR ALL BARS #4 AND LARGER AND ALL BARS USED FOR CONCRETE WALLS. REINFORCING MAY BE GRADE 40 (FY = 40 KSI) DEFORMED BARS FOR ALL BARS #3 AND SMALLER UNLESS NOTED OTHERWISE ON PLANS OR DETAILS. ALL REINFORCING TO BE WELDED SHALL BE ASTM A706, GRADE 60 ALLOY WELDABLE STEEL.

2. ALL DIMENSIONS SHOWING THE LOCATION OF REINFORCING STEEL NOT NOTED AS "CLEAR" OR "CLR" ARE TO CENTER OF STEEL. MINIMUM COVER FOR NON-PRESTRESSED CONCRETE REINFORCING SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS:

EXPOSURE CONDITION:	COVER:	TOLERANCES: (+/-)
FOOTINGS & SLABS ON GRADE:	3"	3/8"
WALLS/SLABS EXPOSED TO EARTH OR WEATHER:	1 1/2"	1/2"
#6 BAR OR LARGER:	2"	1/2"
INTERIOR SLABS:	1 1/2"	1/2"

3. LAP SPLICES OF REINFORCING STEEL IN CONCRETE BEAMS, SLABS AND FOOTINGS SHALL BE ACCORDING TO UBC SECTION 1912 OR LAP SCHEDULE WHERE PRESENT, UNLESS NOTED OTHERWISE STAGGER SPLICES A MINIMUM OF ONE LAP LENGTH. NO TACK WELDING OF REINFORCING BARS ALLOWED. LATEST ACI CODE AND DETAILING MANUAL APPLY. PROVIDE RENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT ALL CORNERS AND INTERSECTIONS. SPLICE BARS TOP BARS AT CENTER LINE OF SPAN AND BOTTOM BARS AT THE SUPPORT IN SPANDRELS, BEAMS, GRADE BEAMS, ETC.., UNLESS NOTED OTHERWISE.

REBAR LAP SCHEDULE		
BAR	LAP	1.7 LAP
#3	18"	31"
#4	18"	31"
#5	23"	39"
#6	28"	48"
#7	36"	62"
#8	47"	80"
#9	59"	101"
#10	75"	128"
#11	92"	157"

4. ALL REINFORCING SHALL BE BENT COLD. BARS SHALL NOT BE UNBENT AND RE-BENT EXCEPT AS NOTED ON PLAN. FIELD BENDING OF REBAR SHALL NOT BE ALLOWED EXCEPT AS NOTED ON PLAN BENDS AND HOOKS SHALL CONFORM TO ACI STANDARD 318.

5. WELDING OF REINFORCING BARS, METAL INSERTS, AND CONNECTIONS SHALL CONFORM WITH ACI 318 CHAPTER 12, AND SHALL BE MADE ONLY AT LOCATIONS SHOWN ON PLANS OR DETAILS. ALL REINF SHALL BE BENT COLD. BARS SHALL NOT BE UN-BENT AND RE-BENT.

6. REINFORCING BAR SPACING SHOWN ON PLANS ARE MAXIMUM ON CENTERS. ALL BARS SHALL BE DETAILED AND PLACED PER CRSI SPECIFICATIONS AND HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE.

EPOXY ANCHORAGE

1. EPOXY GROUTED DOWELS SHALL BE INSTALLED USING:

   1. HILTI HIT HY-150 ADHESIVE ANCHOR SYSTEM (ICBO REPORT NO. 5193)
   2. SIMPSON STRONG-TIE SET ADHESIVE ANCHOR SYSTEM (ICBO NO. 5279)

   - INSTALL THE ABOVE SYSTEMS PER THE ICBO REPORT AND MOR'S RECOMMENDATIONS.
   - ALTERNATE EPOXY GROUT SYSTEMS WITH CURRENT ICBO APPROVAL MAY BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL.

SPECIAL INSPECTIONS

1. THE OWNER SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS WHO SHALL PROVIDE INSPECTIONS DURING PLACEMENT OF THE BACKFILL, REINFORCEMENT, SHOTCRETING, AND EPOXY DOWELING. THE INSPECTOR SHALL SUBMIT A STATEMENT INDICATING COMPLIANCE WITH THE PLANS AND SPECIFICATIONS.

2. SPECIAL INSPECTION OF THE FILL AROUND THE WALLS SHALL BE PROVIDED AT A FREQUENCY AS NECESSARY TO ENSURE THAT PROPER FILL AND COMPACTION IS ACHIEVED. COMPACTION TESTS FOR EACH LIFT SHOULD BE TAKEN PER EVERY 2500 SQUARE FEET PLACED. THE SPECIAL INSPECTOR SHALL SUBMIT A COMPLIANCE REPORT DOCUMENTING FILL TYPE AND PROCEDURES OF PLACEMENT TO SSEDCO FOR APPROVAL.

DEFERRED SUBMITTALS

1. ALL ITEMS CONSIDERED IN THESE DESIGN DOCUMENTS AS BY OTHERS ARE NOTED AS DEFERRED SUBMITTALS. THE FOLLOWING WILL INCLUDE BUT NOT BE LIMITED TO:

   - CONCRETE MIX DESIGN

2. PRIOR TO SUBMITTAL OF DEFERRED ITEMS TO PLAN REVIEW, THEY SHALL BE SUBMITTED TO OUR OFFICE FOR REVIEW.

MASONRY

1. COMPOSITE MASONRY UNIT W/ GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF (f'm)1500 PSI.

2. CONCRETE BLOCK SHALL BE HOLLOW, LIGHT WEIGHT, LOAD-BEARING CONCRETE MASONRY UNITS CONFORMING TO UBC STANDARD 21-4 WITH A MINIMUM COMPRESSIVE STRENGTH OF 1900 PSI. ALL BLOCKS SHALL BE PLACED IN RUNNING BOND CONSTRUCTION (UNLESS NOTED OTHERWISE) WITH ALL VERTICAL CELLS IN ALIGNMENT.

3. MORTAR MIX SHALL CONFORM TO REQUIREMENTS OF UBC STANDARD 21-15, TYPE M OR S. MORTAR SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 P.S.I., AT 28 DAYS. TYPE M MORTAR SHALL BE USED WHERE MASONRY IS IN CONTACT WITH SOIL.

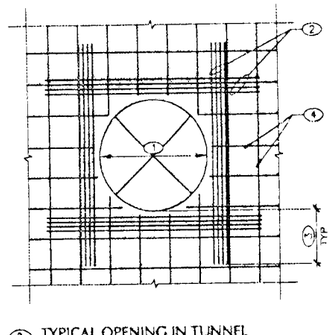
4. GROUT SHALL CONFORM TO REQUIREMENTS OF UBC STANDARD 21-9. USE SUFFICIENT WATER FOR GROUT TO FLOW INTO ALL JOINTS OF THE MASONRY WITHOUT SEGREGATION. GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS. GROUT TO FLOW INTO ALL JOINTS OF THE MASONRY WITHOUT SEGREGATION. ALL CELLS IN CONCRETE BLOCKS CONTAINING REINFORCING SHALL BE FILLED SOLID WITH GROUT. HOLD GROUT DOWN 1-1/2" BELOW TOP OF BLOCK AT GROUT LIFT JOINTS. ALL GROUT SHALL BE MECHANICALLY VIBRATED.

5. VERTICAL REINFORCEMENT SHALL BE SECURED AGAINST DISPLACEMENT PRIOR TO GROUTING BY WIRE POSITIONERS OR OTHER SUITABLE DEVICES AT INTERVALS NOT EXCEEDING 200 BAR DIAMETERS.

6. MINIMUM LINTEL WHERE NOT NOTED ON PLANS, SHALL HAVE A MINIMUM OF (2) #5 CONTINUOUS HORIZONTAL BARS IN BOTTOM OF BOND BEAM OR LINTEL BLOCK AND SHALL BE GROUTED SOLID TO A MINIMUM DEPTH OF 24 INCHES. ALL LINTEL REINFORCING AND GROUT SHALL EXTEND 2 FEET MINIMUM PAST JAMBS UNLESS NOTED OTHERWISE ON PLANS OR DETAILS.

7. LAP REINFORCING BARS 48 BAR DIAMETERS. STAGGER LAP SPLICES A MINIMUM OF 80 BAR DIAMETERS (UNO).

8. CONTROL JOINTS SHALL BE PLACED AT 30'-0" O.C. MAX.



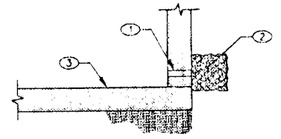
2 TYPICAL OPENING IN TUNNEL
NO SCALE

KEYNOTES:

1. OPENING DIAMETER 3'-0" MAX
2. (4) #4 BARS AT 3" O.C.
3. EXTEND BARS PAST EDGE OF OPENING 1.7 TIMES LAP LENGTH OF BAR, PER LAP SCHEDULE
4. WELDED WIRE MESH PER CULVERT SECTION

NOTE:

LOCATION AS SHOWN PER CIVIL DRAWINGS AS OCCURS



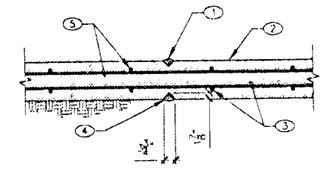
3 WEEP HOLE DRAIN REQUIREMENTS
NO SCALE

KEYNOTES:

1. 3"ø WEEP HOLE EA SIDE OF CULVERT 120" O.C.
2. (1) CUBIC FOOT OF FREE DRAIN MATERIAL WRAPPED IN FILTER FABRIC AT EA WEEP HOLE
3. INVERT

NOTE:

A. REQUIREMENTS SHOWN ARE MIN REQUIREMENTS, GOVERNING CODE OR GEOTECH REQUIREMENTS MAY SUPERSEDE.



1 TYPICAL CONTRACTION JOINT
NO SCALE

KEYNOTES:

1. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL PLACED IN A FORMED GROOVE, TYP.
2. INSIDE FACE OR WALL OR TOP OF SLAB
3. SECOND MAT OF REINFORCEMENT STEEL AS REQUIRED PER DETAILS
4. SEALANT NOT REQUIRED AT BOTTOM OF SLAB
5. REINFORCEMENT PER SECTIONS AND DETAILS

NOTE:

A. CONTRACTION JOINT MUST BE INSTALLED AT A MAX OF 30'-0" O.C.
B. AT SLOPED PAVING, JOINT WIDTH MAY BE 1 1/2" AND DEPTH MAY BE 3/4"

STANDARD ABBREVIATIONS

AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AMSI	AMERICAN MATERIAL STANDARDS INSTITUTE
ARCH	ARCHITECTURAL
ALT	ALTERNATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIAL
BOT	BOTTOM
BRG	BEARING
C	CHANNEL
℄	CENTER LINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR Ø	DIAMETER
DWG	DRAWING
EF	EACH FACE
ELEV	ELEVATION
EQ	EQUAL
EW	EACH WAY
FF	FINISH FLOOR
FLR	FLOOR
FT	FOOT
FTG	FOOTING
GEN	GENERAL STRUCTURAL NOTES
HOR	HORIZONTAL
INFO	INFORMATION
K	KIP (1,000 LBS.)
KSI	KIPS PER SQUARE INCH
L	ANGLE
LL	DOUBLE ANGLE
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LW	LOW
MFR	MANUFACTURER
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
SIM	SIMILAR
SPEC	SPECIFICATION
STD	STANDARD
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROVE
TF	TOP OF
TOC	TOP OF CONCRETE
TOD	TOP OF DECK
TOF	TOP OF FOOTING
TOL	TOP OF LEDGER
TOP	TOP OF PANEL
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UNO	UNLESS OTHERWISE NOTED
VERT	VERTICAL
W	WIDE FLANGE
W/	WITH
W/O	WITHOUT
WT	WEIGHT

SHEET INDEX

SHEET NO.	SHEET TITLE
S0.1	GSN, STD ABBREVIATIONS, SHEET INDEX
S1.1	PLAN VIEWS
S1.2	PLAN VIEWS
S1.3	PLAN VIEWS
S1.4	PLAN VIEWS
S1.5	PLAN VIEWS
S1.6	PLAN VIEWS
S2.1	SECTIONS
S2.2	SECTIONS
S2.3	SECTIONS
S2.4	SECTIONS
S2.5	SECTIONS
S2.6	SECTIONS
S2.7	SECTIONS
S2.8	SECTIONS
S2.9	DETAILS
S2.10	DETAILS

SEAL: STATE OF NEVADA — DOUGLAS H. WEBSTER — No. 15117 — REGISTERED PROFESSIONAL ENGINEER — CIVIL — 12-31-2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

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PROJECT: PALM CITY C1 CHANNEL (PHASE 2) TUSCANY HILLS DEVELOPMENT HENDERSON, CLARK COUNTY, NV

SHEET TITLE: GENERAL STRUCTURAL NOTES

DATE	DESCRIPTION	REV
5/10/02	SUBMITTED FOR CONSTRUCTION	
5/1/02	SUBMITTED FOR APPROVAL	
1/21/02	SUBMITTED FOR APPROVAL	

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02109
SHEET NUMBER: S0.1
19 35

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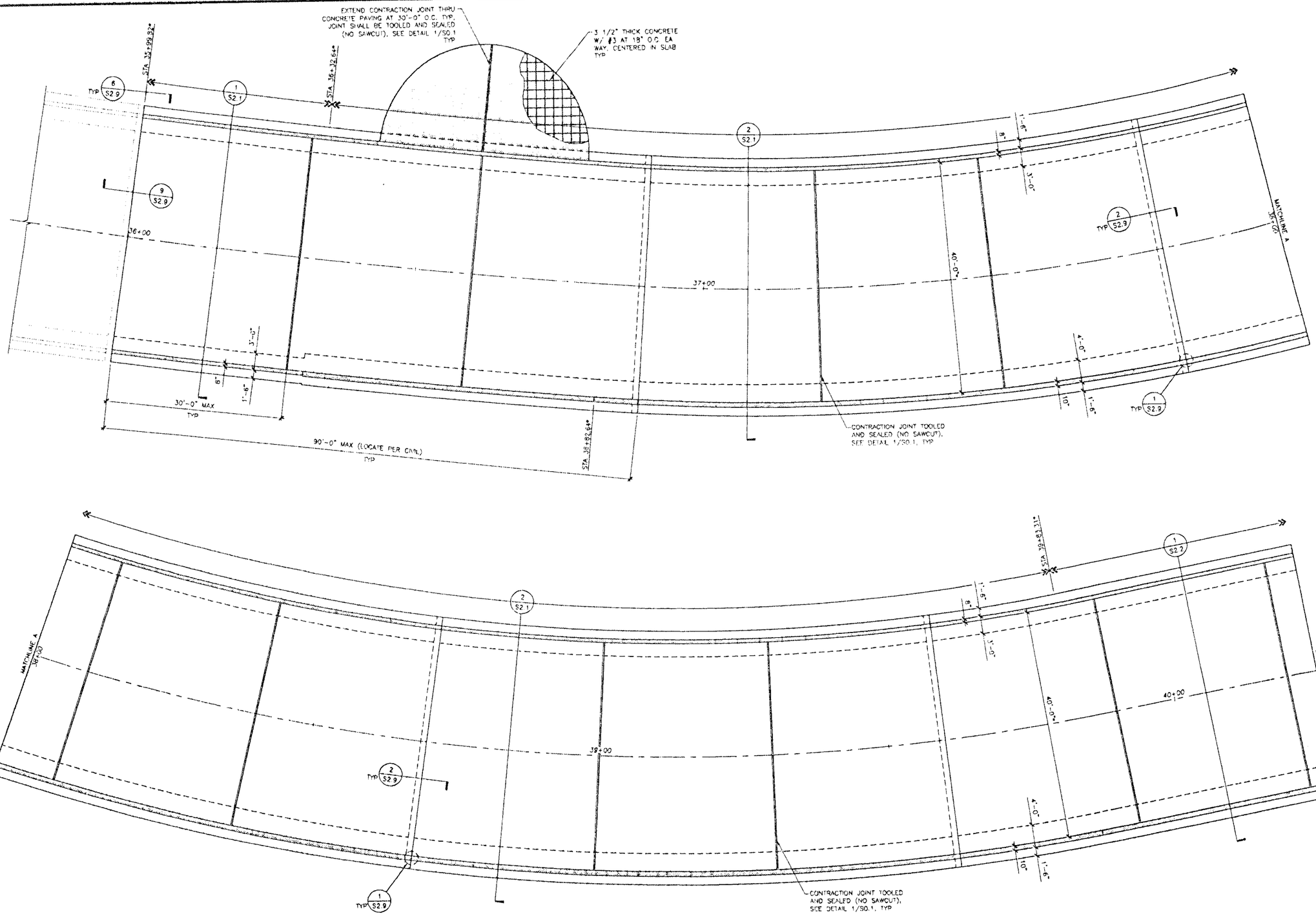

PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL: ENGINEER, STATE OF NEVADA, JOSEPH A. VIGLIOTTI, No. 15117, PROFESSIONAL ENGINEER — MAY 10 2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

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PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

DATE	DESCRIPTION
5/10/02	SUBMITTED FOR CONSTRUCTION
3/15/02	SUBMITTED FOR APPROVAL
1/21/02	SUBMITTED FOR APPROVAL

DATE: JANUARY 21, 2002
PROJECT NUMBER: 0210
SHEET NUMBER: S1.1
20 35

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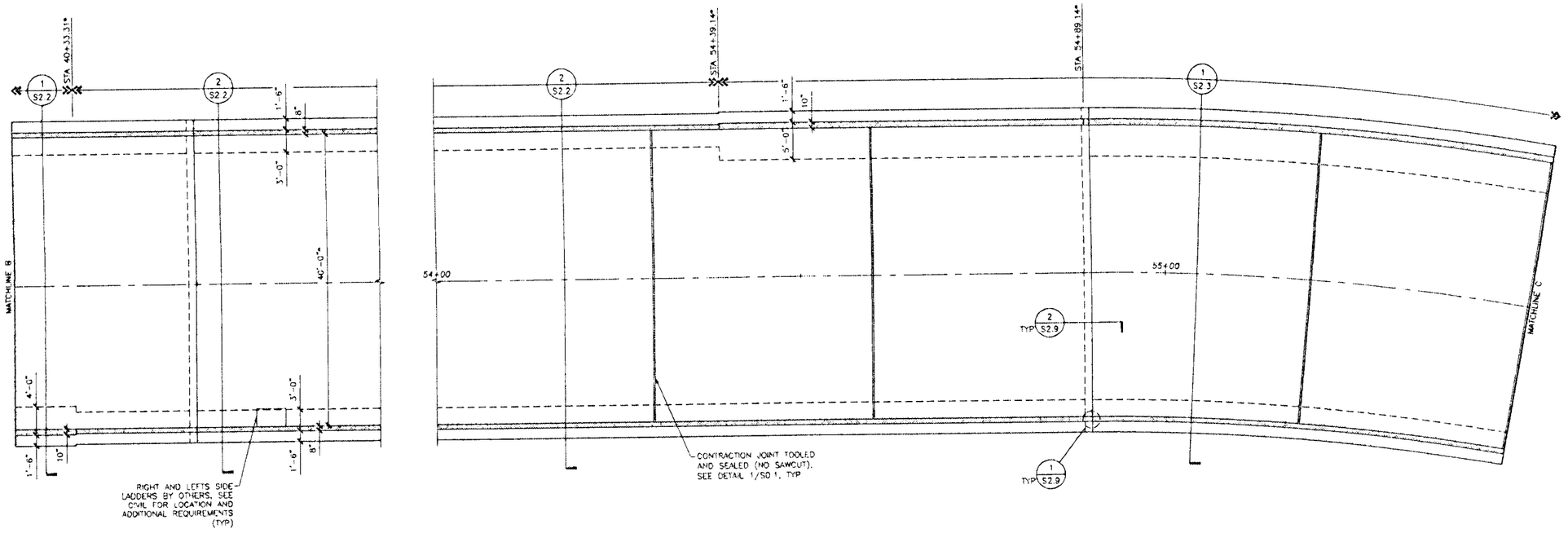

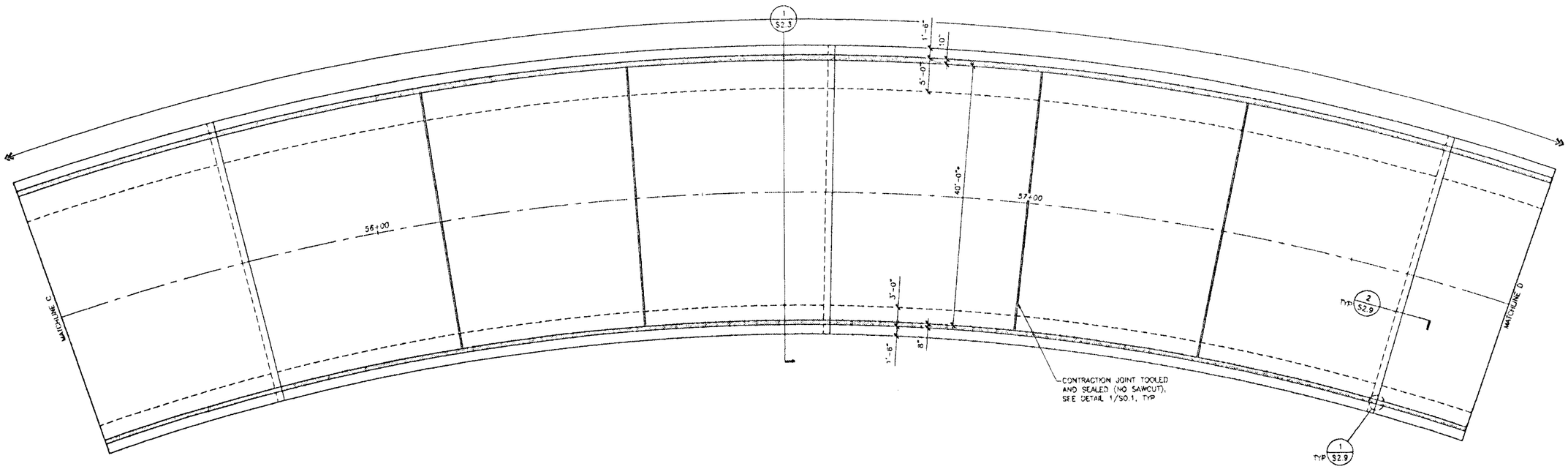

PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL: REGISTERED STATE OF NEVADA PROFESSIONAL ENGINEER DOUGLAS H WEBER PE 9842 MAY 10 2002

DESIGNED: DW
DRAWN: KLH
CHECKED: JS
APPROVED

Specialty Structures Engineering & Design Company
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PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

REV	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02108
SHEET NUMBER: S1.2
21/35

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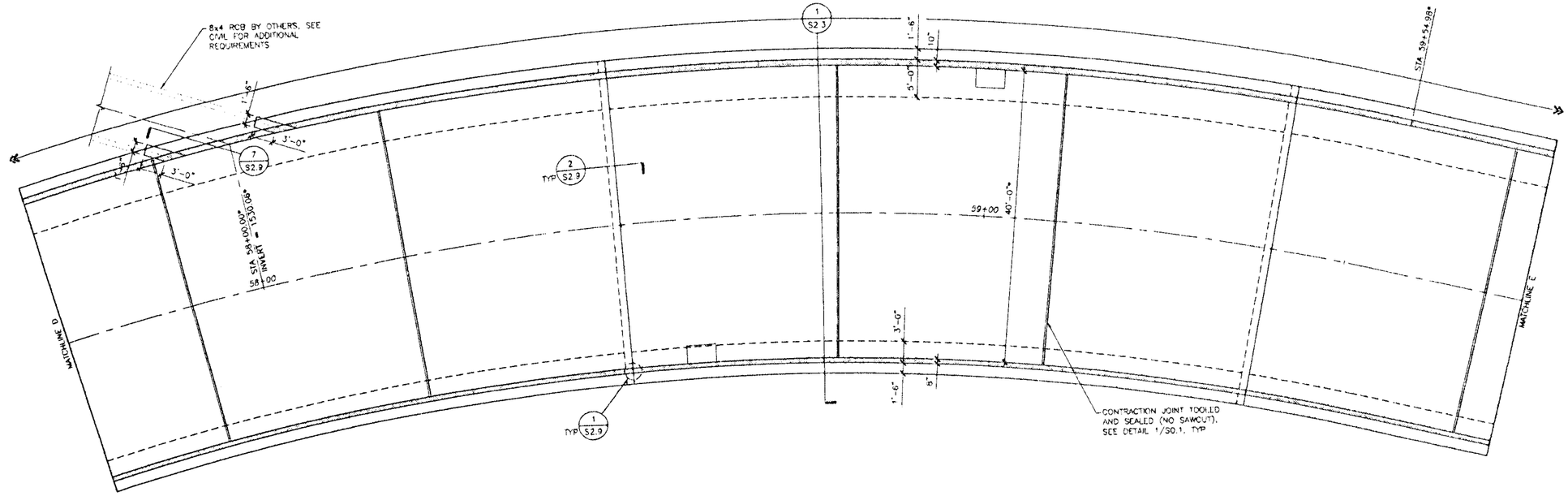

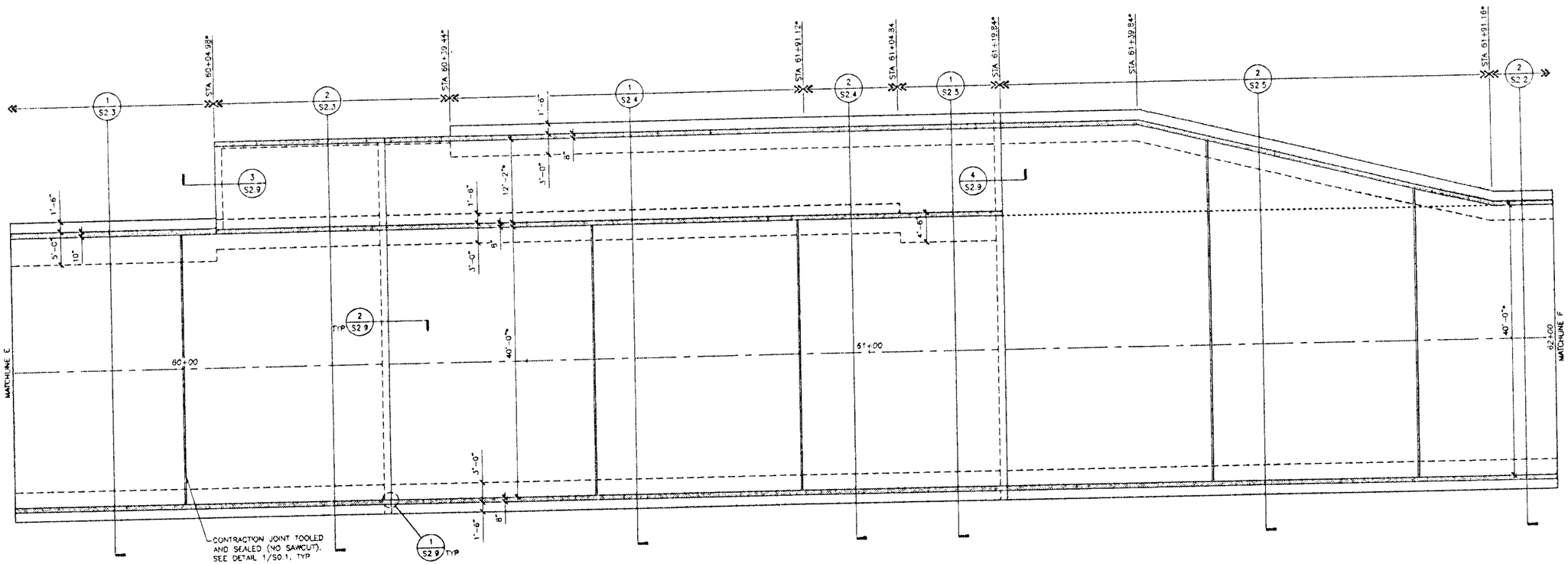

PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL: ENGINEER, STATE OF NEVADA, DOUGLAS H. WEBER, 11511, PROFESSIONAL ENGINEER, MAY 18 2012

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

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PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
2	SUBMITTED FOR CONSTRUCTION	5/10/02
1	SUBMITTED FOR APPROVAL	3/13/02
0	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S1.3 22/35

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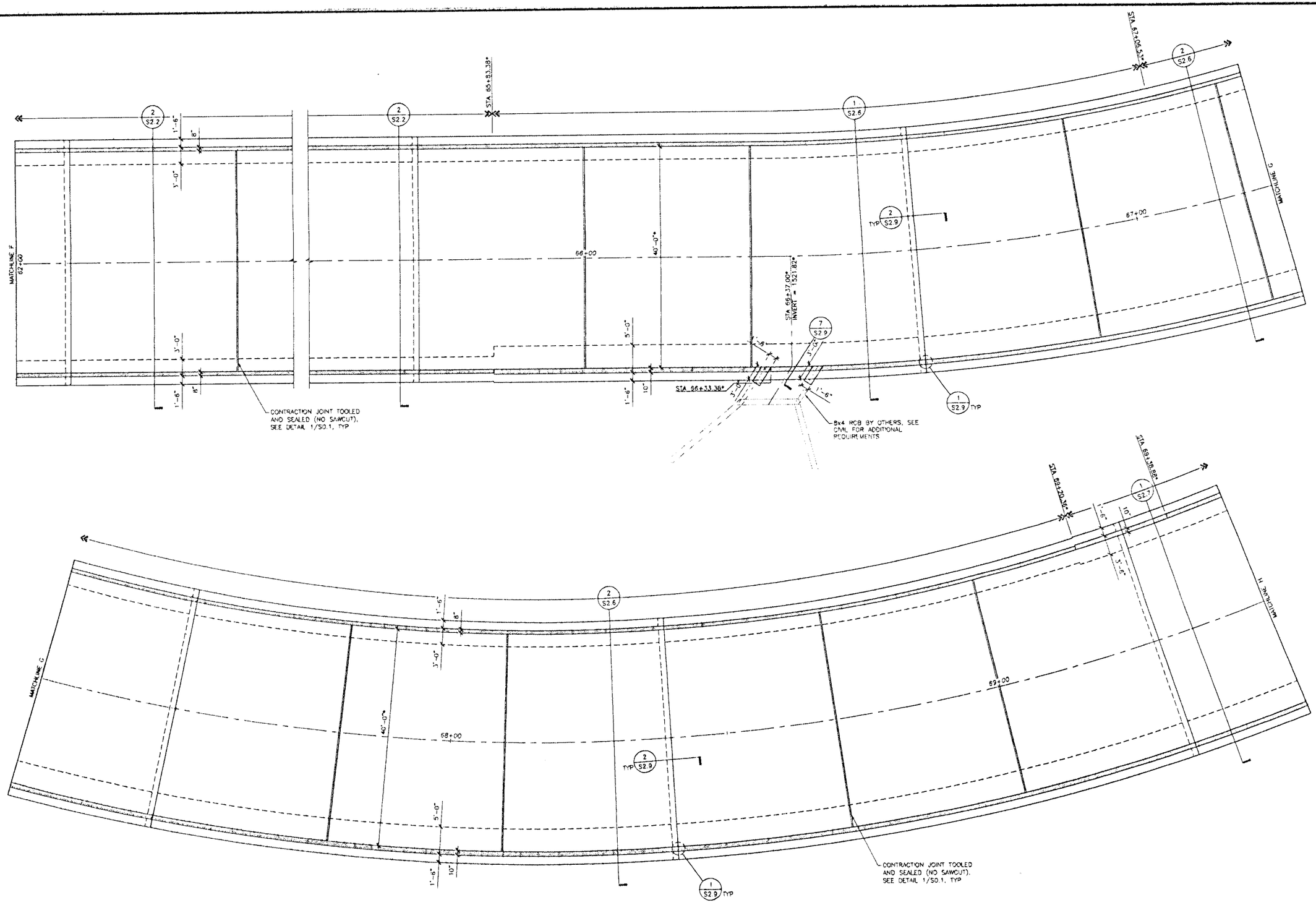

PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

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SEAL: REGISTERED ENGINEER STATE OF NEVADA DOUGLAS H. WEBER 15213 PROFESSIONAL ENGINEER CIVIL — MAY 13 2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

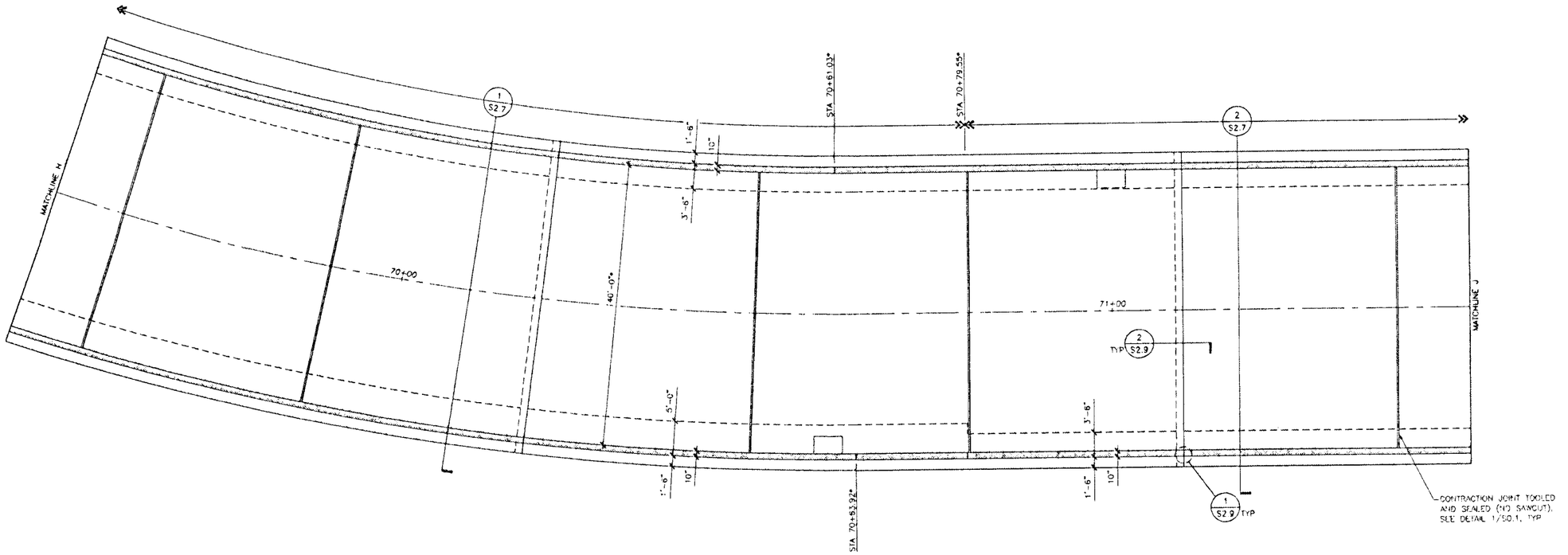
Specialty Structures Engineering & Design Company
E-mail@SSEDCo.com, 1535 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9582

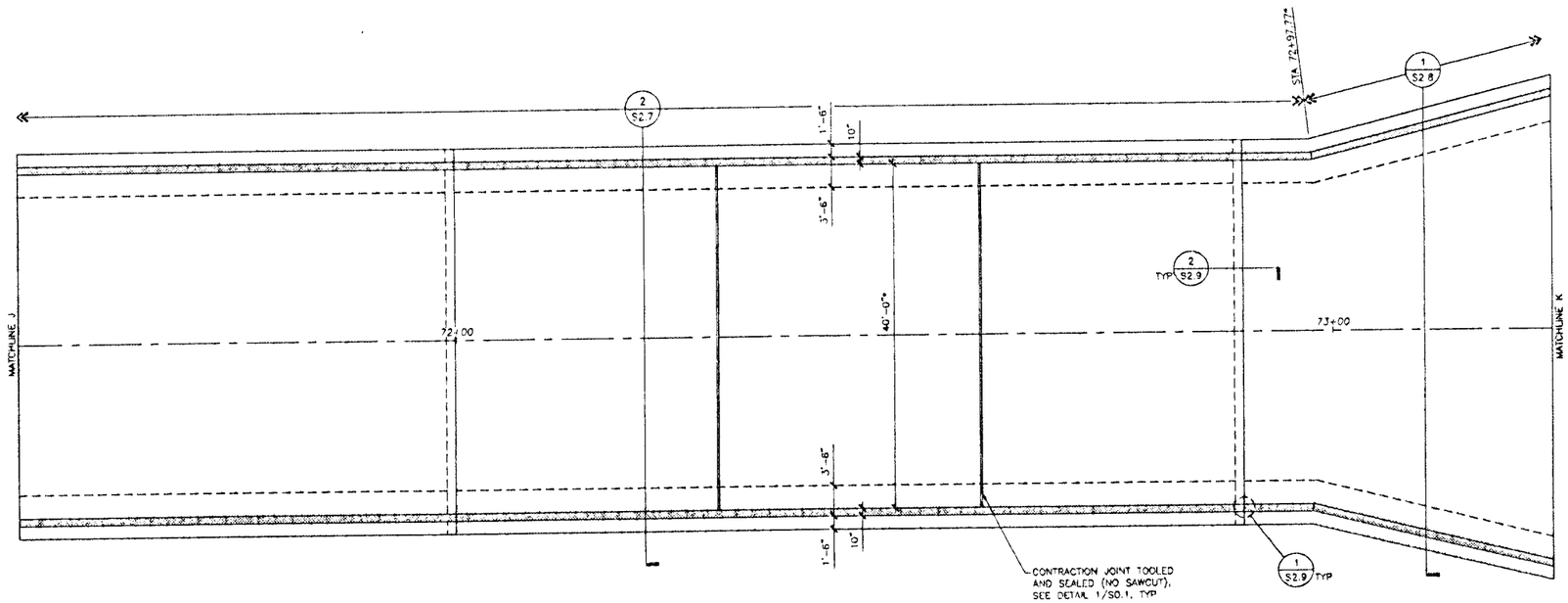
PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

REV	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	5/15/02
	SUBMITTED FOR APPROVAL	12/1/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S1.4 23/35





PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT DIMENSIONS.

SEAL: REGISTERED ENGINEER STATE OF NEVADA DOUGLAS H. ENGLISH No. 15117 PROFESSIONAL ENGINEER CIVIL

DESIGNED: DW
DRAWN: KH
CHECKED: IS
APPROVED

Specialty Structural Engineering & Design Company
E-mail@SSEDCo.com, 1533 E. Lincoln Rd., Idaho Falls, ID 83401
Phone: 208-524-0880 Fax: 208-552-9382

PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	11/15/02
	SUBMITTED FOR APPROVAL	12/11/02

DATE: JANUARY 21, 2003
PROJECT NUMBER: 02100
SHEET NUMBER: S1.5 24 35

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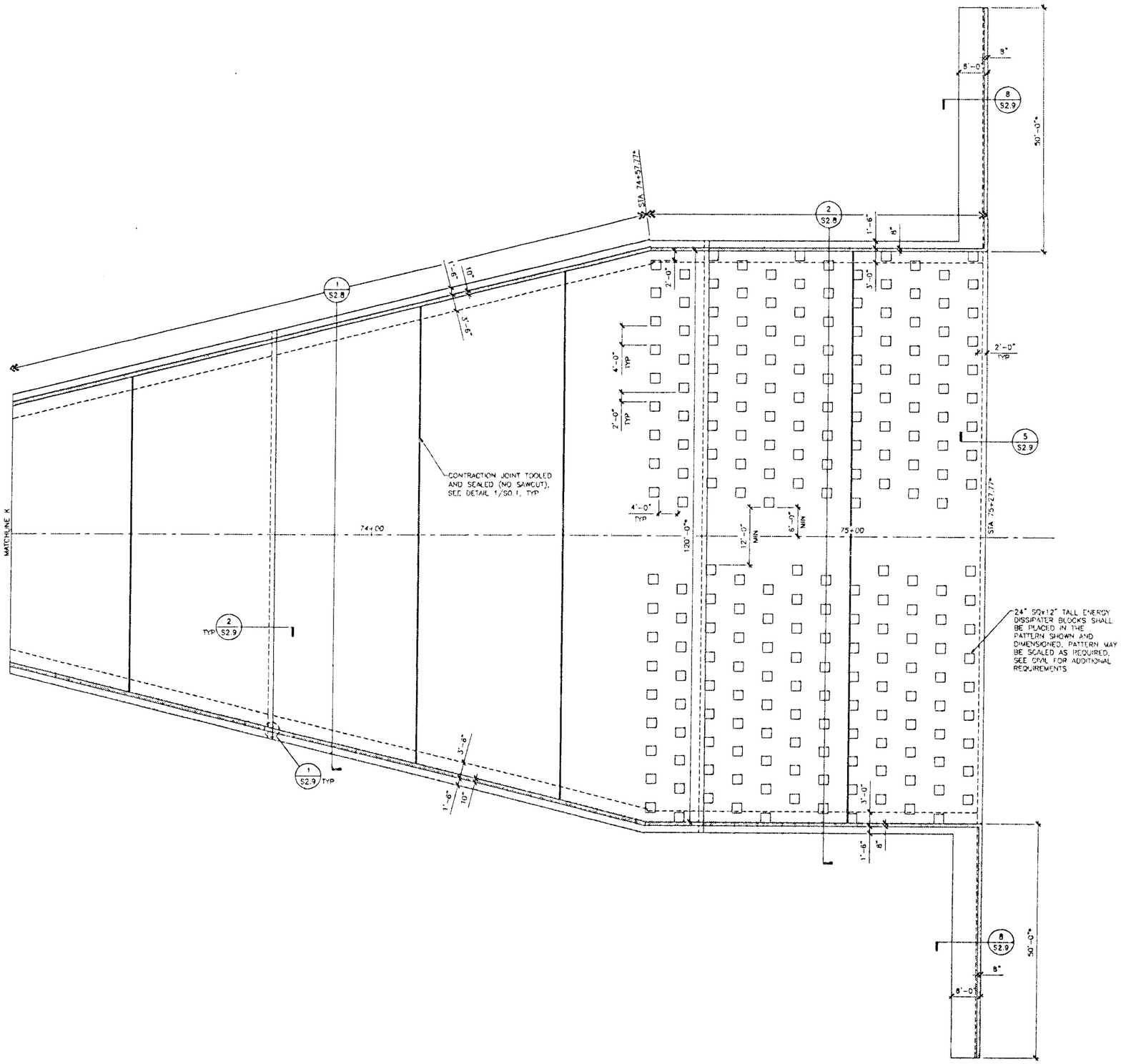


PLAN VIEWS - PALM CITY C1 CHANNEL

SCALE: 3/32"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS BY PBS&J FOR EXACT

SEAL: REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA DOUGLAS H. WEBER 15117 CIVIL MAR 19 2002

DESIGNED: DW | DRAWN: KM | CHECKED: JS | APPROVED:

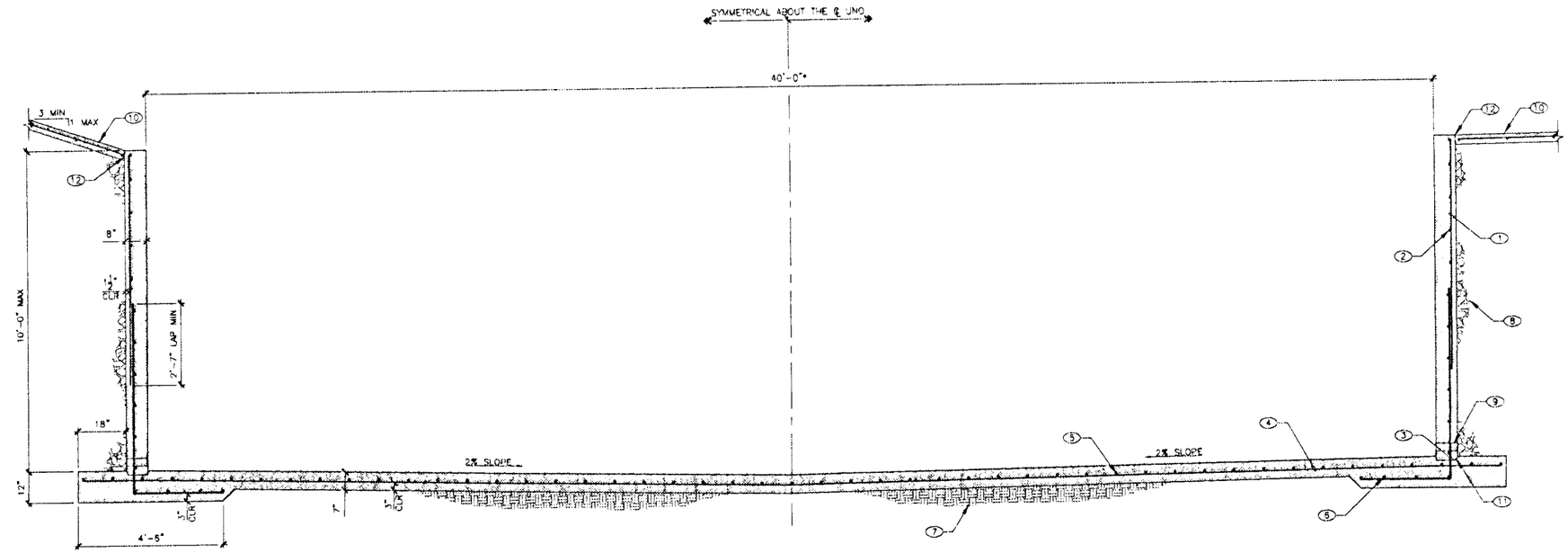
Specialty Structural Engineering & Design Company
E-mail@SSEDCo.com; 1553 N. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0880 Fax: 208-552-9702

PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: PLAN VIEWS

REV	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	5/15/02
	SUBMITTED FOR APPROVAL	12/13/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S1.6 25/35



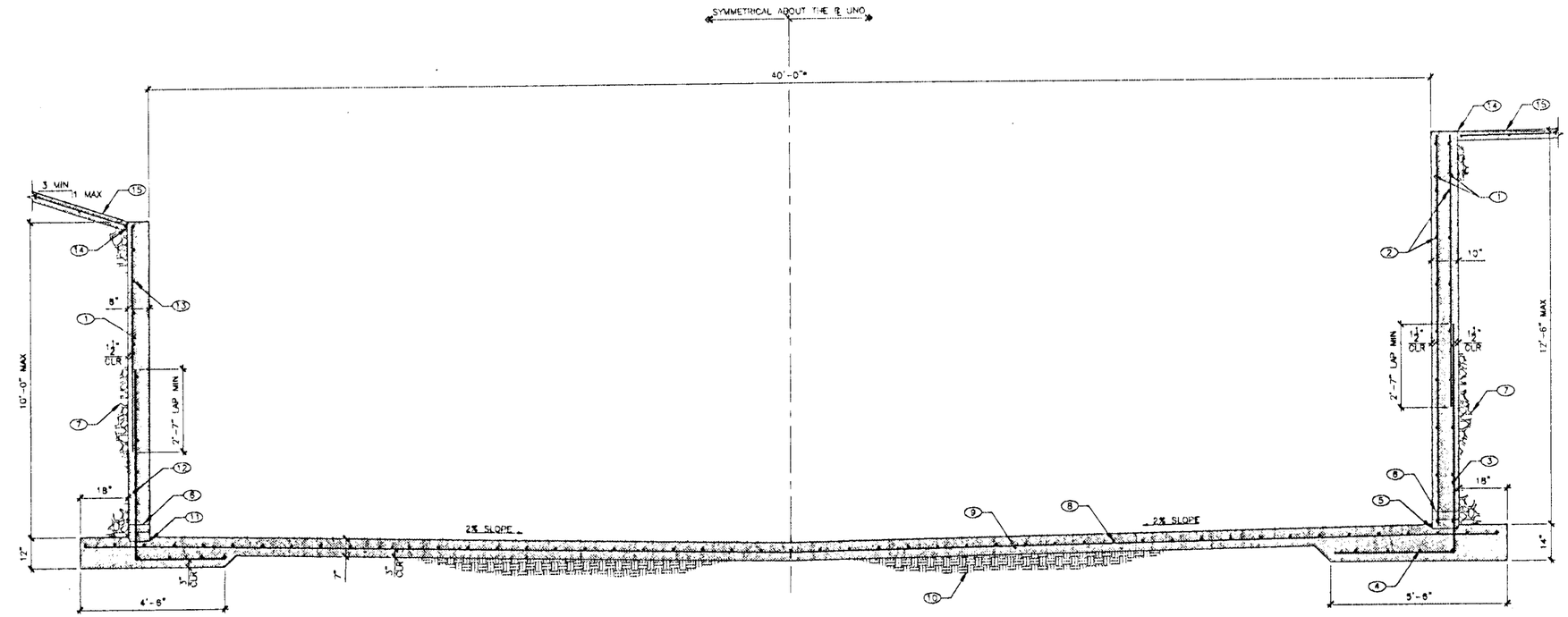
1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 8" O.C.
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 4" O.C.
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 9 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT &/O PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 7 1/4" KEY
12. #5 DOWEL AT 8" O.C.
13. #4 AT 12" O.C. HORIZ
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

SEAL: REGISTERED STATE OF NEVADA — DOUGLAS H. WEBER — 9556 — PROFESSIONAL ENGINEER — MAY 1, 1, 2002

DESIGNED: DW
DRAWN: KM
CHECKED: JS
APPROVED:

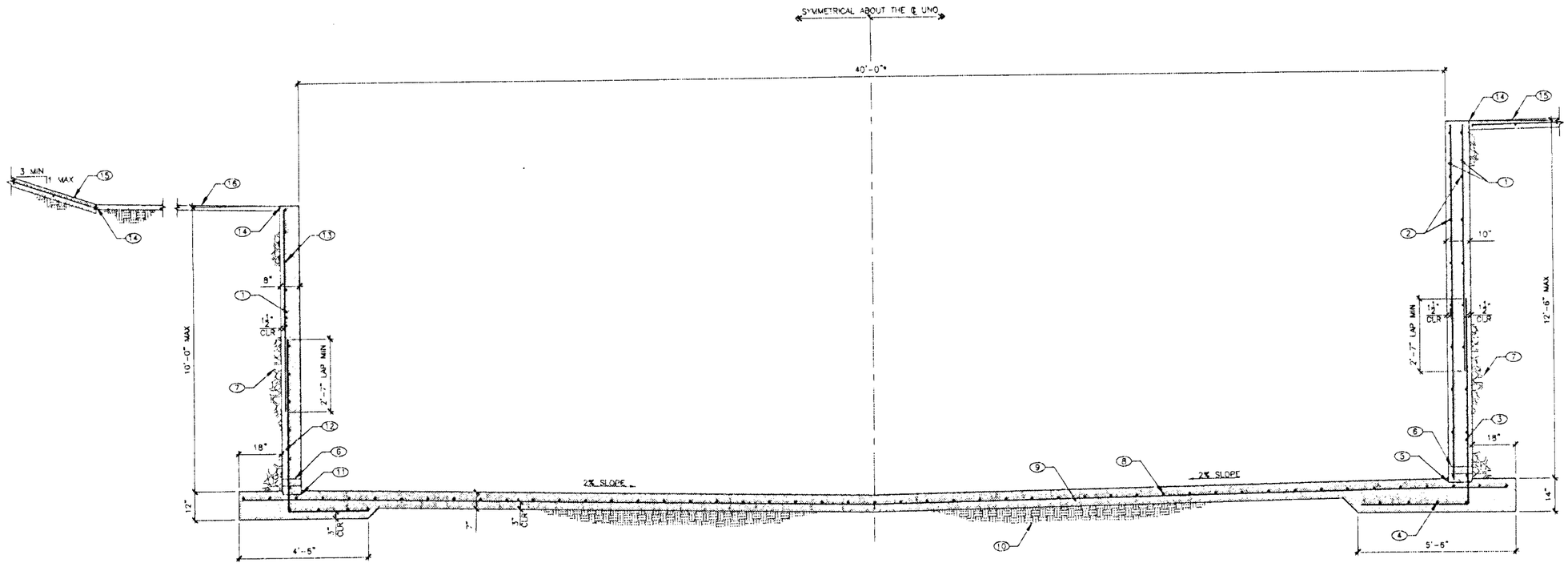
Specialty Structures Engineering & Design Company
Email@SSEDCo.com, 1553 E. Lincoln Rd. Idaho Falls, ID 83401
Phone 208-524-0889 Fax 208-552-9992

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

NO.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/16/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.1
26
35



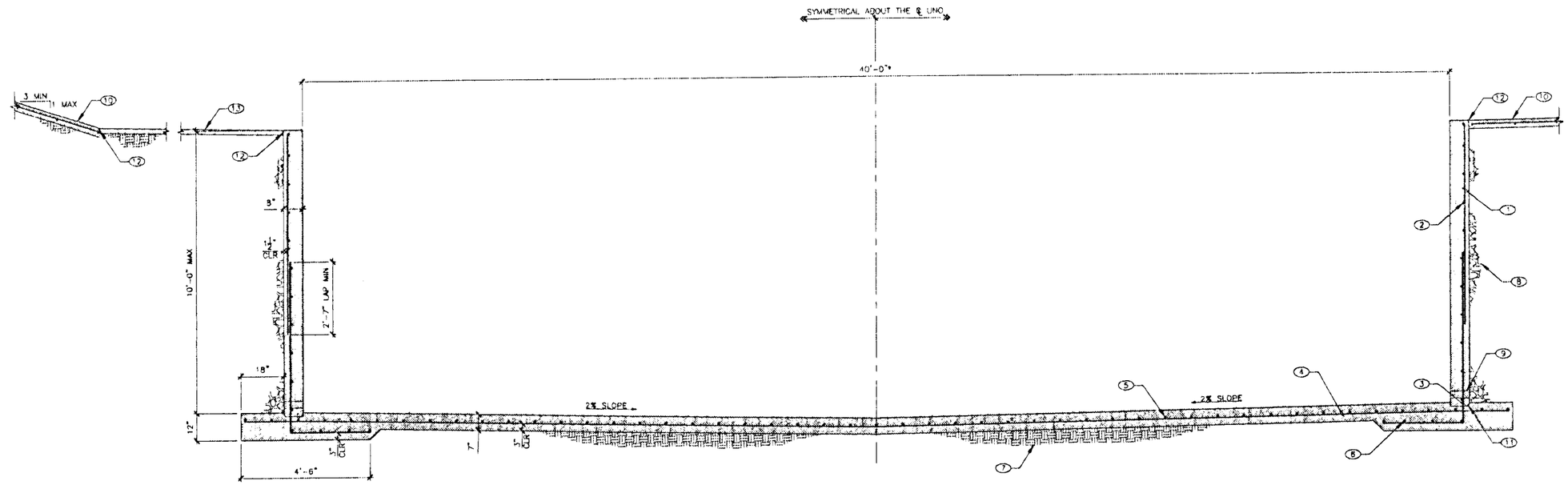
1 DRAINAGE CHANNEL RETAINING WALLS
1/2" SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 4" O.C. 86" / 45"
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 9 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/SD.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 7 1/4" KEY
12. #5 DOWEL AT 6" O.C. 72" / 34"
13. #4 AT 12" O.C. HORIZ
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
16. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "≈" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS
1/2" SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/SD.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "≈" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: REGISTERED STATE OF NEVADA — DOUGLAS H. WEBER — CIVIL — No. 15111 — PROFESSIONAL ENGINEER — MAY 13, 2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

Specialty Structural Engineering & Design Company
E-mail:jgs@SSEDcorp.com, 1533 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9702

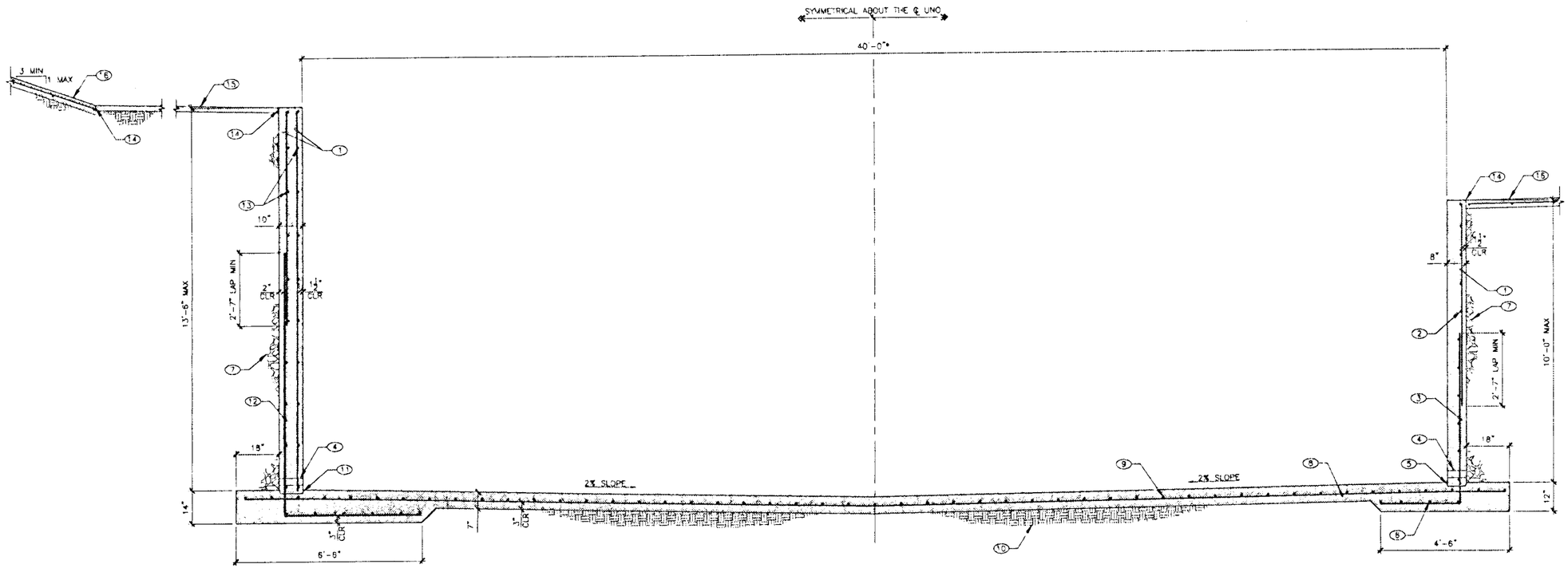
55600

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 0C100
SHEET NUMBER: S2.2 27/35



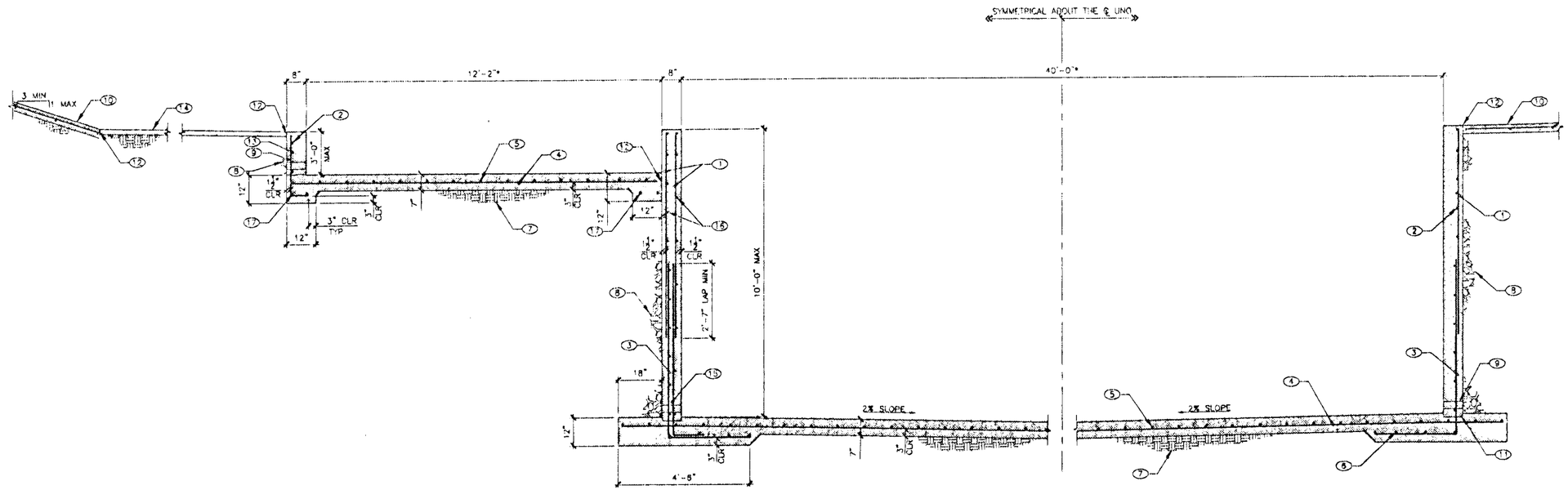
1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/SO.1
5. 1 1/2" DEEP x 7 1/4" KEY
6. #5 AT 12" O.C. LONGITUDINAL
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #4 AT 11" O.C. TRANSVERSE
9. #5 AT 11" O.C. LONGITUDINAL
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 10 1/4" KEY
12. #6 DOWEL AT 4" O.C. 113" / 57"
13. #4 AT 18" O.C. HORIZ
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
16. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/SO.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #4 DOWEL AT 12" O.C. VARIES / 8"
14. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
15. #5 DOWEL AT 6" O.C. 72" / 12"
16. #4 AT 18" O.C. HORIZ
17. (2) #4 CONT HORIZ

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 15 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

SEAL: DOUGLAS H. WORDEN, No. 15171, STATE OF NEVADA, REGISTERED PROFESSIONAL ENGINEER, MAY 13 2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

Specialty Structures Engineering & Design Company
E-mail:info@SSEDCo.com, 1533 E. Lancaster Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9902

PROJECT: PALM CITY C1 CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02180
SHEET NUMBER: S2.3 28/35

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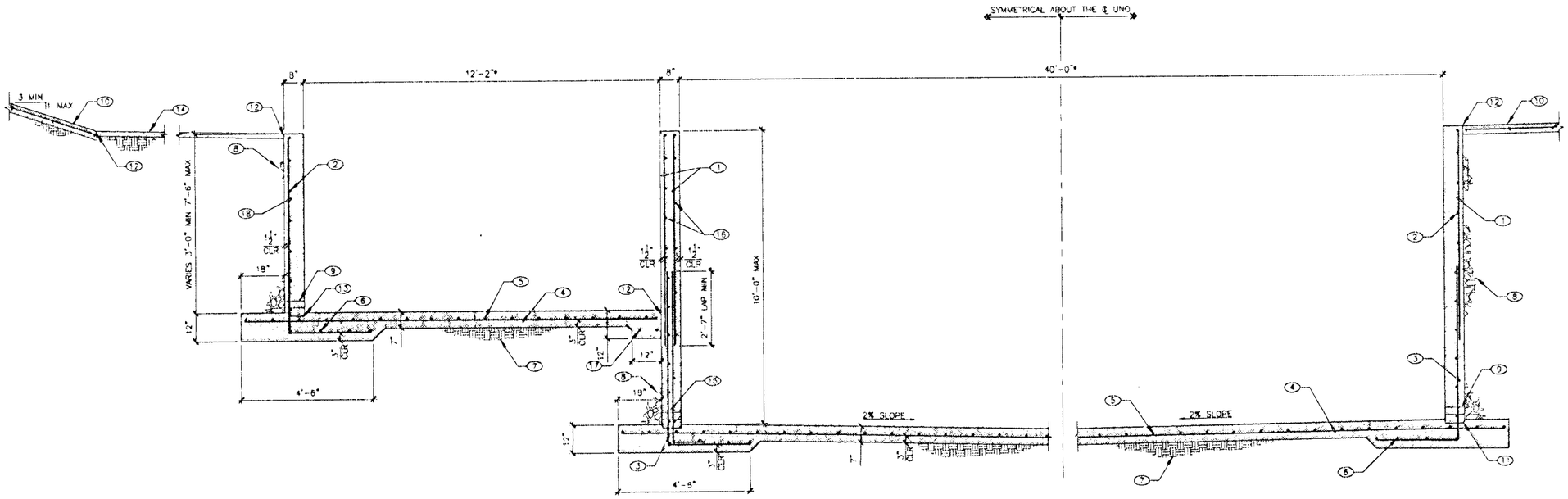


1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

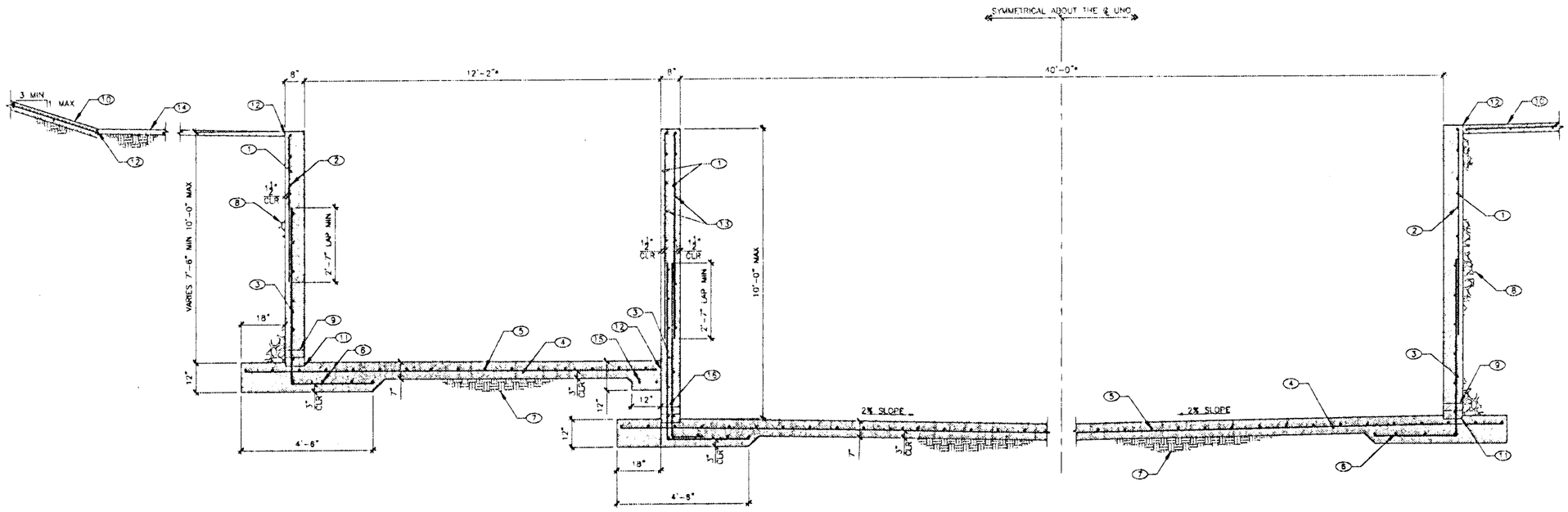
1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 1 1/2" DEEP x 5 1/2" KEY
14. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
15. #5 DOWEL AT 6" O.C. 72" / 12"
16. #4 AT 18" O.C. HORIZ
17. (2) #4 CONT HORIZ
18. #5 DOWEL AT 15" O.C. VARIES / 34"

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 15 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "e" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #4 AT 18" O.C. HORIZ
14. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
15. (2) #4 CONT HORIZ
16. #5 DOWEL AT 6" O.C. 72" / 12"

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 16 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED

B. "e" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J

C. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA DOUGLAS H. WEBER 15111 CIVIL — MAY 1, 2002

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

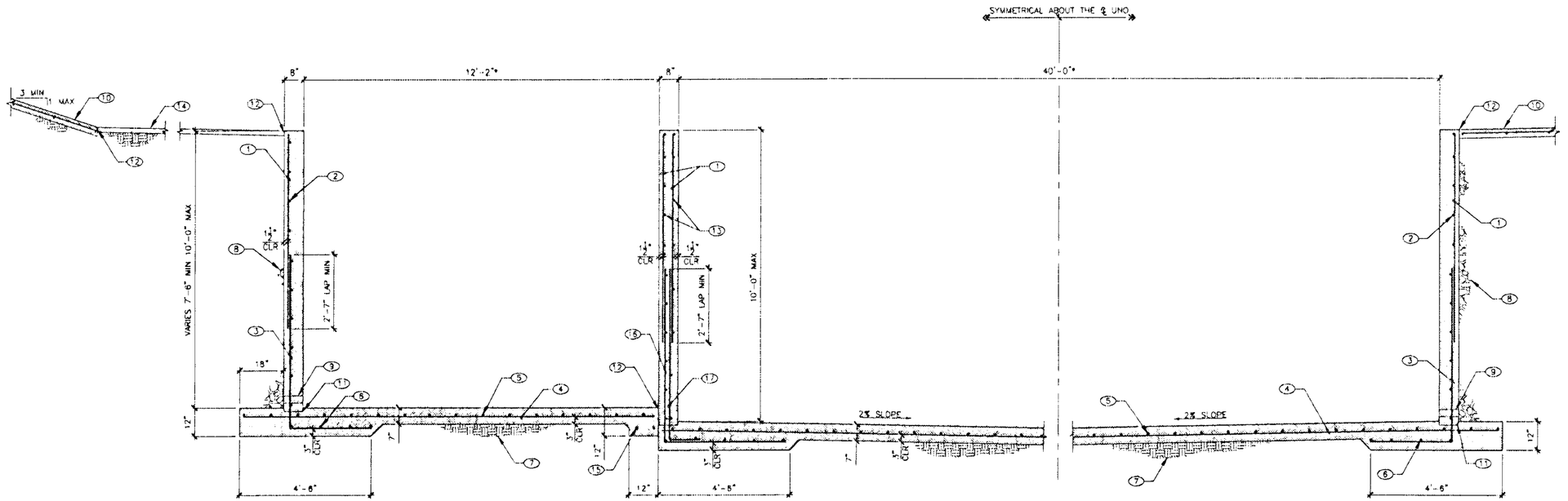
SSEDCO
Specialty Structures Engineering & Design Company
E-mail:@SSEDCo.com, 1553 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-6800 Fax: 208-552-9302

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.4 29/35



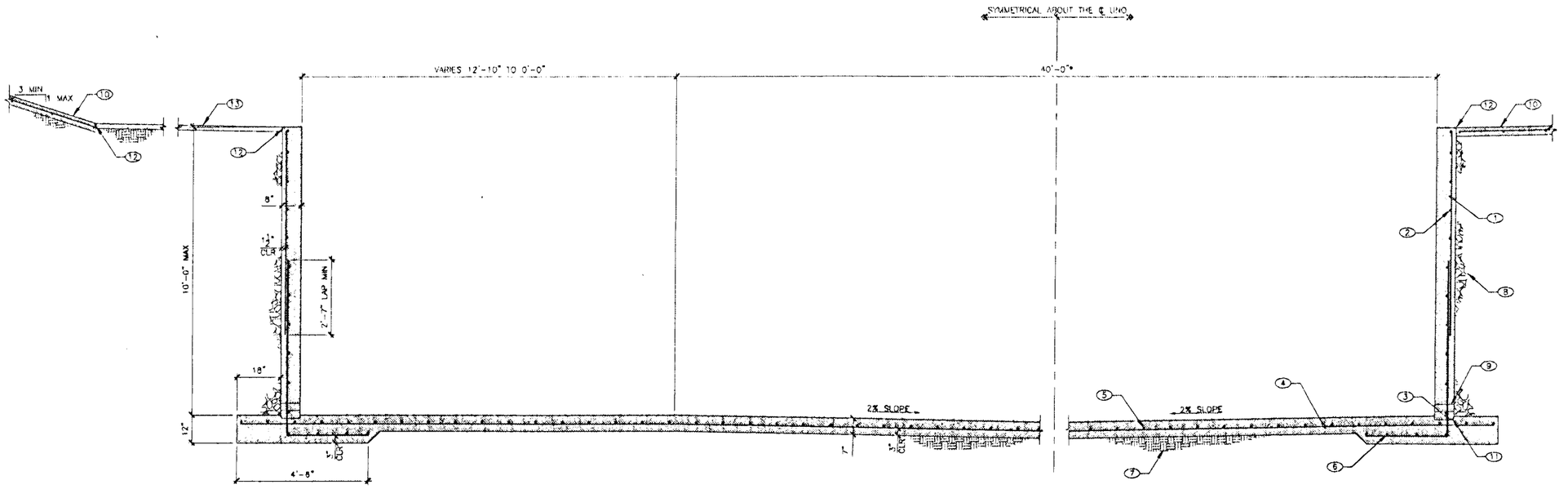
KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 8" O.C. 72" / 54"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. #4 AT 18" O.C. HORIZ
14. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
15. (2) #4 CONT HORIZ
16. #5 DOWEL AT 8" O.C. 72" / 50"
17. #5 DOWEL AT 6" O.C. 72" / 12"

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3, 15 AND 17 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE



KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. 72" / 34"
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP DETAIL 3/S0.1
10. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "±" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

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SEAL: REGISTERED ENGINEER, STATE OF NEVADA, DOUGLAS H. WEGER, CIVIL, No. 15171, DATE: JAN 18 2002

DESIGNED: DW
DRAWN: KH
CHECKED: JS
APPROVED:

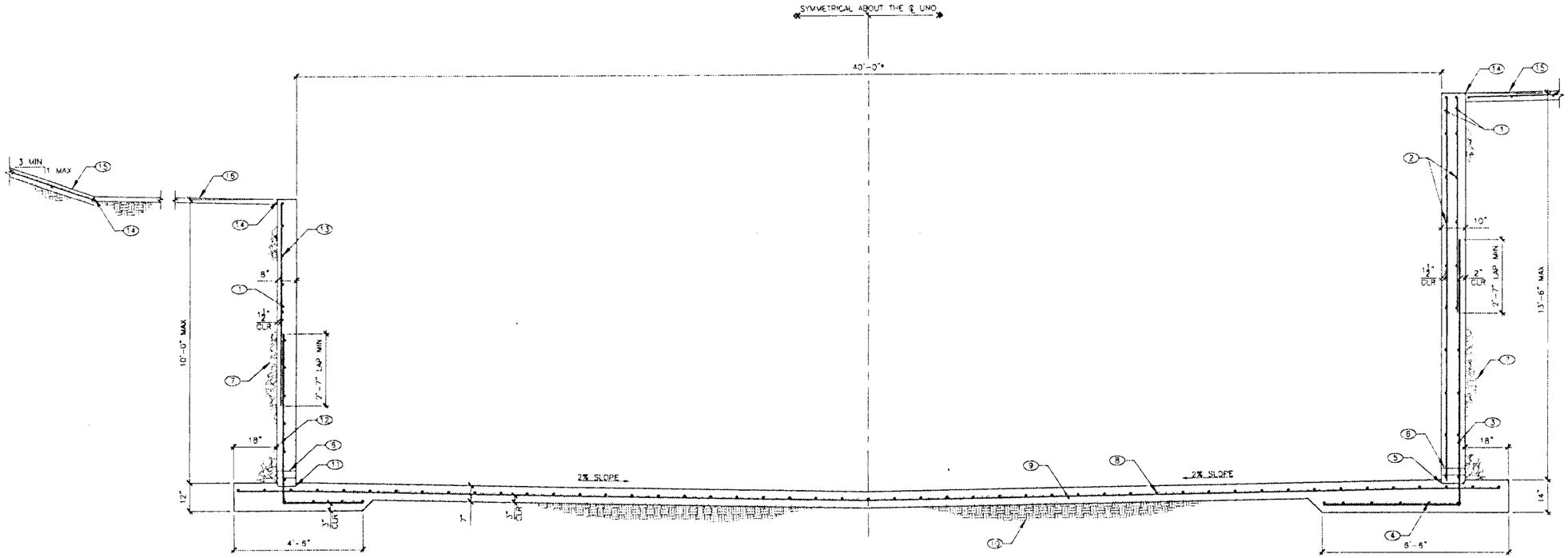
Specialty Structure Engineering & Design Company
E-mail@SASAKI.com, 1555 E. Lugoda Rd. Lugo Park, ID 83401
Phone 208-524-4600 Fax 208-522-9782

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/13/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.5 30/35



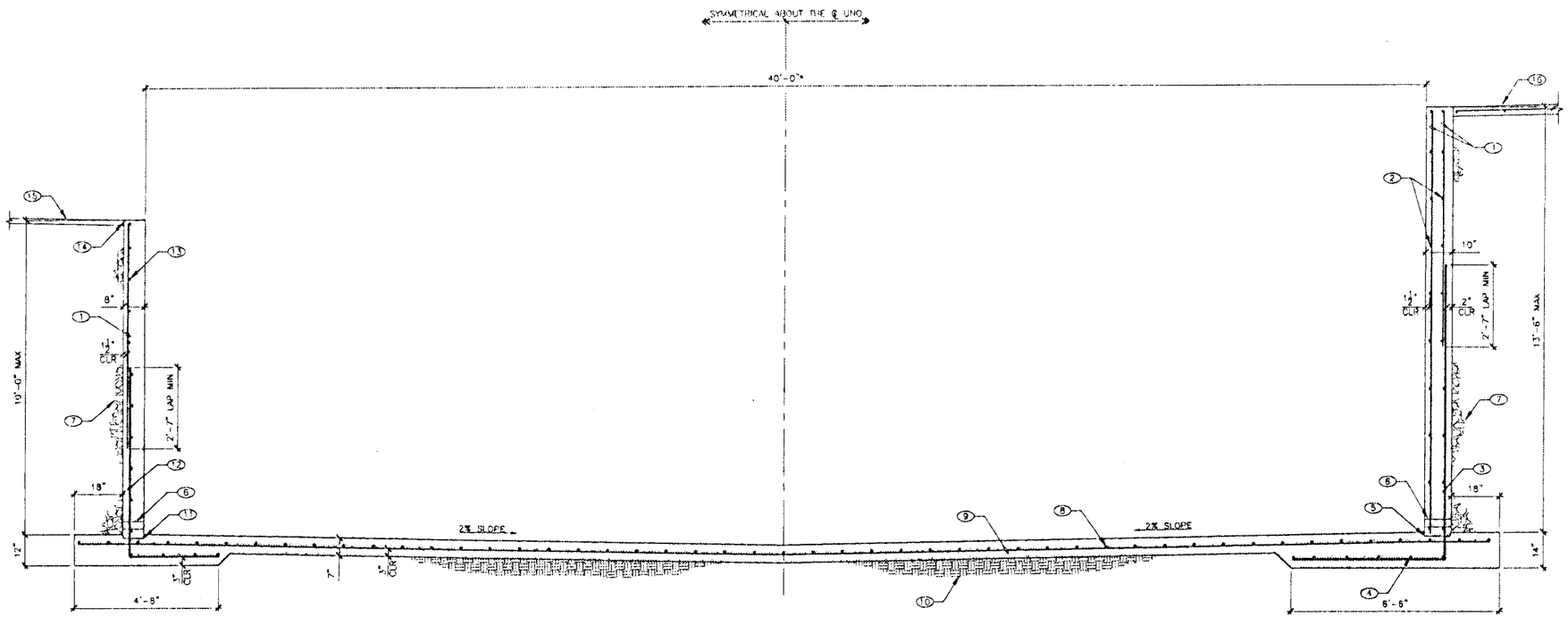
1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 4" O.C. 11.3° / 57"
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 10 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/SO.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 7 1/4" KEY
12. #5 DOWEL AT 8" O.C. 72° / 34"
13. #4 AT 12" O.C. HORIZ
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
16. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "e" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES



2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 4" O.C. 11.3° / 57"
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 10 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/SO.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 7 1/4" KEY
12. #5 DOWEL AT 8" O.C. 72° / 34"
13. #4 AT 12" O.C. HORIZ
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
16. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "e" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
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CHECKED: JS
APPROVED:
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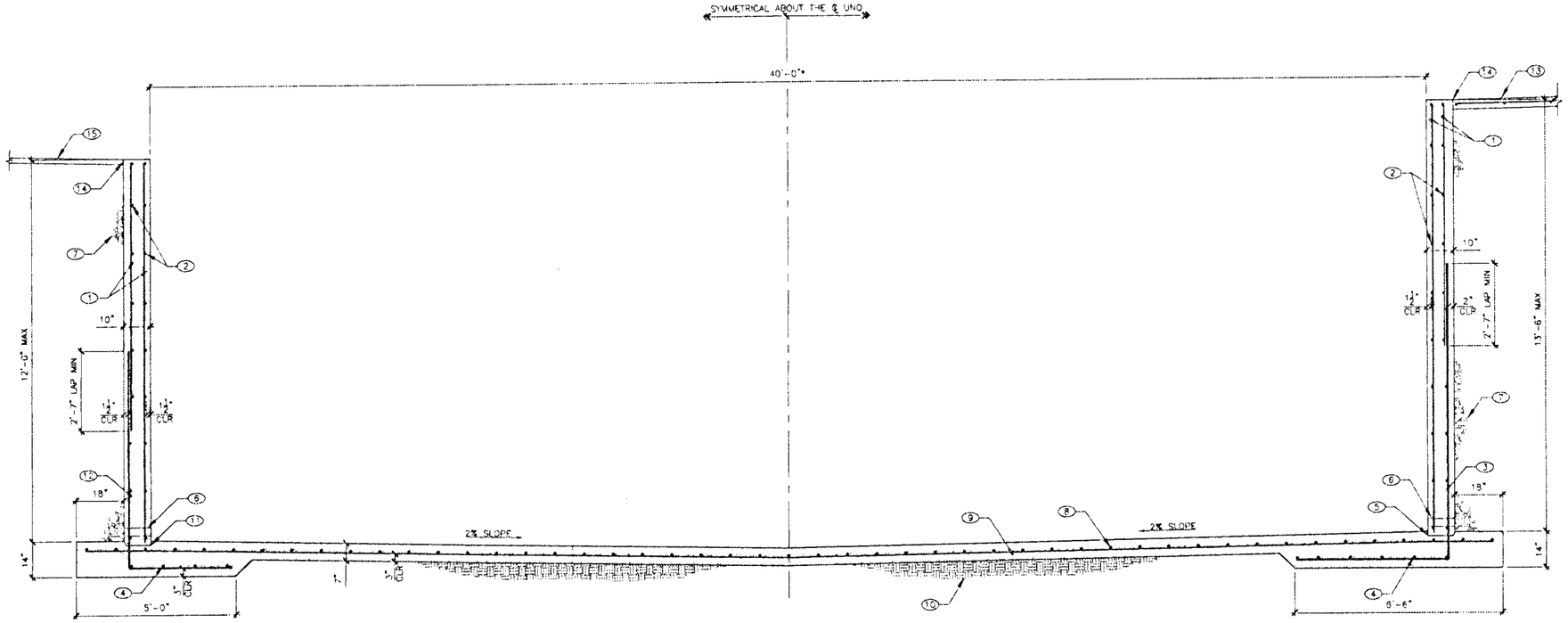
PROJECT
PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE:
SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/13/02
	SUBMITTED FOR APPROVAL	12/14/01

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.6
31 of 35



1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT.
2. #4 AT 18" O.C. HORIZ.
3. #5 DOWEL AT 4" O.C. | 113" / 57"
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 10 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL.
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 1 1/2" DEEP x 9 1/4" KEY
12. #5 DOWEL AT 4" O.C. | 83" / 39"
13. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
14. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
15. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 AND 12 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "#" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
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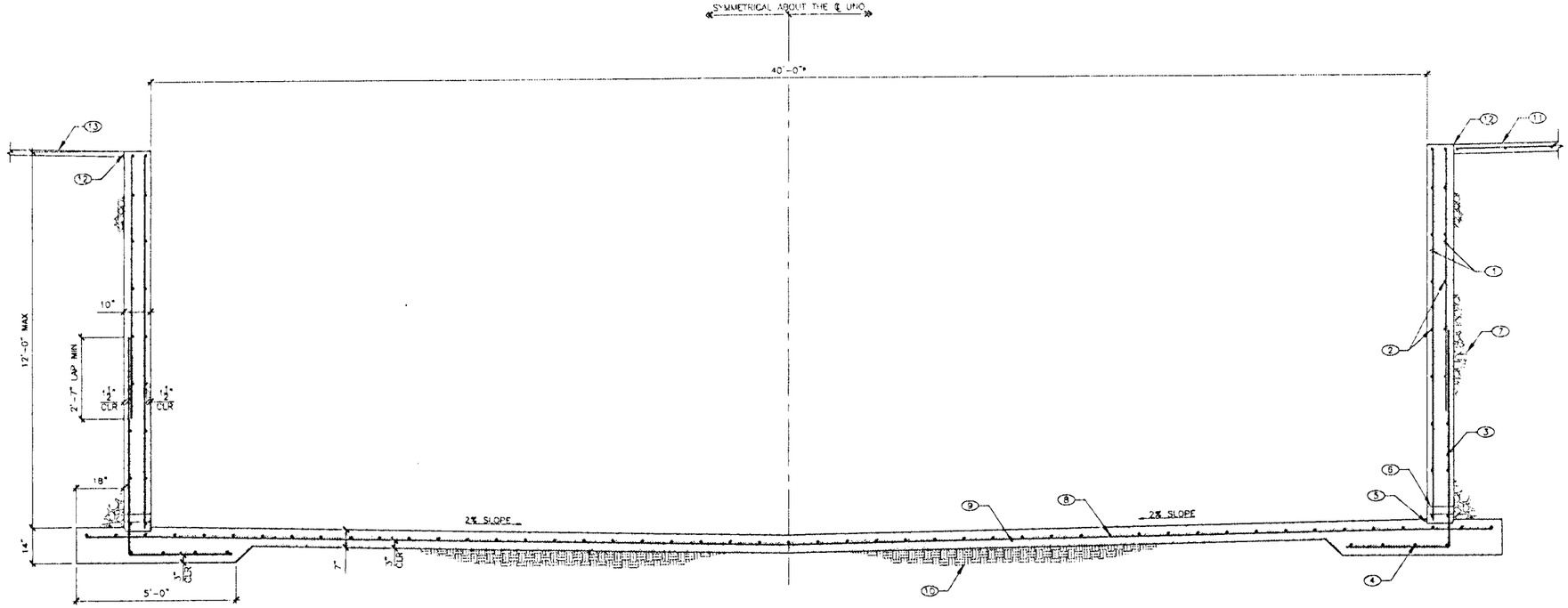

2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT.
2. #4 AT 18" O.C. HORIZ.
3. #5 DOWEL AT 4" O.C. | 83" / 39"
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 9 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL.
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
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SEAL: DOUGLAS H. WEBER, 9351, STATE OF NEVADA, REGISTERED PROFESSIONAL ENGINEER

DESIGNED: DW | DRAWN: KH | CHECKED: JS | APPROVED:

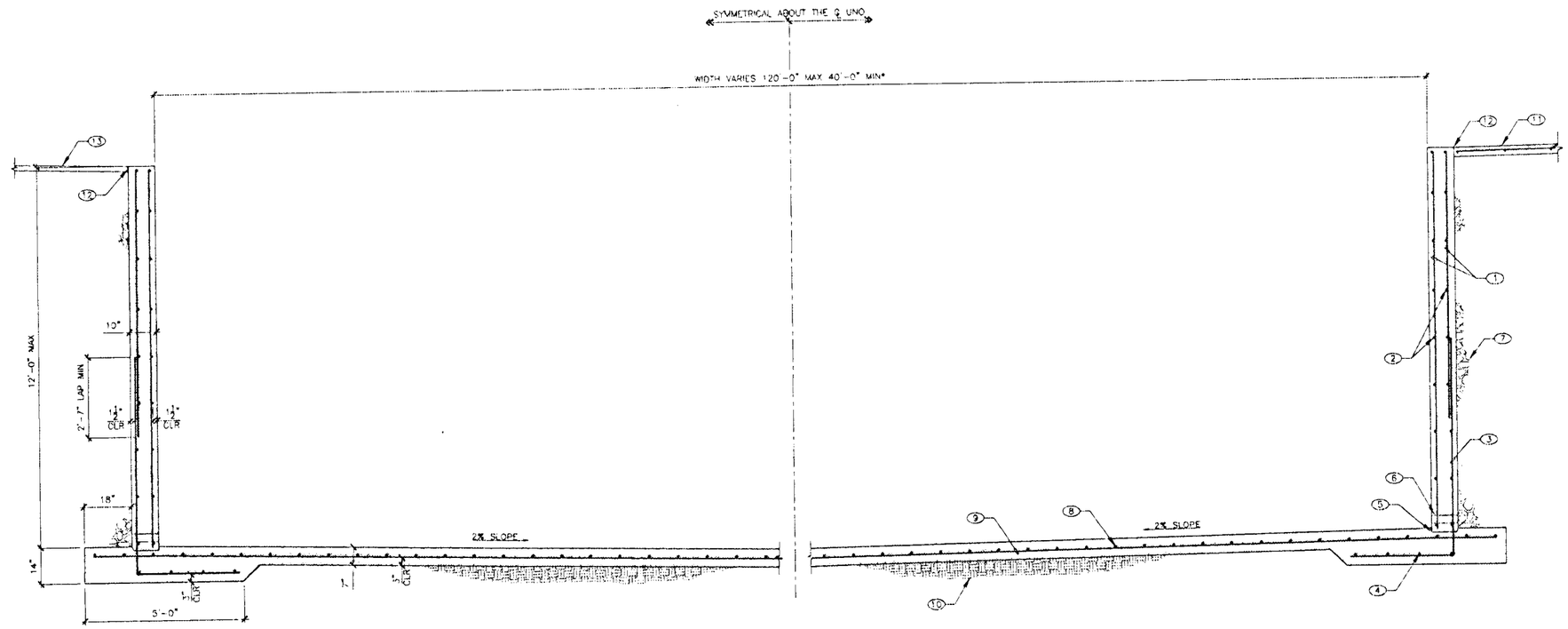
Specialty Structures Engineering & Design Company
Ronald&SSSD Corporate, 1553 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9302

PROJECT: PALM CITY Ct. CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV	DESCRIPTION	DATE
2	SUBMITTED FOR CONSTRUCTION	1/10/02
1	SUBMITTED FOR APPROVAL	5/13/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02109
SHEET NUMBER: S2.7 32 35



1 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 18" O.C. HORIZ
3. #5 DOWEL AT 4' O.C. (83" / 39")
4. #5 AT 12" O.C. LONGITUDINAL
5. 1 1/2" DEEP x 9 1/4" KEY
6. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
7. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
8. #5 AT 11" O.C. LONGITUDINAL
9. #4 AT 11" O.C. TRANSVERSE
10. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
11. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL

NOTES:

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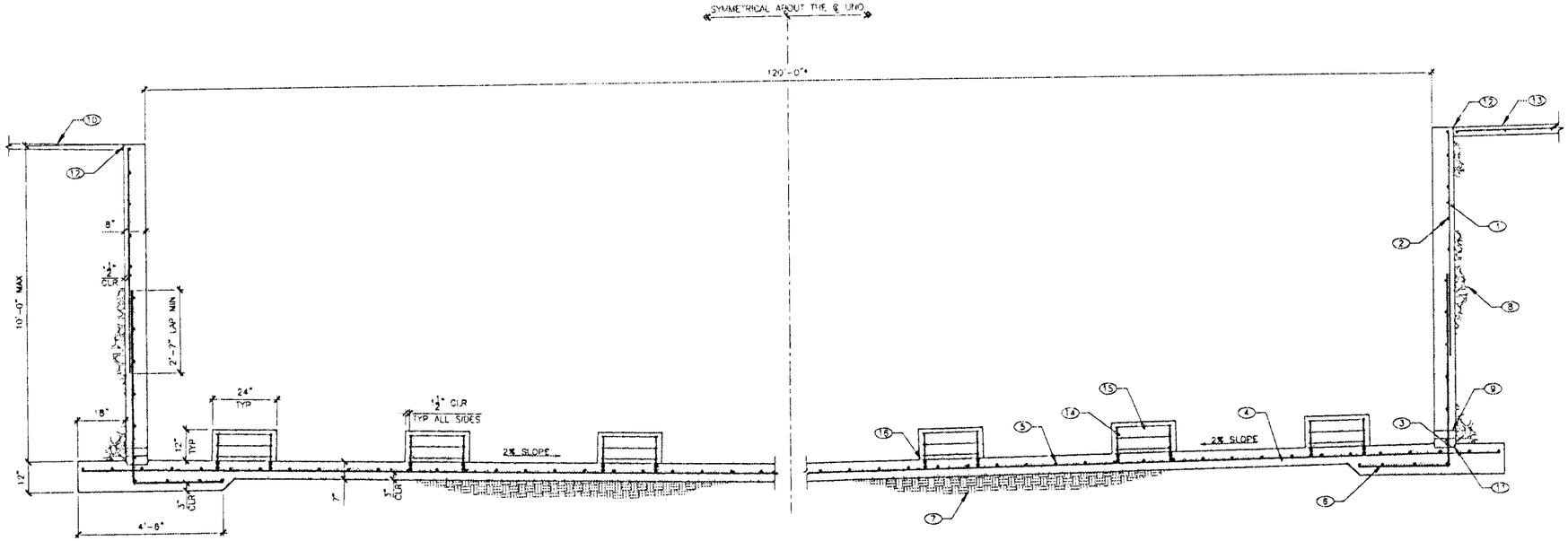

2 DRAINAGE CHANNEL RETAINING WALLS
NO SCALE

KEYNOTES:

1. #4 AT 18" O.C. VERT
2. #4 AT 12" O.C. HORIZ
3. #5 DOWEL AT 6" O.C. (72" / 34")
4. #4 AT 11" O.C. TRANSVERSE
5. #5 AT 11" O.C. LONGITUDINAL
6. #5 AT 12" O.C. LONGITUDINAL
7. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
8. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
9. 3"ø WEEP HOLE AT 120" O.C. AND ROCK POCKET, FILTER FABRIC PER TYP. DETAIL 3/S0.1
10. 2" AC PAVING OVER 4" TYPE II AGGREGATE BASE BY OTHERS, SEE CIVIL
11. 1 1/2" DEEP x 7 1/4" KEY
12. SEE DETAIL 10/S2.9 FOR COMPRESSION AND SEALANT REQUIREMENTS
13. 3 1/2" THICK CONCRETE PAVING W/ #3 AT 18" O.C. EA WAY CENTERED IN SLAB
14. #4x15" LONG EPOXY DOWEL W/ MIN OF 4" EMBEDMENT, (ONE DOWEL EA CORNER (4) TOTAL)
15. (3) #3 CLOSED TIES EQUALLY SPACED
16. CONSTRUCTION JOINT AT CONTRACTORS OPTION. EPOXY DOWELS MAY BE REPLACE W/ BENT DOWELS

NOTES:

A. AT CONTRACTOR'S OPTION, VERT REINF PER KEYNOTE 3 MAY BE EXTENDED FULL WALL HEIGHT AND VERT REINF PER KEYNOTE 1 MAY BE ELIMINATED
B. "A" VERIFY ALL DIMENSIONS W/ CIVIL DRAWINGS BY PBS&J
C. CHAMFER ALL EXTERIOR CONCRETE EDGES

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SEAL: DOUGLAS M. HEISLER, STATE OF NEVADA, 15717, CIVIL ENGINEER
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APPROVED:
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1353 E. Lincoln Rd. Idaho Falls, ID 83401
E-mail@SSEDCo.com
Phone: 208-524-0800
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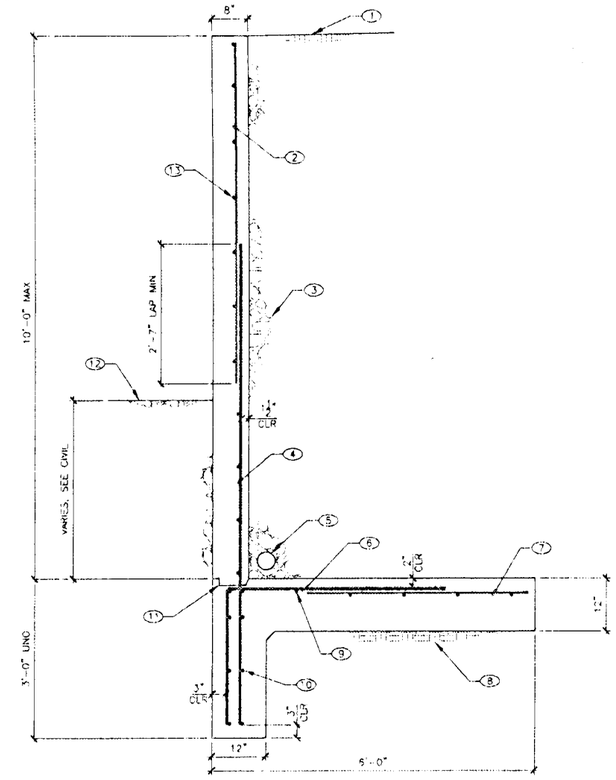
PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: SECTIONS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

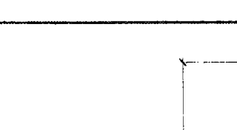
DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.8 33/35



KEYNOTES:

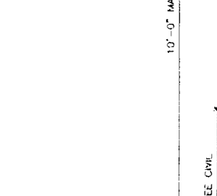
1. FINAL GRADE
2. #4 AT 18" O.C. VERT
3. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
4. #5 x 108" DOWEL AT 7" O.C.
5. 4"ø PERFORATED PVC PIPE W/ FILTER FABRIC
6. #5 BENT DOWEL AT 9" O.C. 48" 30"
7. #4 AT 12" O.C. TRANSVERSE, SEE LAP SCHEDULE
8. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
9. #4 AT 12" O.C. LONGITUDINAL
10. #4 AT 12" O.C. EA FACE
11. 1 1/2" DEEP x 6 1/2" KEY
12. FINAL GRADE PER CIVIL DRAWINGS. TOP OF GRADE TO MATCH TOP OF FOOTING MIN
13. #4 AT 12" O.C. HORIZ

8 RETAINING WALL SECTION 10'-0" MAX
NO SCALE

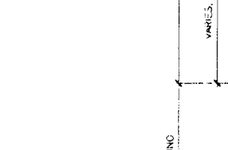


CONDITION A

CONDITION B



CONDITION C



CONDITION D

KEYNOTES:

1. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL
2. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
3. BOND BREAKER TAPE

NOTE:

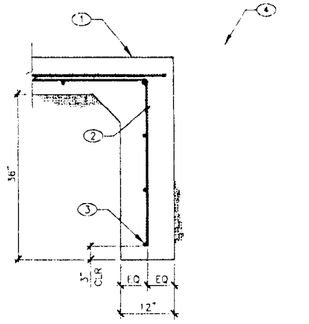
DIMENSIONS SHOWN ARE TYPICAL IN ALL CONDITIONS

10 TYPICAL EXPANSION JOINT
NO SCALE

KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. (2) #4 AT 12" O.C. CONT HORIZ
3. EXISTING CUT OFF WALL
4. 5/8"øx19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

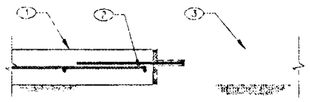
9 EXPANSION JOINT AT CHANNEL BOTTOM
NO SCALE



KEYNOTES:

1. TOP OF CHANNEL BOTTOM SEE SECTIONS FOR ADDITIONAL REQUIREMENTS
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. GROUTED RIP-RAP, SEE CIVIL DRAWINGS

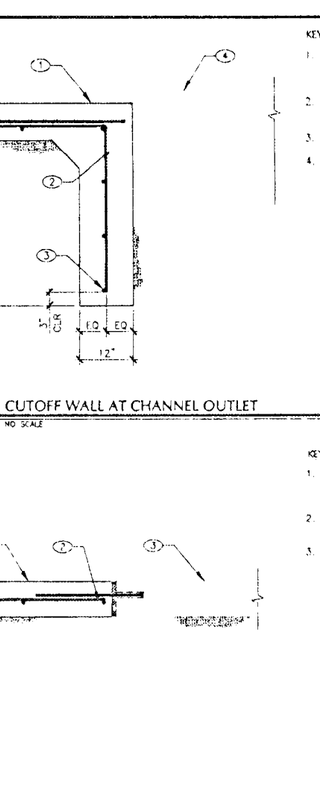
5 CUTOFF WALL AT CHANNEL OUTLET
NO SCALE



KEYNOTES:

1. INSIDE FACE OF CHANNEL WALL, SEE SECTIONS FOR ADDITIONAL REQUIREMENTS
2. DRILL AND EPOXY #4x24" DOWEL AT 12" O.C. W/ 8" EMBEDMENT
3. EXISTING STRUCTURE WALL

6 EXPANSION JOINT AT EXISTING STRUCTURE
NO SCALE



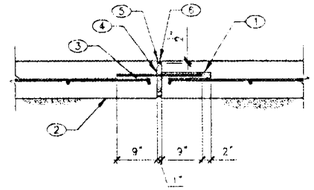
KEYNOTES:

1. #3 TIES AT 10" O.C.
2. BOX CULVERT BY OTHERS, SEE CIVIL FOR ADDITIONAL INFORMATION
3. (4) #5 EPOXY DOWELS EA FACE AT CONCRETE STIFFENER, PROVIDE 6" MIN EMBEDMENT INTO BOX CULVERT
4. FINAL GRADE

NOTE:

FOR ITEMS SHOWN BUT NOT NOTED SEE DETAIL 1/S2.3 AND 1/S2.6

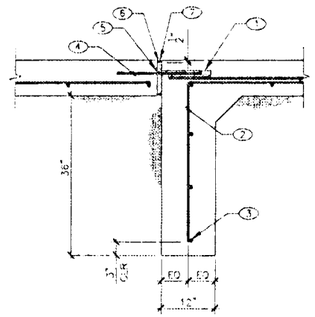
7 BOX CULVERT AT DRAINAGE CHANNEL RETAINING WALL
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. OUTSIDE FACE OF WALL
3. 5/8"øx18" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
4. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
5. BOND BREAKER TAPE
6. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-20" OR APPROVED EQUAL

1 EXPANSION JOINT AT CHANNEL WALL
NO SCALE



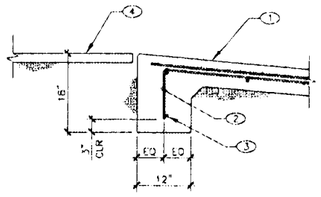
KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. 5/8"øx19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-20" OR APPROVED EQUAL

NOTE:

A. JOINTS SHALL OCCUR AT 90'-0" O.C. MAX

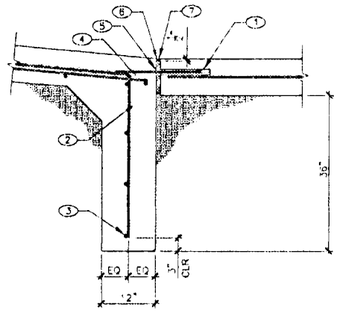
2 EXPANSION JOINT AT CHANNEL BOTTOM
NO SCALE



KEYNOTES:

1. ENTRANCE RAMP SEE DETAILS FOR ADDITIONAL REQUIREMENTS
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 18" O.C. CONT HORIZ
4. CIVIL FLATWORK, SEE CIVIL DRAWINGS

3 TURN DOWN AT RAMP ENTRANCE
NO SCALE



KEYNOTES:

1. 5/8"ø ID PLASTIC SLEEVE AS MANUFACTURED BY SPEED DOWEL OR APPROVED EQUAL
2. #5 BENT DOWEL TO LAP AND MATCH SLAB REINF
3. #4 AT 12" O.C. CONT HORIZ
4. 5/8"øx19" SMOOTH EPOXY COATED DOWELS AT 12" O.C. ALIGN ALL DOWELS TO BE SQUARE WITH WALL OR SLAB HORIZ AND VERT DOWEL ALIGNMENT TO BE CHECKED BEFORE CONCRETE IS POURED
5. NON-EXTRUDING PREMOLDED COMPRESSION MATERIAL
6. BOND BREAKER TAPE
7. SEALANT 2-COMPONENT POLYURETHANE "SIKAFLEX-2C" OR APPROVED EQUAL

4 TURN DOWN AT RAMP OUTLET
NO SCALE

SEAL: REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA KEITH HUGHES 9870 CIVIL

DESIGNED: DW
DRAWN: KH
CHECKED: JS
APPROVED:

Specialty Structures Engineering & Design Company
E-mail@SSEDCo.com, 1535 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0800 Fax: 208-552-9202

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: DETAILS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/01
	SUBMITTED FOR APPROVAL	3/13/02
	SUBMITTED FOR APPROVAL	12/1/02

DATE: JANUARY 21, 2003
PROJECT NUMBER: 0210.0
SHEET NUMBER: S2.9 34 35

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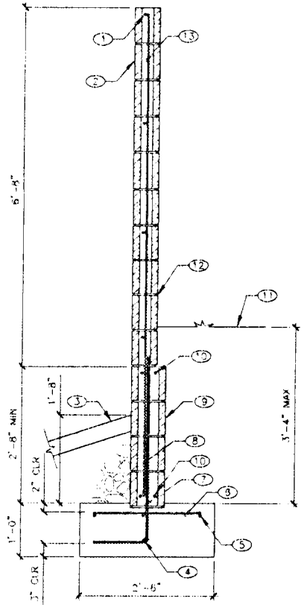


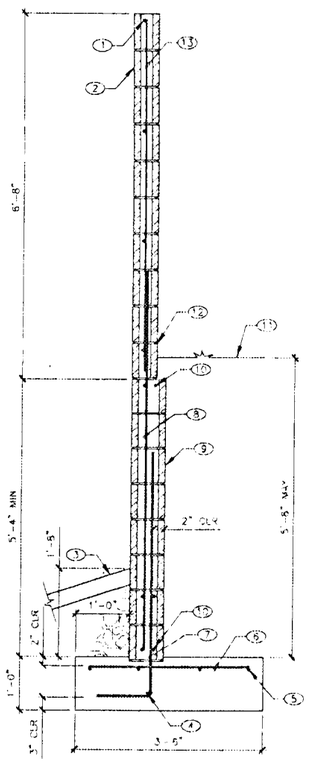
KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (3) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 24" O.C. (CENTERED) 10" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

NOTE:

A. RETAINING MAY BE ON EITHER SIDE OF WALL

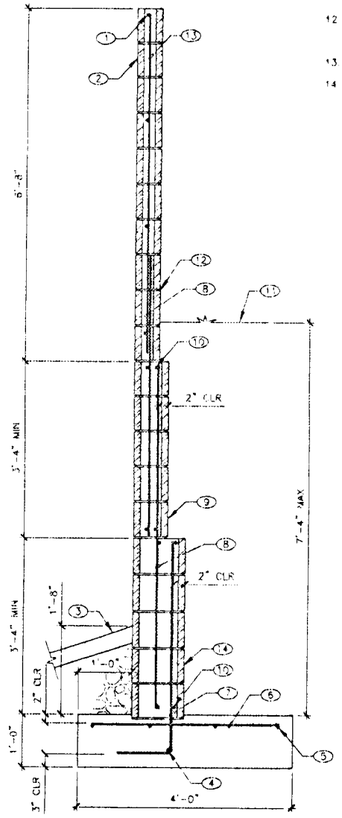
5 MASONRY RETAINING WALL 3'-4" MAX
NO SCALE



KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 8" O.C. 55" / 12"
8. #4 AT 24" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 48" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

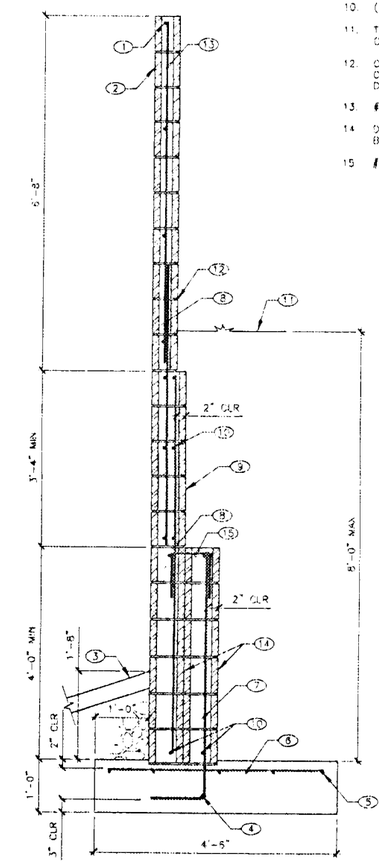
3 MASONRY RETAINING WALL 5'-8" MAX
NO SCALE



KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 8" O.C. 47" / 12"
8. #4 AT 24" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 40" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)
14. 12" CMU GROUTED SOLID BELOW GRADE

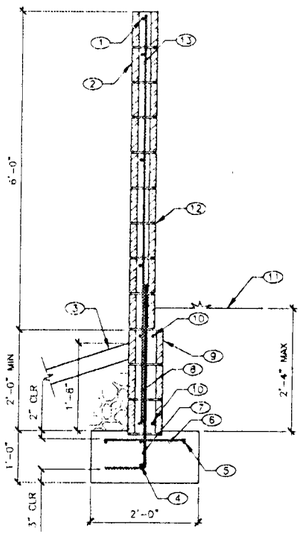
2 MASONRY RETAINING WALL 7'-4" MAX
NO SCALE



KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (5) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #5 DOWELS AT 24" O.C. 55" / 12"
8. #4 AT 24" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 48" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)
14. DBL 8" CMU GROUTED SOLID BELOW GRADE
15. #4 TIES AT 8" O.C. 2" / 10" / 10"

1 MASONRY RETAINING WALL 8'-0" MAX
NO SCALE



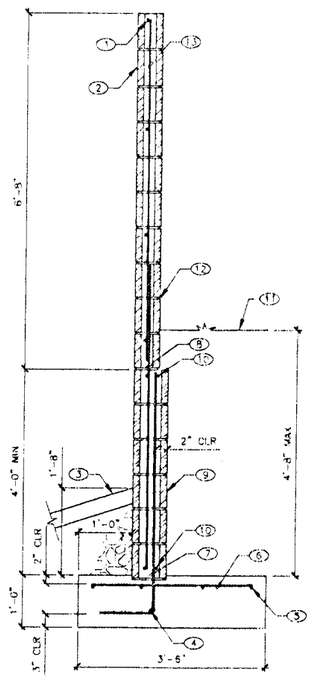
KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (3) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #4 DOWELS AT 24" O.C (CENTERED) 40" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

NOTE:

A. RETAINING MAY BE ON EITHER SIDE OF WALL

6 MASONRY SCREEN WALL W/ RETAINING WALL 3'-4" MAX
NO SCALE



KEYNOTES:

1. #4 AT 24" O.C. HORIZ
2. 6" CMU GROUTED SOLID BELOW GRADE
3. 3 1/2" THICK CONCRETE PAVING
4. #4 CONT
5. (4) #4 CONT
6. #4 TRANSVERSE AT 18" O.C.
7. #4 DOWELS AT 16" O.C. 55" / 12"
8. #4 AT 48" O.C. VERT W/ 30" MIN LAP
9. 8" CMU GROUTED SOLID BELOW GRADE
10. (2) #4 AT 48" O.C. HORIZ
11. TOP OF LEVEL NATURAL GRADE OR COMPACTED SUBGRADE
12. OMIT HEAD JOINT IN FIRST COURSE ABOVE GRADE FOR DRAINAGE
13. #4 AT 48" O.C. VERT (CENTERED)

4 MASONRY RETAINING WALL 4'-8" MAX
NO SCALE

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SEAL: STATE OF NEVADA — DOUGLAS H. WEBER — No. 15141 — PROFESSIONAL ENGINEER — CIVIL

DESIGNED: DW
DRAWN: KH
CHECKED: JS
APPROVED:

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E-mail@SSEDCO.com 1353 E. Lincoln Rd. Idaho Falls, ID 83401
Phone: 208-524-0900 Fax: 208-552-9302

PROJECT: PALM CITY CI CHANNEL (PHASE 2)
TUSCANY HILLS DEVELOPMENT
HENDERSON, CLARK COUNTY, NV

SHEET TITLE: DETAILS

REV.	DESCRIPTION	DATE
	SUBMITTED FOR CONSTRUCTION	5/10/02
	SUBMITTED FOR APPROVAL	3/15/02
	SUBMITTED FOR APPROVAL	1/21/02

DATE: JANUARY 21, 2002
PROJECT NUMBER: 02100
SHEET NUMBER: S2.10 35/35