MIDDLE BRANCH BLUE DIAMOND WASH

Conditional Letter of Map Revision

(Silverton Phase I-Bass Pro Shops)

JOB# 6923.2

October 2003

Prepared for:

COMMERCE CONSTRUCTION COMPANY

Prepared By:
LOCHSA ENGINEERING
5828 Spring Mountain Road
Suite 308
Las Vegas, Nevada 89146-8896
(702) 365-9312

LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

October 10, 2003

FEMA Map Coordination Contractor
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

Subject: **CLOMR for portion of Middle Branch Blue Diamond Wash within Silverton Hotel/Casino**

ATTN: FEMA Map Coordinator Contractor

Lochsa Engineering has been contracted by Commerce Construction Company to complete a Conditional Letter of Map Revision(CLOMR) for a portion of the Middle Branch Blue Diamond Wash (hereinafter referred to as Wash) located within the Silverton property in Clark County, Nevada. The purpose of this CLOMR is to revise the Effective Flood Insurance Rate Map (FIRM) Community Panel number 32003C2566E to reflect the constructed improvements of the Wash within the property. The affected Community Panel is dated September 27, 2002 and revised to reflect LOMR dated August 13, 2003. The current FIRM panel indicate the subject segment of the Middle Branch Blue Diamond Wash as Zone AE Special Flood Hazard Area (SFHA). Zone AE is designated by FEMA as areas inundated by 100-year flood with determined base flood elevations.

The following information is enclosed supporting this request for a CLOMR. This request is based on the constructed improvements within the property. The flood control improvements consist of proposed two storm drain lines to convey runoff flows eastward through the property towards Interstate 15. Proposed storm drain "Line A" intercepts and conveys the eastward runoff flows traveling within the parking lot just south of the existing Silverton Hotel/Casino. The proposed storm drain "Line B" intercepts and conveys portion of the eastward runoff flows near Shelborne Avenue alignment. Both storm drains are joined downstream at a junction box to return flows to historical path onto I-15 right-of-way.

A review fee check in the amount of $4000 payable to the National Flood Insurance Program has been forwarded to the FEMA Fee-Collection System Administrator.
Effective FIRM Panel 32003C2566E
Figure 3, Annotated FIRM with proposed revisions
FEMA Forms
Hydrologic Summary
Hydraulic Modeling
References
Electronic Files on disk
Design Drawings

1. Hydrologic Modeling

The hydrologic analysis utilized in this CLOMR is referenced from the Effective HEC-1 model, DUCK3.XLS, which was submitted with the Duck Creek/Blue Diamond Washes FIS Restudy as prepared by G.C.Wallace, Inc. and LOMR Case No. 03-09-0980X and effective August 13, 2003. The effective FIS Restudy determined the runoff flows impacting the Industrial Road/Blue

Diamond Road Intersection to be 764 cfs, which further splits towards the Silverton Hotel/Casino(391 cfs) and the Shelborne Avenue alignment (373cfs). The peak flow rate utilized in this CLOMR for the runoff through the Silverton Hotel/Casino Parking Lot per the FIS Restudy is 391 cfs. The runoff impacting the parking lot will split through the northern and southern parking lots around the existing Silverton Hotel/Casino building. The provided hydraulic modeling with this CLOMR determines 27cfs to be conveyed south of the Hotel. The proposed storm drain "Line A" intercepts and conveys the 27cfs eastward towards the existing 4:12'x4' RCB underneath I-15.

The peak flow rate for the runoff through the site near Shelborne Avenue alignment per the FIS Restudy is 373 cfs. The proposed storm drain "Line B" intercepts and conveys the majority of these flows eastward towards the existing 4:12'x4' RCB underneath I-15.

A copy of the FIS Restudy approval letter from FEMA and the relevant reference materials are included with this report.

2. Hydraulic Modeling

2.1 Existing Condition

2.1.1. Silverton Hotel/Casino Parking Lot

The U.S. Arm Corps of Engineers HEC-RAS computer program was used for the hydraulic analysis of the existing conditions. Three HEC-RAS models were developed to accurately analyze the runoff flows conveyed through the Silverton Hotel/Casino parking lot. The purpose of the 'Flow Split' model is to determine water surface elevations(WSE) through the parking lot between Industrial Road and the existing Hotel/Casino building. The limits of the hydraulic modeling begin upstream of the Hotel/Casinoat HEC-RAS station -750 and extend approximately 650 feet upstream to HEC-RAS station -1+00. The peak runoff flow rate utilized in the model is 391 cfs, as determined in the effective FIS Restudy. The model is also used to determine the hydraulic characteristics of flow just upstream the Silverton building (River Station -700) necessary to carry out the split flow analysis. Split flow analysis is carried out using FlowMaster to determine flows north and south of the existing Hotel/Casino building. The energy slope approaching the building at HEC-RAS station -700 is used in a matching FlowMaster section to produce the same WSE at the same flow value (391 cfs). Due to the introduction of a non effective flow area at station -700 in the HEC-RAS analysis, the slope used in the FlowMaster section to produce the same WSE slightly differs from the HEC-RAS energy slope. The FlowMaster section is then split into two sections to represent the sections north and south of the Hotel/Casino building. Maintaining the same WSE and the determined slope from the FlowMaster analysis, the flows in the north and south sections are determined. To check the results of the flow split analysis, the north and south flows are added up and the sum is compared with the 391 cfs flow value. The north and south flows are then corrected maintaining the same split ratio determined in the FlowMaster analysis. Using this split flow analysis, flows through the north and south parking lots are determined to be 364 and 27 cfs, respectively.

The 'Existing-North Parking' model is developed to model runoff flows north of the Silverton Hotel/Casino within the parking lot. The limits of the hydraulic modeling begin upstream of Interstate 15 at HEC-RAS station -23+00 and extend approximately 1650 feet upstream to HEC-RAS station -7+00. The peak runoff flow rate utilized in the model is 364 cfs, as determined from the Split Flow analysis around the building. The existing 4:12'x4' RCBC's underneath I-15 represents the downstream end of the model. The starting WSE at the downstream boundary for the model is set to 2268-ft per the FIS Restudy. This is also in agreement with the highest headwater elevation determined from the inlet nomograph for the existing 4:12'x4' RCB underneath I-15, as shown in the Appendix.

The 'Existing-South Parking' model is developed to model runoff flows south of the Silverton Hotel/Casino within the parking lot. The limits of the hydraulic modeling begin upstream of Interstate 15 at HEC-RAS station 0+25 and extend approximately 980 feet upstream to HEC-RAS station 8+60. The peak runoff flow rate utilized in the model is 27 cfs, as determined from the Split Flow analysis around the building. The existing 4:12'x4' RCBC's underneath I-15 represents the downstream end of the model. The starting WSE at the downstream boundary for the model is set to 2268-ft per the FIS Restudy.

Existing condition cross sections for the HEC-RAS models have utilized a 1-foot contour areal to represent the actual field condition. The location of the cross sections and the topography are included in the Appendix of this report for reference.

2.1.2. Shelborne Avenue Alignment

The 'Shelborne Ave. Ex' HEC-RAS model is developed to model runoff flows through Shelborne Channel alignment. The limits of the hydraulic modeling begin upstream I-15 at HEC-RAS station 0+50 and extend approximately 345 feet west(upstream) of Industrial Road centerline at HEC-RAS station 7+96. As shown in the HEC-RAS model, runoff flows will overtop Industrial Road and continue eastward due to the limited capacity of the existing 2: 5.5' x 3' RCB underneath Industrial Road. Due to the low point along Industrial Road alignment at Shelborne alignment, the overtopping flows continue eastward across Industrial Road and back to the Shelborne Channel. Existing condition cross sections for the HEC-RAS model have utilized the 1-foot contour areal to represent the actual field condition. The location of the cross sections and the topography are included in the Appendix of this report for reference.

2.2 Proposed Condition

2.2.1. Proposed Storm Drain Line A

Line A storm drain is designed to intercept onsite and offsite flows impacting the Silverton Hotel/Casino southern parking and convey it towards the 4:12'x4' RCB underneath I-15. A 40-ft Drop Inlet with 13 grates (storm drain station 9+98.86) is proposed to intercept the entire 27 cfs at the parking lot. As shown in the attached hydraulic calculation for the 40-ft drop inlet, the WSE required to drain the 27 cfs is determined to be 2273.05 ft. FlowMaster flow analysis is also provided at Section BB to determine the WSE for the runoff flows just upstream the Drop Inlet. The WSE elevation at section BB is determined to be 2273.22. The WSE at section BB is therefore lower than the existing WSE determined at River Station 600 for the existing 'Existing-South Parking Lot' HEC-RAS model. Using the proposed grading plan, the onsite basins that will be intercepted through proposed 4-ft drop inlets has been delineated into 4 drainage basins labeled DI-1 through DI-4. The runoff intercepted through these drop inlets also drains into Line A. Copy of the HEC-1 determining the runoff generated through basins DI-1 through DI-4 is included in the Appendix, as well as their basin delineation map. The flow values used in the WSPG and their corresponding HEC-1 cards are summarized in the following table. Please note that portion of the runoff generated from basin DI-3(5/9 cfs) drains into Line A through the proposed 24-inch roof-drain at station 4+24.42. The remaining portion of DI-3 is intercepted through the proposed drop inlet to drain into Line A at station 4+40.82.

WSPG Station (Line A)	Basin and Q from HEC-1	Runoff Flow Used in WSPG	Comment
Junction at 7+40.96	LAT-A1(4/7 cfs)	7 cfs	-
Junction at 4+40.82	DI-3 (5/9 cfs)	4 cfs	* Estimated portion of DI-3
Junction at 4+24.42	DI-3 (5/9 cfs)	5 cfs	* Estimated portion of DI-3
Junction at 2+47.91	DI-4 (3/5 cfs)	5 cfs	-

Please also note the large difference in peak time between the offsite flows conveyed in Line A and the local onsite flows from the drop inlets into the storm drain. Therefore, in practice, insignificant flows will be contributing from the drop inlets to the storm drain during the 100-year storm event.

The proposed Line A consists of segments with different sizes. As shown in the provided grading plan, the line consists approximately 86 lf of 7'x3' precast RCB, 841 lf of 8'x5.5' precast RCB, junction structure (station 19+49.61), 185 lf of 12'x6' precast RCB, and NDOT concrete headwall at the outlet. The Los Angeles County Flood Control District Water Surface and Pressure Gradient (WSPG) program was used for the hydraulic analysis of Line A. The hydraulic analysis for Line A is provided in the Appendix to illustrate its capability to convey the runoff flows. The location of the WSPG cross sections along Line A and the HGL are included with the provided plan and profile for the storm drain.

Based on the comparison of existing and proposed WSE's near the Silverton Hotel/Casino, Lochsa Engineering believes the project is in conformance with FEMA flood zone regulations.

2.2.2 Proposed Storm Drain Line B

Line B storm drain is proposed to convey a portion of the runoff flows within Shelborne alignment towards the existing 4:12'x4' RCB underneath I-15. The peak flow rate for the runoff through the site near Shelborne Avenue alignment per the FIS Restudy is 373 cfs. In the proposed flood control improvements, the existing 2:5.5'x3' RCB underneath Industrial Road is to be replaced by approximately 80 lf of 2:7'x3' RCB. The proposed storm drain Line B continues as double 7'x3' RCB through the property for approximately 697 lf, as shown in the grading plans. A portion of the 373cfs runoff flows will be conveyed through the Line B underneath Industrial Road and the remaining flows will overtop the Road towards to be conveyed through the proposed parking lot. A WSPG model was developed for the hydraulic analysis of Line B, whereas a HEC-RAS model (labeled Shelborne Ave. Pr) is used for the hydraulic analysis of overtopping flows within the parking lot. Through iterative procedure, the runoff flows intercepted through the 7'x3' RCB (Line B) was determined as the flows in the storm drain that will maintain an EGL matching to the WSE at HEC-RAS River Station 514 just upstream of the proposed RCB underneath Industrial. As shown in the analysis, Line B is determined to convey 326 cfs during 100-year storm events. The remaining runoff flow values of 47 cfs will be overtopping Industrial Road and conveyed through the proposed parking lot within the property. The hydraulic analysis for Line B is provided in the

Appendix to illustrate its capability to convey the runoff flows. The location of the WSPG cross sections along Line B and the HGL are included with the provided plan and profile for the storm drain. The hydraulic analysis of the overtopping flows through the proposed parking lot is provided in the HEC-RAS model 'Shelborne Ave. Pr'.

Based on the comparison of existing and proposed WSE's near the Shelborne Avenue alignment, Lochsa Engineering believes the project is in conformance with FEMA flood zone regulations.

2.3 Mapping

The Effective FIRM is provided with this report. The proposed revisions to the Effective FIRM take into account the proposed improvements within the project site along the Middle Branch Blue Diamond Wash floodplain. The annotated portion of the subject FIRM with the proposed revisions is shown in Figure 3.

Please do not hesitate to contact our office at (702) 365-9312 at your convenience if you have any questions.

Sincerely,

LOCHSA ENGINEERING

Hani M. Noshi, Ph.D., P.E.
Director of Flood Control and Drainage

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 480287	City of Katy Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
320003	Clark County	NV	32003	2556E	09/27/02

2. *Flooding Source: Middle Branch Blue Diamond Wash*

3. Project Name/Identifier: Silverton Retail Phase I - Bass Pro Shop

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

5. Basis for Request and Type of Revision:

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

☑ Physical Change ☐ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

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

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

Types of Flooding: ☑ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☑ Channelization ☐ Levee/Floodwall ☑ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☑ Yes Fee amount: $4000

☐ 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: EDWARD P. ROSKI JR.	Company: MAJESTIC NEVADA INC	
Mailing Address: 13191 CROSSROADS PKWY. NO. CITY OF INDUSTRY CA 91746	Daytime Telephone No.: 562/692-9581	Fax No.: 562/695-2329
	E-Mail Address:	
Signature of Requester (required):		Date: 10-10-03

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:		Telephone No.:
Community Name:	Community Official's Signature (required):	Date:

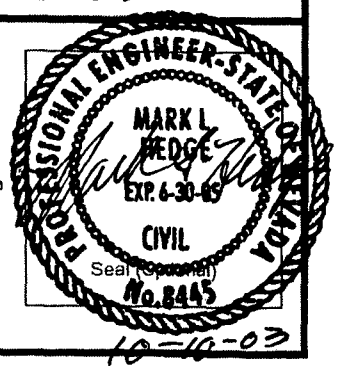
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Mark L. Hedge	License No.: 8445 NV	Expiration Date: 6/30/05
Company Name: Lochsa Engineering	Telephone No.: 702-365-9312	Fax No.: 702-365-9317
Signature: Mark L. Hedge		Date: 10-10-03

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

Form Name and (Number)	Required if ...
☑ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☑ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans



Seal (Optional)

10-10-03

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:
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

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

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

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

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.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	Interstate 15	FIS HEC-2 Sec. 45300		
Upstream Limit	Industrial/Blue Diamond Rd Intersection	FIS HEC-2 Sec. 46100		

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS and WSPG [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:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: Sliverton.pri	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: Line-a.dat &Line-B.d	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

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

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

C. MAPPING REQUIREMENTS

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

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

D. COMMON REGULATORY REQUIREMENTS

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

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

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

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

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

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

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

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

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK REDUCTION ACT

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:
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:** Storm Drain LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)

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

   Location of Structure: Silverton Hotel/Casino Parking Lot between I-15 & Industrial /Blue Diamond Rd Intersection

   Downstream Limit/Cross Section: WSPG Station 0+0.0 (FIS HEC-2 Station 45300)

   Upstream Limit/Cross Section: WSPG Station 11+48.18 (FIS HEC-2 Station 45800)

2. **Name of Structure:** Storm Drain LINE B (Double 7'X3'RCB)

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

   Location of Structure: Along Shelbourne Avenue Alignment Between Industrial Road and Interstate 15

   Downstream Limit/Cross Section: WSPG Station 6+62.57

   Upstream Limit/Cross Section: WSPG Station 7+96.40 (FIS HEC-2 Station 48500)

3. **Name of Structure:** Upstream Portion of Line B (Double 7'x3' RCB) underneath Industrial Road along Shelbourne

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

   Location of Structure:

   Downstream Limit/Cross Section: WSPG Station 0+0.0 (FIS HEC-2 Station 45300)

   Upstream Limit/Cross Section: WSPG Station 7+96.40 (FIS HEC-2 Station 48500)

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

B. CHANNELIZATION

Flooding Source: Middle Branch Blue Diamond Wash

Name of Structure: Storm Drain Line A and Line B

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☑ Other (Describe): Junction Box between Line A and Line B
- ☐ 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: Middle Branch Blue Diamond Wash

Name of Structure: Portion of Line B underneath Industrial Road

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): WSPG with Wall Entrance
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.

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name: Clark County

Project Identifier: Siverton Retail Phase I - Bass Pro Shop

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO ONE OF TWO POST OFFICE BOXES (SEE BELOW) OR FAXED TO THE FAX NUMBER BELOW.

Type of Request:

MT-1 application fee
MT-2 application fee } (Insert **3173** as the P.O. Box number in the address below)

External Data Requests (EDRs) (Insert **398** as the P.O. Box number in the address below)

Federal Emergency Management Agency
Revisions Fee-Collection System Administrator
P.O. Box
Merrifield, Virginia 22116
Fax: (703) 849-0282
Phone: (703) 849-0432

Request No.: (if known) Amount: 4000

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☑ CHECK ☐ MONEY ORDER

*Note: Applicable only for EDR and/or Alluvial Fan requests (as appropriate).

**Note: Applicable only if submitting a corrected fee for an ongoing request.

COMPLETE THIS SECTION ONLY IF PAYING BY CREDIT CARD

EXP. DATE

☐☐☐☐—☐☐☐☐—☐☐☐☐—☐☐☐☐ ☐☐—☐☐
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Month Year

CARD NUMBER

Date Signature

NAME *(AS IT APPEARS ON CARD)*:
(please print or type)

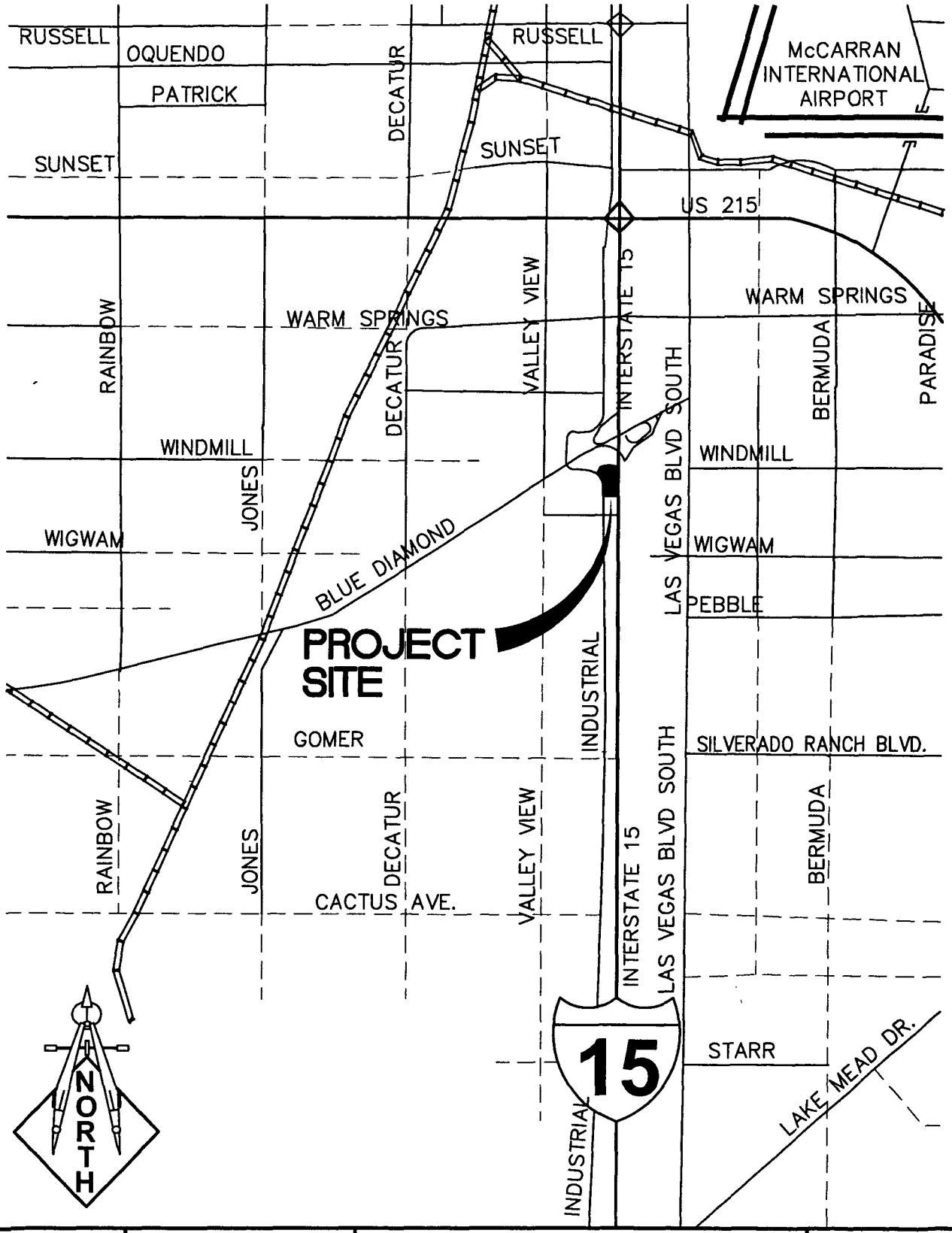
ADDRESS:
(for your credit card receipt-please print or type)

DAYTIME PHONE:

Form 3 ATTACHMENT

Form 3 (B(4)) Maintenance agreement requires persistent and immediate removal of accumulated sediment.

FIGURES

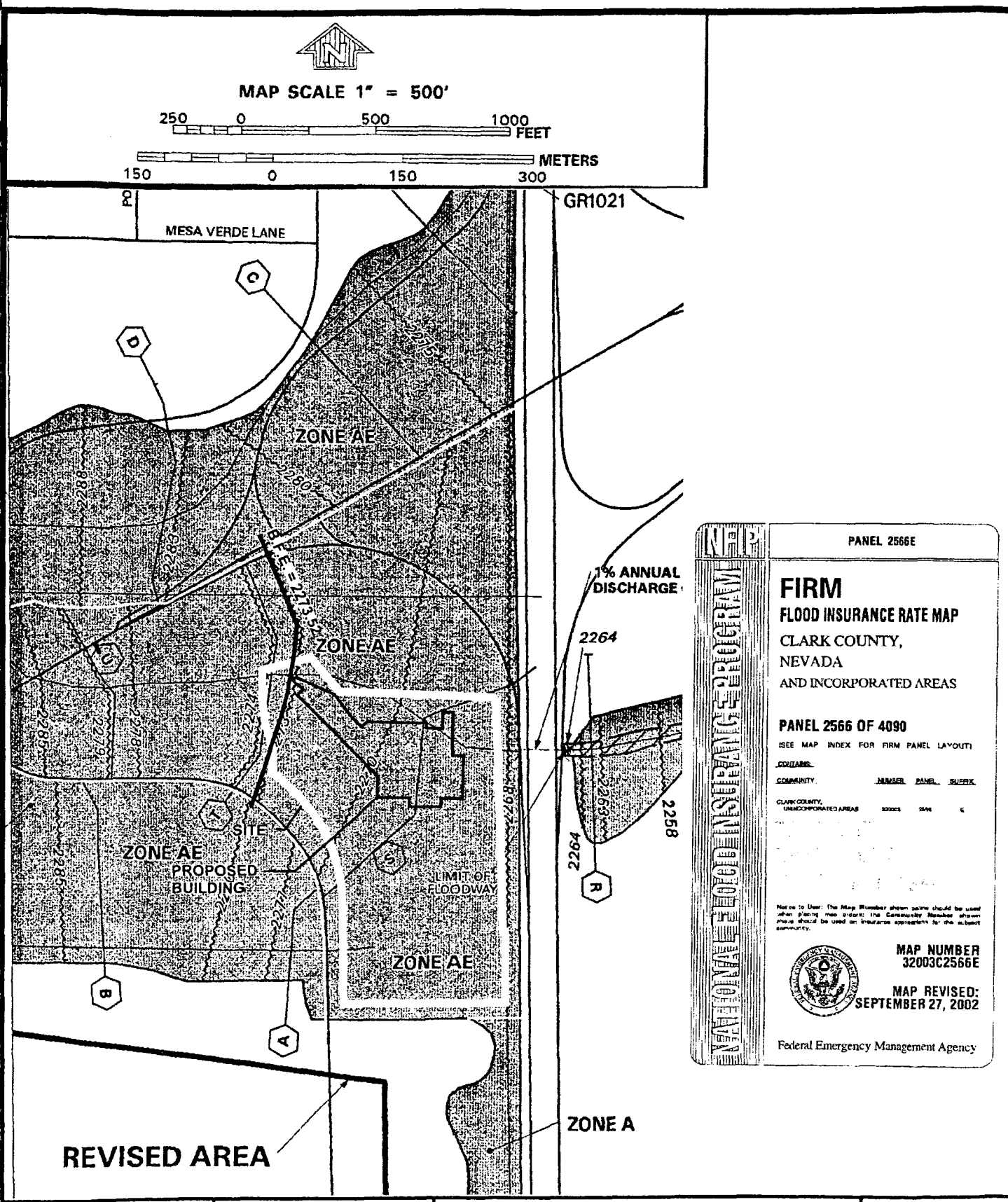


DRAWN BY: WSB	SCALE: N.T.S	**VICINITY MAP (FIGURE 1)**	PROJECT No.: 6923.2
CHECKED BY: HMN	DATE: 10-10-03		SHEET No. 1

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
P: 702 365-9312, F: 702 365-9317

SILVERTON EXPANSION PH1, BASS PRO SHOPS

SHEET 1 OF 1



DRAWN BY: WSB	SCALE: 1"=500'	FLOOD INSURANCE RATE MAP (FIGURE 2)	PROJECT No.: 6923.2
CHECKED BY: HMN	DATE: 10-6-03		SHEET No. 2

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
P: 702 365-9312, F: 702 365-9317

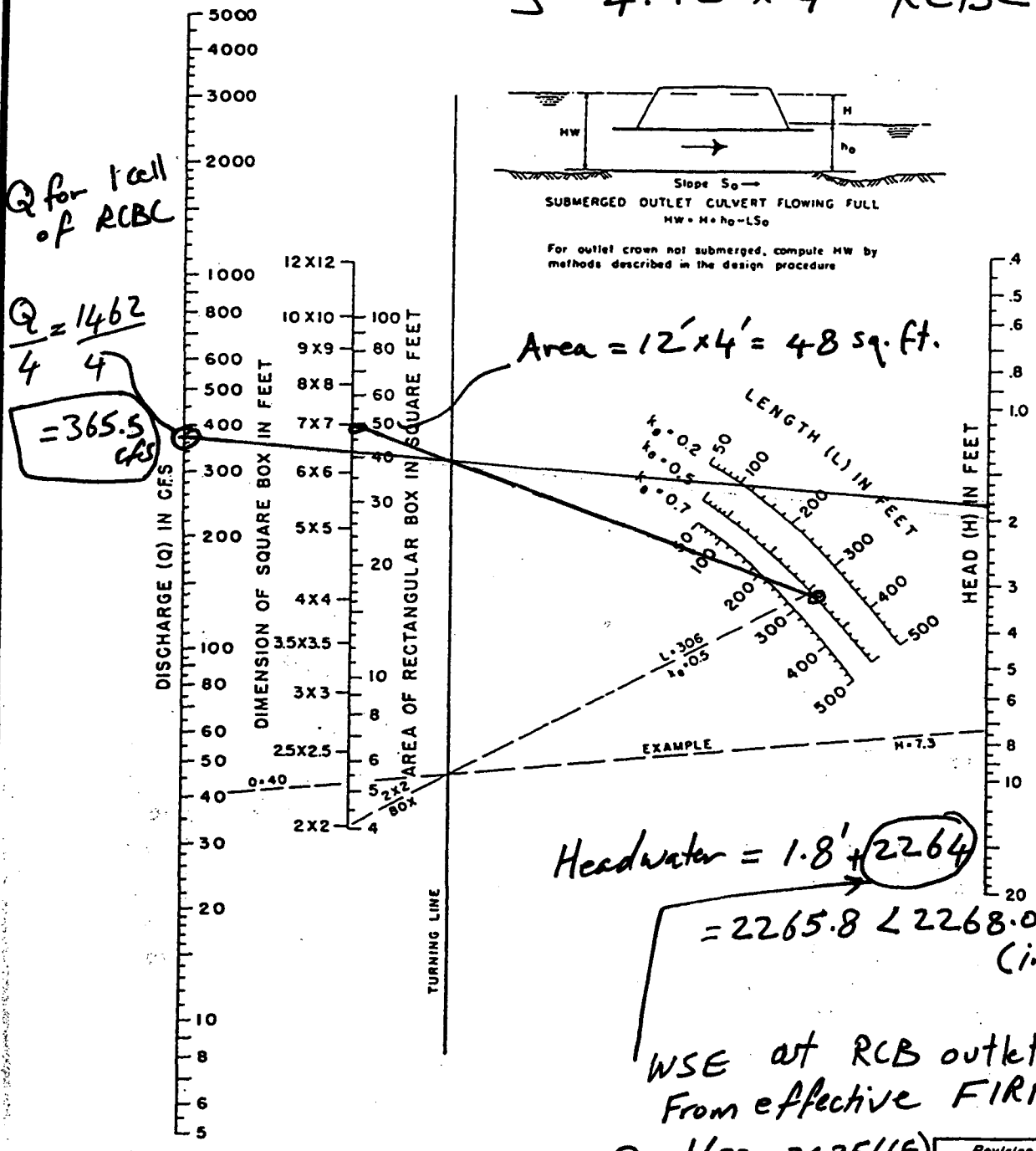
BASS PRO SHOPS

INLET AND OUTLET CONTROL NOMPGRAPH
FOR THE EXISTING 4:12'X4' RCBC
(TO DETERMINE THE WSE UPSTREAM THE RCBC)

NOMOGRAPH – OUTLET CONTROL BOX CULVERT

(n=0.012)

Existing 4: 12' x 4' RCBC



Q for 1 cell of RCBC

$\frac{Q}{4} = \frac{1462}{4}$

= 365.5 cfs

Area = 12' x 4' = 48 sq. ft.

Headwater = 1.8' + (2264)

= 2265.8 < 2268.0 (inlet Control)

WSE at RCB outlet From effective FIRM Panel (32003C2566E)

Revision	Date

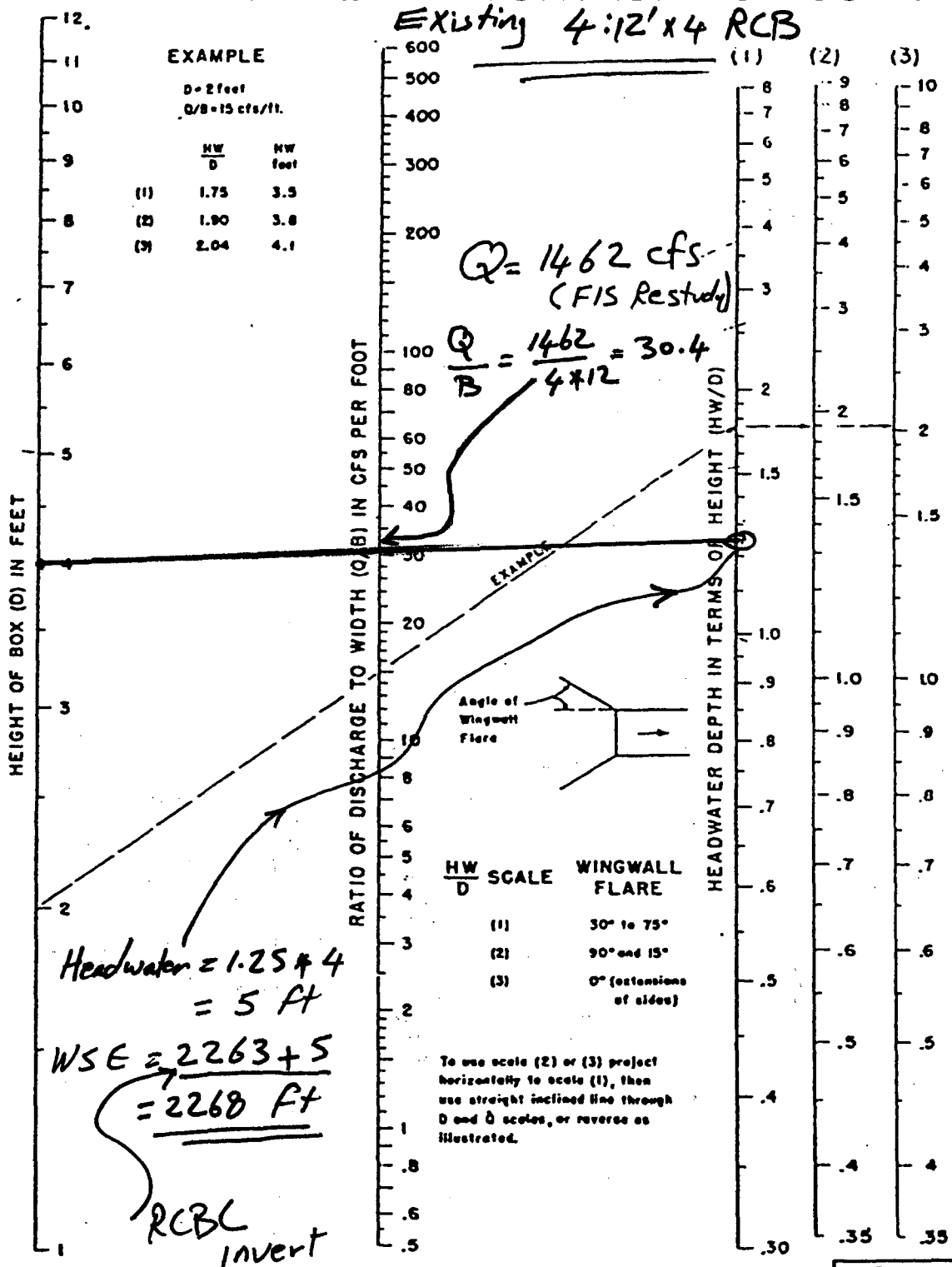
WRC ENGINEERING

REFERENCE: USDOT, FHWA, HDS No. 5, 1985

FIGURE 1008

NOMOGRAPH – INLET CONTROL BOX CULVERT

Existing 4:12'x4 RCB



Q = 1462 cfs (FIS Restudy)

$\frac{Q}{B} = \frac{1462}{4 \times 12} = 30.4$

Headwater = 1.25 * 4 = 5 ft

WSE = 2263 + 5 = 2268 ft

RCBC invert

Revision	Date

WRC ENGINEERING

REFERENCE: USDOT, FHWA, HDS No.5, 1985

FIGURE 1004

HEC-RAS ANALYSIS OF FLOW THROUGH PARKING LOT NEAR SILVERTON HOTEL TO DETERMINE THE PORTION OF FLOW THROUGH THE SOUTHERN PARKING LOT

(EXISTING CONDITION, FLOW SPLIT MODEL)

HEC-RAS Plan: Flow Split River: Silverton Reach: North Profile: 391 cfs

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North	-100	391.00	83.00	85.41	85.41	85.68	0.005105	4.17	93.79	188.30	1.04
North	-200	391.00	82.00	82.78	83.12	84.32	0.062618	9.96	39.24	129.68	3.19
North	-300	391.00	79.20	80.36	80.59	81.10	0.017391	6.92	56.49	133.75	1.88
North	-400	391.00	78.00	78.72	78.92	79.36	0.017001	6.38	61.27	159.92	1.82
North	-500	391.00	76.20	77.25	77.39	77.72	0.014975	5.46	71.55	212.81	1.66
North	-600	391.00	75.20	76.15	76.23	76.43	0.010360	4.27	91.51	299.07	1.36
North	-650	391.00	74.50	75.16	75.28	75.58	0.020304	5.17	75.63	308.70	1.84
North	-700	391.00	73.50	74.79	74.52	74.90	0.001160	2.58	151.80	328.59	0.53
North	-750	391.00	73.80	74.51	74.51	74.73	0.005071	3.83	102.12	229.39	1.01

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Silverton Flow
Project File : Silverton.prj
Run Date and Time: 10/7/03 6:42:44 PM

Project in English units

PLAN DATA

Plan Title: Flow Split
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.p06

Geometry Title: Flow split
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g05

Flow Title : Flow Split
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f05

Plan Summary Information:
Number of: Cross Sections = 9 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 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: Flow Split
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f05

Flow Data (cfs)

River	Reach	RS	391 cfs
Silverton	North	-100	391

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	North	391 cfs	Critical	Normal S = .006

GEOMETRY DATA

Geometry Title: Flow split
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g05

CROSS SECTION RIVER: Silverton
REACH: North RS: -100

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.5	27	87	41	83	46	83	54.5	85
54.5	84.5	164	85.5	243.9	85	243.9	85.5	257.7	86
287.6	86								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	54.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	257.7	100	100	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	85.68	Element			
Vel Head (ft)	0.27	Wt. n-Val.		0.020	
W.S. Elev (ft)	85.41	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	85.41	Flow Area (sq ft)		93.79	
E.G. Slope (ft/ft)	0.005105	Area (sq ft)		93.79	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	188.30	Top Width (ft)		188.30	
Vel Total (ft/s)	4.17	Avg. Vel. (ft/s)		4.17	
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	5472.2	Conv. (cfs)		5472.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		189.79	
Min Ch El (ft)	83.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.66	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		1.26	
C & E Loss (ft)	0.02	Cum SA (acres)		3.19	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -200

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.5	15	86	39	83	41.7	82	55.4	83.2
55.4	82.7	161.9	83	247.5	82	247.5	82.5	260	82.5
260	82	273.9	83	312.6	83.5	312.6	84		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	55.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	312.6	100	100	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	84.32	Element			
Vel Head (ft)	1.54	Wt. n-Val.		0.017	
W.S. Elev (ft)	82.78	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	83.12	Flow Area (sq ft)		39.24	
E.G. Slope (ft/ft)	0.062618	Area (sq ft)		39.24	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	129.68	Top Width (ft)		129.68	
Vel Total (ft/s)	9.96	Avg. Vel. (ft/s)		9.96	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.30	
Conv. Total (cfs)	1562.5	Conv. (cfs)		1562.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		130.97	
Min Ch El (ft)	82.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)		11.67	
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)		1.11	
C & E Loss (ft)	0.13	Cum SA (acres)		2.82	

Warning: Divided flow computed for this cross-section.
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: Silverton
REACH: North RS: -300

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.5	30.6	84	46.5	80	56	80.5	56	80
130.5	80.5	130.5	81	209.3	80.5	209.3	80	231.5	79.2
265.9	80	333.3	81.5	333.3	82				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	56	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	333.3	100	0	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	81.10	Element			
Vel Head (ft)	0.74	Wt. n-Val.		0.016	
W.S. Elev (ft)	80.36	Reach Len. (ft)	100.00	100.00	0.00

Crit W.S. (ft)	80.59	Flow Area (sq ft)	56.49
E.G. Slope (ft/ft)	0.017391	Area (sq ft)	56.49
Q Total (cfs)	391.00	Flow (cfs)	391.00
Top Width (ft)	133.75	Top Width (ft)	133.75
Vel Total (ft/s)	6.92	Avg. Vel. (ft/s)	6.92
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)	0.42
Conv. Total (cfs)	2964.9	Conv. (cfs)	2964.9
Length Wtd. (ft)	100.00	Wetted Per. (ft)	134.54
Min Ch El (ft)	79.20	Shear (lb/sq ft)	0.46
Alpha	1.00	Stream Power (lb/ft s)	3.16
Frctn Loss (ft)	2.98	Cum Volume (acre-ft)	1.00
C & E Loss (ft)	0.24	Cum SA (acres)	2.52

Warning: Divided flow computed for this cross-section.
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: Silverton
REACH: North RS: -400

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85	50.3	84	71.9	79.5	71.9	79	99	78
199.7	79	250.3	78	281.2	78.5	281.2	79	370	82

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	71.9	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	370	100	100	110	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

E.G. Elev (ft)	79.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.016	
W.S. Elev (ft)	78.72	Reach Len. (ft)	100.00	100.00	110.00
Crit W.S. (ft)	78.92	Flow Area (sq ft)		61.27	
E.G. Slope (ft/ft)	0.017001	Area (sq ft)		61.27	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	159.92	Top Width (ft)		159.92	
Vel Total (ft/s)	6.38	Avg. Vel. (ft/s)		6.38	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	2998.7	Conv. (cfs)		2998.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		160.17	
Min Ch El (ft)	78.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		2.59	
Frctn Loss (ft)	1.72	Cum Volume (acre-ft)		0.86	
C & E Loss (ft)	0.03	Cum SA (acres)		2.18	

Warning: Divided flow computed for this cross-section.
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: Silverton
REACH: North RS: -500

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.1	10.9	83.8	29.9	84	46.7	84.5	50.4	84
77.2	79.5	77.2	79	79.3	77	121.1	76.6	162.3	77
264.4	77.4	275.3	77.2	275.3	77.7	284.6	77.7	284.6	77.2
312.4	76.5	312.4	77	322	77.2	322	76.2	364.1	78
437.1	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	46.7	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	364.1	100	110	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

E.G. Elev (ft)	77.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.016	
W.S. Elev (ft)	77.25	Reach Len. (ft)	100.00	100.00	110.00
Crit W.S. (ft)	77.39	Flow Area (sq ft)		71.55	
E.G. Slope (ft/ft)	0.014975	Area (sq ft)		71.55	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	212.81	Top Width (ft)		212.81	
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)		5.46	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	3195.2	Conv. (cfs)		3195.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		214.55	
Min Ch El (ft)	76.20	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.70	
Frctn Loss (ft)	1.59	Cum Volume (acre-ft)		0.71	
C & E Loss (ft)	0.05	Cum SA (acres)		1.76	

Warning: Divided flow computed for this cross-section.
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: Silverton
REACH: North RS: -600

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.3	16.4	83	54.3	84	83.5	79	83.5	78.5
101.6	76	316.9	75.8	331.7	75.6	331.7	76.1	341.5	76.1
341.5	75.6	368.3	75.2	370.4	75.2	370.4	75.7	379.4	76
379.4	75.5	395.1	76	425.8	77	487.9	79		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	83.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	425.8	50	60	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

E.G. Elev (ft)	76.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.016	
W.S. Elev (ft)	76.15	Reach Len. (ft)	50.00	60.00	60.00
Crit W.S. (ft)	76.23	Flow Area (sq ft)		91.51	
E.G. Slope (ft/ft)	0.010360	Area (sq ft)		91.51	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	299.07	Top Width (ft)		299.07	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	0.95	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	3841.4	Conv. (cfs)		3841.4	

Length Wtd. (ft)	60.00	Wetted Per. (ft)	301.10
Min Ch El (ft)	75.20	Shear (lb/sq ft)	0.20
Alpha	1.00	Stream Power (lb/ft s)	0.84
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)	0.52
C & E Loss (ft)	0.05	Cum SA (acres)	1.17

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: Silverton
REACH: North RS: -650

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83	20	82.5	40.5	82.8	57.6	82.8	85.5	78
85.5	77.5	105	75	129.9	74.5	129.9	75	137.7	75
137.7	74.5	219	75	341.5	75.1	360.2	75	395.1	74.7
407.9	75	436.3	76	470.2	77	498.1	78	532.4	79

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	85.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	470.2	50	50	60	.1	.3

CROSS SECTION OUTPUT Profile #391 cfs

E.G. Elev (ft)	75.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.016	
W.S. Elev (ft)	75.16	Reach Len. (ft)	50.00	50.00	60.00
Crit W.S. (ft)	75.28	Flow Area (sq ft)		75.63	
E.G. Slope (ft/ft)	0.020304	Area (sq ft)		75.63	
Q Total (cfs)	391.00	Flow (cfs)		391.00	
Top Width (ft)	308.70	Top Width (ft)		308.70	
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.17	
Max Chl Dpth (ft)	0.66	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	2744.0	Conv. (cfs)		2744.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		309.72	
Min Ch El (ft)	74.50	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.60	
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)		0.41	
C & E Loss (ft)	0.01	Cum SA (acres)		0.75	

CROSS SECTION RIVER: Silverton
REACH: North RS: -700

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.5	42.1	82	63.5	81	84.7	77	88.2	76.5
108.9	74	108.9	73.5	163.1	74	306.5	74	306.5	74.5
320	74.5	320	74	373.3	74.4	425.3	74.3	425.3	74.8
436.3	75.1	436.3	74.6	447.9	75	480.8	76	510.4	77
541.3	78								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	88.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	510.4	60	60	65	.3	.5

Ineffective Flow num= 1

```
   Sta L   Sta R    Elev  Permanent
888       F

CROSS SECTION OUTPUT    Profile #391  cfs

  E.G. Elev (ft)             74.90    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                         0.016
  W.S. Elev (ft)             74.79    Reach Len. (ft)          60.00     60.00      65.00
  Crit W.S. (ft)             74.52    Flow Area (sq ft)                  151.80
  E.G. Slope (ft/ft)      0.001160    Area (sq ft)                       232.27
  Q Total (cfs)             391.00    Flow (cfs)                         391.00
  Top Width (ft)            328.59    Top Width (ft)                     328.59
  Vel Total (ft/s)            2.58    Avg. Vel. (ft/s)                     2.58
  Max Chl Dpth (ft)           1.29    Hydr. Depth (ft)                     0.74
  Conv. Total (cfs)        11480.9    Conv. (cfs)                      11480.9
  Length Wtd. (ft)           60.00    Wetted Per. (ft)                   206.54
  Min Ch El (ft)             73.50    Shear (lb/sq ft)                     0.05
  Alpha                       1.00    Stream Power (lb/ft s)               0.14
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)                 0.23
  C & E Loss (ft)             0.04    Cum SA (acres)                       0.38


Warning: Divided flow computed for this cross-section.
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.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION          RIVER: Silverton
REACH: North              RS: -750

INPUT
Description:
Station Elevation Data    num=      34
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0       82       44       81     65.5       80     79.8       77       91     75.5
      91       75    108.8       74    184.8     73.8    184.8     74.3    197.7     74.3
   197.7     73.8    250.9       74    250.9       80    405.2       80    405.2       75
     415    74.92      415    74.42      451    74.18      451    74.68    489.4     74.3
   489.4     73.8    500.1       74    513.4    74.63    513.4    75.13    553.7    76.23
   553.7    75.73    563.2       76    578.4     76.6    578.4     77.1    615.6    78.23
   615.6    77.73    626.6       78    646.2    78.86    646.2    79.36

Manning's n Values        num=      2
     Sta   n Val      Sta   n Val
       0    .025       91    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  578.4                0       0       0             .1       .3

CROSS SECTION OUTPUT    Profile #391  cfs

  E.G. Elev (ft)             74.73    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.23    Wt. n-Val.                         0.016
  W.S. Elev (ft)             74.51    Reach Len. (ft)
  Crit W.S. (ft)             74.51    Flow Area (sq ft)                  102.12
  E.G. Slope (ft/ft)      0.005071    Area (sq ft)                       102.12
  Q Total (cfs)             391.00    Flow (cfs)                         391.00
  Top Width (ft)            229.39    Top Width (ft)                     229.39
  Vel Total (ft/s)            3.83    Avg. Vel. (ft/s)                     3.83
  Max Chl Dpth (ft)           0.71    Hydr. Depth (ft)                     0.45
  Conv. Total (cfs)         5490.5    Conv. (cfs)                       5490.5
  Length Wtd. (ft)                    Wetted Per. (ft)                   231.84
  Min Ch El (ft)             73.80    Shear (lb/sq ft)                     0.14
  Alpha                       1.00    Stream Power (lb/ft s)               0.53
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)
```

Warning: Divided flow computed for this cross-section.
Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2
North	-100	.025	.016
North	-200	.025	.016
North	-300	.025	.016
North	-400	.025	.016
North	-500	.025	.016
North	-600	.025	.016
North	-650	.025	.016
North	-700	.025	.016
North	-750	.025	.016

SUMMARY OF REACH LENGTHS

River: Silverton

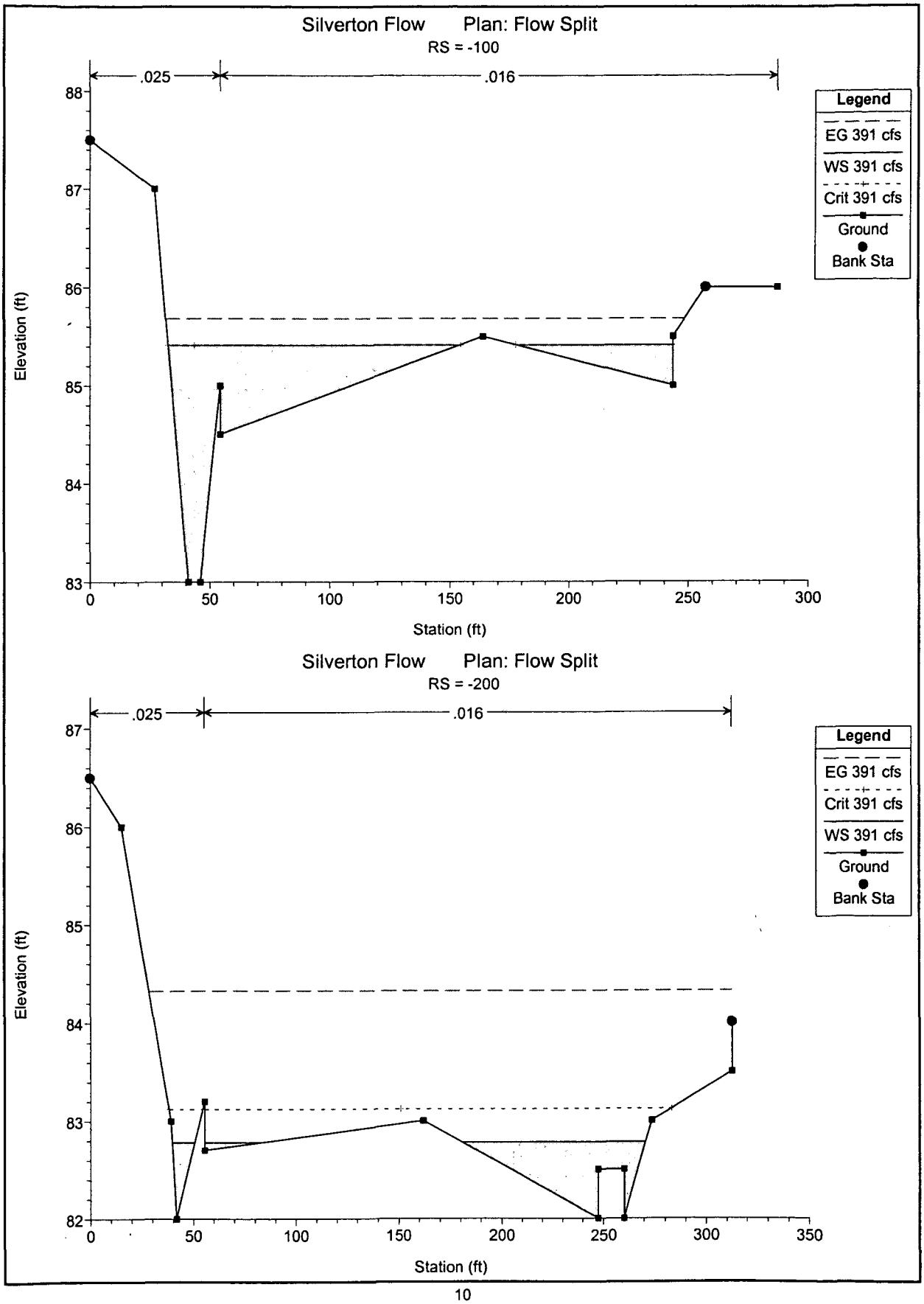
Reach	River Sta.	Left	Channel	Right
North	-100	100	100	100
North	-200	100	100	100
North	-300	100	100	0
North	-400	100	100	110
North	-500	100	100	110
North	-600	50	60	60
North	-650	50	50	60
North	-700	60	60	65
North	-750	0	0	0

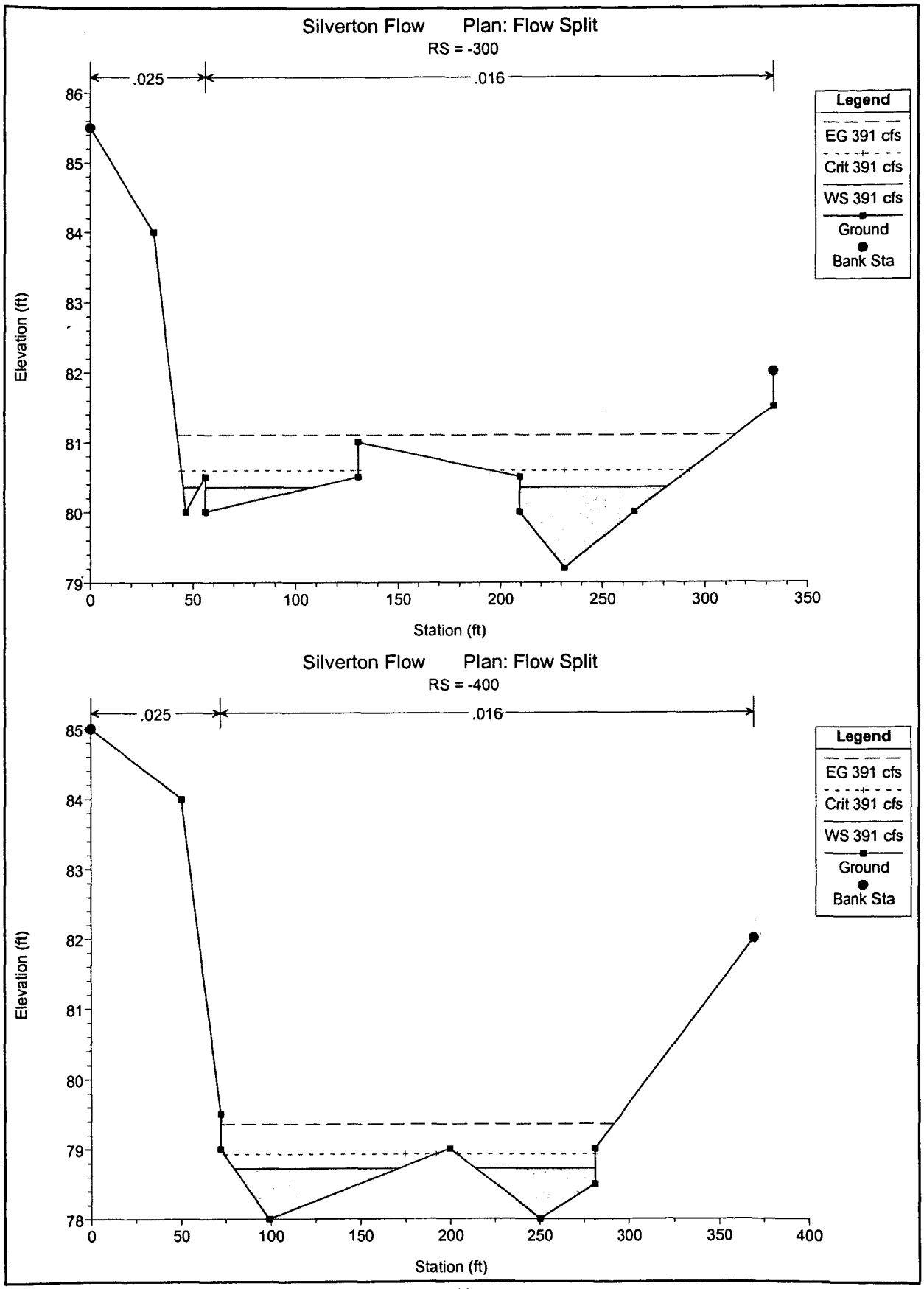
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

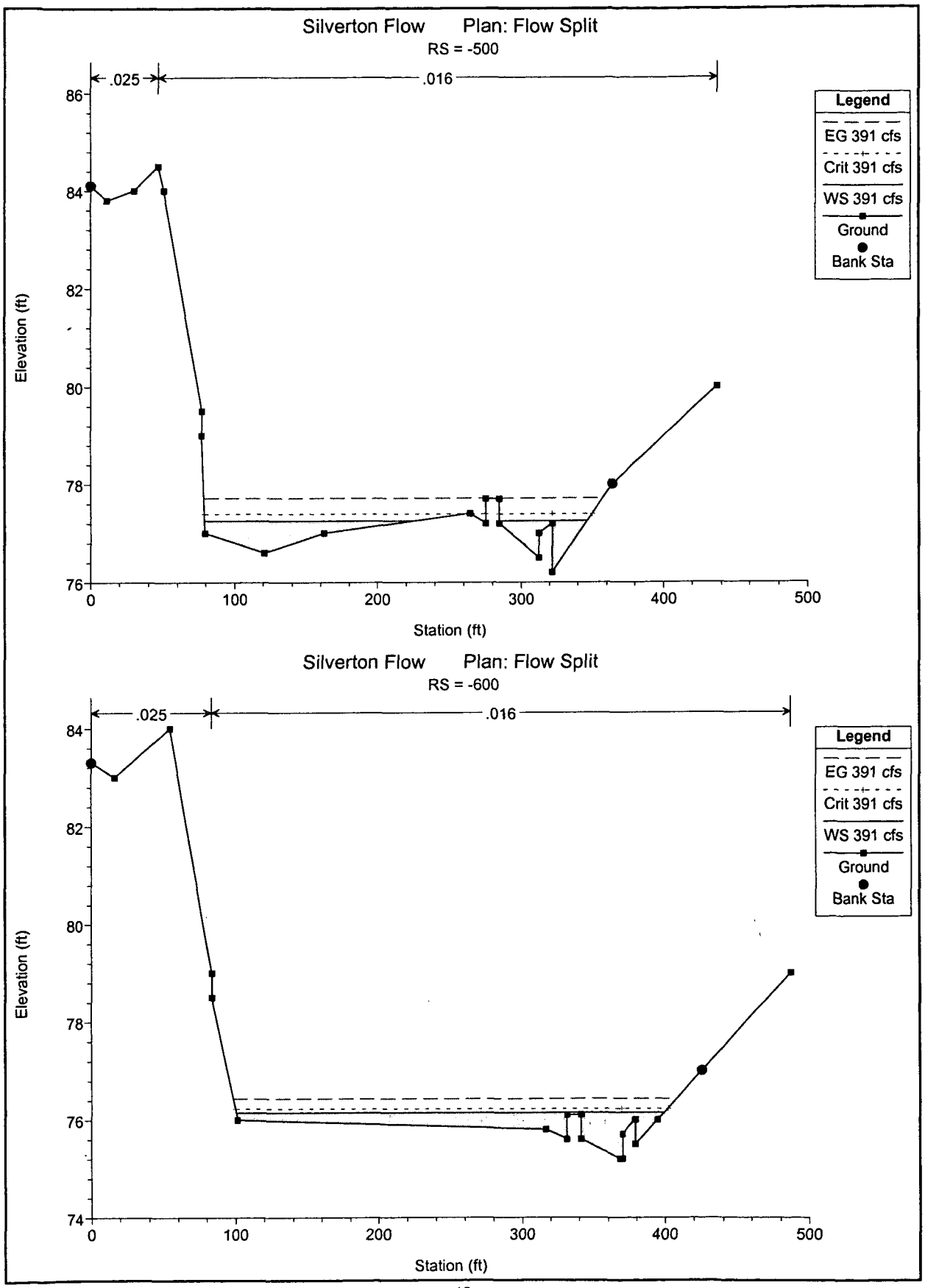
Reach	River Sta.	Contr.	Expan.
North	-100	.1	.3
North	-200	.1	.3
North	-300	.1	.3
North	-400	.1	.3
North	-500	.1	.3
North	-600	.1	.3
North	-650	.1	.3
North	-700	.3	.5
North	-750	.1	.3

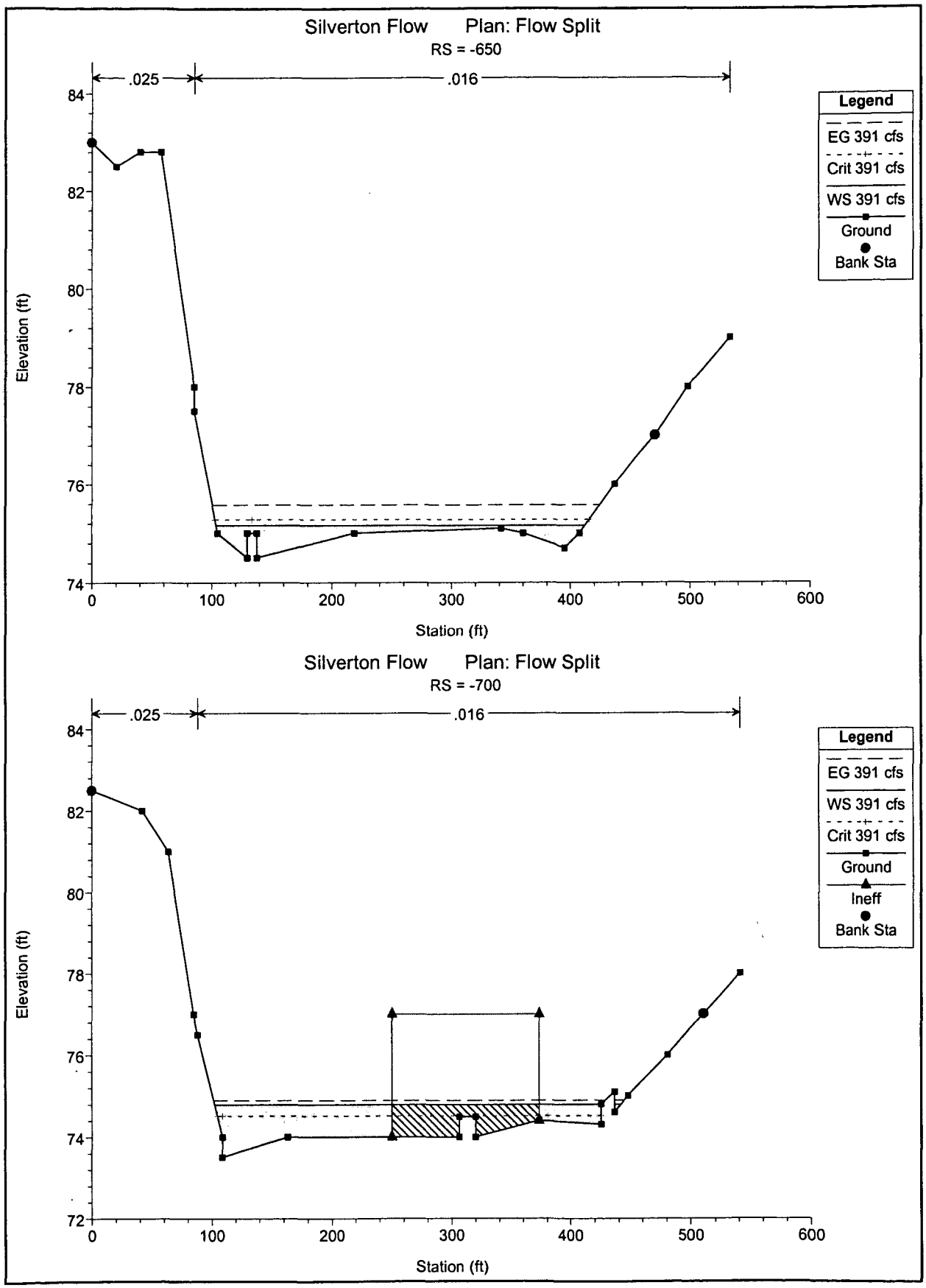
Profile Output Table - Standard Table 1

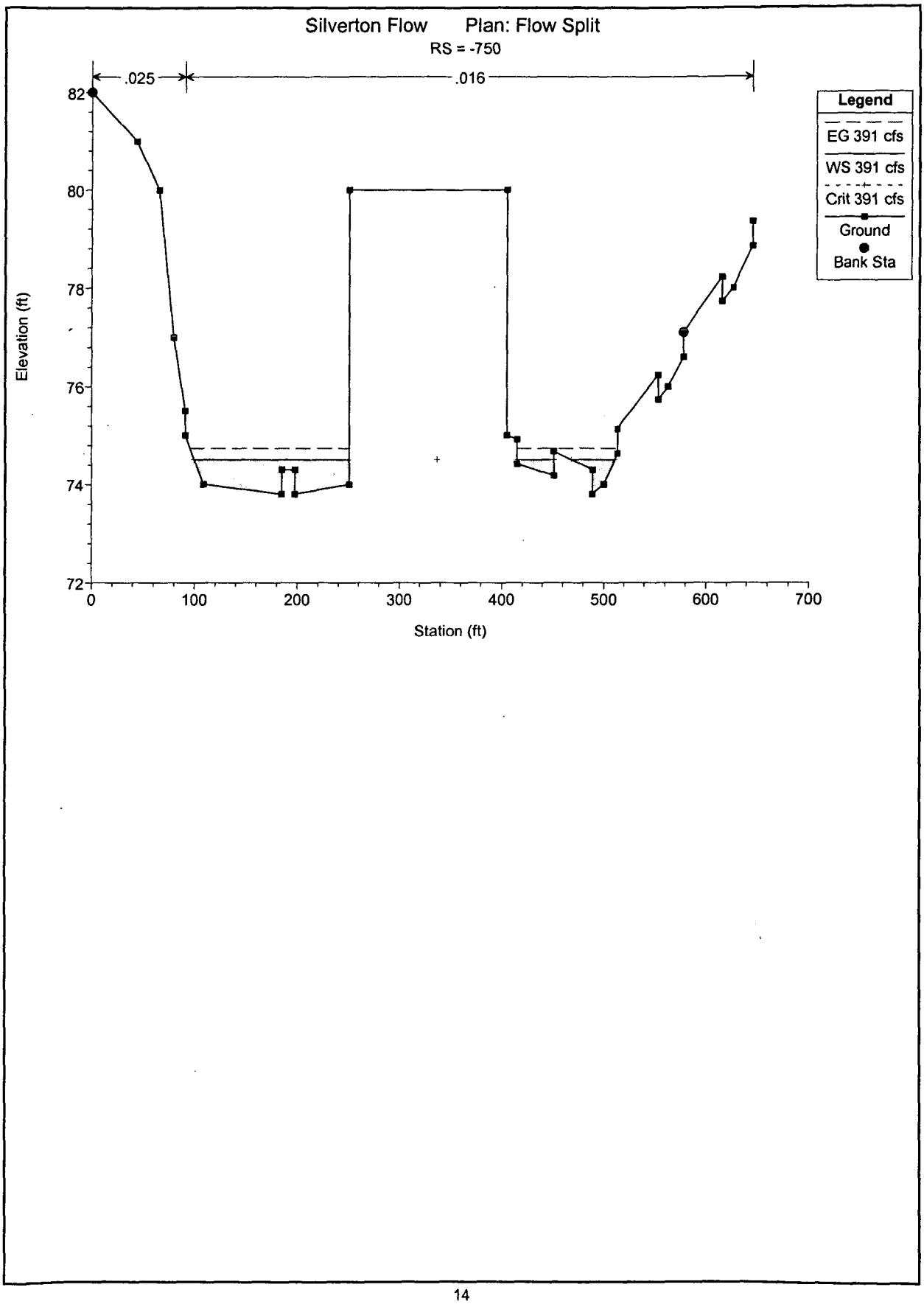
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
North	-100	391.00	83.00	85.41	85.41	85.68	0.005105	4.17	93.79	188.30	1.04
North	-200	391.00	82.00	82.78	83.12	84.32	0.062618	9.96	39.24	129.68	3.19
North	-300	391.00	79.20	80.36	80.59	81.10	0.017391	6.92	56.49	133.75	1.88
North	-400	391.00	78.00	78.72	78.92	79.36	0.017001	6.38	61.27	159.92	1.82
North	-500	391.00	76.20	77.25	77.39	77.72	0.014975	5.46	71.55	212.81	1.66
North	-600	391.00	75.20	76.15	76.23	76.43	0.010360	4.27	91.51	299.07	1.36
North	-650	391.00	74.50	75.16	75.28	75.58	0.020304	5.17	75.63	308.70	1.84
North	-700	391.00	73.50	74.79	74.52	74.90	0.001160	2.58	151.80	328.59	0.53
North	-750	391.00	73.80	74.51	74.51	74.73	0.005071	3.83	102.12	229.39	1.01


Silverton Flow Plan: Flow Split
RS = -100
.025
.016
Legend
EG 391 cfs
WS 391 cfs
Crit 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Flow Split
RS = -200
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Flow Split
RS = -300
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Flow Split
RS = -400
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Flow Split
RS = -500
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Flow Split
RS = -600
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Flow Split
RS = -650
.025
.016
Legend
EG 391 cfs
Crit 391 cfs
WS 391 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Flow Split
RS = -700
.025
.016
Legend
EG 391 cfs
WS 391 cfs
Crit 391 cfs
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Flow Split
RS = -750
.025
.016
Legend
EG 391 cfs
WS 391 cfs
Crit 391 cfs
Ground
Bank Sta
Elevation (ft)
82
80
78
76
74
72
0
100
200
300
400
500
600
700
Station (ft)

SPLIT FLOW ANALYSIS AT RIVER STATION -700
TO DETERMINE THE RUNOFF FLOWS REACHING THE PROPOSED
STORM DRAIN 'LINE A'

Flow Section at Station -700 to Determine the Flow Split Ratio (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Project Description	
Worksheet	Flow Section at Station -700
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.000530	ft/ft
Discharge	391.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	74.79	ft
Elevation Range	73.50 to 82.50	
Flow Area	231.8	ft²
Wetted Perimeter	330.78	ft
Top Width	328.54	ft
Actual Depth	1.29	ft
Critical Elevation	74.42	ft
Critical Slope	0.005231	ft/ft
Velocity	1.69	ft/s
Velocity Head	0.04	ft
Specific Energy	74.84	ft
Froude Number	0.35	
Flow Type	Subcritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+88.20	0.025
0+88.20	5+41.30	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	82.50
0+42.10	82.00
0+63.50	81.00
0+84.70	77.00
0+88.20	76.50
1+08.90	74.00
1+08.90	73.50
1+63.10	74.00
3+06.50	74.00

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Flow Section at Station -700 to Determine the Flow Split Ratio (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
3+06.50	74.50
3+20.00	74.50
3+20.00	74.00
3+73.30	74.40
4+25.30	74.30
4+25.30	74.80
4+36.30	75.10
4+36.30	74.60
4+47.90	75.00
4+80.80	76.00
5+10.40	77.00
5+41.30	78.00

Notes: * Q approaching the Silverton Hotel Building at HEC-RAS Station -700 is determined from the per the FIS Restudy be 391 cfs.

* The slope is determined by trial and error to provide the WSE = 2274.79 as determined in the attached HEC-RAS anslysis (the Flow Split Model) at RS -700.

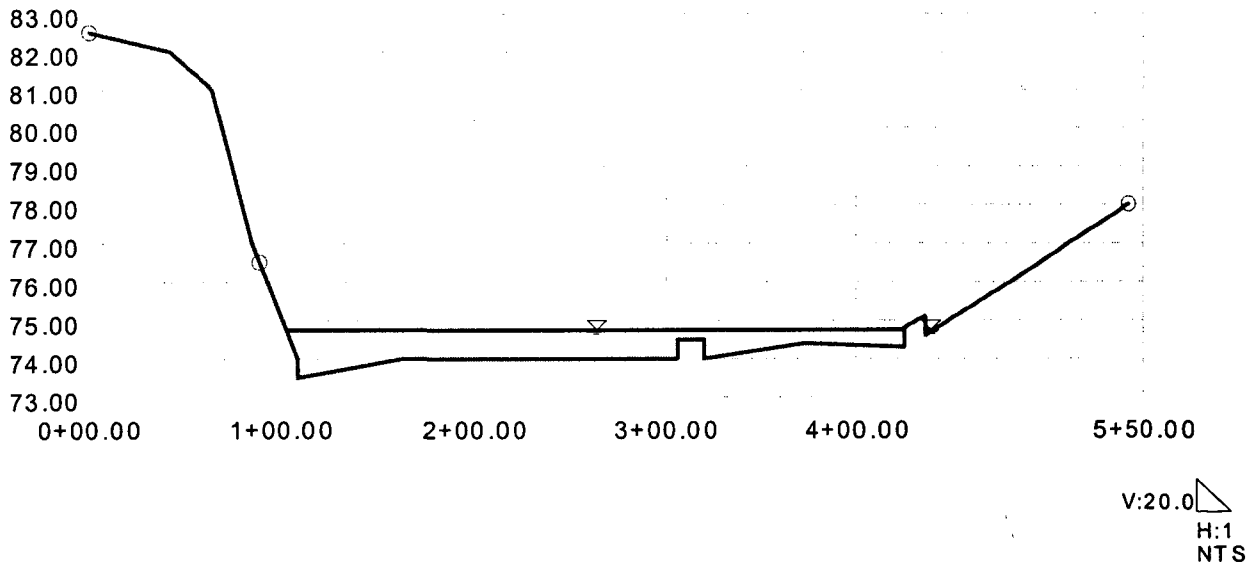
* The slope in this analysis is different than the HEC-RAS Energy Slope at River Station -700 due to the use of the ineffective area in the HEC-RAS analysis.

© Haestad Methods, Inc.

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Section at Station -700
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	0.000530	ft/ft
Water Surface Elevation	74.79	ft
Elevation Range	73.50 to 82.50	
Discharge	391.00	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Split Flow South of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Project Description	
Worksheet	Flow Split at Station -700 (South)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Slope	0.000530	ft/ft
Water Surface Elevation	74.79	ft

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Elevation Range	74.30 to 78.00	
Discharge	27.14	cfs
Flow Area	23.4	ft²
Wetted Perimeter	58.58	ft
Top Width	57.51	ft
Actual Depth	0.49	ft
Critical Elevation	74.55	ft
Critical Slope	0.006405	ft/ft
Velocity	1.16	ft/s
Velocity Head	0.02	ft
Specific Energy	74.81	ft
Froude Number	0.32	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.39 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
3+73.30	5+41.30	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
3+73.30	74.40
4+25.30	74.30
4+25.30	74.80
4+36.30	75.10
4+36.30	74.60
4+47.90	75.00
4+80.80	76.00
5+10.40	77.00
5+41.30	78.00

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Split Flow South of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Notes: * To determine the portion of Q within the segment of HEC-RAS Section -700 North of the Existing Hotel Building which will satisfy the WSE determined from the HEC-RAS analysis

* Since North flow (369.89) + South flow(27.14cfs) = 397.03 cfs > 391 cfs

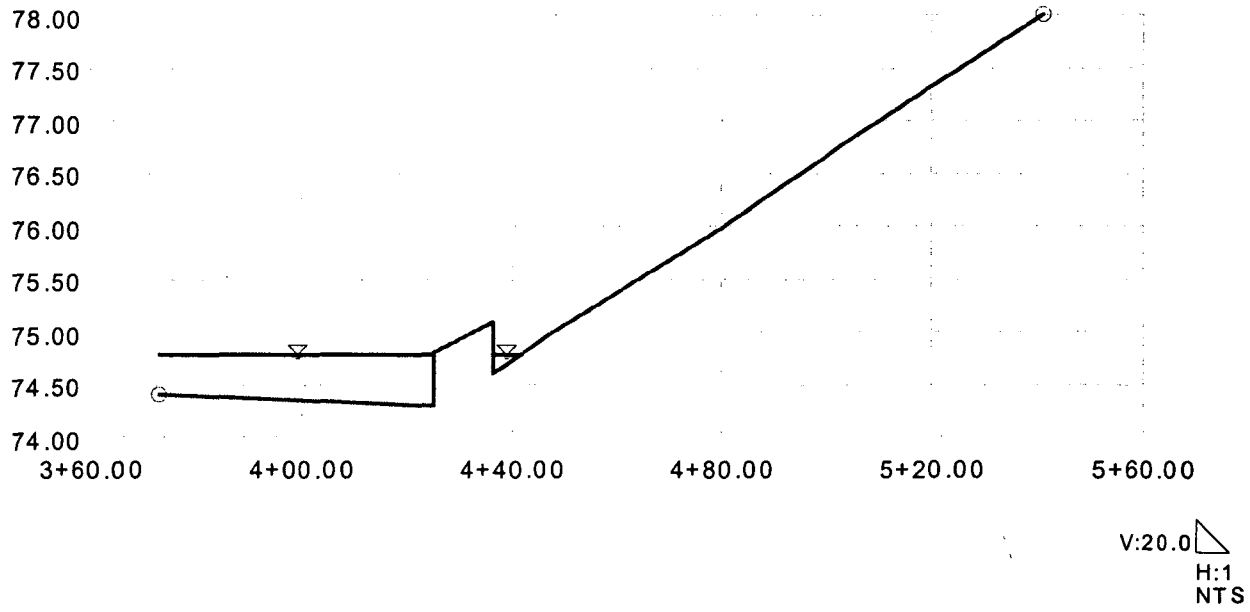
* The corrected South Split Flow = 27 cfs by proportionality [i.e. (27.14/397.03) x 391 cfs)

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Split at Station -700 (South)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Slope	0.000530	ft/ft
Water Surface Elevation	74.79	ft
Elevation Range	74.30 to 78.00	
Discharge	27.14	cfs



© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Split Flow North of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Project Description	
Worksheet	Flow Split at Station -700 (North)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Slope	0.000530	ft/ft
Water Surface Elevation	74.79	ft

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Elevation Range	73.50 to 82.50	
Discharge	369.89	cfs
Flow Area	207.6	ft²
Wetted Perimeter	272.88	ft
Top Width	270.94	ft
Actual Depth	1.29	ft
Critical Elevation	74.39	ft
Critical Slope	0.005079	ft/ft
Velocity	1.78	ft/s
Velocity Head	0.05	ft
Specific Energy	74.84	ft
Froude Number	0.36	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.39 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+88.20	0.025
0+88.20	3+73.30	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	82.50
0+42.10	82.00
0+63.50	81.00
0+84.70	77.00
0+88.20	76.50
1+08.90	74.00
1+08.90	73.50
1+63.10	74.00
3+06.50	74.00

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Split Flow North of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
3+06.50	74.50
3+20.00	74.50
3+20.00	74.00
3+73.30	74.40

Notes: * To determine the split flow ratio of Q within the segment of HEC-RAS Section -700 North of the Existing Hotel Building which will satisfy the WSE determined from the HEC-RAS analysis

* Since North flow (369.89cfs) + South flow(27.14cfs) = 397.03 cfs > 391 cfs

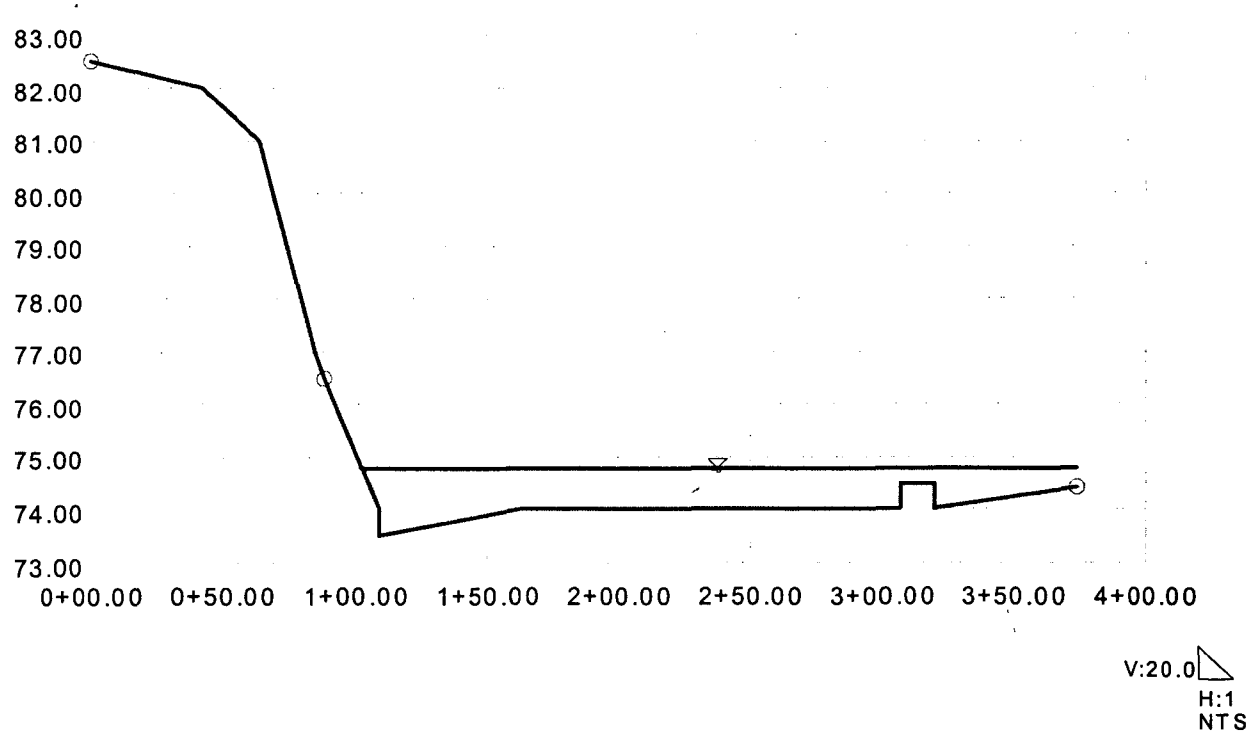
* The corrected North Split Flow = 364 cfs by proportionality [i.e. (369.89/397.03) x 391 cfs)

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Split at Station -700 (North)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Slope	0.000530	ft/ft
Water Surface Elevation	74.79	ft
Elevation Range	73.50 to 82.50	
Discharge	369.89	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

HEC-RAS ANALYSIS OF FLOW THROUGH PARKING LOT NORTH OF SILVERTON HOTEL/CASINO

(EXISTING CONDITION)

HEC-RAS Plan: Silv-N-FEMA River: Silverton Reach: North Profile: North Split

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North	-700	364.00	73.50	74.85	74.49	74.96	0.000920	2.70	135.95	271.41	0.49
North	-750	364.00	73.80	74.52	74.52	74.80	0.004590	4.27	85.34	151.35	1.00
North	-850	364.00	73.00	74.27	74.05	74.50	0.001846	3.86	94.23	98.54	0.70
North	-950	364.00	73.00	74.15		74.32	0.001456	3.32	109.79	122.13	0.62
North	-1050	364.00	72.32	73.71	73.71	74.07	0.004213	4.82	75.55	105.42	1.00
North	-1150	364.00	70.00	72.87	72.12	72.90	0.000209	1.44	252.64	221.41	0.24
North	-1250	364.00	70.50	72.52	72.52	72.82	0.004842	4.39	82.84	140.53	1.01
North	-1350	364.00	70.90	71.97	71.98	72.31	0.004751	4.65	78.25	119.11	1.01
North	-1450	364.00	70.00	71.50	71.25	71.67	0.001820	3.37	107.85	133.53	0.66
North	-1550	364.00	69.90	70.96	70.96	71.30	0.004594	4.67	77.95	116.02	1.00
North	-1650	364.00	69.00	70.59	70.45	70.88	0.002667	4.37	83.30	94.37	0.82
North	-1780	364.00	68.50	70.00	70.00	70.41	0.004480	5.16	70.49	86.20	1.01
North	-1960	364.00	68.00	68.78	68.90	69.26	0.009750	5.56	65.51	120.48	1.33
North	-2020	364.00	67.00	68.48	68.48	68.88	0.005054	5.07	71.79	90.22	1.00
North	-2110	364.00	66.00	68.04	67.37	68.09	0.000596	1.74	209.68	209.52	0.31
North	-2200	364.00	64.00	68.03		68.05	0.000207	1.22	297.47	171.59	0.16
North	-2250	364.00	62.31	68.03		68.04	0.000108	0.99	368.13	167.97	0.12
North	-2300	364.00	64.00	68.00	65.70	68.03	0.000345	1.41	258.59	144.15	0.19

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Silverton Flow
Project File : Silverton.prj
Run Date and Time: 10/8/03 5:32:30 PM

Project in English units

PLAN DATA

Plan Title: Existing-North Parking
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.p08

Geometry Title: Existing-North Parking
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g08

Flow Title : Existing-North Parking
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f07

Plan Summary Information:
Number of: Cross Sections = 18 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.0001
Critical depth calculaton tolerance = 0.0001
Maximum number of interations = 40
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.0001

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: Existing-North Parking
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f07

Flow Data (cfs)

River	Reach	RS	North Split
Silverton	North	-700	364

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	North	North Split	Normal S = .01	Known WS = 68

GEOMETRY DATA

Geometry Title: Existing-North Parking
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g08

CROSS SECTION RIVER: Silverton
REACH: North RS: -700

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.5	42.1	82	63.5	81	84.7	77	88.2	76.5
108.9	74	108.9	73.5	163.1	74	306.5	74	306.5	74.5
320	74.5	320	74	373.3	74.4				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	88.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
108.9	373.3	60	60	65	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	E		

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	74.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.016	0.016	
W.S. Elev (ft)	74.85	Reach Len. (ft)	60.00	60.00	65.00
Crit W.S. (ft)	74.49	Flow Area (sq ft)	2.97	132.99	
E.G. Slope (ft/ft)	0.000920	Area (sq ft)	2.97	219.94	
Q Total (cfs)	364.00	Flow (cfs)	4.69	359.31	
Top Width (ft)	271.41	Top Width (ft)	7.01	264.40	
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	1.58	2.70	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)	0.42	0.94	
Conv. Total (cfs)	11998.6	Conv. (cfs)	154.5	11844.1	
Length Wtd. (ft)	60.00	Wetted Per. (ft)	7.06	141.60	
Min Ch El (ft)	73.50	Shear (lb/sq ft)	0.02	0.05	
Alpha	1.01	Stream Power (lb/ft s)	0.04	0.15	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	4.79	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	5.17	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Silverton

REACH: North RS: -750

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82	44	81	65.5	80	79.8	77	91	75.5
91	75	108.8	74	184.8	73.8	184.8	74.3	197.7	74.3
197.7	73.8	250.9	74	250.9	80				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	250.9	100	100	100	.1 .3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.80	Element			
Vel Head (ft)	0.28	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.52	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	74.52	Flow Area (sq ft)		85.34	
E.G. Slope (ft/ft)	0.004590	Area (sq ft)		85.34	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	151.35	Top Width (ft)		151.35	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)		0.56	
Conv. Total (cfs)	5372.5	Conv. (cfs)		5372.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		152.89	
Min Ch El (ft)	73.80	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.68	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)		4.58	
C & E Loss (ft)	0.02	Cum SA (acres)		4.88	

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 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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -850

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.2	10.2	81	43.1	80	76.46	79	80.55	78
84.47	77	88.48	76	97.51	75	101.13	75.18	103.46	74.48
109.19	74	121.53	73	158.79	73	204.51	73.92	204.51	74.42
241.48	74.6	241.48	80						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	97.51	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	241.48	100	100	100	.1 .3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.50	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.016	

W.S. Elev (ft)	74.27	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	74.05	Flow Area (sq ft)		94.23	
E.G. Slope (ft/ft)	0.001846	Area (sq ft)		94.23	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	98.54	Top Width (ft)		98.54	
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	1.27	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	8471.2	Conv. (cfs)		8471.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		98.95	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		4.38	
C & E Loss (ft)	0.02	Cum SA (acres)		4.59	

CROSS SECTION RIVER: Silverton
REACH: North RS: -950

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.2	58.27	79	69.7	78	78.68	77	89.47	76
91.81	75	103.8	74	103.8	73.5	120.15	73	172.6	73
206.69	73.73	207.94	73.23	220.9	74	239.03	74.83	269.59	74.9
269.59	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.8	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	269.59	100	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	74.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.15	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		109.79	
E.G. Slope (ft/ft)	0.001456	Area (sq ft)		109.79	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	122.13	Top Width (ft)		122.13	
Vel Total (ft/s)	3.32	Avg. Vel. (ft/s)		3.32	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	9538.7	Conv. (cfs)		9538.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		122.78	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.27	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		4.14	
C & E Loss (ft)	0.02	Cum SA (acres)		4.34	

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: Silverton
REACH: North RS: -1050

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.75	4.68	79	5.16	79	14.16	79	24.8	80
44.69	80	76.02	79	81.43	78	84.68	77	88.14	76
91.55	75	95.02	74	103.03	73.65	103.03	73.15	123.05	73
148.49	72.32	148.49	72.82	148.99	72.82	160.94	72.82	160.94	72.32
173.47	73	220.9	74	248.03	74.29	248.03	74.79	253	74.9

253 80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.03	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	253	150	120	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev. (ft)	74.07	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.71	Reach Len. (ft)	150.00	120.00	100.00
Crit W.S. (ft)	73.71	Flow Area (sq ft)		75.55	
E.G. Slope (ft/ft)	0.004213	Area (sq ft)		75.55	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	105.42	Top Width (ft)		105.42	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	5608.2	Conv. (cfs)		5608.2	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		106.96	
Min Ch El (ft)	72.32	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.90	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		3.93	
C & E Loss (ft)	0.10	Cum SA (acres)		4.08	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1150

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.1	1.08	77	6.57	76	16.44	76	32.45	77
56.45	77	81.53	76	85.38	75	89.29	74	93.85	73
98.71	72	103.31	71	103.81	71	103.81	70.5	104.91	70.63
107.15	71	147.84	72	147.84	72.5	160.16	72.5	160.16	72
197.27	72	272.5	72	291.35	71	309.75	70	331.12	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	331.12	105	92	62	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.90	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.87	Reach Len. (ft)	105.00	92.00	62.00
Crit W.S. (ft)	72.12	Flow Area (sq ft)		252.64	
E.G. Slope (ft/ft)	0.000209	Area (sq ft)		252.64	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	221.41	Top Width (ft)		221.41	
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44	

Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)	1.14
Conv. Total (cfs)	25203.8	Conv. (cfs)	25203.8
Length Wtd. (ft)	92.00	Wetted Per. (ft)	223.84
Min Ch El (ft)	70.00	Shear (lb/sq ft)	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	3.48
C & E Loss (ft)	0.03	Cum SA (acres)	3.63

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: Silverton
REACH: North RS: -1250

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76	7.42	75	15.29	75	27.13	76	49.88	76
53.72	76	79.03	76	83.47	75	89.51	74	94.15	73
98.68	72	103.28	71	103.58	71	103.58	70.5	105.08	70.63
107.32	71	148.01	72	148.01	72.5	158.15	72.5	158.15	72
159.65	72.13	197.71	72	272.42	73	272.42	73.5	285.9	73.6
285.9	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.28	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	285.9	120	105	.3	.5

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.82	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.52	Reach Len. (ft)	120.00	105.00	85.00
Crit W.S. (ft)	72.52	Flow Area (sq ft)		82.84	
E.G. Slope (ft/ft)	0.004842	Area (sq ft)		82.84	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	140.53	Top Width (ft)		140.53	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	5230.8	Conv. (cfs)		5230.8	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		142.25	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.77	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		3.12	
C & E Loss (ft)	0.01	Cum SA (acres)		3.25	

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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1350

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.1	1.66	75	6.95	74	14.56	74	27.97	75
29.03	75	75.95	75	77.5	75	83.27	74	88.1	73

92.46	72	96.91	71	102.55	71.4	102.55	70.9	104.05	71.03
147.7	71	147.7	71.5	162.18	71.5	162.18	71	163.68	71.13
213.22	72	272.15	73	273.25	73	273.25	73.5	277.8	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	102.55	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	277.8	150	135	120	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.31	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.97	Reach Len. (ft)	150.00	135.00	120.00
Crit W.S. (ft)	71.98	Flow Area (sq ft)		78.25	
E.G. Slope (ft/ft)	0.004751	Area (sq ft)		78.25	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	119.11	Top Width (ft)		119.11	
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)		4.65	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	5281.1	Conv. (cfs)		5281.1	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		120.75	
Min Ch El (ft)	70.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		2.93	
C & E Loss (ft)	0.01	Cum SA (acres)		2.93	

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1450

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75	22	72.1	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	115.49	72	120.12	71	125.66	70
127.8	70.5	128.3	70.5	128.3	70	129.91	70.13	166.31	70
173.26	70.82	173.76	70.82	184.55	70.82	184.55	70.57	186.05	70.61
211.54	71	278.27	72	325.62	73	356.76	74	367.73	74.31
367.73	74.81	374.91	74.9	374.91	80				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.66	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	374.91	165	130	70	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	71.67	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.50	Reach Len. (ft)	165.00	130.00	70.00
Crit W.S. (ft)	71.25	Flow Area (sq ft)		107.85	
E.G. Slope (ft/ft)	0.001820	Area (sq ft)		107.85	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	133.53	Top Width (ft)		133.53	
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.37	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	8533.3	Conv. (cfs)		8533.3	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		134.63	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.09	

Alpha	1.00	Stream Power (lb/ft s)	0.31
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	2.64
C & E Loss (ft)	0.02	Cum SA (acres)	2.54

Warning: Divided flow computed for this cross-section.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1550

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74	22	72.08	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	111.05	72	115.68	71	120.22	70
124.41	70.4	124.91	70.4	124.91	69.9	167.98	70	169	70.06
169	70.56	179.55	70.56	179.55	70.06	234.07	71	275.41	72
315.98	73	331.81	73.84	331.81	74.34	340.71	74.4	340.71	80

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	340.71	105	80	55	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	71.30	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.96	Reach Len. (ft)	105.00	80.00	55.00
Crit W.S. (ft)	70.96	Flow Area (sq ft)		77.95	
E.G. Slope (ft/ft)	0.004594	Area (sq ft)		77.95	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	116.02	Top Width (ft)		116.02	
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.67	
Max Chl Dpth (ft)	1.06	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	5370.5	Conv. (cfs)		5370.5	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		117.65	
Min Ch El (ft)	69.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		2.36	
C & E Loss (ft)	0.01	Cum SA (acres)		2.17	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1650

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.5	22	71.22	25.21	71	35.02	71	39.59	72
44.24	73	48.98	74	96.9	74	104.05	73	109.88	72
115.33	71	120.59	70	124.43	69.5	124.93	69.5	125.43	69.13
138.1	69	185.01	70	230.94	71	265.98	72	297.99	73
299.25	73.01	299.25	73.51	309.23	73.6	309.23	80		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.43	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	309.23	165	135	80 .1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.88	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.59	Reach Len. (ft)	165.00	135.00	80.00
Crit W.S. (ft)	70.45	Flow Area (sq ft)		83.30	
E.G. Slope (ft/ft)	0.002667	Area (sq ft)		83.30	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	94.37	Top Width (ft)		94.37	
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)		4.37	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	7048.0	Conv. (cfs)		7048.0	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		94.59	
Min Ch El (ft)	69.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		2.22	
C & E Loss (ft)	0.01	Cum SA (acres)		1.98	

CROSS SECTION RIVER: Silverton
REACH: North RS: -1780

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.5	22	69.68	28.14	69	31.25	69	36.26	70
41.27	71	46.27	72	75.34	73	99.51	73	105.11	72
109.71	71	116.34	70	122.87	69	125.27	69	125.27	68.5
158.27	69	175.45	69.55	175.45	70.05	190.42	70.17	190.42	69.67
191.59	69.8	239.54	71	297.08	72.27	297.08	72.77	301.16	72.79
329.68	72.9	329.68	80						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.27	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	329.68	285	180	130 .1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.41	Element			
Vel Head (ft)	0.41	Wt. n-Val.		0.017	
W.S. Elev (ft)	70.00	Reach Len. (ft)	285.00	180.00	130.00
Crit W.S. (ft)	70.00	Flow Area (sq ft)		70.49	
E.G. Slope (ft/ft)	0.004480	Area (sq ft)		70.49	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	86.20	Top Width (ft)		86.20	
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)		5.16	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	5438.1	Conv. (cfs)		5438.1	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		87.72	
Min Ch El (ft)	68.50	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.16	
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)		1.98	
C & E Loss (ft)	0.04	Cum SA (acres)		1.70	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1960

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70.2	62	69	110	70	135	68	147.7	68
155.63	69	163.67	70	185.08	71	216.22	71	223.41	70
230.47	69	237.16	68	238.84	68.5	239.34	68.5	239.34	68
240.71	68	268.91	68	281.94	68.28	283.25	68.51	294.14	68.51
294.14	68	370.33	70	419.65	71	477.14	72.21	477.14	72.71
489.87	72.85	542.92	72.95	542.92	80				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	62	.025	110	.016	135	.025	238.84	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	542.92	75	70	45	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	69.26	Element			
Vel Head (ft)	0.48	Wt. n-Val.		0.018	
W.S. Elev (ft)	68.78	Reach Len. (ft)	75.00	70.00	45.00
Crit W.S. (ft)	68.90	Flow Area (sq ft)		65.51	
E.G. Slope (ft/ft)	0.009750	Area (sq ft)		65.51	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	120.48	Top Width (ft)		120.48	
Vel Total (ft/s)	5.56	Avg. Vel. (ft/s)		5.56	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	3686.4	Conv. (cfs)		3686.4	
Length Wtd. (ft)	70.00	Wetted Per. (ft)		121.74	
Min Ch El (ft)	68.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		1.82	
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)		1.70	
C & E Loss (ft)	0.01	Cum SA (acres)		1.27	

Warning: Divided flow computed for this cross-section.
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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2020

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70	48	69	66	69	86	68	100	67.42
104.13	67	106.95	67	112.07	68	117	69	121.77	70
126.5	71	130.98	72	176.97	72	182.86	71	188.27	70
194.3	68	200.48	67.7	203.4	67.7	203.4	67.2	246.18	68
304.9	69	349.08	70	381.66	70.95	381.66	71.45	385.55	71.45
385.55	70.95	447.5	72.17	447.5	72.67	480.72	72.8	480.72	80

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	48	.025	66	.016	100	.025	203.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	480.72	110	90	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
245	295	69	295	340	70	340	375	71

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.88	Element			
Vel Head (ft)	0.40	Wt. n-Val.		0.018	
W.S. Elev (ft)	68.48	Reach Len. (ft)	110.00	90.00	50.00
Crit W.S. (ft)	68.48	Flow Area (sq ft)		71.79	
E.G. Slope (ft/ft)	0.005054	Area (sq ft)		71.79	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	90.22	Top Width (ft)		90.22	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	5120.1	Conv. (cfs)		5120.1	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		91.51	
Min Ch El (ft)	67.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		1.59	
C & E Loss (ft)	0.11	Cum SA (acres)		1.10	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2110

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.8	88	67.06	88.98	67	101.15	66	120	66
140	67	152.01	67	153.51	67.13	166.89	67	197.91	67.2
197.91	66.7	218.04	67	263.66	68	318.44	69	361.21	70
400.78	71	445.72	71.11	445.72	71.61				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	88	.025	197.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	445.72	115	95	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.09	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.022	
W.S. Elev (ft)	68.04	Reach Len. (ft)	115.00	95.00	60.00
Crit W.S. (ft)	67.37	Flow Area (sq ft)		209.68	
E.G. Slope (ft/ft)	0.000596	Area (sq ft)		209.68	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	209.52	Top Width (ft)		209.52	
Vel Total (ft/s)	1.74	Avg. Vel. (ft/s)		1.74	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.00	

Conv. Total (cfs)	14915.5	Conv. (cfs)	14915.5
Length Wtd. (ft)	95.00	Wetted Per. (ft)	210.13
Min Ch El. (ft)	66.00	Shear (lb/sq ft)	0.04
Alpha	1.00	Stream Power (lb/ft s)	0.06
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.29
C & E Loss (ft)	0.01	Cum SA (acres)	0.79

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2200

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	100	67.28	106.77	67	109.68	66	115.87	65
126.13	64	132.54	64	159.48	65	178.75	66	206.82	67
213.83	67.48	213.83	67.98	221.95	67.98	221.95	67.48	236.59	68
284.28	69	339.29	70	382.8	71	446.41	72	454.18	72.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	100	.035	178.75	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	454.18	50	50	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.05	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.031	
W.S. Elev (ft)	68.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		297.47	
E.G. Slope (ft/ft)	0.000207	Area (sq ft)		297.47	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	171.59	Top Width (ft)		171.59	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	25292.2	Conv. (cfs)		25292.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		172.99	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.74	
C & E Loss (ft)	0.00	Cum SA (acres)		0.37	

CROSS SECTION RIVER: Silverton
REACH: North RS: -2250

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.08	82.5	68	95	67	103.8	68.8
104.68	68.8	104.68	62.31	146.31	64	160.11	65	177.31	66
202.53	67	251.11	68	312.06	69	390.15	70	437.97	70.57

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.025	95	.035	177.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	437.97	50	50	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	68.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.032	
W.S. Elev (ft)	68.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		368.13	
E.G. Slope (ft/ft)	0.000108	Area (sq ft)		368.13	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	167.97	Top Width (ft)		167.97	
Vel Total (ft/s)	0.99	Avg. Vel. (ft/s)		0.99	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		2.19	
Conv. Total (cfs)	35005.0	Conv. (cfs)		35005.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		173.96	
Min Ch El (ft)	62.31	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.36	
C & E Loss (ft)	0.00	Cum SA (acres)		0.18	

Warning: Divided flow computed for this cross-section.
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: Silverton
REACH: North RS: -2300

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.13	77.28	68	91.2	67	98.67	66
108.25	65	112.72	64	132.64	64	145.6	65	157.85	66
171.22	67	221.43	68	355.24	69	431.16	69.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.035	171.22	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	431.16	0	0	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	68.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.034	
W.S. Elev (ft)	68.00	Reach Len. (ft)			
Crit W.S. (ft)	65.70	Flow Area (sq ft)		258.59	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		258.59	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	144.15	Top Width (ft)		144.15	
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	4.00	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	19607.1	Conv. (cfs)		19607.1	
Length Wtd. (ft)		Wetted Per. (ft)		144.54	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2	n3	n4	n5

North	-700	.025	.016			
North	-750	.025	.016			
North	-850	.025	.016			
North	-950	.025	.016			
North	-1050	.025	.016			
North	-1150	.025	.016			
North	-1250	.025	.016			
North	-1350	.025	.016			
North	-1450	.016	.025	.016		
North	-1550	.016	.025	.016		
North	-1650	.016	.025	.016		
North	-1780	.016	.025	.016		
North	-1960	.016	.025	.016	.025	.016
North	-2020	.016	.025	.016	.025	.016
North	-2110	.016	.025	.016		
North	-2200	.016	.035	.016		
North	-2250	.016	.025	.035	.016	
North	-2300	.016	.035	.016		

SUMMARY OF REACH LENGTHS

River: Silverton

Reach	River Sta.	Left	Channel	Right
North	-700	60	60	65
North	-750	100	100	100
North	-850	100	100	100
North	-950	100	100	100
North	-1050	150	120	100
North	-1150	105	92	62
North	-1250	120	105	85
North	-1350	150	135	120
North	-1450	165	130	70
North	-1550	105	80	55
North	-1650	165	135	80
North	-1780	285	180	130
North	-1960	75	70	45
North	-2020	110	90	50
North	-2110	115	95	60
North	-2200	50	50	50
North	-2250	50	50	50
North	-2300	0	0	0

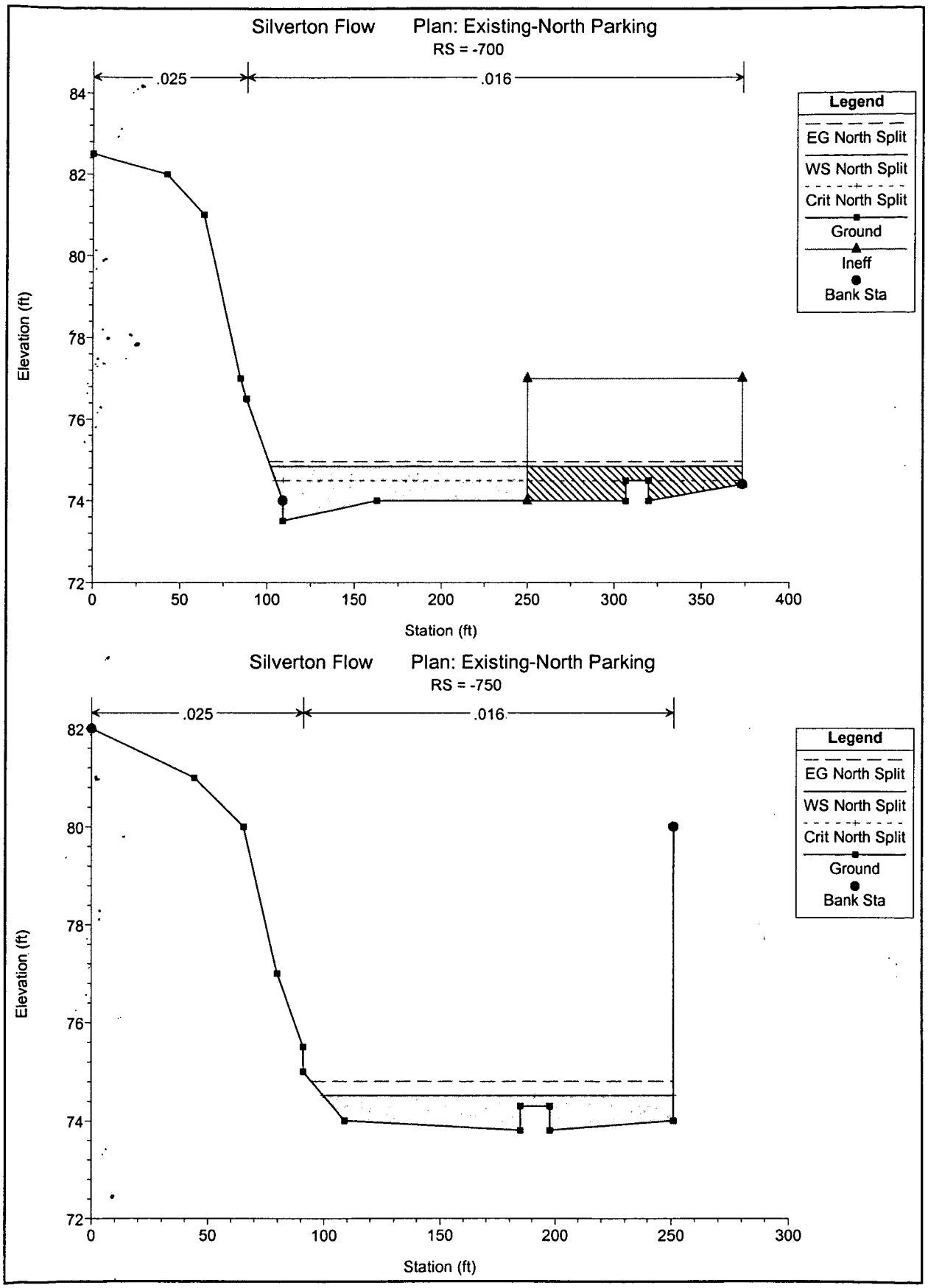
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

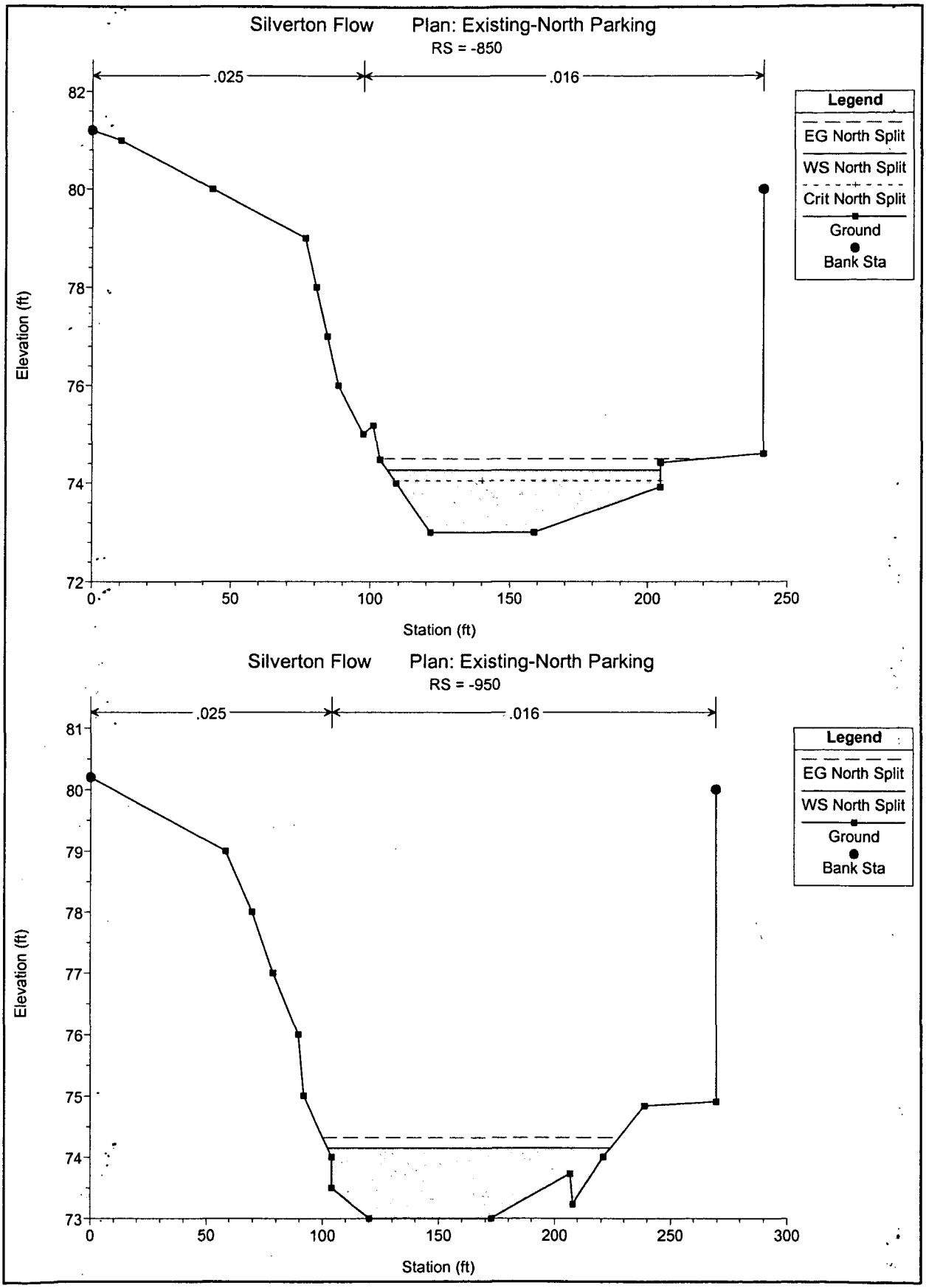
Reach	River Sta.	Contr.	Expan.
North	-700	.3	.5
North	-750	.1	.3
North	-850	.1	.3
North	-950	.1	.3
North	-1050	.1	.3
North	-1150	.1	.3
North	-1250	.3	.5
North	-1350	.1	.3
North	-1450	.1	.3
North	-1550	.1	.3
North	-1650	.1	.3
North	-1780	.1	.3

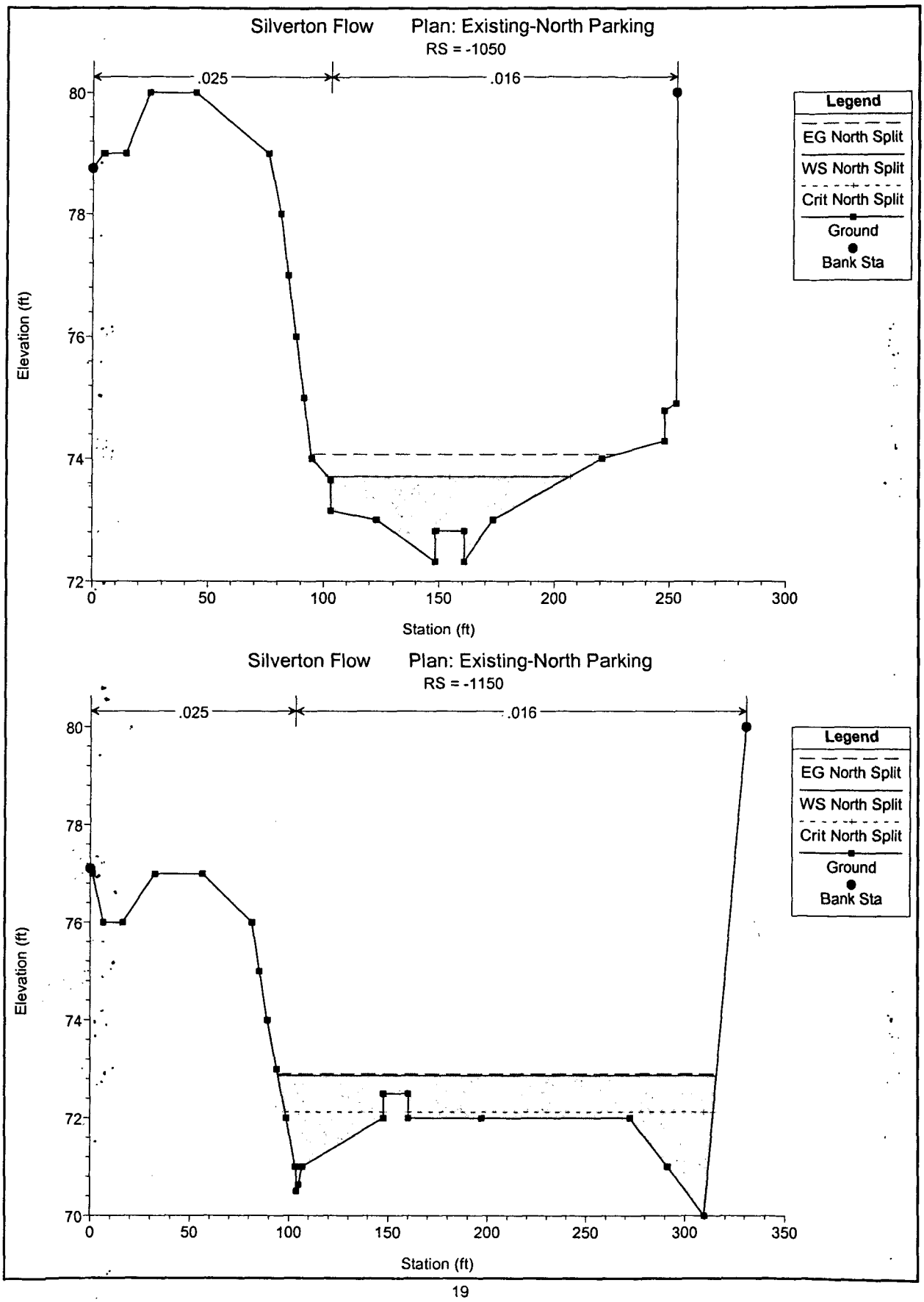
North	-1960	.1	.3
North	-2020	.1	.3
North	-2110	.1	.3
North	-2200	.1	.3
North	-2250	.1	.3
North	-2300	.1	.3

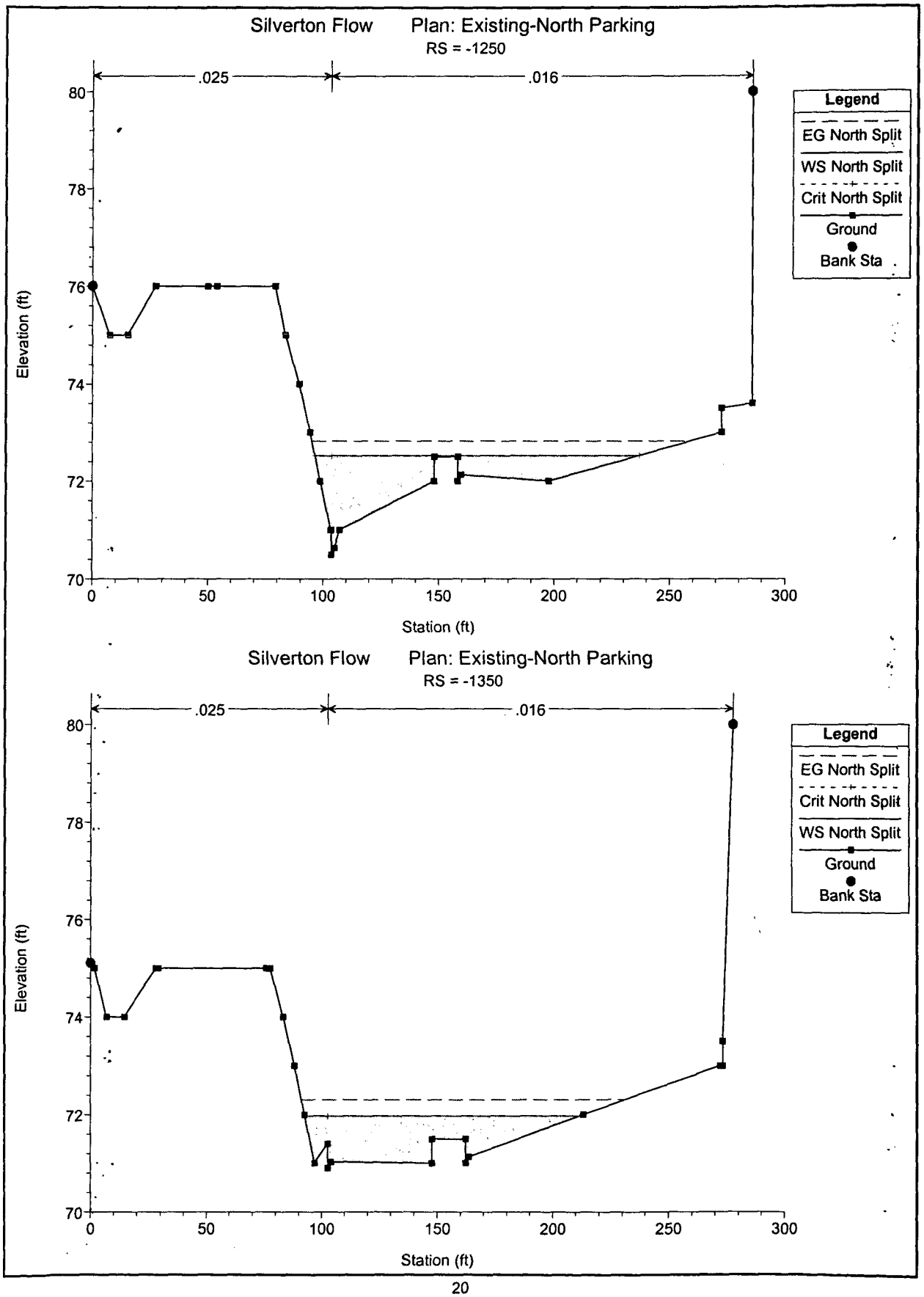
Profile Output Table - Standard Table 1

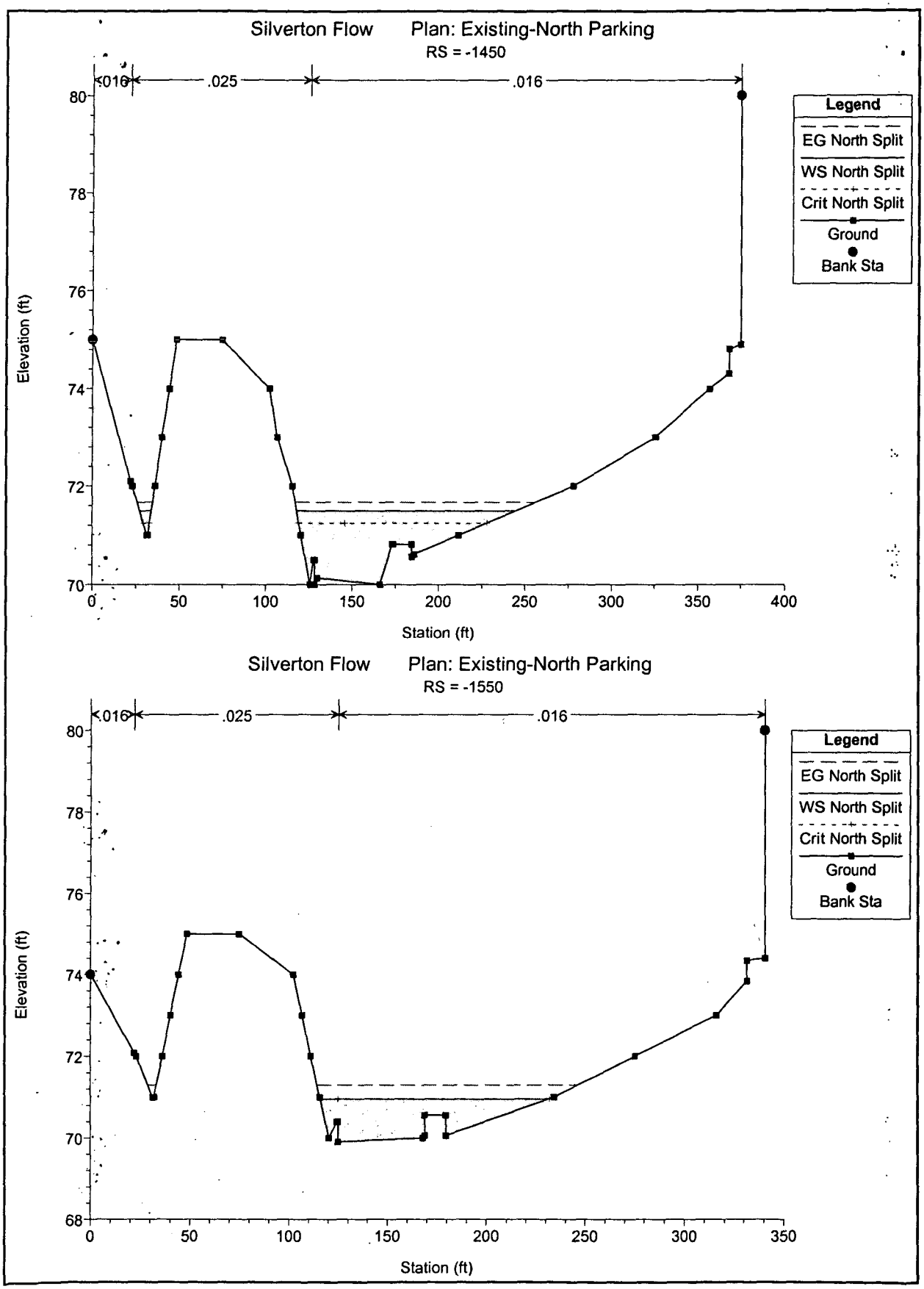
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
North	-700	364.00	73.50	74.85	74.49	74.96	0.000920	2.70	135.95	271.41	0.49
North	-750	364.00	73.80	74.52	74.52	74.80	0.004590	4.27	85.34	151.35	1.00
North	-850	364.00	73.00	74.27	74.05	74.50	0.001846	3.86	94.23	98.54	0.70
North	-950	364.00	73.00	74.15		74.32	0.001456	3.32	109.79	122.13	0.62
North	-1050	364.00	72.32	73.71	73.71	74.07	0.004213	4.82	75.55	105.42	1.00
North	-1150	364.00	70.00	72.87	72.12	72.90	0.000209	1.44	252.64	221.41	0.24
North	-1250	364.00	70.50	72.52	72.52	72.82	0.004842	4.39	82.84	140.53	1.01
North	-1350	364.00	70.90	71.97	71.98	72.31	0.004751	4.65	78.25	119.11	1.01
North	-1450	364.00	70.00	71.50	71.25	71.67	0.001820	3.37	107.85	133.53	0.66
North	-1550	364.00	69.90	70.96	70.96	71.30	0.004594	4.67	77.95	116.02	1.00
North	-1650	364.00	69.00	70.59	70.45	70.88	0.002667	4.37	83.30	94.37	0.82
North	-1780	364.00	68.50	70.00	70.00	70.41	0.004480	5.16	70.49	86.20	1.01
North	-1960	364.00	68.00	68.78	68.90	69.26	0.009750	5.56	65.51	120.48	1.33
North	-2020	364.00	67.00	68.48	68.48	68.88	0.005054	5.07	71.79	90.22	1.00
North	-2110	364.00	66.00	68.04	67.37	68.09	0.000596	1.74	209.68	209.52	0.31
North	-2200	364.00	64.00	68.03		68.05	0.000207	1.22	297.47	171.59	0.16
North	-2250	364.00	62.31	68.03		68.04	0.000108	0.99	368.13	167.97	0.12
North	-2300	364.00	64.00	68.00	65.70	68.03	0.000345	1.41	258.59	144.15	0.19

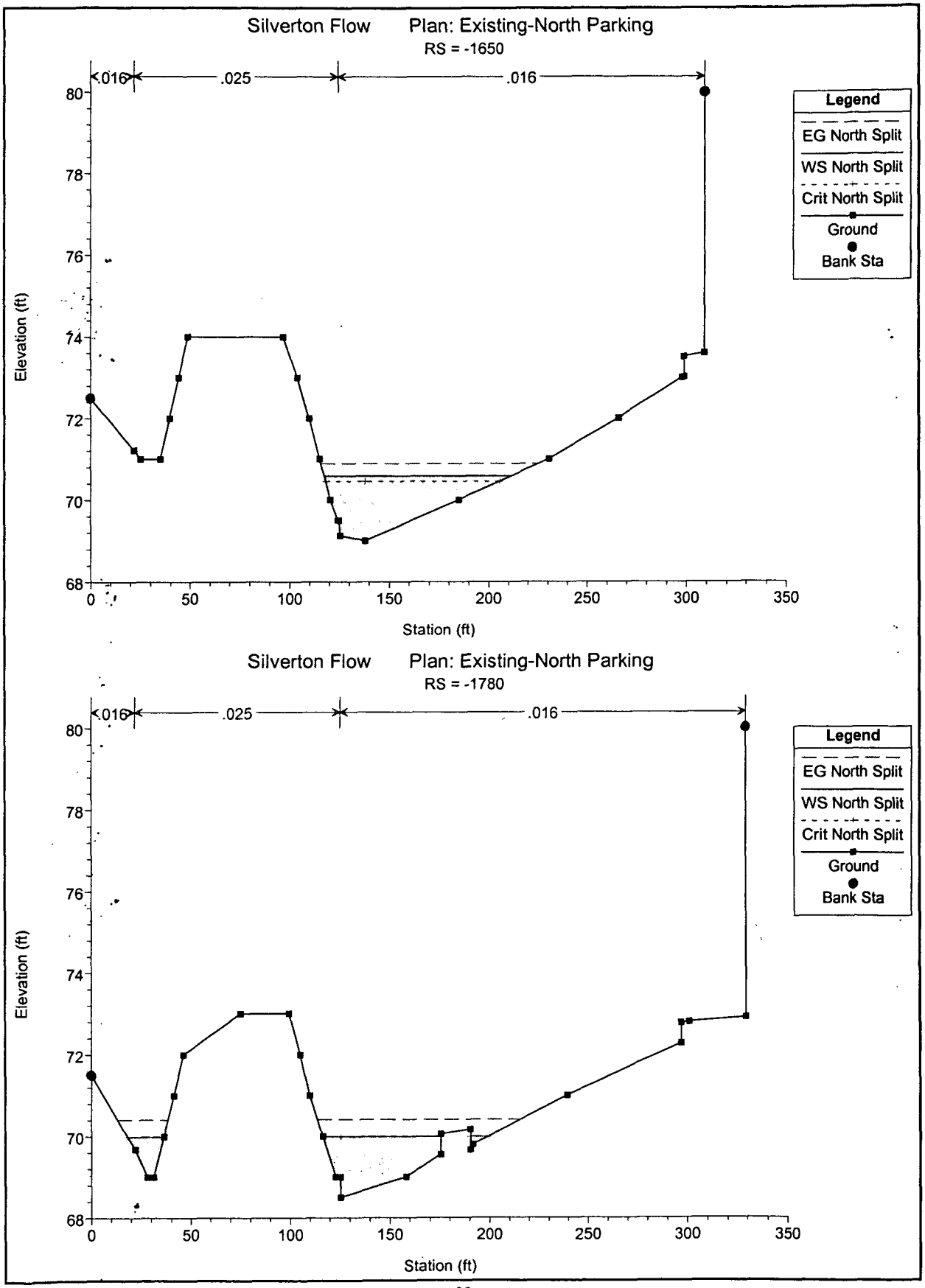

Silverton Flow Plan: Existing-North Parking
RS = -700
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -750
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

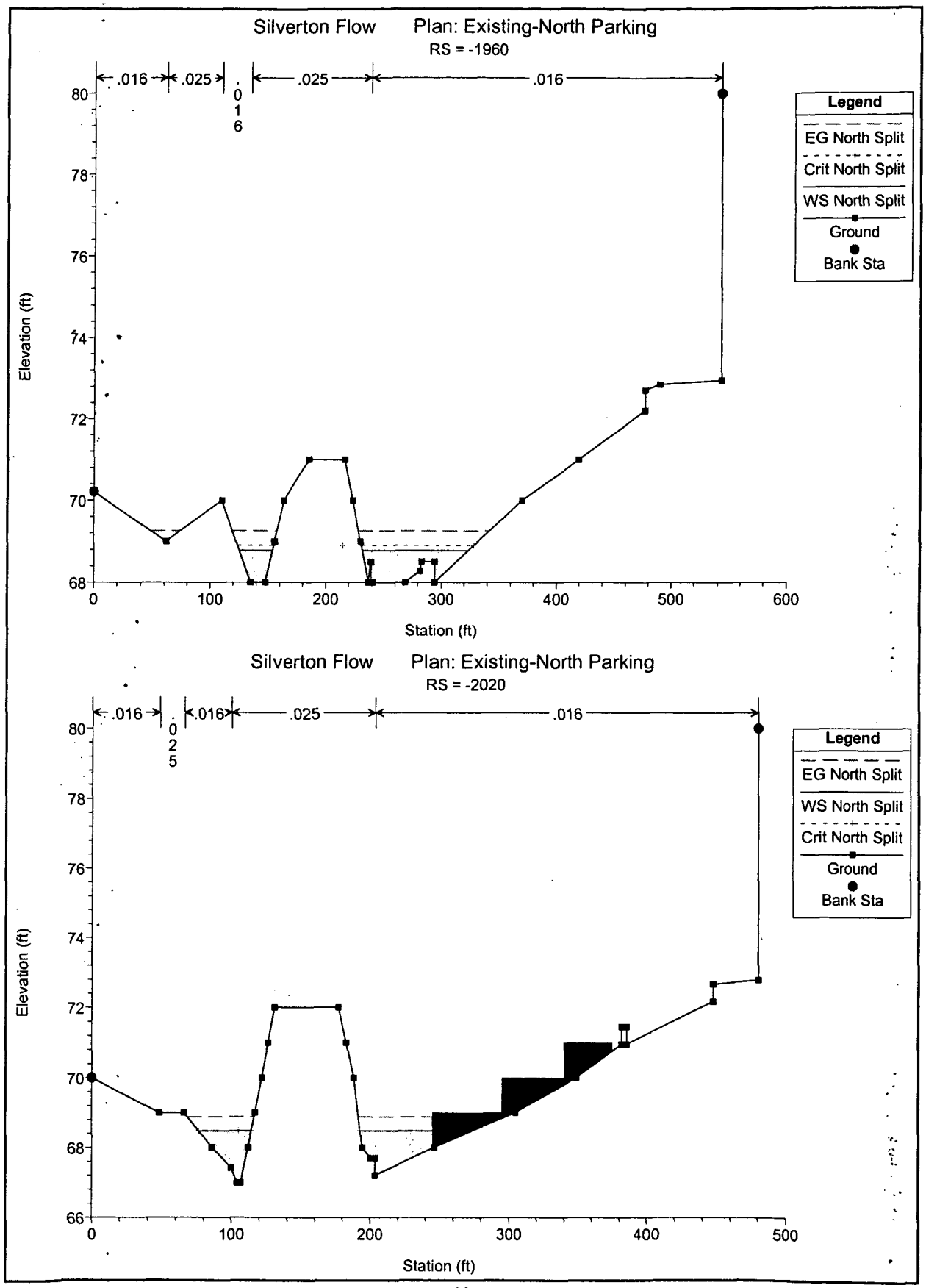

Silverton Flow Plan: Existing-North Parking
RS = -850
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -950
.025
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

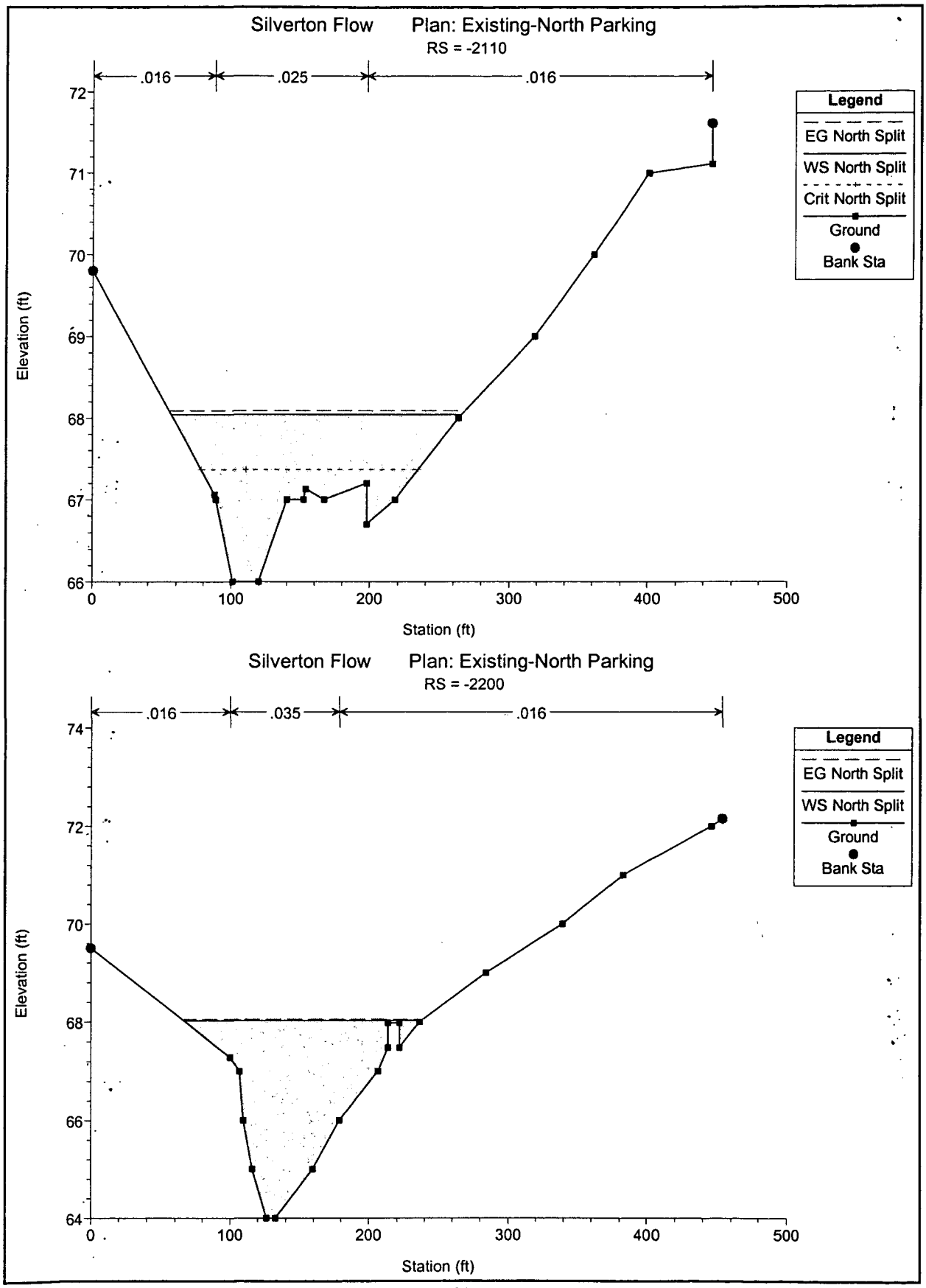

Silverton Flow Plan: Existing-North Parking
RS = -1050
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -1150
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

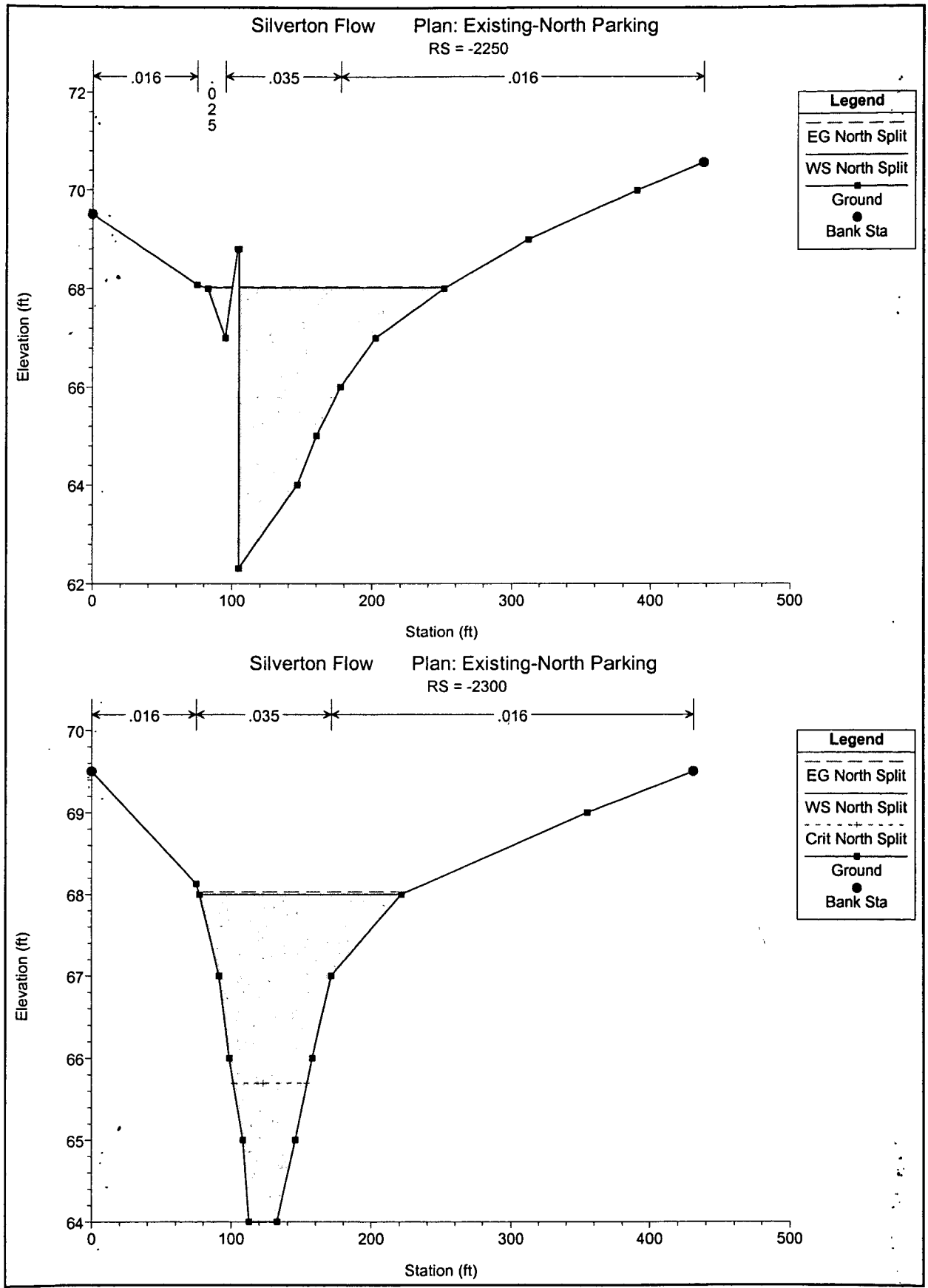

Silverton Flow Plan: Existing-North Parking
RS = -1250
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -1350
.025
.016
Legend
EG North Split
Crit North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-North Parking
RS = -1450
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -1550
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-North Parking
RS = -1650
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -1780
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-North Parking
RS = -1960
.016
.025
.016
.025
.016
Legend
EG North Split
Crit North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -2020
.016
.025
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-North Parking
RS = -2110
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -2200
.016
.035
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-North Parking
RS = -2250
.016
.025
.035
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-North Parking
RS = -2300
.016
.035
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS ANALYSIS OF FLOW THROUGH PARKING LOT SOUTH OF SILVERTON HOTEL/CASINO

(EXISTING CONDITION)

HEC-RAS Plan: Silv-S-FEMA River: Silverton Reach: South Profile: Soth Split

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
South	860	27.00	74.50	74.74	74.76	74.87	0.010014	2.92	9.25	51.97	1.22
South	820	27.00	73.80	74.38	74.40	74.49	0.008572	2.68	10.08	57.27	1.13
South	700	27.00	73.29	73.84	73.76	73.91	0.002766	2.03	13.32	49.31	0.69
South	600	27.00	73.00	73.43	73.41	73.53	0.005119	2.64	10.24	40.85	0.93
South	500	27.00	71.85	72.40	72.40	72.52	0.006083	2.78	9.70	40.70	1.00
South	400	27.00	70.50	70.78	70.83	70.94	0.016927	3.26	8.29	59.18	1.53
South	300	27.00	70.00	70.32	70.32	70.39	0.007029	2.22	12.14	79.42	1.00
South	200	27.00	69.00	69.36	69.23	69.39	0.001282	1.42	19.00	68.03	0.47
South	100	27.00	68.61	69.07	69.07	69.13	0.008014	1.88	14.34	133.14	1.01
South	25	27.00	68.00	68.40	68.40	68.44	0.010508	1.70	15.89	210.55	1.09

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Silverton Flow
Project File : Silverton.prj
Run Date and Time: 10/9/03 1:29:40 PM

Project in English units

PLAN DATA

Plan Title: Existing-South Parking
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.p09

Geometry Title: Existing-South
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g09

Flow Title : Existing-South
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f08

Plan Summary Information:
Number of: Cross Sections = 10 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.0001
Critical depth calculaton tolerance = 0.0001
Maximum number of interations = 40
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.0001

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: Existing-South
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f08

Flow Data (cfs)

River	Reach	RS	Soth Split
Silverton	South	860	27

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	South	Soth Split	Normal S = .01	Known WS = 68

GEOMETRY DATA

Geometry Title: Existing-South
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g09

CROSS SECTION RIVER: Silverton
REACH: South RS: 860

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
363.3	76	363.3	75.1	373.3	75.1	373.3	74.6	421.3	74.5
421.3	75	436.3	75.1	436.3	74.6	447.9	75	480.8	76
510.4	77	541.3	78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
363.3	.016	373.3	.016	510.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
373.3	510.4	40	40	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.87	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.74	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	74.76	Flow Area (sq ft)		9.25	
E.G. Slope (ft/ft)	0.010014	Area (sq ft)		9.25	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	51.97	Top Width (ft)		51.97	
Vel Total (ft/s)	2.92	Avg. Vel. (ft/s)		2.92	
Max Chl Dpth (ft)	0.24	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	269.8	Conv. (cfs)		269.8	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		52.48	
Min Ch El (ft)	74.50	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.32	
Frctn Loss (ft)		Cum Volume (acre-ft)		0.28	
C & E Loss (ft)		Cum SA (acres)		1.58	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Silverton
REACH: South RS: 820

INPUT
Description: 820
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75	9.8	74.92	9.8	74.42	45.8	74.18	45.8	74.68
84.2	74.3	84.2	73.8	94.9	74	108.2	74.63	108.2	75.13
148.5	76.23	148.5	75.73	158	76	173.2	76.6	173.2	77.1
210.4	78.23	210.4	77.73	221.4	78	241	78.86	241	79.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	241	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	241	120	120	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.49	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.38	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	74.40	Flow Area (sq ft)		10.08	
E.G. Slope (ft/ft)	0.008572	Area (sq ft)		10.08	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	57.27	Top Width (ft)		57.27	
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)		2.68	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	291.6	Conv. (cfs)		291.6	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		57.98	
Min Ch El (ft)	73.80	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		0.27	
C & E Loss (ft)	0.01	Cum SA (acres)		1.53	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Silverton
REACH: South RS: 700

INPUT
Description: 700
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	9	75.12	18.13	74.95	21.12	74.45
49	74	73	73.66	73	74.16	78	74.07	78	73.57
98	73.37	99.5	73.29	101	73.37	119	74	133	75
183	76	215	77	252	78	267.85	78.6	267.85	79.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	267.85	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	267.85	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.91	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.84	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	73.76	Flow Area (sq ft)		13.32	
E.G. Slope (ft/ft)	0.002766	Area (sq ft)		13.32	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	49.31	Top Width (ft)		49.31	
Vel Total (ft/s)	2.03	Avg. Vel. (ft/s)		2.03	
Max Chl Dpth (ft)	0.55	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	513.4	Conv. (cfs)		513.4	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.78	
Min Ch El (ft)	73.29	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.09	

Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.24
C & E Loss (ft)	0.00	Cum SA (acres)	1.39

Warning: Divided flow computed for this cross-section.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: South RS: 600

INPUT
Description: 600
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	18.13	74.94	21.12	74.31	47.75	74
72.5	73.67	72.5	74.17	78.11	73.78	78.11	73.28	96.49	73.08
97.99	73	99.49	73.08	101.94	73	141.9	74	184.61	75
221.37	76	265.79	76.3	266.29	76.8	267.89	77		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	267.89	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	267.89	271	182	71	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.53	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.43	Reach Len. (ft)	271.00	182.00	71.00
Crit W.S. (ft)	73.41	Flow Area (sq ft)		10.24	
E.G. Slope (ft/ft)	0.005119	Area (sq ft)		10.24	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	40.85	Top Width (ft)		40.85	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	377.4	Conv. (cfs)		377.4	
Length Wtd. (ft)	182.00	Wetted Per. (ft)		41.00	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)		0.21	
C & E Loss (ft)	0.00	Cum SA (acres)		1.28	

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: Silverton
REACH: South RS: 500

INPUT
Description: 500
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	55.43	74.84	55.93	74.34	71.91	74
100.4	73	152.21	72.07	157.71	71.85	163.21	72.07	195.51	73
224.24	74	254.76	75	284.1	76	317.75	77	354.53	78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	354.53	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	354.53	46	165	277	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

E.G. Elev (ft)	72.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.40	Reach Len. (ft)	46.00	165.00	277.00
Crit W.S. (ft)	72.40	Flow Area (sq ft)		9.70	
E.G. Slope (ft/ft)	0.006083	Area (sq ft)		9.70	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	40.70	Top Width (ft)		40.70	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	0.55	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	346.2	Conv. (cfs)		346.2	
Length Wtd. (ft)	165.00	Wetted Per. (ft)		40.72	
Min Ch El (ft)	71.85	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)		0.17	
C & E Loss (ft)	0.02	Cum SA (acres)		1.11	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: South RS: 400

INPUT
Description: 400
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	38.44	75.54	38.94	75.04	66.09	73
121.29	72	161.23	71	174.91	71.03	177.91	70.95	180.91	71.03
191.02	71	206.84	72	226.36	71	245.18	70.5	332.01	71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	332.01	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	332.01	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

E.G. Elev (ft)	70.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.78	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	70.83	Flow Area (sq ft)		8.29	
E.G. Slope (ft/ft)	0.016927	Area (sq ft)		8.29	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	59.18	Top Width (ft)		59.18	
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)		3.26	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.14	
Conv. Total (cfs)	207.5	Conv. (cfs)		207.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		59.18	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.48	
Frctn Loss (ft)	1.57	Cum Volume (acre-ft)		0.14	
C & E Loss (ft)	0.00	Cum SA (acres)		0.92	

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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: South RS: 300

INPUT
Description: 300
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	38.4	74.05	38.9	74.05	38.9	73.55
59.81	73	70.25	72.87	70.25	73.37	75.25	73.2	75.25	72.7
97.36	72	142.4	71	178.41	70	214.73	71	218.97	70
233.2	70.1	321.24	70.57						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	321.24	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	321.24	145	140	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.39	Element			
Vel Head (ft)	0.08	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.32	Reach Len. (ft)	145.00	140.00	140.00
Crit W.S. (ft)	70.32	Flow Area (sq ft)		12.14	
E.G. Slope (ft/ft)	0.007029	Area (sq ft)		12.14	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	79.42	Top Width (ft)		79.42	
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)		2.22	
Max Chl Dpth (ft)	0.32	Hydr. Depth (ft)		0.15	
Conv. Total (cfs)	322.0	Conv. (cfs)		322.0	
Length Wtd. (ft)	140.00	Wetted Per. (ft)		79.46	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.15	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)		0.11	
C & E Loss (ft)	0.01	Cum SA (acres)		0.76	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: South RS: 200

INPUT
Description: 200
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.59	0	72.09	32.19	71.62	32.19	72.12	37.33	72.02
37.33	71.52	58.84	71	107.43	70	140.41	69.35	169.13	70
185.2	70	208.16	69.3	232	69	267.75	69	274.8	69.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	274.8	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	274.8	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

E.G. Elev (ft)	69.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.016	
W.S. Elev (ft)	69.36	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	69.23	Flow Area (sq ft)		19.00	
E.G. Slope (ft/ft)	0.001282	Area (sq ft)		19.00	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	68.03	Top Width (ft)		68.03	
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	0.36	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	754.0	Conv. (cfs)		754.0	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		68.04	
Min Ch El (ft)	69.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		0.06	
C & E Loss (ft)	0.00	Cum SA (acres)		0.53	

Warning: Divided flow computed for this cross-section.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: South RS: 100

INPUT
Description: 100
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	70.5	-65	70	0	69.84	121.62	69	138.45	68.61
148.45	69	211.18	69	235.38	69	282.51	69.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.016	0	.016	282.51	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	282.51	75	75	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

E.G. Elev (ft)	69.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.016	
W.S. Elev (ft)	69.07	Reach Len. (ft)	75.00	75.00	75.00
Crit W.S. (ft)	69.07	Flow Area (sq ft)		14.34	
E.G. Slope (ft/ft)	0.008014	Area (sq ft)		14.34	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	133.14	Top Width (ft)		133.14	
Vel Total (ft/s)	1.88	Avg. Vel. (ft/s)		1.88	
Max Chl Dpth (ft)	0.46	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	301.6	Conv. (cfs)		301.6	
Length Wtd. (ft)	75.00	Wetted Per. (ft)		133.16	
Min Ch El (ft)	68.61	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)		0.03	
C & E Loss (ft)	0.00	Cum SA (acres)		0.30	

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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: South RS: 25

INPUT
Description: 25
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	68.88	.5	68.88	.5	68.38	202.63	68.28	205.26	68
209.07	68	211.17	68.42	239.32	69	240	69	240	69.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	240	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	240	0	0	.1	.3

CROSS SECTION OUTPUT Profile #Soth Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.44	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.016	
W.S. Elev (ft)	68.40	Reach Len. (ft)			
Crit W.S. (ft)	68.40	Flow Area (sq ft)		15.89	
E.G. Slope (ft/ft)	0.010508	Area (sq ft)		15.89	
Q Total (cfs)	27.00	Flow (cfs)		27.00	
Top Width (ft)	210.55	Top Width (ft)		210.55	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	0.40	Hydr. Depth (ft)		0.08	
Conv. Total (cfs)	263.4	Conv. (cfs)		263.4	
Length Wtd. (ft)		Wetted Per. (ft)		210.62	
Min Ch El (ft)	68.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.08	
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)			
C & E Loss (ft)	0.00	Cum SA (acres)			

Note: Program found supercritical flow starting at this cross section.

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2	n3
South	860	.016	.016	.016
South	820	.016	.016	.016
South	700	.016	.016	.016
South	600	.016	.016	.016
South	500	.016	.016	.016
South	400	.016	.016	.016
South	300	.016	.016	.016
South	200	.016	.016	.016
South	100	.016	.016	.016
South	25	.016	.016	.016

SUMMARY OF REACH LENGTHS

River: Silverton

Reach	River Sta.	Left	Channel	Right
South	860	40	40	40
South	820	120	120	120
South	700	100	100	100
South	600	271	182	71
South	500	46	165	277

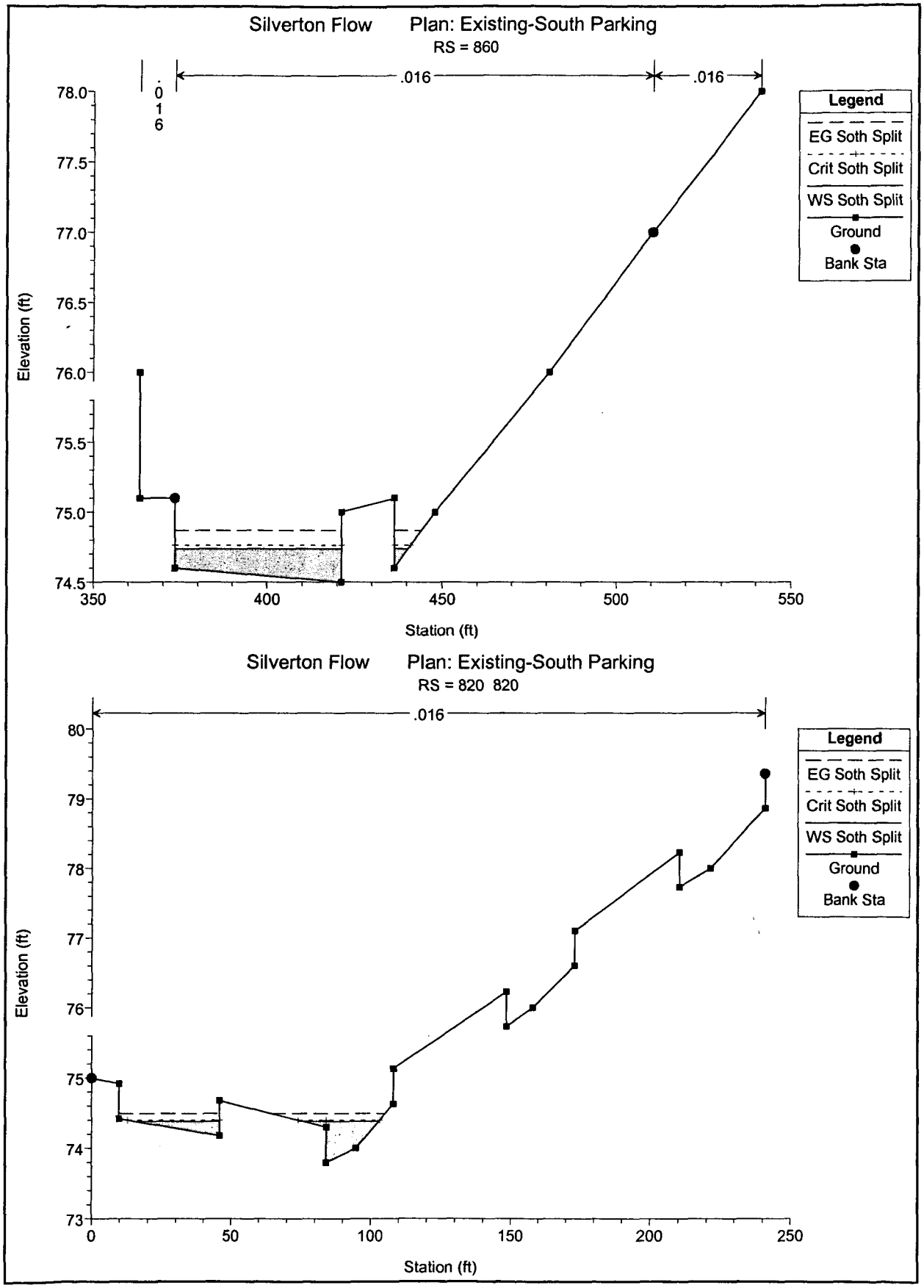
South	400	100	100	100
South	300	145	140	140
South	200	100	100	100
South	100	75	75	75
South	25	0	0	0

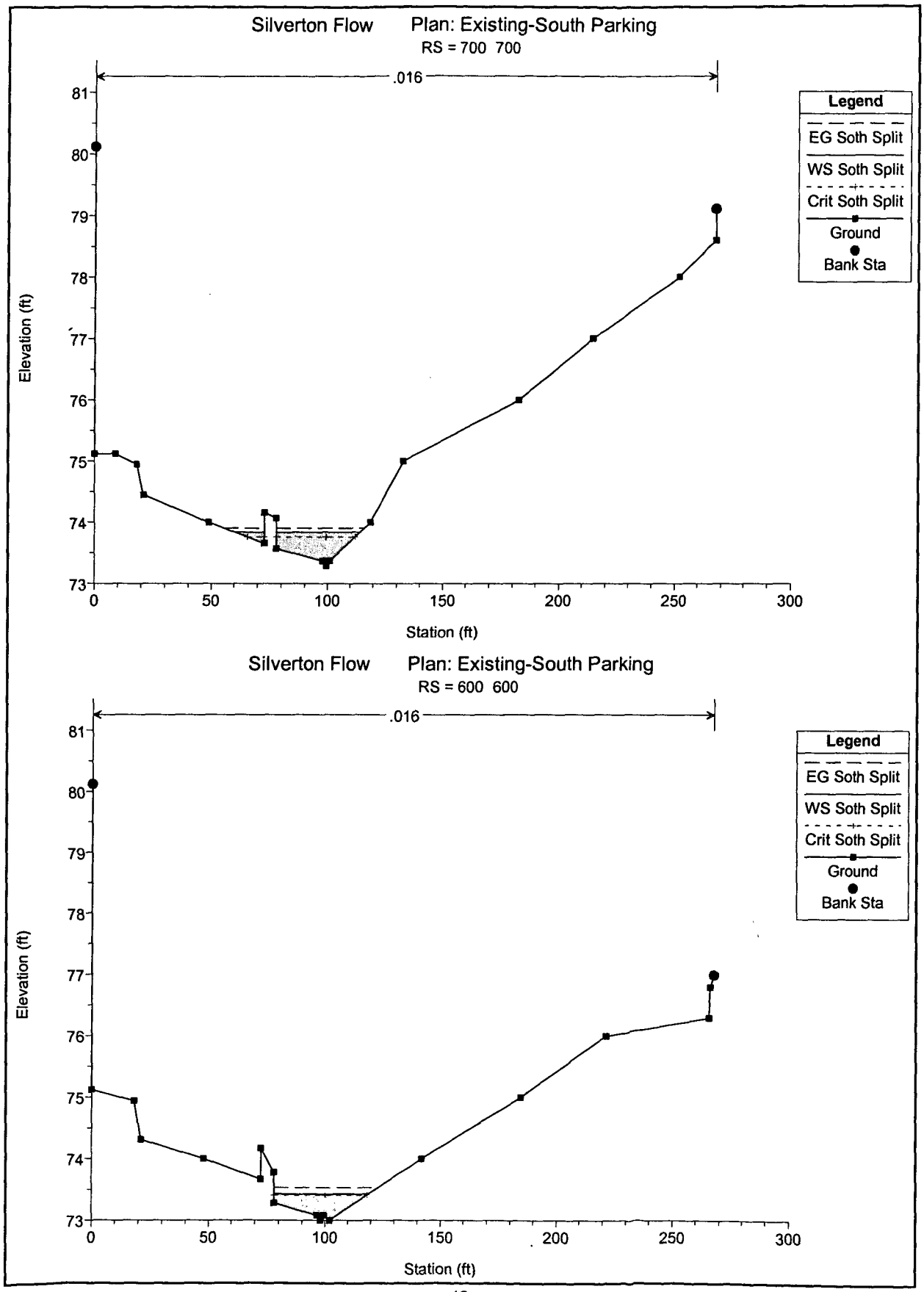
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

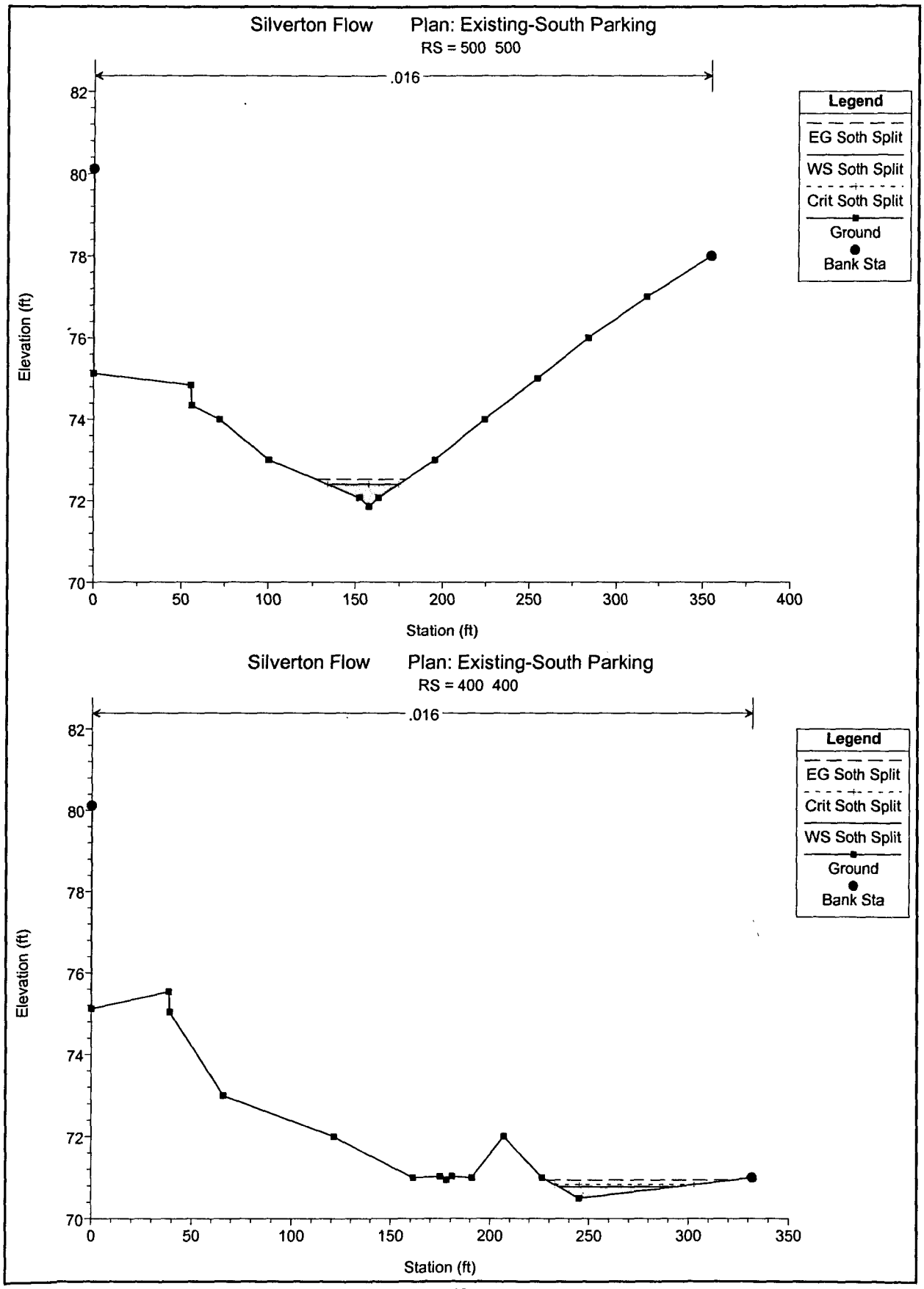
Reach	River Sta.	Contr.	Expan.
South	860	.1	.3
South	820	.1	.3
South	700	.1	.3
South	600	.1	.3
South	500	.1	.3
South	400	.1	.3
South	300	.1	.3
South	200	.1	.3
South	100	.1	.3
South	25	.1	.3

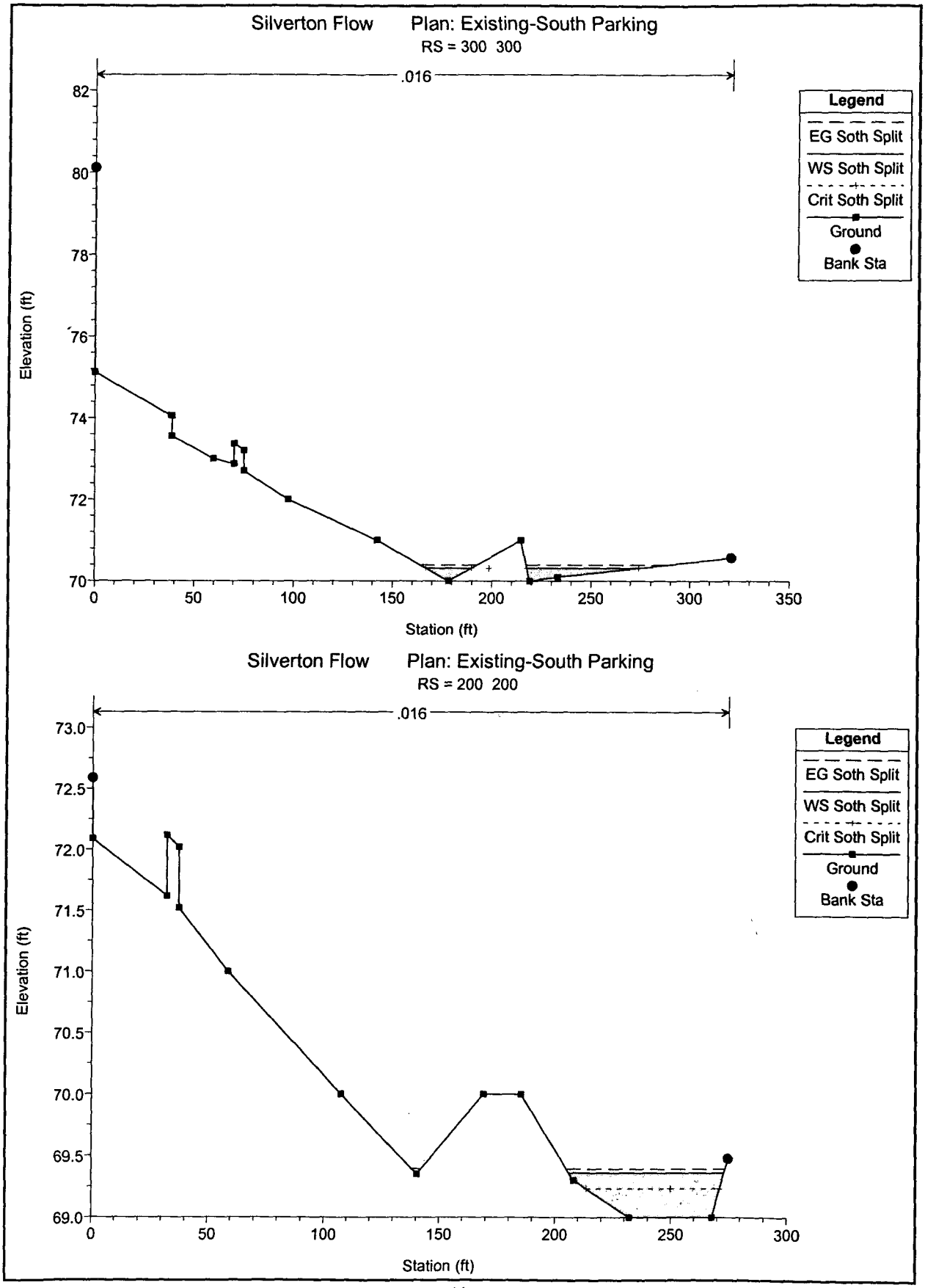
Profile Output Table - Standard Table 1

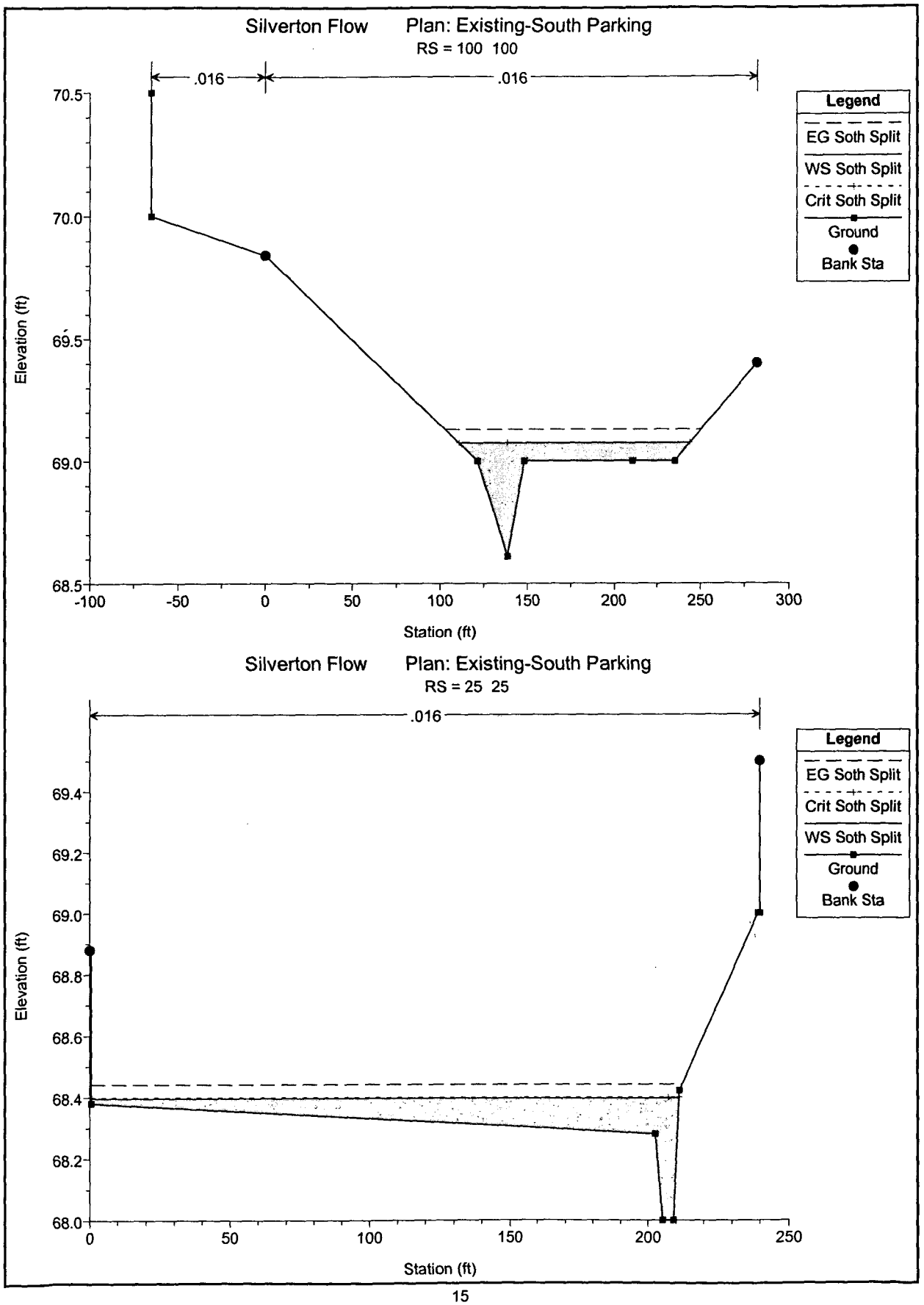
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
South	860	27.00	74.50	74.74	74.76	74.87	0.010014	2.92	9.25	51.97	1.22
South	820	27.00	73.80	74.38	74.40	74.49	0.008572	2.68	10.08	57.27	1.13
South	700	27.00	73.29	73.84	73.76	73.91	0.002766	2.03	13.32	49.31	0.69
South	600	27.00	73.00	73.43	73.41	73.53	0.005119	2.64	10.24	40.85	0.93
South	500	27.00	71.85	72.40	72.40	72.52	0.006083	2.78	9.70	40.70	1.00
South	400	27.00	70.50	70.78	70.83	70.94	0.016927	3.26	8.29	59.18	1.53
South	300	27.00	70.00	70.32	70.32	70.39	0.007029	2.22	12.14	79.42	1.00
South	200	27.00	69.00	69.36	69.23	69.39	0.001282	1.42	19.00	68.03	0.47
South	100	27.00	68.61	69.07	69.07	69.13	0.008014	1.88	14.34	133.14	1.01
South	25	27.00	68.00	68.40	68.40	68.44	0.010508	1.70	15.89	210.55	1.09


Silverton Flow Plan: Existing-South Parking
RS = 860
.016
.016
.016
Legend
EG Soth Split
Crit Soth Split
WS Soth Split
Ground
Bank Sta
Elevation (ft)
78.0
77.5
77.0
76.5
76.0
75.5
75.0
74.5
350
400
450
500
550
Station (ft)
Silverton Flow Plan: Existing-South Parking
RS = 820 820
.016
Legend
EG Soth Split
Crit Soth Split
WS Soth Split
Ground
Bank Sta
Elevation (ft)
80
79
78
77
76
75
74
73
0
50
100
150
200
250
Station (ft)


Silverton Flow Plan: Existing-South Parking
RS = 700 700
.016
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
81
80
79
78
77
76
75
74
73
0
50
100
150
200
250
300
Silverton Flow Plan: Existing-South Parking
RS = 600 600
.016
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-South Parking
RS = 500 500
.016
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
82
80
78
76
74
72
70
0
50
100
150
200
250
300
350
400
Silverton Flow Plan: Existing-South Parking
RS = 400 400
.016
Legend
EG Soth Split
Crit Soth Split
WS Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
82
80
78
76
74
72
70
0
50
100
150
200
250
300
350


Silverton Flow Plan: Existing-South Parking
RS = 300 300
.016
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Existing-South Parking
RS = 200 200
.016
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Existing-South Parking
RS = 100 100
.016
.016
70.5
70.0
69.5
69.0
68.5
Elevation (ft)
-100
-50
0
50
100
150
200
250
300
Station (ft)
Legend
EG Soth Split
WS Soth Split
Crit Soth Split
Ground
Bank Sta
Silverton Flow Plan: Existing-South Parking
RS = 25 25
.016
69.4
69.2
69.0
68.8
68.6
68.4
68.2
68.0
Elevation (ft)
0
50
100
150
200
250
Station (ft)
Legend
EG Soth Split
Crit Soth Split
WS Soth Split
Ground
Bank Sta

HEC-RAS ANALYSIS OF FLOW THROUGH PARKING LOT NORTH OF SILVERTON HOTEL/CASINO

(PROPOSED CONDITION)

HEC-RAS Plan: North-Prop River: Silverton Reach: North Profile: North Split

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North	-700	364.00	73.50	74.85	74.49	74.96	0.000920	2.70	135.95	271.41	0.49
North	-750	364.00	73.80	74.52	74.52	74.80	0.004590	4.27	85.34	151.35	1.00
North	-850	364.00	73.00	74.27	74.05	74.50	0.001846	3.86	94.23	98.54	0.70
North	-950	364.00	73.00	74.15		74.32	0.001456	3.32	109.79	122.13	0.62
North	-1050	364.00	72.32	73.71	73.71	74.07	0.004213	4.82	75.55	105.42	1.00
North	-1150	364.00	70.00	72.87	72.12	72.90	0.000209	1.44	252.64	221.41	0.24
North	-1250	364.00	70.50	72.52	72.52	72.82	0.004842	4.39	82.84	140.53	1.01
North	-1350	364.00	70.90	71.97	71.98	72.31	0.004751	4.65	78.25	119.11	1.01
North	-1450	364.00	70.00	71.50	71.25	71.67	0.001820	3.37	107.85	133.53	0.66
North	-1550	364.00	69.90	70.96	70.96	71.30	0.004594	4.67	77.95	116.02	1.00
North	-1650	364.00	69.00	70.59	70.45	70.88	0.002667	4.37	83.30	94.37	0.82
North	-1780	364.00	68.50	70.00	70.00	70.41	0.004480	5.16	70.49	86.20	1.01
North	-1960	364.00	68.00	68.78	68.90	69.26	0.009750	5.56	65.51	120.48	1.33
North	-2020	364.00	67.00	68.48	68.48	68.88	0.005054	5.07	71.79	90.22	1.00
North	-2110	364.00	66.00	68.07	67.37	68.11	0.000550	1.69	215.45	211.91	0.30
North	-2200	364.00	64.00	68.03		68.07	0.000400	1.59	229.42	127.97	0.21
North	-2250	364.00	62.31	68.03		68.05	0.000161	1.19	306.73	95.23	0.12
North	-2300	364.00	64.00	68.00	65.70	68.04	0.000399	1.55	234.81	96.61	0.18

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX        XX      XXXX
X     X  X        X    X      X   X      X  X    X
X     X  X        X           X   X     X    X   X
XXXXXXX  XXXX     X       XXX XXXX      XXXXXX    XXXX
X     X  X        X           X  X      X    X        X
X     X  X        X    X      X   X     X    X        X
X     X  XXXXXX    XXXX       X    X    X    X   XXXXX
```

PROJECT DATA
Project Title: Silverton Flow
Project File : Silverton.prj
Run Date and Time: 10/9/03 5:18:06 PM

Project in English units

PLAN DATA

Plan Title: Proposed-North Parking
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.p10

Geometry Title: Proposed-North Parking
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g10

Flow Title : Proposed-North Parking
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f09

Plan Summary Information:
Number of: Cross Sections = 18 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.0001
Critical depth calculaton tolerance = 0.0001
Maximum number of interations = 40
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.0001

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: Proposed-North Parking
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.f09

Flow Data (cfs)

River	Reach	RS	North Split
Silverton	North	-700	364

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	North	North Split	Normal S = .01	Known WS = 68

GEOMETRY DATA

Geometry Title: Proposed-North Parking
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Silverton.g10

CROSS SECTION RIVER: Silverton
REACH: North RS: -700

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.5	42.1	82	63.5	81	84.7	77	88.2	76.5
108.9	74	108.9	73.5	163.1	74	306.5	74	306.5	74.5
320	74.5	320	74	373.3	74.4				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	88.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
108.9	373.3	60	60	65	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888			F

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.96	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.016	0.016	
W.S. Elev (ft)	74.85	Reach Len. (ft)	60.00	60.00	65.00
Crit W.S. (ft)	74.49	Flow Area (sq ft)	2.97	132.99	
E.G. Slope (ft/ft)	0.000920	Area (sq ft)	2.97	219.94	
Q Total (cfs)	364.00	Flow (cfs)	4.69	359.31	
Top Width (ft)	271.41	Top Width (ft)	7.01	264.40	
Vel Total (ft/s)	2.68	Avg. Vel. (ft/s)	1.58	2.70	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)	0.42	0.94	
Conv. Total (cfs)	11998.6	Conv. (cfs)	154.5	11844.1	
Length Wtd. (ft)	60.00	Wetted Per. (ft)	7.06	141.60	
Min Ch El (ft)	73.50	Shear (lb/sq ft)	0.02	0.05	
Alpha	1.01	Stream Power (lb/ft s)	0.04	0.15	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	4.61	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	4.99	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Silverton

REACH: North RS: -750

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82	44	81	65.5	80	79.8	77	91	75.5
91	75	108.8	74	184.8	73.8	184.8	74.3	197.7	74.3
197.7	73.8	250.9	74	250.9	80				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	250.9	100	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.80	Element			
Vel Head (ft)	0.28	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.52	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	74.52	Flow Area (sq ft)		85.34	
E.G. Slope (ft/ft)	0.004590	Area (sq ft)		85.34	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	151.35	Top Width (ft)		151.35	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)		0.56	
Conv. Total (cfs)	5372.5	Conv. (cfs)		5372.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		152.89	
Min Ch El (ft)	73.80	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.68	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)		4.40	
C & E Loss (ft)	0.02	Cum SA (acres)		4.70	

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 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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -850

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.2	10.2	81	43.1	80	76.46	79	80.55	78
84.47	77	88.48	76	97.51	75	101.13	75.18	103.46	74.48
109.19	74	121.53	73	158.79	73	204.51	73.92	204.51	74.42
241.48	74.6	241.48	80						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	97.51	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	241.48	100	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.50	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.016	

W.S. Elev (ft)	74.27	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	74.05	Flow Area (sq ft)		94.23	
E.G. Slope (ft/ft)	0.001846	Area (sq ft)		94.23	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	98.54	Top Width (ft)		98.54	
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	1.27	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	8471.2	Conv. (cfs)		8471.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		98.95	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		4.19	
C & E Loss (ft)	0.02	Cum SA (acres)		4.41	

CROSS SECTION RIVER: Silverton
REACH: North RS: -950

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.2	58.27	79	69.7	78	78.68	77	89.47	76
91.81	75	103.8	74	103.8	73.5	120.15	73	172.6	73
206.69	73.73	207.94	73.23	220.9	74	239.03	74.83	269.59	74.9
269.59	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.8	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	269.59	100	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	74.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.15	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		109.79	
E.G. Slope (ft/ft)	0.001456	Area (sq ft)		109.79	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	122.13	Top Width (ft)		122.13	
Vel Total (ft/s)	3.32	Avg. Vel. (ft/s)		3.32	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	9538.7	Conv. (cfs)		9538.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		122.78	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.27	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		3.96	
C & E Loss (ft)	0.02	Cum SA (acres)		4.16	

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: Silverton
REACH: North RS: -1050

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.75	4.68	79	5.16	79	14.16	79	24.8	80
44.69	80	76.02	79	81.43	78	84.68	77	88.14	76
91.55	75	95.02	74	103.03	73.65	103.03	73.15	123.05	73
148.49	72.32	148.49	72.82	148.99	72.82	160.94	72.82	160.94	72.32
173.47	73	220.9	74	248.03	74.29	248.03	74.79	253	74.9

253 80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.03	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	253	150	120	100	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.07	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.71	Reach Len. (ft)	150.00	120.00	100.00
Crit W.S. (ft)	73.71	Flow Area (sq ft)		75.55	
E.G. Slope (ft/ft)	0.004213	Area (sq ft)		75.55	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	105.42	Top Width (ft)		105.42	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	5608.2	Conv. (cfs)		5608.2	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		106.96	
Min Ch El (ft)	72.32	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.90	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		3.74	
C & E Loss (ft)	0.10	Cum SA (acres)		3.90	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1150

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.1	1.08	77	6.57	76	16.44	76	32.45	77
56.45	77	81.53	76	85.38	75	89.29	74	93.85	73
98.71	72	103.31	71	103.81	71	103.81	70.5	104.91	70.63
107.15	71	147.84	72	147.84	72.5	160.16	72.5	160.16	72
197.27	72	272.5	72	291.35	71	309.75	70	331.12	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	331.12	105	92	62	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.90	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.87	Reach Len. (ft)	105.00	92.00	62.00
Crit W.S. (ft)	72.12	Flow Area (sq ft)		252.64	
E.G. Slope (ft/ft)	0.000209	Area (sq ft)		252.64	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	221.41	Top Width (ft)		221.41	
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44	

Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)	1.14
Conv. Total (cfs)	25203.8	Conv. (cfs)	25203.8
Length Wtd. (ft)	92.00	Wetted Per. (ft)	223.84
Min Ch El (ft)	70.00	Shear (lb/sq ft)	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	3.29
C & E Loss (ft)	0.03	Cum SA (acres)	3.45

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: Silverton
REACH: North RS: -1250

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76	7.42	75	15.29	75	27.13	76	49.88	76
53.72	76	79.03	76	83.47	75	89.51	74	94.15	73
98.68	72	103.28	71	103.58	71	103.58	70.5	105.08	70.63
107.32	71	148.01	72	148.01	72.5	158.15	72.5	158.15	72
159.65	72.13	197.71	72	272.42	73	272.42	73.5	285.9	73.6
285.9	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.28	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	285.9	120	105	.3	.5

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.82	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.52	Reach Len. (ft)	120.00	105.00	85.00
Crit W.S. (ft)	72.52	Flow Area (sq ft)		82.84	
E.G. Slope (ft/ft)	0.004842	Area (sq ft)		82.84	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	140.53	Top Width (ft)		140.53	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	5230.8	Conv. (cfs)		5230.8	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		142.25	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.77	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		2.94	
C & E Loss (ft)	0.01	Cum SA (acres)		3.07	

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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1350

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.1	1.66	75	6.95	74	14.56	74	27.97	75
29.03	75	75.95	75	77.5	75	83.27	74	88.1	73

92.46	72	96.91	71	102.55	71.4	102.55	70.9	104.05	71.03
147.7	71	147.7	71.5	162.18	71.5	162.18	71	163.68	71.13
213.22	72	272.15	73	273.25	73	273.25	73.5	277.8	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	102.55	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	277.8	150	135	120	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	72.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.97	Reach Len. (ft)	150.00	135.00	120.00
Crit W.S. (ft)	71.98	Flow Area (sq ft)		78.25	
E.G. Slope (ft/ft)	0.004751	Area (sq ft)		78.25	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	119.11	Top Width (ft)		119.11	
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)		4.65	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	5281.1	Conv. (cfs)		5281.1	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		120.75	
Min Ch El (ft)	70.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		2.74	
C & E Loss (ft)	0.01	Cum SA (acres)		2.75	

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1450

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75	22	72.1	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	115.49	72	120.12	71	125.66	70
127.8	70.5	128.3	70.5	128.3	70	129.91	70.13	166.31	70
173.26	70.82	173.76	70.82	184.55	70.82	184.55	70.57	186.05	70.61
211.54	71	278.27	72	325.62	73	356.76	74	367.73	74.31
367.73	74.81	374.91	74.9	374.91	80				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.66	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	374.91	165	130	70	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	71.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.50	Reach Len. (ft)	165.00	130.00	70.00
Crit W.S. (ft)	71.25	Flow Area (sq ft)		107.85	
E.G. Slope (ft/ft)	0.001820	Area (sq ft)		107.85	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	133.53	Top Width (ft)		133.53	
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.37	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	8533.3	Conv. (cfs)		8533.3	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		134.63	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.09	

Alpha	1.00	Stream Power (lb/ft s)	0.31
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	2.46
C & E Loss (ft)	0.02	Cum SA (acres)	2.36

Warning: Divided flow computed for this cross-section.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1550

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74	22	72.08	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	111.05	72	115.68	71	120.22	70
124.41	70.4	124.91	70.4	124.91	69.9	167.98	70	169	70.06
169	70.56	179.55	70.56	179.55	70.06	234.07	71	275.41	72
315.98	73	331.81	73.84	331.81	74.34	340.71	74.4	340.71	80

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	340.71	105	80	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	71.30	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.96	Reach Len. (ft)	105.00	80.00	55.00
Crit W.S. (ft)	70.96	Flow Area (sq ft)		77.95	
E.G. Slope (ft/ft)	0.004594	Area (sq ft)		77.95	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	116.02	Top Width (ft)		116.02	
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.67	
Max Chl Dpth (ft)	1.06	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	5370.5	Conv. (cfs)		5370.5	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		117.65	
Min Ch El (ft)	69.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		2.18	
C & E Loss (ft)	0.01	Cum SA (acres)		1.99	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1650

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.5	22	71.22	25.21	71	35.02	71	39.59	72
44.24	73	48.98	74	96.9	74	104.05	73	109.88	72
115.33	71	120.59	70	124.43	69.5	124.93	69.5	125.43	69.13
138.1	69	185.01	70	230.94	71	265.98	72	297.99	73
299.25	73.01	299.25	73.51	309.23	73.6	309.23	80		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.43	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	309.23	165	135	80	.1 .3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	70.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.59	Reach Len. (ft)	165.00	135.00	80.00
Crit W.S. (ft)	70.45	Flow Area (sq ft)		83.30	
E.G. Slope (ft/ft)	0.002667	Area (sq ft)		83.30	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	94.37	Top Width (ft)		94.37	
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)		4.37	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	7048.0	Conv. (cfs)		7048.0	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		94.59	
Min Ch El (ft)	69.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		2.03	
C & E Loss (ft)	0.01	Cum SA (acres)		1.80	

CROSS SECTION RIVER: Silverton
REACH: North RS: -1780

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.5	22	69.68	28.14	69	31.25	69	36.26	70
41.27	71	46.27	72	75.34	73	99.51	73	105.11	72
109.71	71	116.34	70	122.87	69	125.27	69	125.27	68.5
158.27	69	175.45	69.55	175.45	70.05	190.42	70.17	190.42	69.67
191.59	69.8	239.54	71	297.08	72.27	297.08	72.77	301.16	72.79
329.68	72.9	329.68	80						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.27	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	329.68	285	180	130	.1 .3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	70.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.017	
W.S. Elev (ft)	70.00	Reach Len. (ft)	285.00	180.00	130.00
Crit W.S. (ft)	70.00	Flow Area (sq ft)		70.49	
E.G. Slope (ft/ft)	0.004480	Area (sq ft)		70.49	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	86.20	Top Width (ft)		86.20	
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)		5.16	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	5438.1	Conv. (cfs)		5438.1	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		87.72	
Min Ch El (ft)	68.50	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.16	
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)		1.79	
C & E Loss (ft)	0.04	Cum SA (acres)		1.52	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1960

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70.2	62	69	110	70	135	68	147.7	68
155.63	69	163.67	70	185.08	71	216.22	71	223.41	70
230.47	69	237.16	68	238.84	68.5	239.34	68.5	239.34	68
240.71	68	268.91	68	281.94	68.28	283.25	68.51	294.14	68.51
294.14	68	370.33	70	419.65	71	477.14	72.21	477.14	72.71
489.87	72.85	542.92	72.95	542.92	80				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	62	.025	110	.016	135	.025	238.84	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	542.92	75	70	45	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	69.26	Element			
Vel Head (ft)	0.48	Wt. n-Val.		0.018	
W.S. Elev (ft)	68.78	Reach Len. (ft)	75.00	70.00	45.00
Crit W.S. (ft)	68.90	Flow Area (sq ft)		65.51	
E.G. Slope (ft/ft)	0.009750	Area (sq ft)		65.51	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	120.48	Top Width (ft)		120.48	
Vel Total (ft/s)	5.56	Avg. Vel. (ft/s)		5.56	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	3686.4	Conv. (cfs)		3686.4	
Length Wtd. (ft)	70.00	Wetted Per. (ft)		121.74	
Min Ch El (ft)	68.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		1.82	
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)		1.51	
C & E Loss (ft)	0.01	Cum SA (acres)		1.09	

Warning: Divided flow computed for this cross-section.
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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2020

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70	48	69	66	69	86	68	100	67.42
104.13	67	106.95	67	112.07	68	117	69	121.77	70
126.5	71	130.98	72	176.97	72	182.86	71	188.27	70
194.3	68	200.48	67.7	203.4	67.7	203.4	67.2	246.18	68
304.9	69	349.08	70	381.66	70.95	381.66	71.45	385.55	71.45
385.55	70.95	447.5	72.17	447.5	72.67	480.72	72.8	480.72	80

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	48	.025	66	.016	100	.025	203.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	480.72	110	90	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
245	295	69	295	340	70	340	375	71

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	68.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.018	
W.S. Elev (ft)	68.48	Reach Len. (ft)	110.00	90.00	50.00
Crit W.S. (ft)	68.48	Flow Area (sq ft)		71.79	
E.G. Slope (ft/ft)	0.005054	Area (sq ft)		71.79	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	90.22	Top Width (ft)		90.22	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	5120.1	Conv. (cfs)		5120.1	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		91.51	
Min Ch El (ft)	67.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.26	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		1.40	
C & E Loss (ft)	0.11	Cum SA (acres)		0.92	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2110

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.8	88	67.06	88.98	67	101.15	66	120	66
140	67	152.01	67	153.51	67.13	166.89	67	197.91	67.2
197.91	66.7	218.04	67	263.66	68	318.44	69	361.21	70
400.78	71	445.72	71.11	445.72	71.61				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	88	.025	197.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	445.72	115	95	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	68.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.022	
W.S. Elev (ft)	68.07	Reach Len. (ft)	115.00	95.00	60.00
Crit W.S. (ft)	67.37	Flow Area (sq ft)		215.45	
E.G. Slope (ft/ft)	0.000550	Area (sq ft)		215.45	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	211.91	Top Width (ft)		211.91	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.02	

Conv. Total (cfs)	15525.8	Conv. (cfs)	15525.8
Length Wtd. (ft)	95.00	Wetted Per. (ft)	212.51
Min Ch El (ft)	66.00	Shear (lb/sq ft)	0.03
Alpha	1.00	Stream Power (lb/ft s)	0.06
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1.10
C & E Loss (ft)	0.00	Cum SA (acres)	0.61

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2200

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	100	67.28	106.77	67	109.68	66	115.87	65
126.13	64	132.54	64	159.48	65	178.75	68	178.75	67.5
208	68.5	208	69	230.3	70	251.6	71		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	100	.035	178.75	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	208	50	50	.1	.3

CROSS SECTION OUTPUT Profile #North Split

E.G. Elev (ft)	68.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.034	
W.S. Elev (ft)	68.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		229.42	
E.G. Slope (ft/ft)	0.000400	Area (sq ft)		229.42	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	127.97	Top Width (ft)		127.97	
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)		1.59	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	18194.3	Conv. (cfs)		18194.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		129.04	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.62	
C & E Loss (ft)	0.01	Cum SA (acres)		0.24	

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: Silverton
REACH: North RS: -2250

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.08	82.5	68	95	67	103.8	68.8
104.68	68.8	104.68	62.31	146.31	64	160.11	65	177.31	66
183.1	71	183.1	70.5	191.8	71	219.8	72	258.5	73

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.025	95	.035	177.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	191.8	50	50	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.05	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.033	
W.S. Elev (ft)	68.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		306.73	
E.G. Slope (ft/ft)	0.000161	Area (sq ft)		306.73	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	95.23	Top Width (ft)		95.23	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		3.22	
Conv. Total (cfs)	28698.2	Conv. (cfs)		28698.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		101.95	
Min Ch El (ft)	62.31	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.04	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.31	
C & E Loss (ft)	0.00	Cum SA (acres)		0.11	

Warning: Divided flow computed for this cross-section.
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.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2300

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.13	77.28	68	91.2	67	98.67	66
108.25	65	112.72	64	132.64	64	145.6	65	157.85	66
171.22	67	181.3	70.78	181.3	70.28	197.7	71	209.5	71.45
209.5	71.95	227.7	72	259	73				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.035	171.22	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	197.7	0	0	.1	.3

CROSS SECTION OUTPUT Profile #North Split

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.04	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	68.00	Reach Len. (ft)			
Crit W.S. (ft)	65.70	Flow Area (sq ft)		234.81	
E.G. Slope (ft/ft)	0.000399	Area (sq ft)		234.81	
Q Total (cfs)	364.00	Flow (cfs)		364.00	
Top Width (ft)	96.61	Top Width (ft)		96.61	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	4.00	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	18213.2	Conv. (cfs)		18213.2	
Length Wtd. (ft)		Wetted Per. (ft)		97.17	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2	n3	n4	n5
North	-700	.025	.016			
North	-750	.025	.016			
North	-850	.025	.016			
North	-950	.025	.016			
North	-1050	.025	.016			
North	-1150	.025	.016			
North	-1250	.025	.016			
North	-1350	.025	.016			
North	-1450	.016	.025	.016		
North	-1550	.016	.025	.016		
North	-1650	.016	.025	.016		
North	-1780	.016	.025	.016		
North	-1960	.016	.025	.016	.025	.016
North	-2020	.016	.025	.016	.025	.016
North	-2110	.016	.025	.016		
North	-2200	.016	.035	.016		
North	-2250	.016	.025	.035	.016	
North	-2300	.016	.035	.016		

SUMMARY OF REACH LENGTHS

River: Silverton

Reach	River Sta.	Left	Channel	Right
North	-700	60	60	65
North	-750	100	100	100
North	-850	100	100	100
North	-950	100	100	100
North	-1050	150	120	100
North	-1150	105	92	62
North	-1250	120	105	85
North	-1350	150	135	120
North	-1450	165	130	70
North	-1550	105	80	55
North	-1650	165	135	80
North	-1780	285	180	130
North	-1960	75	70	45
North	-2020	110	90	50
North	-2110	115	95	60
North	-2200	50	50	50
North	-2250	50	50	50
North	-2300	0	0	0

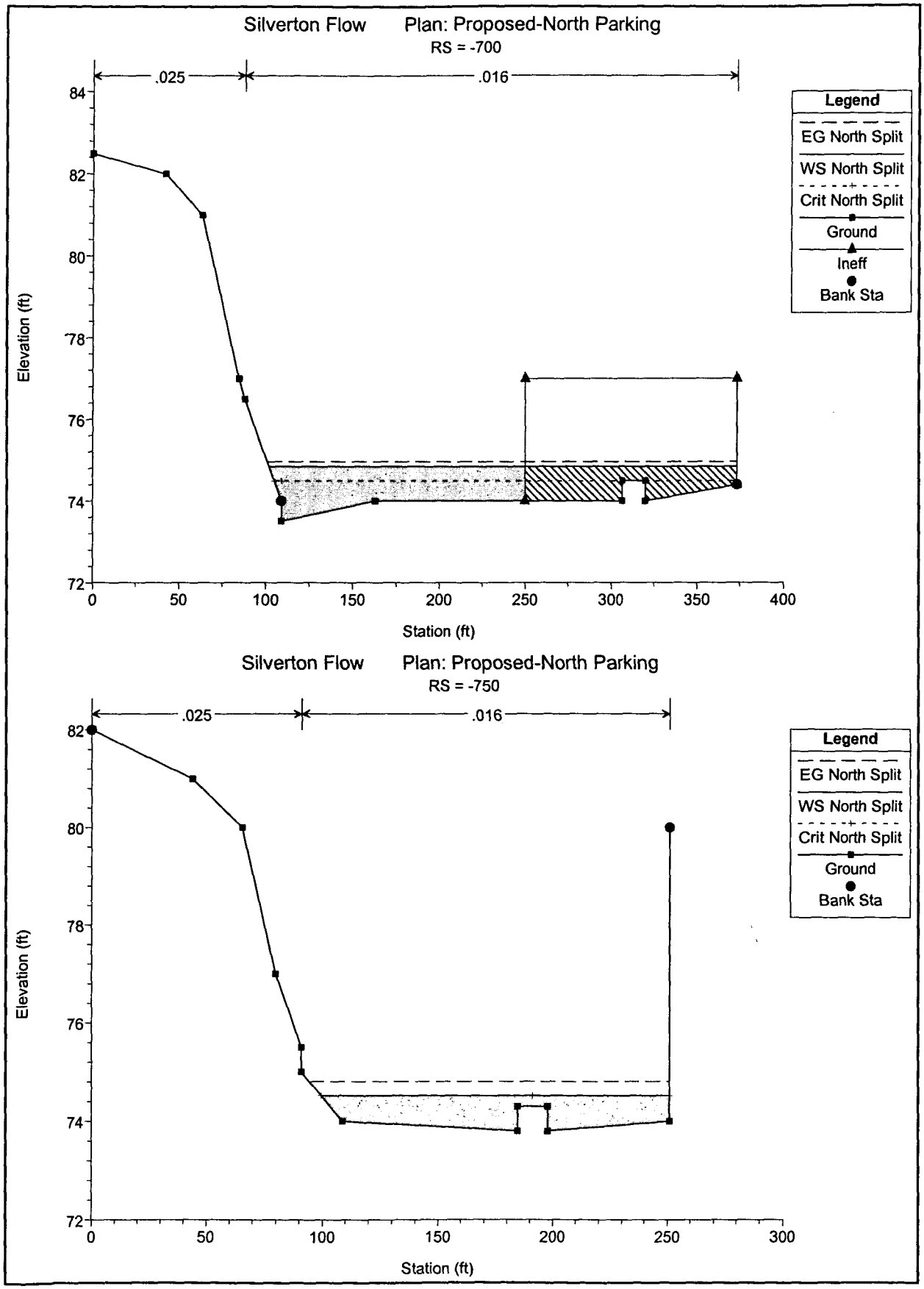
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

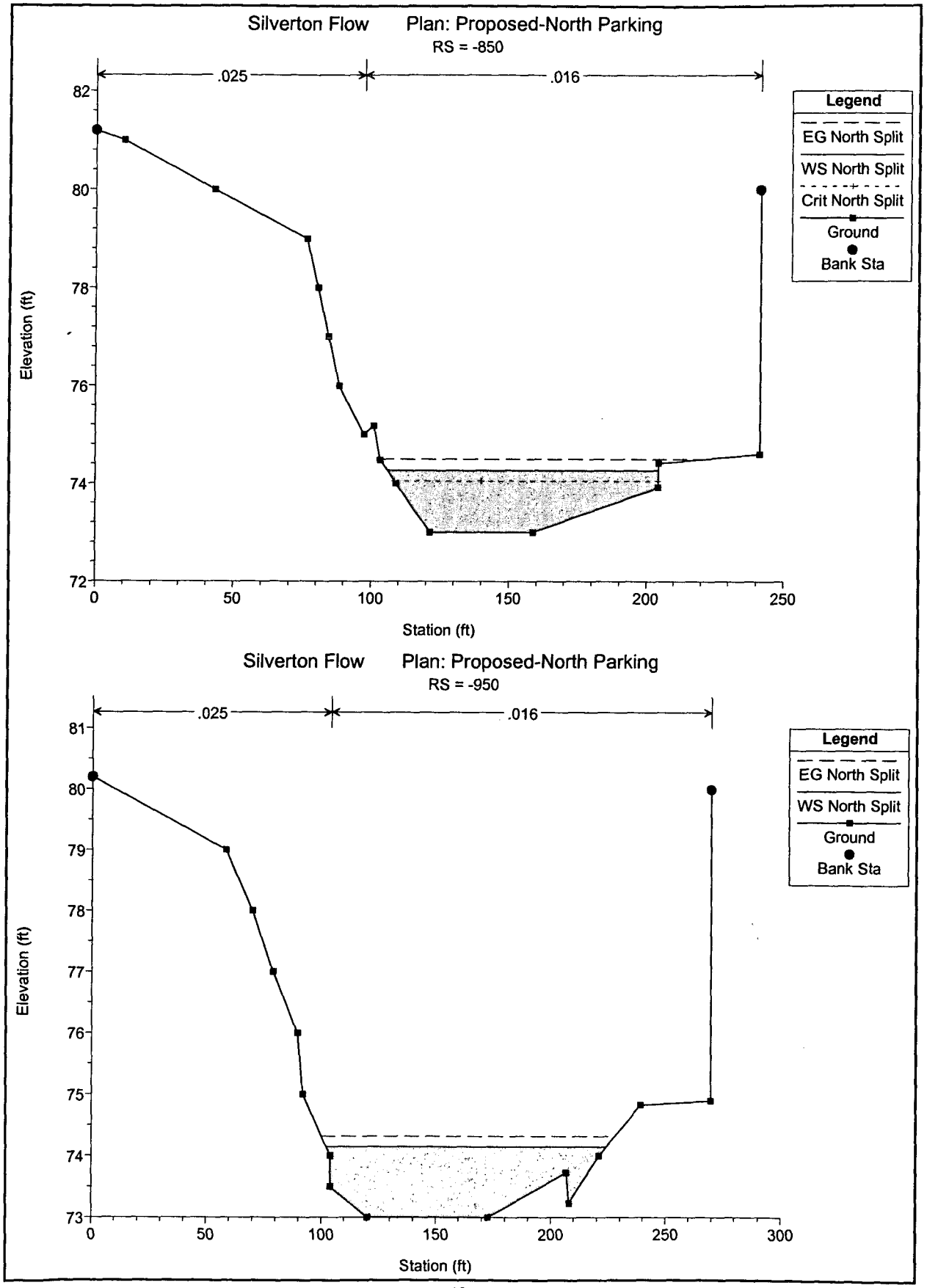
Reach	River Sta.	Contr.	Expan.
North	-700	.3	.5
North	-750	.1	.3
North	-850	.1	.3
North	-950	.1	.3
North	-1050	.1	.3
North	-1150	.1	.3
North	-1250	.3	.5
North	-1350	.1	.3
North	-1450	.1	.3
North	-1550	.1	.3

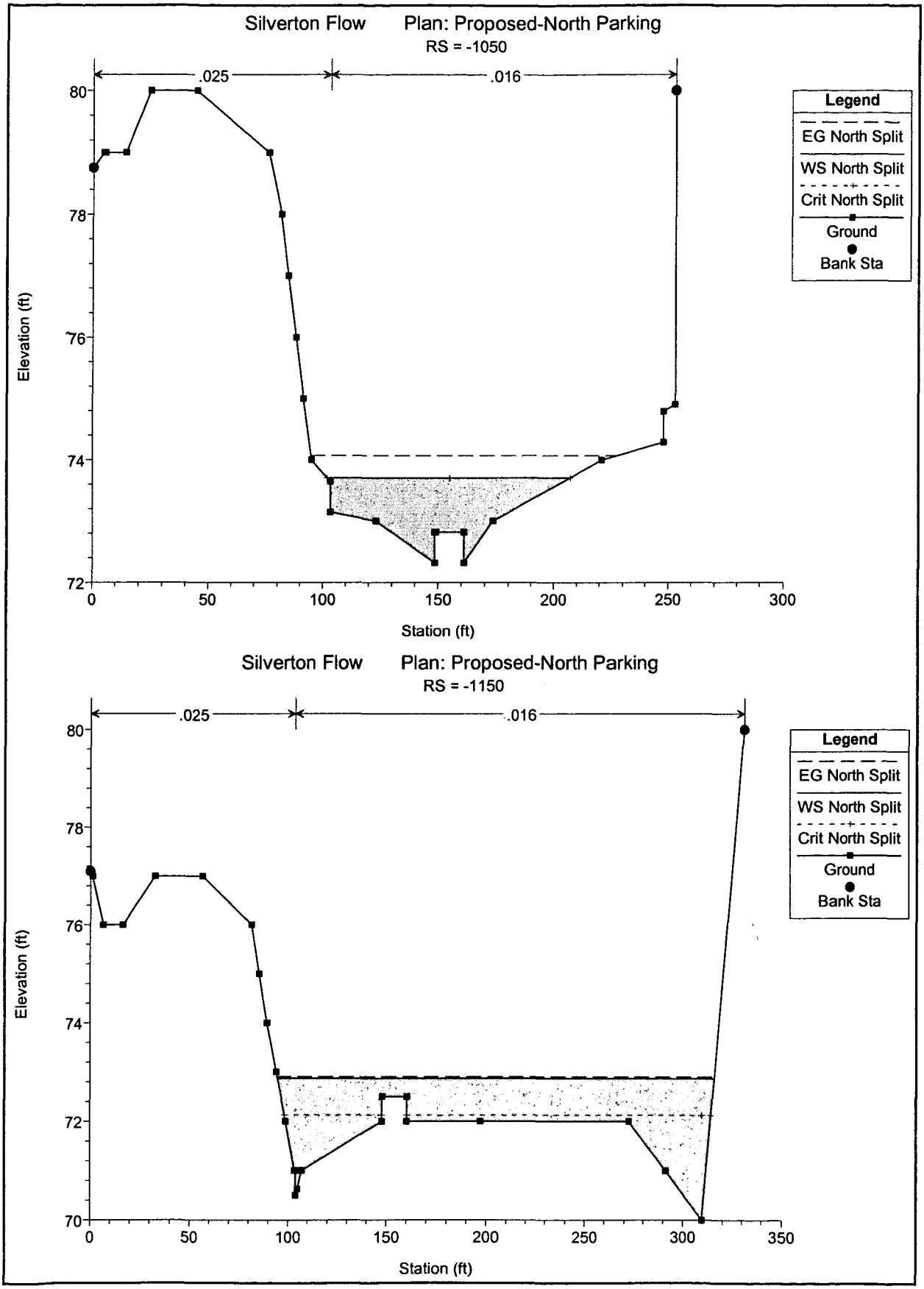
North	-1650	.1	.3
North	-1780	.1	.3
North	-1960	.1	.3
North	-2020	.1	.3
North	-2110	.1	.3
North	-2200	.1	.3
North	-2250	.1	.3
North	-2300	.1	.3

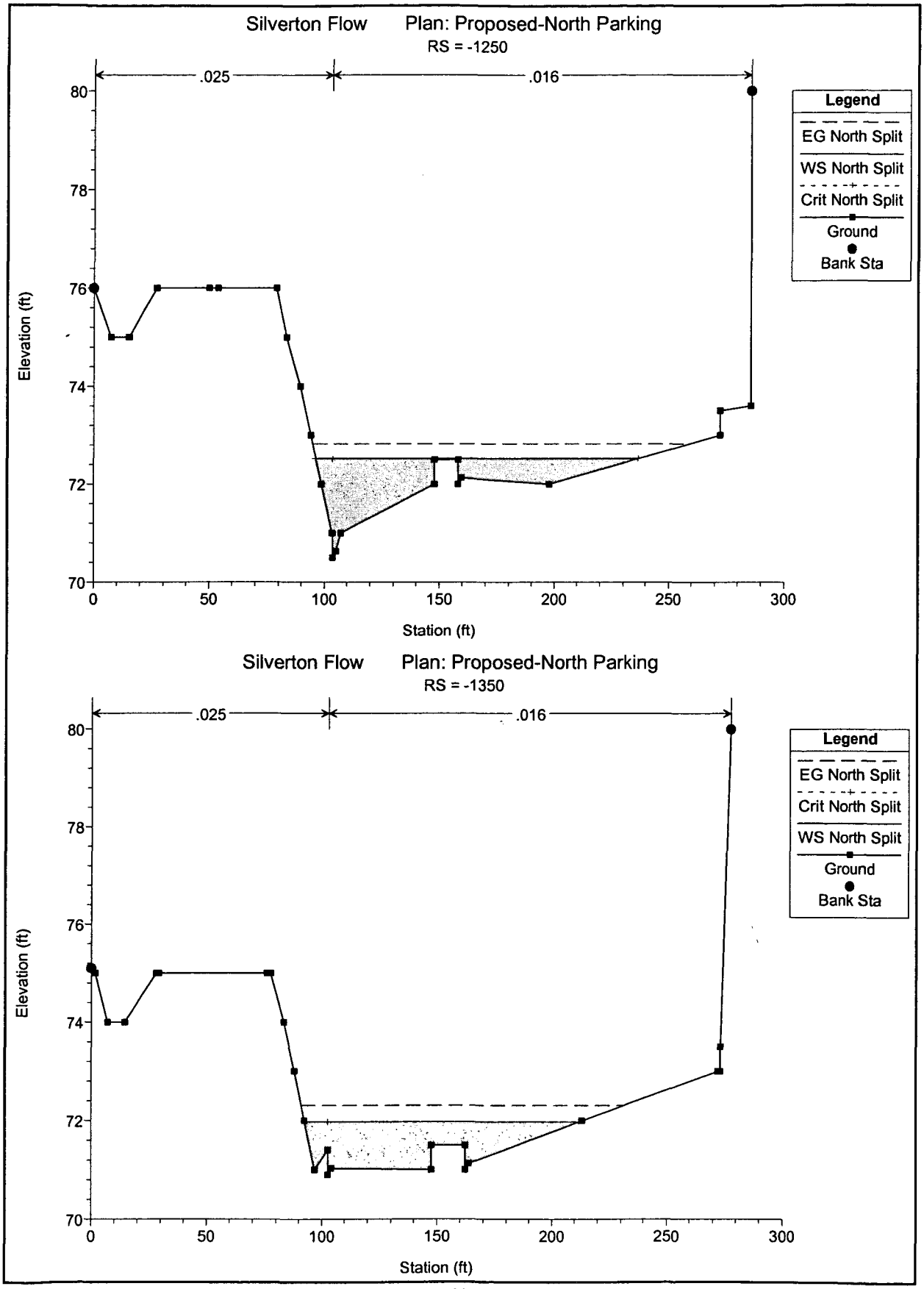
Profile Output Table - Standard Table 1

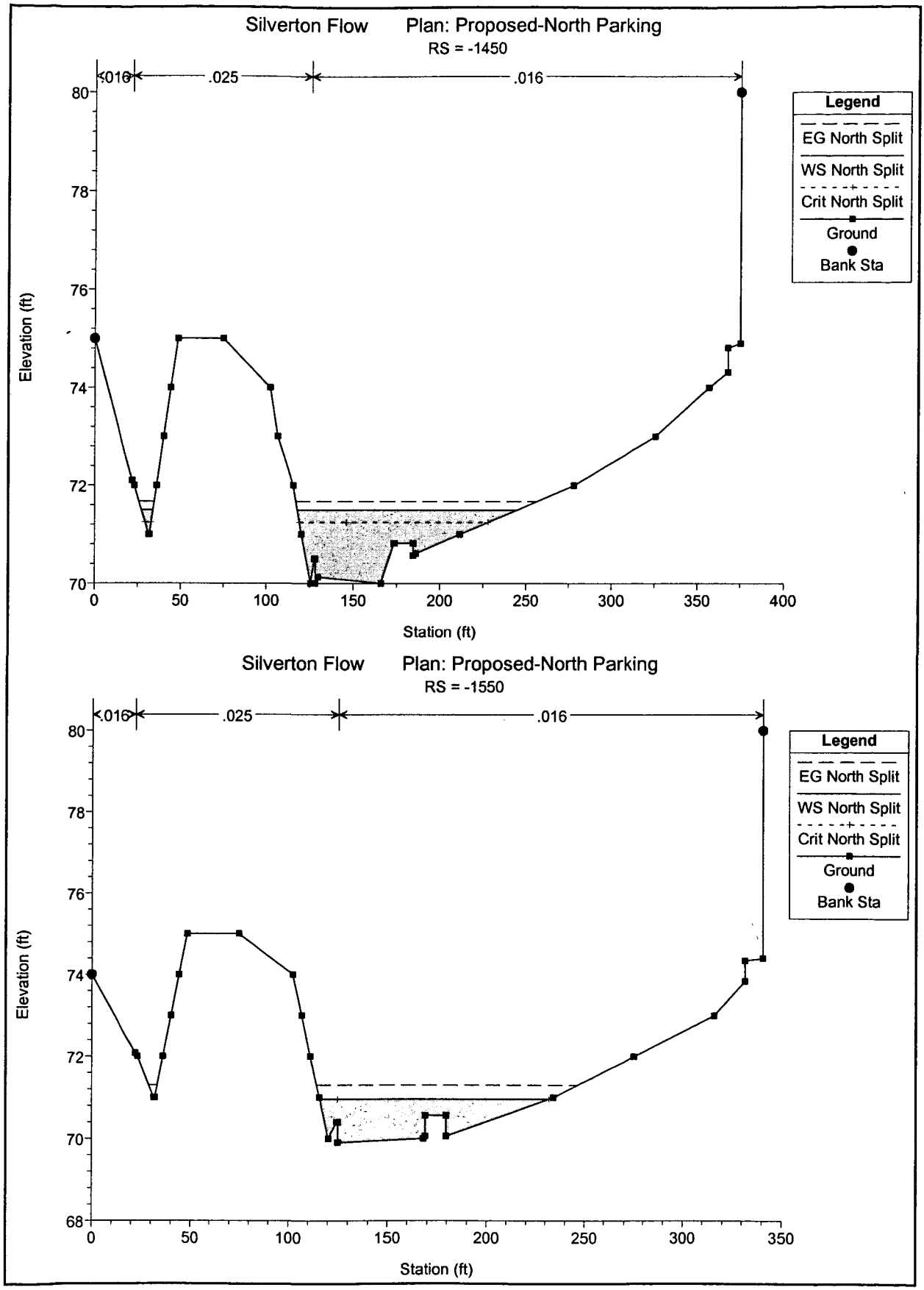
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
North	-700	364.00	73.50	74.85	74.49	74.96	0.000920	2.70	135.95	271.41	0.49
North	-750	364.00	73.80	74.52	74.52	74.80	0.004590	4.27	85.34	151.35	1.00
North	-850	364.00	73.00	74.27	74.05	74.50	0.001846	3.86	94.23	98.54	0.70
North	-950	364.00	73.00	74.15		74.32	0.001456	3.32	109.79	122.13	0.62
North	-1050	364.00	72.32	73.71	73.71	74.07	0.004213	4.82	75.55	105.42	1.00
North	-1150	364.00	70.00	72.87	72.12	72.90	0.000209	1.44	252.64	221.41	0.24
North	-1250	364.00	70.50	72.52	72.52	72.82	0.004842	4.39	82.84	140.53	1.01
North	-1350	364.00	70.90	71.97	71.98	72.31	0.004751	4.65	78.25	119.11	1.01
North	-1450	364.00	70.00	71.50	71.25	71.67	0.001820	3.37	107.85	133.53	0.66
North	-1550	364.00	69.90	70.96	70.96	71.30	0.004594	4.67	77.95	116.02	1.00
North	-1650	364.00	69.00	70.59	70.45	70.88	0.002667	4.37	83.30	94.37	0.82
North	-1780	364.00	68.50	70.00	70.00	70.41	0.004480	5.16	70.49	86.20	1.01
North	-1960	364.00	68.00	68.78	68.90	69.26	0.009750	5.56	65.51	120.48	1.33
North	-2020	364.00	67.00	68.48	68.48	68.88	0.005054	5.07	71.79	90.22	1.00
North	-2110	364.00	66.00	68.07	67.37	68.11	0.000550	1.69	215.45	211.91	0.30
North	-2200	364.00	64.00	68.03		68.07	0.000400	1.59	229.42	127.97	0.21
North	-2250	364.00	62.31	68.03		68.05	0.000161	1.19	306.73	95.23	0.12
North	-2300	364.00	64.00	68.00	65.70	68.04	0.000399	1.55	234.81	96.61	0.18

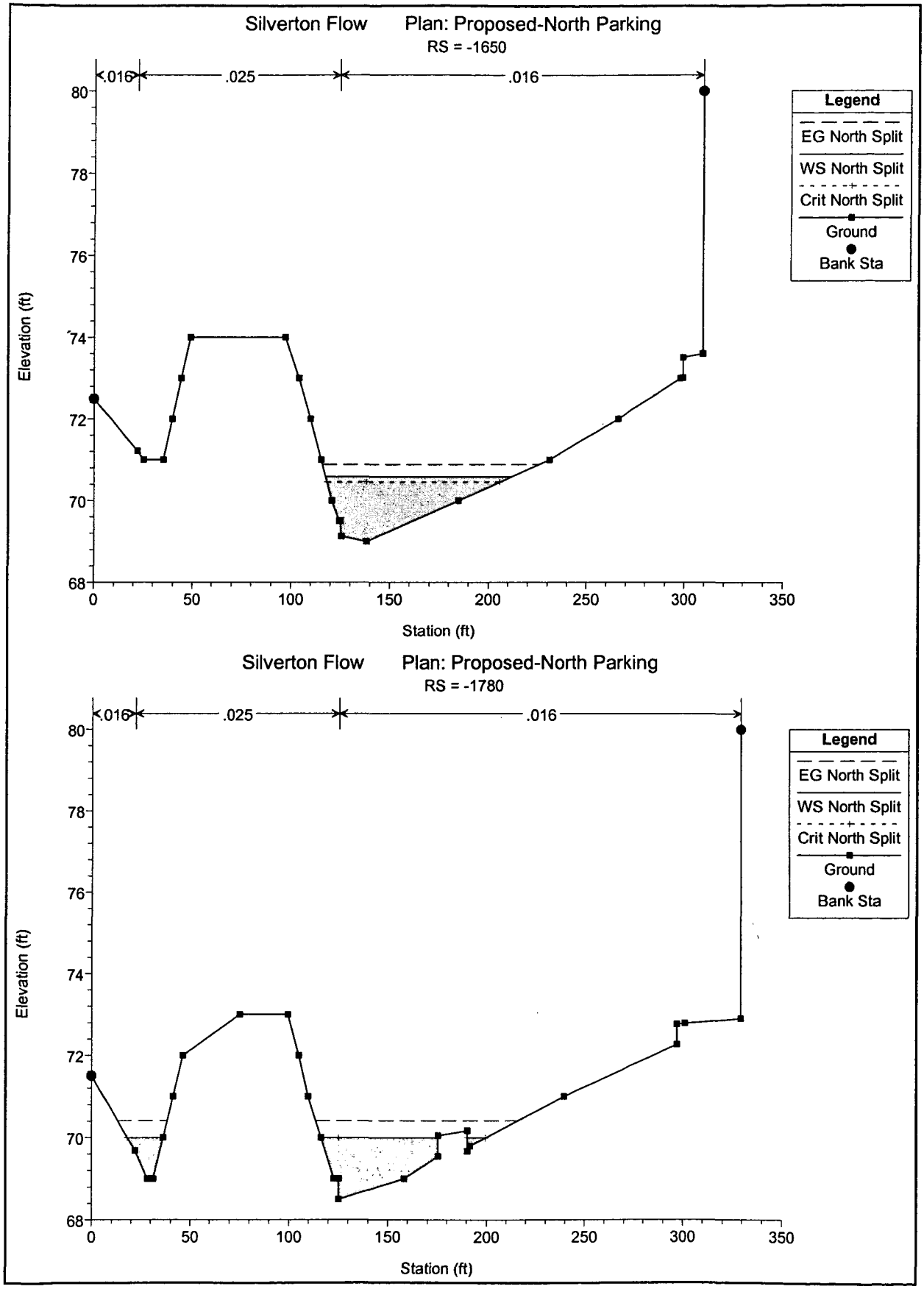

Silverton Flow Plan: Proposed-North Parking
RS = -700
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -750
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

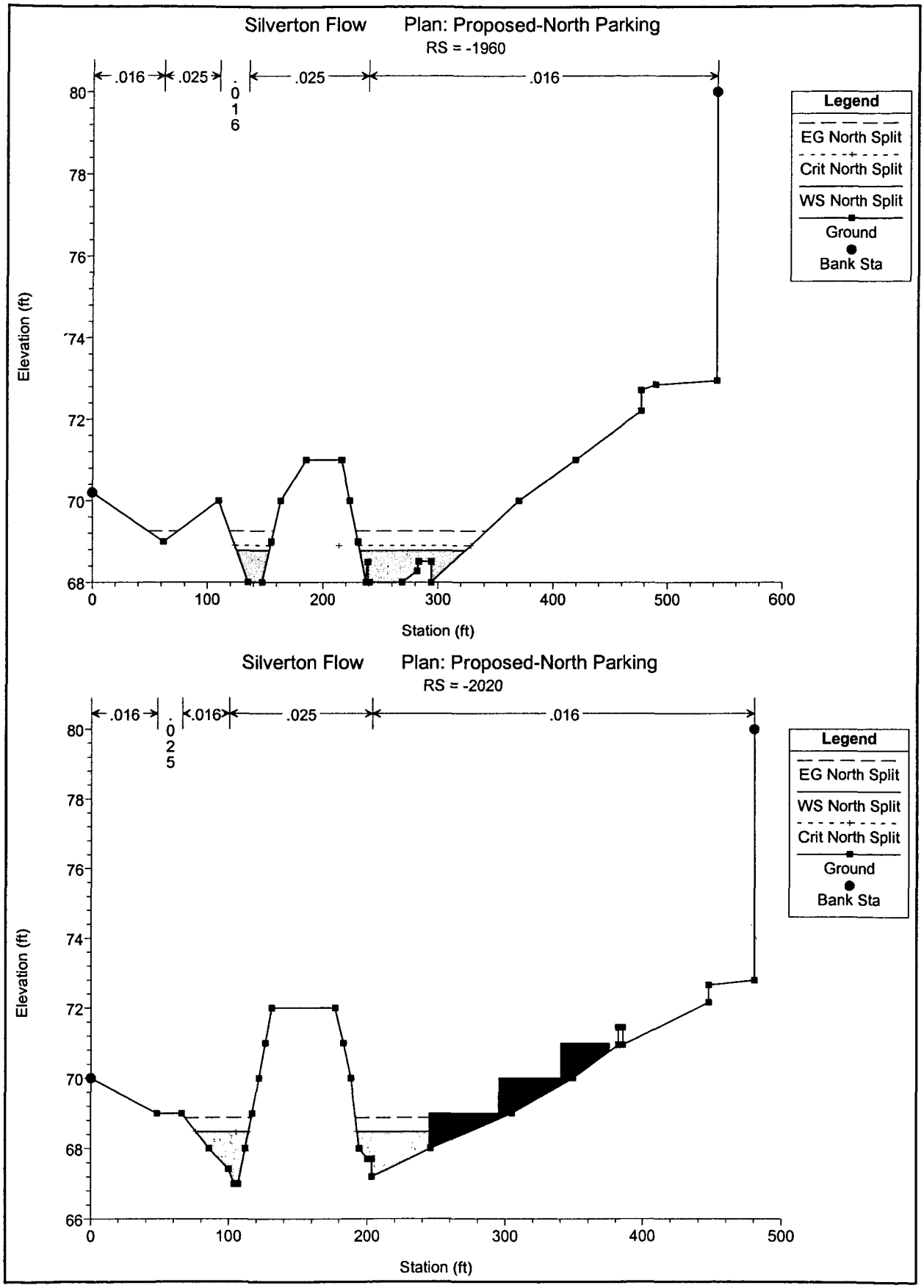

Silverton Flow Plan: Proposed-North Parking
RS = -850
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -950
.025
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

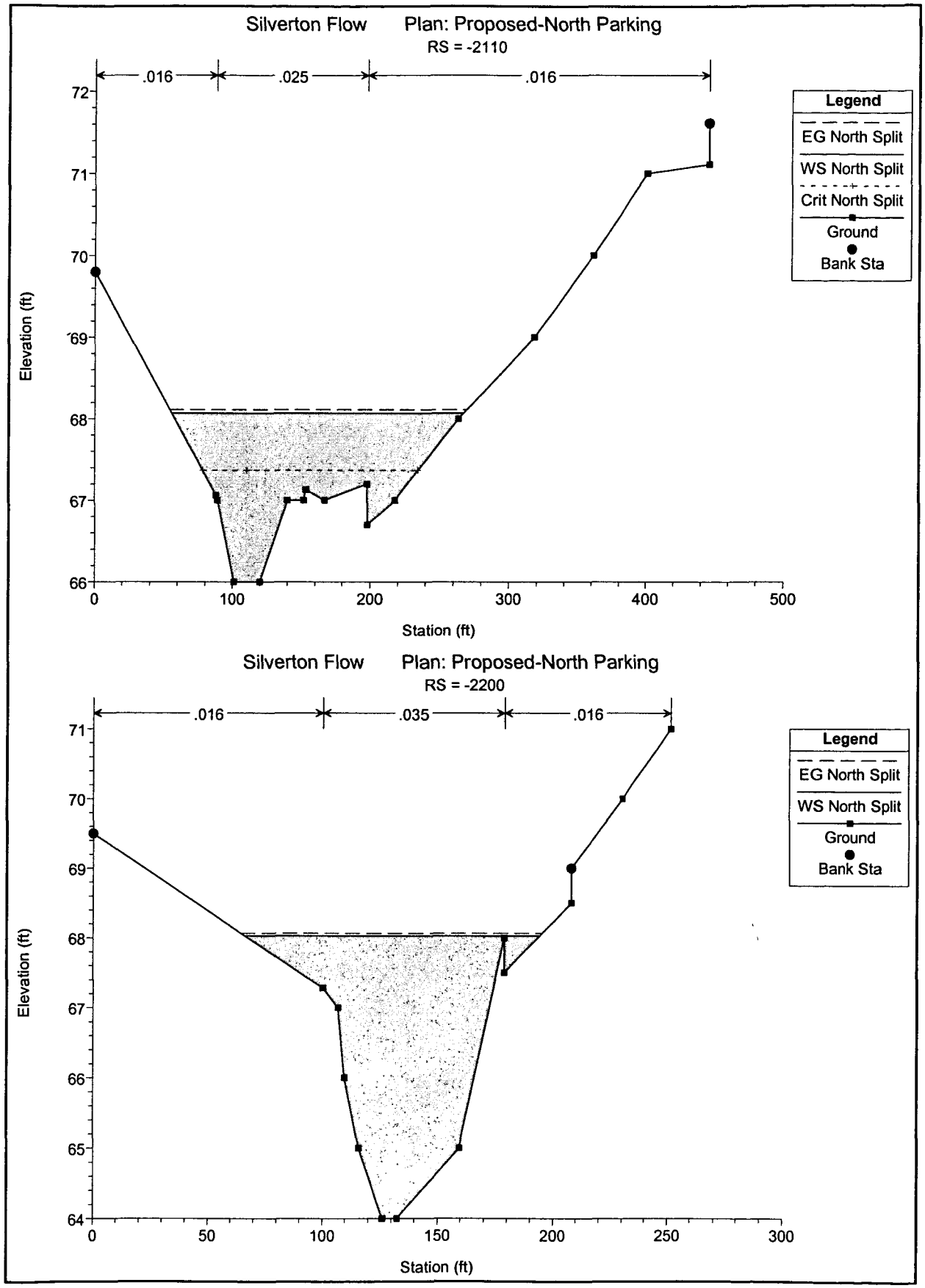

Silverton Flow Plan: Proposed-North Parking
RS = -1050
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -1150
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)

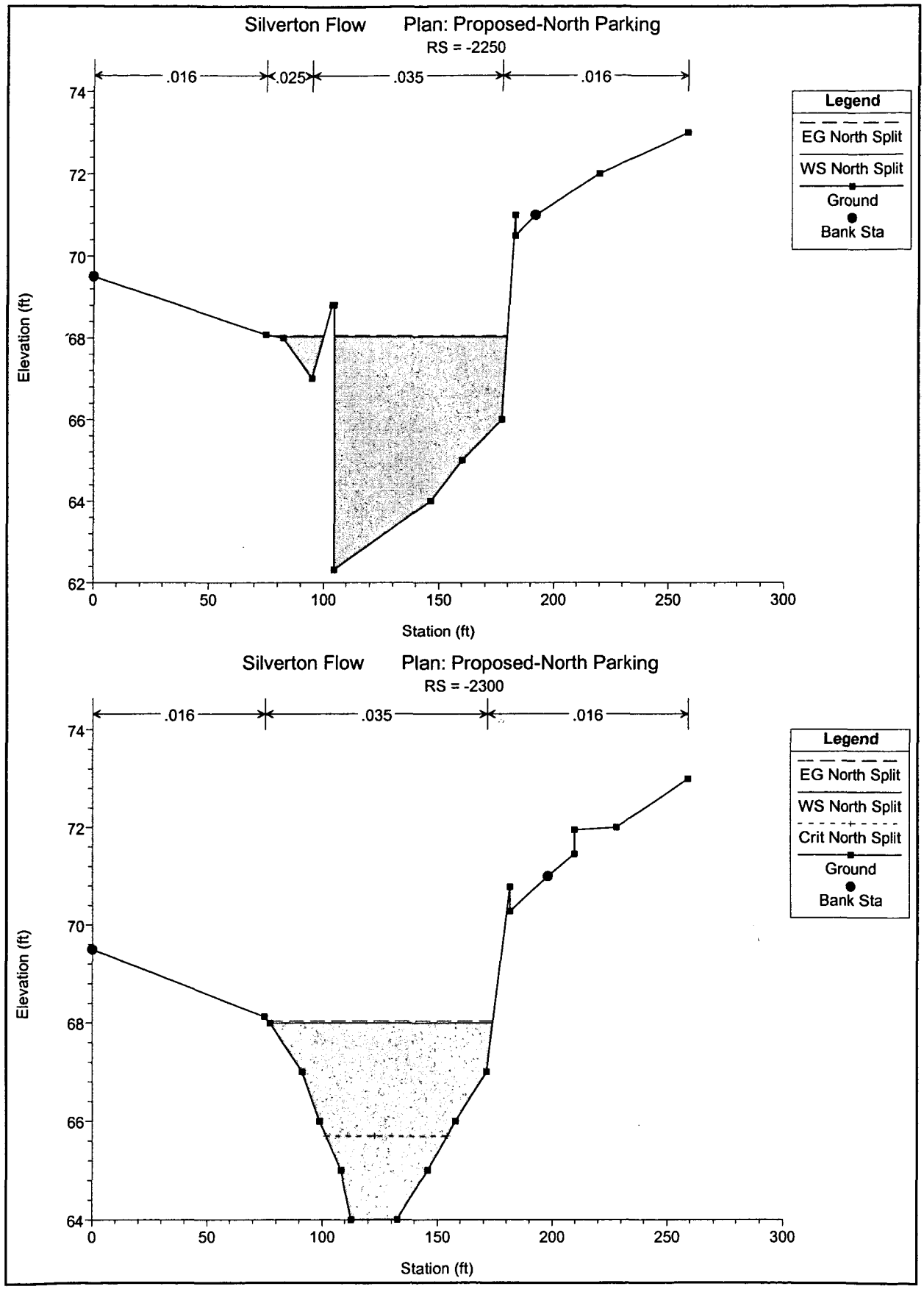

Silverton Flow Plan: Proposed-North Parking
RS = -1250
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -1350
.025
.016
Legend
EG North Split
Crit North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Proposed-North Parking
RS = -1450
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -1550
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Proposed-North Parking
RS = -1650
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -1780
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
Station (ft)


Silverton Flow Plan: Proposed-North Parking
RS = -1960
.016
.025
.016
.025
.016
Elevation (ft)
Station (ft)
Legend
EG North Split
Crit North Split
WS North Split
Ground
Bank Sta
Silverton Flow Plan: Proposed-North Parking
RS = -2020
.016
.025
.016
.025
.016
Elevation (ft)
Station (ft)
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta


Silverton Flow Plan: Proposed-North Parking
RS = -2110
.016
.025
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
72
71
70
69
68
67
66
0
100
200
300
400
500
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -2200
.016
.035
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
71
70
69
68
67
66
65
64
0
50
100
150
200
250
300
Station (ft)


Silverton Flow Plan: Proposed-North Parking
RS = -2250
.016
.025
.035
.016
Legend
EG North Split
WS North Split
Ground
Bank Sta
Elevation (ft)
74
72
70
68
66
64
62
0
50
100
150
200
250
300
Station (ft)
Silverton Flow Plan: Proposed-North Parking
RS = -2300
.016
.035
.016
Legend
EG North Split
WS North Split
Crit North Split
Ground
Bank Sta
Elevation (ft)
74
72
70
68
66
64
0
50
100
150
200
250
300
Station (ft)

HYDRAULIC ANALYSIS AT PROPOSED ONSITE DROP INLET FOR STORM DRAIN LINE A

Project: Silverton Expansion Phase 1-Bass Pro Shop

Project Number: 6923.2 **Date:** October 2003

Drop Inlet Capacity for the D.I. intercepting the 100-year Offsite Flow

Orifice Equation: Q=KCA(2gh)^0.5

D.I Flowline = 2272.0

Side Opening		**Grate**	
Length of Opening (Ls)(ft):	40.0	Length of Opening (Lg)(ft):	39.0
Orifice Coefficient (Cs):	0.67	Orifice Coefficient (Cg):	0.70
Clogging Factor (Ks):	0.50	Clogging Factor (Kg):	0.50
		Effective Area Coeficient =	0.75
		* As = 0.75 x Lg x grate width (1.5 ft)	

WSE (ft)	Depth of Flow (ft)	Head Above Side Opening (Hs) (ft)	Area of Side Opening (As) (sf)	Flow into Side Opening (Qs) (cfs)	Head Above Grate (Hg) (ft)	Area of Grate (As) (sf)	Flow into Grate (Qs) (cfs)	Total Flow (Qt) (cfs)	
2272	0.00	0.000	0.0	0	0.0	43.9	0	0	
2272.05	**0.05**	**0.025**	**2.0**	**1**	**0.1**	**43.9**	**28**	**28**	<---WSE at D.I U/S the Proposed SD Line A
2272.15	0.15	0.075	6.0	4	0.2	43.9	48	52	
2272.25	0.25	0.125	10.0	10	0.3	43.9	62	71	
2272.35	0.35	0.175	14.0	16	0.3	43.9	73	89	
2272.45	0.45	0.225	18.0	23	0.4	43.9	83	106	
2272.55	0.55	0.300	20.0	29	0.5	43.9	91	121	
2272.65	0.65	0.400	20.0	34	0.6	43.9	99	133	
2272.75	0.75	0.500	20.0	38	0.7	43.9	107	145	
2272.85	0.85	0.600	20.0	42	0.8	43.9	114	155	
2272.95	0.95	0.700	20.0	45	0.9	43.9	120	165	
2273.05	1.05	0.800	20.0	48	1.0	43.9	126	174	

HYDRAULIC ANALYSIS AT FLOW SECTION BB
(To Determine WSE Upstream the Proposed Drop Inlet at Storm Drain Line A)

Hydraulic Analysis at Section BB (Proposed Condition)
Worksheet for Irregular Channel

Project Description	
Worksheet	Hydraulic Analysis at Section BB (Proposed Condition)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.005000	ft/ft
Discharge	27.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	73.22	ft
Elevation Range	72.35 to 74.42	
Flow Area	8.1	ft²
Wetted Perimeter	22.36	ft
Top Width	21.82	ft
Actual Depth	0.87	ft
Critical Elevation	73.21	ft
Critical Slope	0.005387	ft/ft
Velocity	3.34	ft/s
Velocity Head	0.17	ft
Specific Energy	73.39	ft
Froude Number	0.97	
Flow Type	Subcritical	

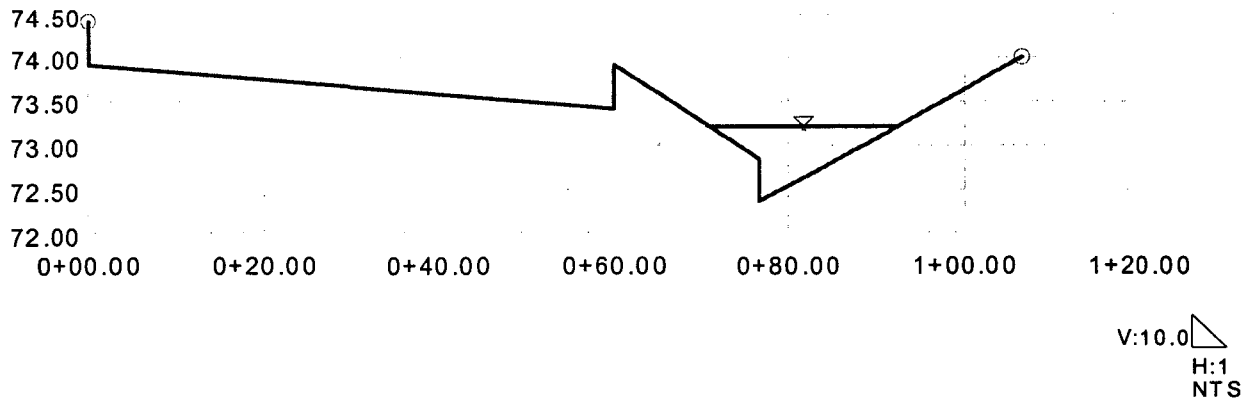
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	1+06.60	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	74.42
0+00.00	73.92
0+60.00	73.41
0+60.00	73.91
0+76.60	72.85
0+76.60	72.35
0+88.70	73.00
1+06.60	74.00

Hydraulic Analysis at Section BB (Proposed Condition)
Cross Section for Irregular Channel

Project Description	
Worksheet	Hydraulic Analysis at Section BB (Proposed Condition)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	0.005000	ft/ft
Water Surface Elevation	73.22	ft
Elevation Range	72.35 to 74.42	
Discharge	27.00	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666
Project Engineer: Hani M. Noshi

HEC-RAS ANALYSIS FOR FLOWS ALONG SHELBORNE ALIGNMENT (EXISTING CONDITION)

HEC-RAS Plan: SHELBEX River: Shelborne Avenue Reach: RV Park Profile: FIS RESTUDY

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV Park	796	373.00	77.00	78.97	78.97	79.49	0.010766	5.85	67.89	70.87	0.93
RV Park	667	373.00	75.00	76.92	77.04	77.77	0.015486	7.40	50.41	37.96	1.13
RV Park	567	373.00	73.00	76.38	75.24	76.59	0.001809	3.64	103.91	53.96	0.42
RV Park	525	373.00	73.00	76.39		76.51	0.000837	2.77	137.12	65.21	0.30
RV Park	514	373.00	71.60	76.26	74.90	76.49	0.002054	4.01	108.29	73.25	0.41
RV Park	462	Culvert									
RV Park	412	373.00	71.00	73.70	73.70	74.48	0.008230	7.20	56.21	42.16	0.88
RV Park	376	373.00	71.18	72.68	73.10	74.03	0.028915	9.31	40.05	34.14	1.52
RV Park	299	373.00	70.00	72.17	72.12	72.68	0.007910	6.01	69.05	57.77	0.83
RV Park	207	373.00	69.00	71.49		71.98	0.006987	5.67	68.42	55.01	0.79
RV Park	100	373.00	68.79	71.03	71.03	71.35	0.004347	4.84	105.81	206.53	0.63
RV Park	90	373.00	69.00	70.25	70.42	70.84	0.018412	7.21	79.53	211.44	1.20
RV Park	70	373.00	68.00	69.39	69.39	69.60	0.007690	4.56	122.48	254.32	0.77
RV Park	60	373.00	67.00	68.26	68.48	68.97	0.020450	7.60	69.86	165.87	1.24
RV Park	50	373.00	65.00	68.00	67.16	68.02	0.000409	1.04	357.20	334.00	0.18

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X     X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X      X    X        X
X     X  X        X    X      X   X     X    X        X
X     X  XXXXXX    XXXX       X    X    X    X   XXXXX
```

PROJECT DATA
Project Title: Shelbourne Flow
Project File : Shelbourne.prj
Run Date and Time: 10/8/03 12:36:52 PM

Project in English units

PLAN DATA

Plan Title: Shelborne Ave. EX
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.p01

Geometry Title: Shelborne Ave. EX
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.g01

Flow Title : Shelborne Ave. EX
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.f01

Plan Summary Information:
Number of: Cross Sections = 14 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculaton tolerance = 0.003
Maximum number of interations = 20
Maximum difference tolerance = 0.1
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: Shelborne Ave. EX
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.f01

Flow Data (cfs)

River	Reach	RS	FIS RESTUDY
Shelborne Avenue	RV Park	796	373

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Shelborne Avenue	RV Park	FIS RESTUDY	Normal S = .0103	Known WS = 68

GEOMETRY DATA

Geometry Title: Shelborne Ave. EX
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.g01

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 796

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88	0	78.3	22	79	45	79	65	79
74	78	106	77	111	78	115	79	119	80
165	80								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	65	.03	119	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65	119	133	131	124	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	79.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	78.97	Reach Len. (ft)	133.00	131.00	124.00
Crit W.S. (ft)	78.97	Flow Area (sq ft)	7.15	60.74	
E.G. Slope (ft/ft)	0.010766	Area (sq ft)	7.15	60.74	
Q Total (cfs)	373.00	Flow (cfs)	17.44	355.56	
Top Width (ft)	70.87	Top Width (ft)	21.20	49.67	
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)	2.44	5.85	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)	0.34	1.22	
Conv. Total (cfs)	3594.9	Conv. (cfs)	168.1	3426.8	
Length Wtd. (ft)	131.05	Wetted Per. (ft)	21.89	49.96	
Min Ch El (ft)	77.00	Shear (lb/sq ft)	0.22	0.82	
Alpha	1.09	Stream Power (lb/ft s)	0.54	4.78	
Frctn Loss (ft)	1.49	Cum Volume (acre-ft)	0.15	1.47	0.38
C & E Loss (ft)	0.02	Cum SA (acres)	0.30	0.97	1.38

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 667

INPUT

Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97	0	77.9	13.4	77	21.7	76	30.2	75
44.8	75	48.3	76	52.3	77	57.1	78	72.5	78
107.2	78	178.9	78.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	13.4	.03	57.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.4	57.1	107	101	87	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.77	Element			
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	76.92	Reach Len. (ft)	107.00	101.00	87.00
Crit W.S. (ft)	77.04	Flow Area (sq ft)		50.41	
E.G. Slope (ft/ft)	0.015486	Area (sq ft)		50.41	
Q Total (cfs)	373.00	Flow (cfs)		373.00	
Top Width (ft)	37.96	Top Width (ft)		37.96	
Vel Total (ft/s)	7.40	Avg. Vel. (ft/s)		7.40	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	2997.4	Conv. (cfs)		2997.4	
Length Wtd. (ft)	101.00	Wetted Per. (ft)		38.33	
Min Ch El (ft)	75.00	Shear (lb/sq ft)		1.27	
Alpha	1.00	Stream Power (lb/ft s)		9.41	
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	0.14	1.30	0.38
C & E Loss (ft)	0.03	Cum SA (acres)	0.27	0.84	1.38

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: Shelborne Avenue
REACH: RV Park RS: 567

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	96	0	77.52	8.1	77	24.8	76	30.2	75
34.7	74	52.4	73	56.5	73	60.7	74	65	75
69.1	76	77.5	77	123.2	78	169.9	79	180	79.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.8	.03	69.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.8	69.1	43	43	63	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.59	Element			
Vel Head (ft)	0.21	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.38	Reach Len. (ft)	43.00	43.00	63.00
Crit W.S. (ft)	75.24	Flow Area (sq ft)	1.24	102.05	0.62
E.G. Slope (ft/ft)	0.001809	Area (sq ft)	1.24	102.05	0.62
Q Total (cfs)	373.00	Flow (cfs)	0.87	371.70	0.43
Top Width (ft)	53.96	Top Width (ft)	6.43	44.30	3.23
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)	0.70	3.64	0.70
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)	0.19	2.30	0.19
Conv. Total (cfs)	8770.4	Conv. (cfs)	20.4	8739.8	10.2
Length Wtd. (ft)	43.04	Wetted Per. (ft)	6.44	44.88	3.26
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.02	0.26	0.02

Alpha	1.03	Stream Power (lb/ft s)	0.02	0.94	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	1.13	0.38
C & E Loss (ft)	0.03	Cum SA (acres)	0.26	0.75	1.37

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 525

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78	22.9	77.3	35.4	77	47	76.33	52.8	76
56.6	75	60.5	74	64.3	73	91.9	73	95.1	74
98.4	75	101.7	76	125.6	77	146.3	78	197.7	78.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	52.8	.03	101.7	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.8	101.7	17	10	18	.1 .3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.39	Reach Len. (ft)	17.00	10.00	18.00
Crit W.S. (ft)		Flow Area (sq ft)	1.36	133.90	1.85
E.G. Slope (ft/ft)	0.000837	Area (sq ft)	1.36	133.90	1.85
Q Total (cfs)	373.00	Flow (cfs)	0.66	371.44	0.90
Top Width (ft)	65.21	Top Width (ft)	6.90	48.90	9.41
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)	0.49	2.77	0.48
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)	0.20	2.74	0.20
Conv. Total (cfs)	12889.9	Conv. (cfs)	22.8	12836.0	31.0
Length Wtd. (ft)	10.39	Wetted Per. (ft)	6.91	49.73	9.42
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.01	0.14	0.01
Alpha	1.04	Stream Power (lb/ft s)	0.00	0.39	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	1.01	0.38
C & E Loss (ft)	0.01	Cum SA (acres)	0.26	0.70	1.36

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: Shelborne Avenue
REACH: RV Park RS: 514

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74.77	102.75	106	104	101	.3 .5

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.49	Element			
Vel Head (ft)	0.23	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.26	Reach Len. (ft)	106.00	104.00	101.00
Crit W.S. (ft)	74.90	Flow Area (sq ft)	14.21	83.60	10.47
E.G. Slope (ft/ft)	0.002054	Area (sq ft)	14.21	83.60	10.47
Q Total (cfs)	373.00	Flow (cfs)	21.09	335.61	16.30
Top Width (ft)	73.25	Top Width (ft)	27.18	27.98	18.09
Vel Total (ft/s)	3.44	Avg. Vel. (ft/s)	1.48	4.01	1.56
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)	0.52	2.99	0.58
Conv. Total (cfs)	8231.2	Conv. (cfs)	465.4	7406.0	359.8
Length Wtd. (ft)	104.00	Wetted Per. (ft)	27.27	34.95	18.13
Min Ch El (ft)	71.60	Shear (lb/sq ft)	0.07	0.31	0.07
Alpha	1.24	Stream Power (lb/ft s)	0.10	1.23	0.12
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	0.98	0.38
C & E Loss (ft)		Cum SA (acres)	0.25	0.69	1.36

CULVERT RIVER: Shelborne Avenue
REACH: RV Park RS: 462

INPUT
Description:
Distance from Upstream XS = 1
Deck/Roadway Width = 100
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	76	71	195	76	71

Upstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
74.77	102.75	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	75	70	180	75	70

Downstream Bridge Cross Section Data
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85	0	75	24.25	75.4	34.79	74.4	35.4	74.4
35.4	73.9	56	73	60	72	63	71	73	71
76	72	80	73	83	74	129	75	185	75.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	56	.03	80	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
56	80	.3	.5

Upstream Embankment side slope = 3 horiz. to 1.0 vertical

```
Downstream Embankment side slope            =       3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      76
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       3      5.5
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length     n Value   Entrance Loss Coef   Exit Loss Coef
                  1     100        .013                   .5                 1
Number of Barrels =  2
Upstream   Elevation =  71.6
Centerline Stations
    Sta.     Sta.
      82     88.5
Downstream Elevation =  70.5
Centerline Stations
    Sta.     Sta.
    64.5     70.5

CULVERT OUTPUT    Profile #FIS RESTUDY
Culvert ID : Culvert #1

  Culv Q (cfs)             311.52    Culv Ful Lngh (ft)        100.00
  # Barrels                     2    Culv Vel US (ft/s)          9.44
  Q Barrel (cfs)           155.76    Culv Vel DS (ft/s)          9.44
  E.G. US. (ft)             76.49    Culv Inv El Up (ft)        71.60
  W.S. US. (ft)             76.26    Culv Inv El Dn (ft)        70.50
  E.G. DS (ft)              74.48    Culv Frctn Ls (ft)          0.90
  W.S. DS (ft)              73.70    Culv Ext Lss (ft)           0.61
  Delta EG (ft)              2.01    Culv Ent Lss (ft)           0.69
  Delta WS (ft)              2.56    Q Weir (cfs)               61.48
  E.G. IC (ft)              76.64    Weir Sta Lft (ft)          45.87
  E.G. OC (ft)              76.49    Weir Sta Rgt (ft)         125.46
  Culvert Control         Outlet     Weir Submerg                0.00
  Culv WS Inlet (ft)        74.60    Weir Max Depth (ft)         0.49
  Culv WS Outlet (ft)       73.50    Weir Avg Depth (ft)         0.44
  Culv Nml Depth (ft)        2.10    Wr Flw Area (sq ft)        35.04
  Culv Crt Depth (ft)        2.92    Min El Weir Flow (ft)      76.01


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.
         Therefore, the culvert inlet equations are not valid and the supercritical result has been
         discarded.  The outlet answer will be used.

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 412

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0      85       0      75   24.25    75.4   34.79    74.4    35.4    74.4
    35.4    73.9      56      73      60      72      63      71      73      71
      76      72      80      73      83      74     129      75     185    75.5

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0     .03       56     .03       80     .03

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

56	80	20	20	20	.3	.5

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.48	Element			
Vel Head (ft)	0.78	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	73.70	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	73.70	Flow Area (sq ft)	5.63	49.84	0.74
E.G. Slope (ft/ft)	0.008230	Area (sq ft)	5.63	49.84	0.74
Q Total (cfs)	373.00	Flow (cfs)	12.58	358.83	1.59
Top Width (ft)	42.16	Top Width (ft)	16.06	24.00	2.10
Vel Total (ft/s)	6.64	Avg. Vel. (ft/s)	2.23	7.20	2.16
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	0.35	2.08	0.35
Conv. Total (cfs)	4111.5	Conv. (cfs)	138.7	3955.3	17.6
Length Wtd. (ft)	20.00	Wetted Per. (ft)	16.07	24.57	2.22
Min Ch El (ft)	71.00	Shear (lb/sq ft)	0.18	1.04	0.17
Alpha	1.14	Stream Power (lb/ft s)	0.40	7.50	0.37
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.11	0.83	0.36
C & E Loss (ft)	0.03	Cum SA (acres)	0.20	0.63	1.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 376

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.28	0	73.28	22	73	27	72	30	71.18
48	71.18	55	72	59	73	62	74	135	75
158	75								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	22	.03	62	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
22	62	77	77	71	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.03	Element			
Vel Head (ft)	1.35	Wt. n-Val.		0.030	
W.S. Elev (ft)	72.68	Reach Len. (ft)	77.00	77.00	71.00
Crit W.S. (ft)	73.10	Flow Area (sq ft)		40.05	
E.G. Slope (ft/ft)	0.028915	Area (sq ft)		40.05	
Q Total (cfs)	373.00	Flow (cfs)		373.00	
Top Width (ft)	34.14	Top Width (ft)		34.14	
Vel Total (ft/s)	9.31	Avg. Vel. (ft/s)		9.31	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	2193.5	Conv. (cfs)		2193.5	
Length Wtd. (ft)	77.00	Wetted Per. (ft)		34.45	
Min Ch El (ft)	71.18	Shear (lb/sq ft)		2.10	
Alpha	1.00	Stream Power (lb/ft s)		19.55	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.10	0.80	0.36
C & E Loss (ft)	0.17	Cum SA (acres)	0.19	0.62	1.33

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: Shelborne Avenue
REACH: RV Park RS: 299

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.11	0	72.11	24	71	29.26	70.59	50	70
53.4	71	57	72	61.51	73	106	74	159.49	74.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24	.03	61.51	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24	61.51	91	93	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.68	Element			
Vel Head (ft)	0.51	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	72.17	Reach Len. (ft)	91.00	93.00	98.00
Crit W.S. (ft)	72.12	Flow Area (sq ft)	14.76	54.28	
E.G. Slope (ft/ft)	0.007910	Area (sq ft)	14.76	54.28	
Q Total (cfs)	373.00	Flow (cfs)	46.94	326.06	
Top Width (ft)	57.77	Top Width (ft)	24.00	33.77	
Vel Total (ft/s)	5.40	Avg. Vel. (ft/s)	3.18	6.01	
Max Chl Dpth. (ft)	2.17	Hydr. Depth (ft)	0.62	1.61	
Conv. Total (cfs)	4193.8	Conv. (cfs)	527.7	3666.1	
Length Wtd. (ft)	92.86	Wetted Per. (ft)	24.09	34.09	
Min Ch El (ft)	70.00	Shear (lb/sq ft)	0.30	0.79	
Alpha	1.12	Stream Power (lb/ft s)	0.96	4.72	
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.09	0.72	0.36
C & E Loss (ft)	0.01	Cum SA (acres)	0.17	0.55	1.33

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 207

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.59	0	71.59	18	71	26	70	30	69
52.5	70	56	71	60	72	163	72.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	18	.03	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18	60	106	107	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	71.98	Element			
Vel Head (ft)	0.49	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	71.49	Reach Len. (ft)	106.00	107.00	125.00
Crit W.S. (ft)		Flow Area (sq ft)	3.71	64.72	
E.G. Slope (ft/ft)	0.006987	Area (sq ft)	3.71	64.72	
Q Total (cfs)	373.00	Flow (cfs)	6.03	366.97	
Top Width (ft)	55.01	Top Width (ft)	15.04	39.97	
Vel Total (ft/s)	5.45	Avg. Vel. (ft/s)	1.63	5.67	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	0.25	1.62	
Conv. Total (cfs)	4462.2	Conv. (cfs)	72.1	4390.1	
Length Wtd. (ft)	107.62	Wetted Per. (ft)	15.05	40.38	

Min Ch El (ft)	69.00	Shear (lb/sq ft)	0.11	0.70	
Alpha	1.07	Stream Power (lb/ft s)	0.17	3.96	
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	0.07	0.59	0.36
C & E Loss (ft)	0.05	Cum SA (acres)	0.13	0.48	1.33

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 100

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.62	0	70.62	25.65	70.28	30.73	68.79	51.84	68.88
60.92	70.9	107.16	70.85	142.48	70.72	156.18	70.8	206	71
222	72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	25.65	.03	60.92	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
25.65	60.92	55	58	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	71.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	71.03	Reach Len. (ft)	55.00	58.00	75.00
Crit W.S. (ft)	71.03	Flow Area (sq ft)	14.96	64.39	26.46
E.G. Slope (ft/ft)	0.004347	Area (sq ft)	14.96	64.39	26.46
Q Total (cfs)	373.00	Flow (cfs)	33.73	311.56	27.72
Top Width (ft)	206.53	Top Width (ft)	25.65	35.27	145.61
Vel Total (ft/s)	3.53	Avg. Vel. (ft/s)	2.26	4.84	1.05
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)	0.58	1.83	0.18
Conv. Total (cfs)	5657.2	Conv. (cfs)	511.6	4725.3	420.4
Length Wtd. (ft)	60.76	Wetted Per. (ft)	26.07	35.71	145.61
Min Ch El (ft)	68.79	Shear (lb/sq ft)	0.16	0.49	0.05
Alpha	1.62	Stream Power (lb/ft s)	0.35	2.37	0.05
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.05	0.44	0.32
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	0.38	1.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 90

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80	0	70	2	70	20	70	24	69
48	69	52	70	90	70	208	70	222	71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	20	.03	52	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
20	52	120	115	129	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.84	Element			
Vel Head (ft)	0.59	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	70.25	Reach Len. (ft)	120.00	115.00	129.00
Crit W.S. (ft)	70.42	Flow Area (sq ft)	4.91	35.86	38.75
E.G. Slope (ft/ft)	0.018412	Area (sq ft)	4.91	35.86	38.75
Q Total (cfs)	373.00	Flow (cfs)	12.85	258.72	101.43
Top Width (ft)	211.44	Top Width (ft)	20.00	32.00	159.44
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)	2.62	7.21	2.62
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)	0.25	1.12	0.24
Conv. Total (cfs)	2748.9	Conv. (cfs)	94.7	1906.7	747.5
Length Wtd. (ft)	121.85	Wetted Per. (ft)	20.25	32.25	159.45
Min Ch El (ft)	69.00	Shear (lb/sq ft)	0.28	1.28	0.28
Alpha	1.74	Stream Power (lb/ft s)	0.73	9.22	0.73
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.04	0.37	0.27
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	0.34	0.86

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: Shelborne Avenue
REACH: RV Park RS: 70

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.5	0	68.5	14	68	30	68	32	69
35	69	38.5	69	83	69	230	69	292	70
345	71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	14	.03	38.5	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14	38.5	45	45	56	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	69.60	Element			
Vel Head (ft)	0.21	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	69.39	Reach Len. (ft)	45.00	45.00	56.00
Crit W.S. (ft)	69.39	Flow Area (sq ft)	15.99	26.61	79.88
E.G. Slope (ft/ft)	0.007690	Area (sq ft)	15.99	26.61	79.88
Q Total (cfs)	373.00	Flow (cfs)	72.80	121.34	178.85
Top Width (ft)	254.32	Top Width (ft)	14.00	24.50	215.82
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)	4.55	4.56	2.24
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)	1.14	1.09	0.37
Conv. Total (cfs)	4253.5	Conv. (cfs)	830.2	1383.7	2039.5
Length Wtd. (ft)	48.97	Wetted Per. (ft)	14.90	24.74	215.82
Min Ch El (ft)	68.00	Shear (lb/sq ft)	0.52	0.52	0.18
Alpha	1.42	Stream Power (lb/ft s)	2.35	2.36	0.40
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.01	0.29	0.09
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.26	0.31

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 60

INPUT
Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77	0	67	27	67	31	68	35	69
42	69	45	70	63	70	70	71	81	70
85	69	100	68	218	68	264	69	315	70
368	70.71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	0	.03	45	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	45	66	56	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.97	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	68.26	Reach Len. (ft)	66.00	56.00	54.00
Crit W.S. (ft)	68.48	Flow Area (sq ft)		37.18	32.68
E.G. Slope (ft/ft)	0.020450	Area (sq ft)		37.18	32.68
Q Total (cfs)	373.00	Flow (cfs)		282.57	90.43
Top Width (ft)	165.87	Top Width (ft)		32.04	133.83
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)		7.60	2.77
Max Chl Dpth (ft)	1.26	Hydr. Depth (ft)		1.16	0.24
Conv. Total (cfs)	2608.3	Conv. (cfs)		1976.0	632.4
Length Wtd. (ft)	55.59	Wetted Per. (ft)		33.45	133.84
Min Ch El (ft)	67.00	Shear (lb/sq ft)		1.42	0.31
Alpha	1.60	Stream Power (lb/ft s)		10.78	0.86
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		0.25	0.02
C & E Loss (ft)	0.05	Cum SA (acres)		0.24	0.08

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 50

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.4	0	66.4	4	66	9	65	24	65
30	66	50	67	112	67	137	67	224	67
261	67	334	68	358	69	430	69.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	0	.03	430	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	430	0	0	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.02	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	68.00	Reach Len. (ft)			
Crit W.S. (ft)	67.16	Flow Area (sq ft)		357.20	
E.G. Slope (ft/ft)	0.000409	Area (sq ft)		357.20	
Q Total (cfs)	373.00	Flow (cfs)		373.00	
Top Width (ft)	334.00	Top Width (ft)		334.00	
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)		1.07	

Conv. Total (cfs)	18435.0	Conv. (cfs)	18435.0
Length Wtd. (ft)		Wetted Per. (ft)	335.83
Min Ch El (ft)	65.00	Shear (lb/sq ft)	0.03
Alpha	1.00	Stream Power (lb/ft s)	0.03
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

SUMMARY OF MANNING'S N VALUES

River:Shelborne Avenue

Reach	River Sta.	n1	n2	n3
RV Park	796	.03	.03	.03
RV Park	667	.03	.03	.03
RV Park	567	.03	.03	.03
RV Park	525	.03	.03	.03
RV Park	514	.03	.03	.03
RV Park	462	Culvert		
RV Park	412	.03	.03	.03
RV Park	376	.03	.03	.03
RV Park	299	.03	.03	.03
RV Park	207	.03	.03	.03
RV Park	100	.03	.03	.03
RV Park	90	.03	.03	.03
RV Park	70	.03	.03	.03
RV Park	60	.03	.03	.03
RV Park	50	.03	.03	.03

SUMMARY OF REACH LENGTHS

River: Shelborne Avenue

Reach	River Sta.	Left	Channel	Right
RV Park	796	133	131	124
RV Park	667	107	101	87
RV Park	567	43	43	63
RV Park	525	17	10	18
RV Park	514	106	104	101
RV Park	462	Culvert		
RV Park	412	20	20	20
RV Park	376	77	77	71
RV Park	299	91	93	98
RV Park	207	106	107	125
RV Park	100	55	58	75
RV Park	90	120	115	129
RV Park	70	45	45	56
RV Park	60	66	56	54
RV Park	50	0	0	0

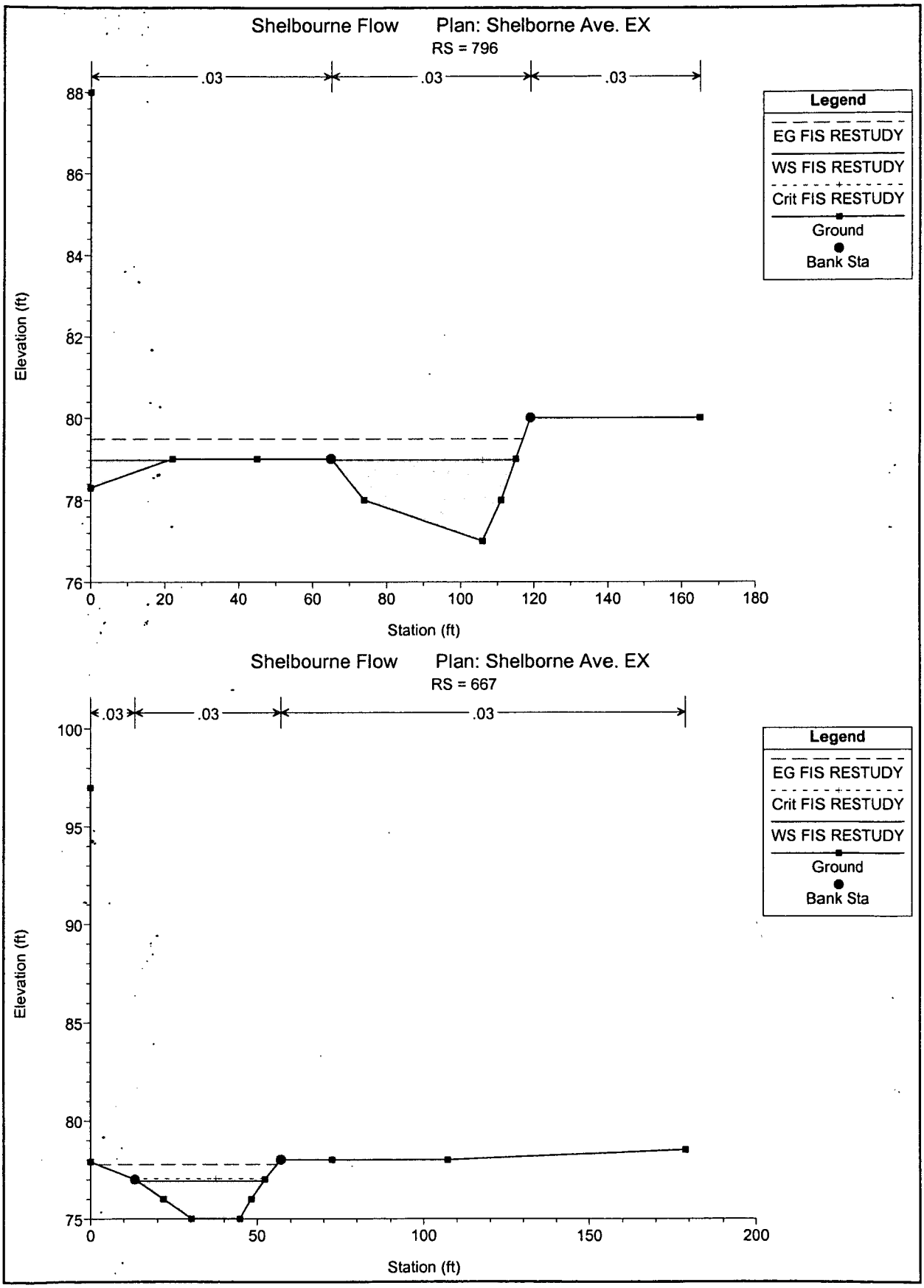
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Shelborne Avenue

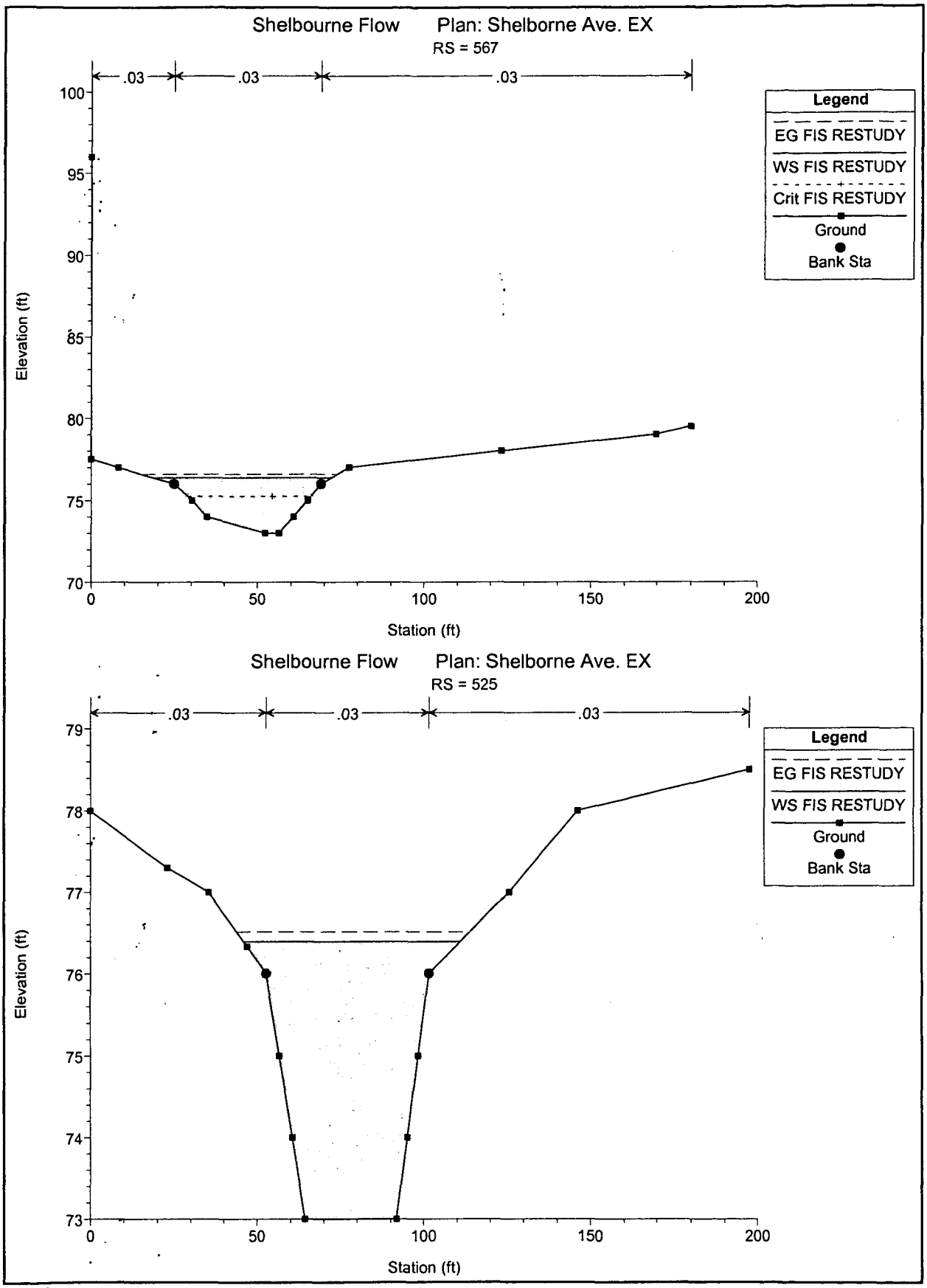
Reach	River Sta.	Contr.	Expan.

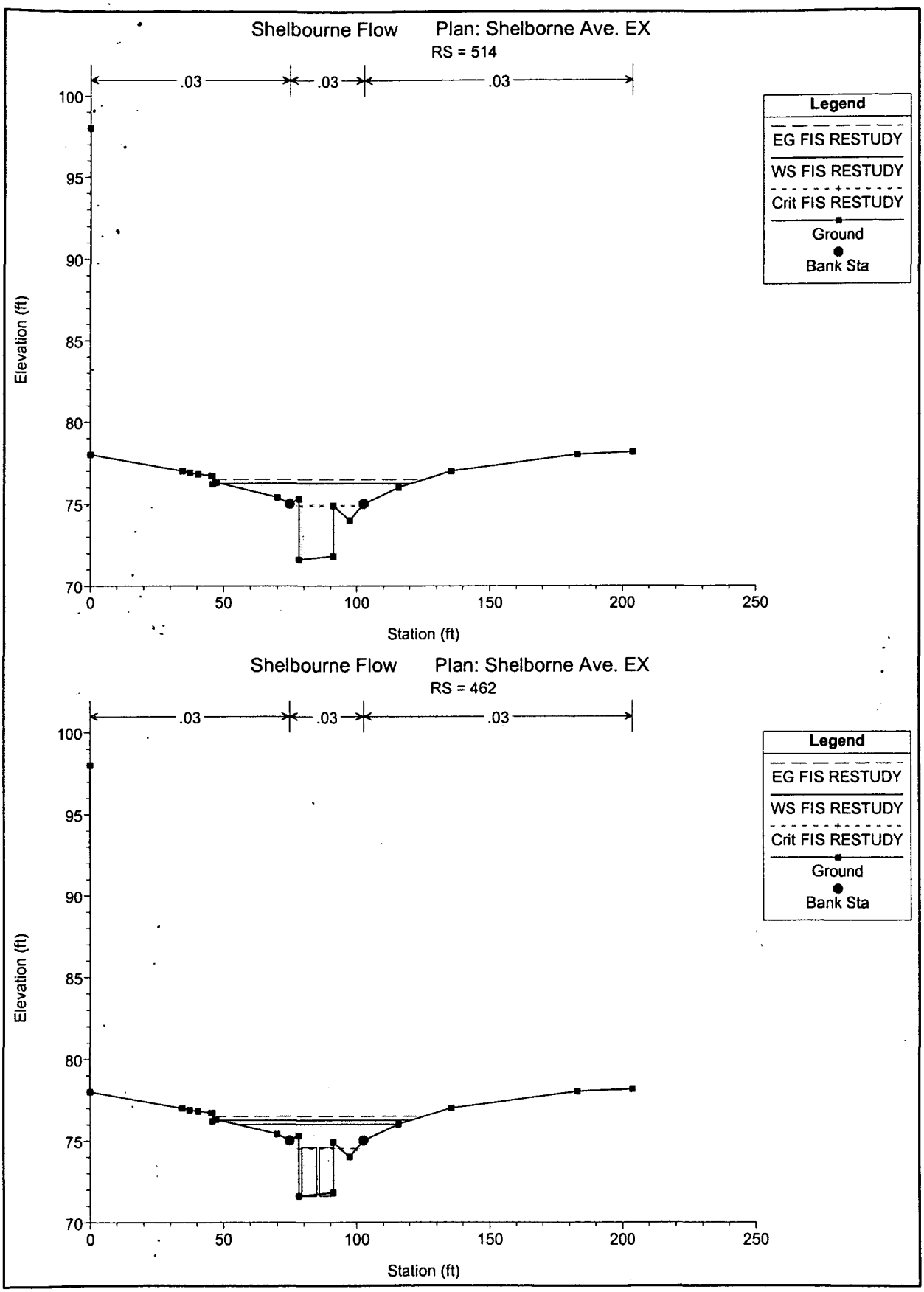
RV Park	796	.1	.3
RV Park	667	.1	.3
RV Park	567	.1	.3
RV Park	525	.1	.3
RV Park	514	.3	.5
RV Park	462	Culvert	
RV Park	412	.3	.5
RV Park	376	.1	.3
RV Park	299	.1	.3
RV Park	207	.1	.3
RV Park	100	.1	.3
RV Park	90	.1	.3
RV Park	70	.1	.3
RV Park	60	.1	.3
RV Park	50	.1	.3

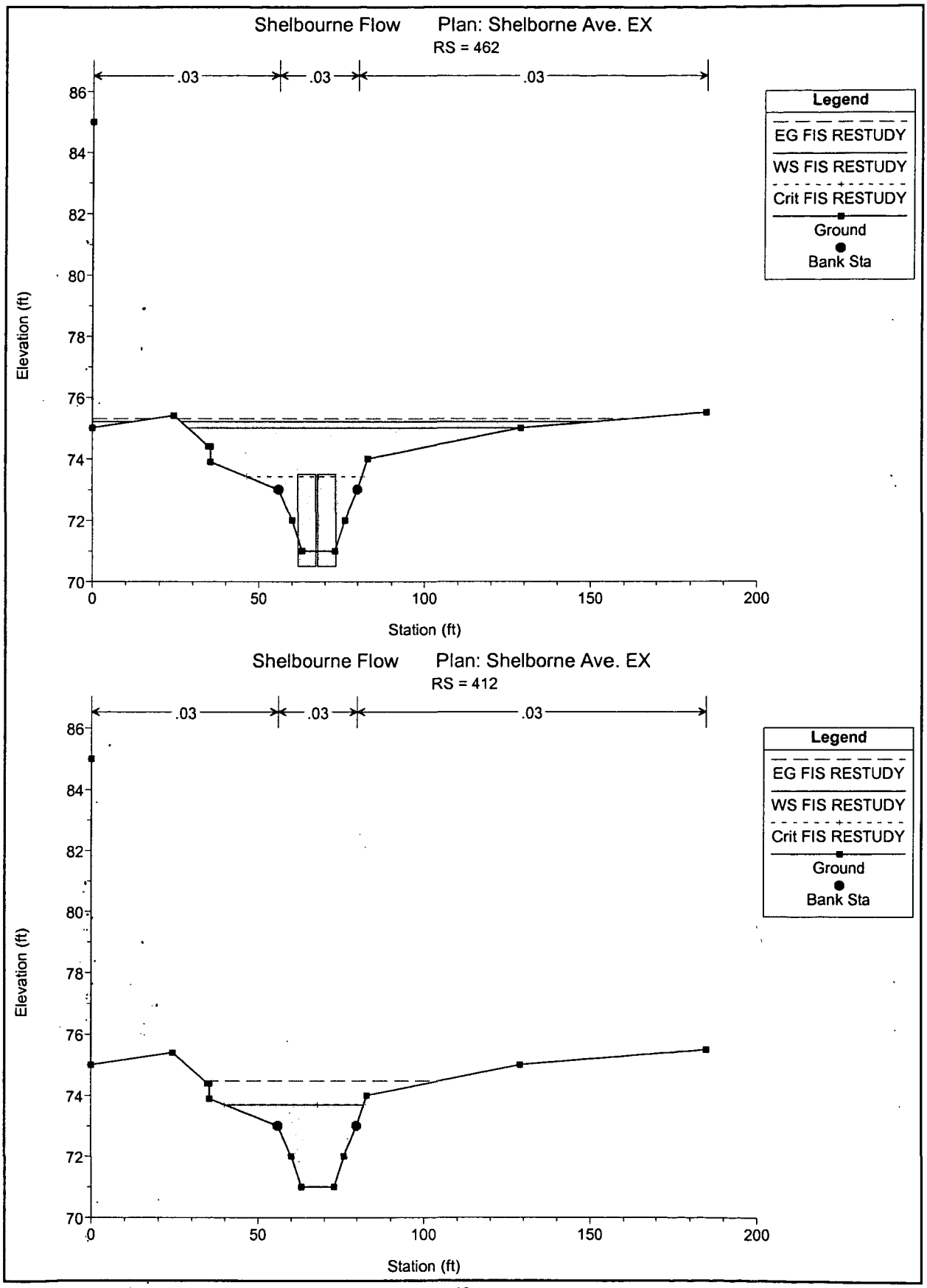
Profile Output Table - Standard Table 1

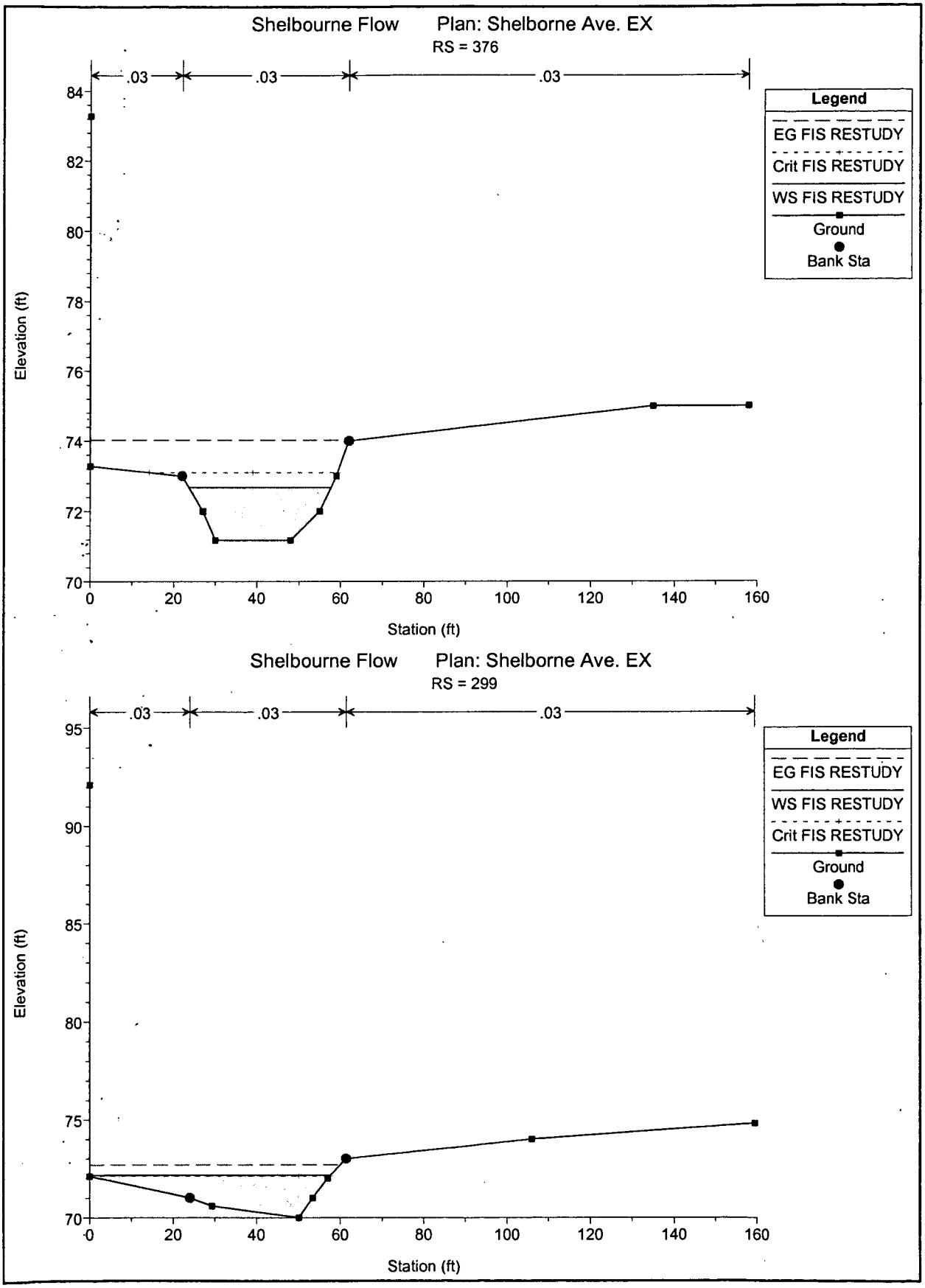
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
RV Park	796	373.00	77.00	78.97	78.97	79.49	0.010766	5.85	67.89	70.87	0.93
RV Park	667	373.00	75.00	76.92	77.04	77.77	0.015486	7.40	50.41	37.96	1.13
RV Park	567	373.00	73.00	76.38	75.24	76.59	0.001809	3.64	103.91	53.96	0.42
RV Park	525	373.00	73.00	76.39		76.51	0.000837	2.77	137.12	65.21	0.30
RV Park	514	373.00	71.60	76.26	74.90	76.49	0.002054	4.01	108.29	73.25	0.41
RV Park	462	Culvert									
RV Park	412	373.00	71.00	73.70	73.70	74.48	0.008230	7.20	56.21	42.16	0.88
RV Park	376	373.00	71.18	72.68	73.10	74.03	0.028915	9.31	40.05	34.14	1.52
RV Park	299	373.00	70.00	72.17	72.12	72.68	0.007910	6.01	69.05	57.77	0.83
RV Park	207	373.00	69.00	71.49		71.98	0.006987	5.67	68.42	55.01	0.79
RV Park	100	373.00	68.79	71.03	71.03	71.35	0.004347	4.84	105.81	206.53	0.63
RV Park	90	373.00	69.00	70.25	70.42	70.84	0.018412	7.21	79.53	211.44	1.20
RV Park	70	373.00	68.00	69.39	69.39	69.60	0.007690	4.56	122.48	254.32	0.77
RV Park	60	373.00	67.00	68.26	68.48	68.97	0.020450	7.60	69.86	165.87	1.24
RV Park	50	373.00	65.00	68.00	67.16	68.02	0.000409	1.04	357.20	334.00	0.18

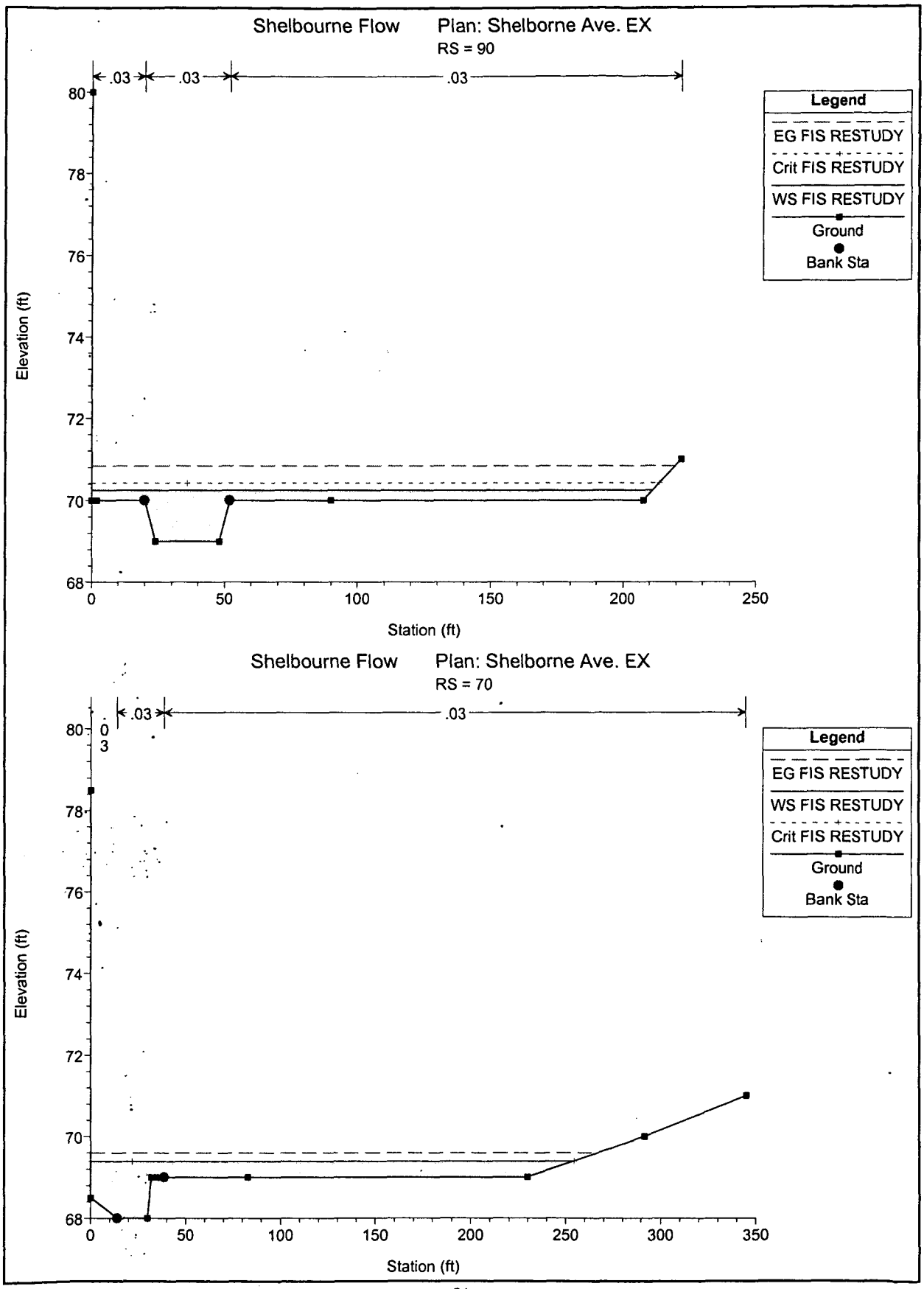

Shelbourne Flow Plan: Shelborne Ave. EX
RS = 796
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
88
86
84
82
80
78
76
0
20
40
60
80
100
120
140
160
180
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. EX
RS = 667
.03
.03
.03
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
0
50
100
150
200
Station (ft)

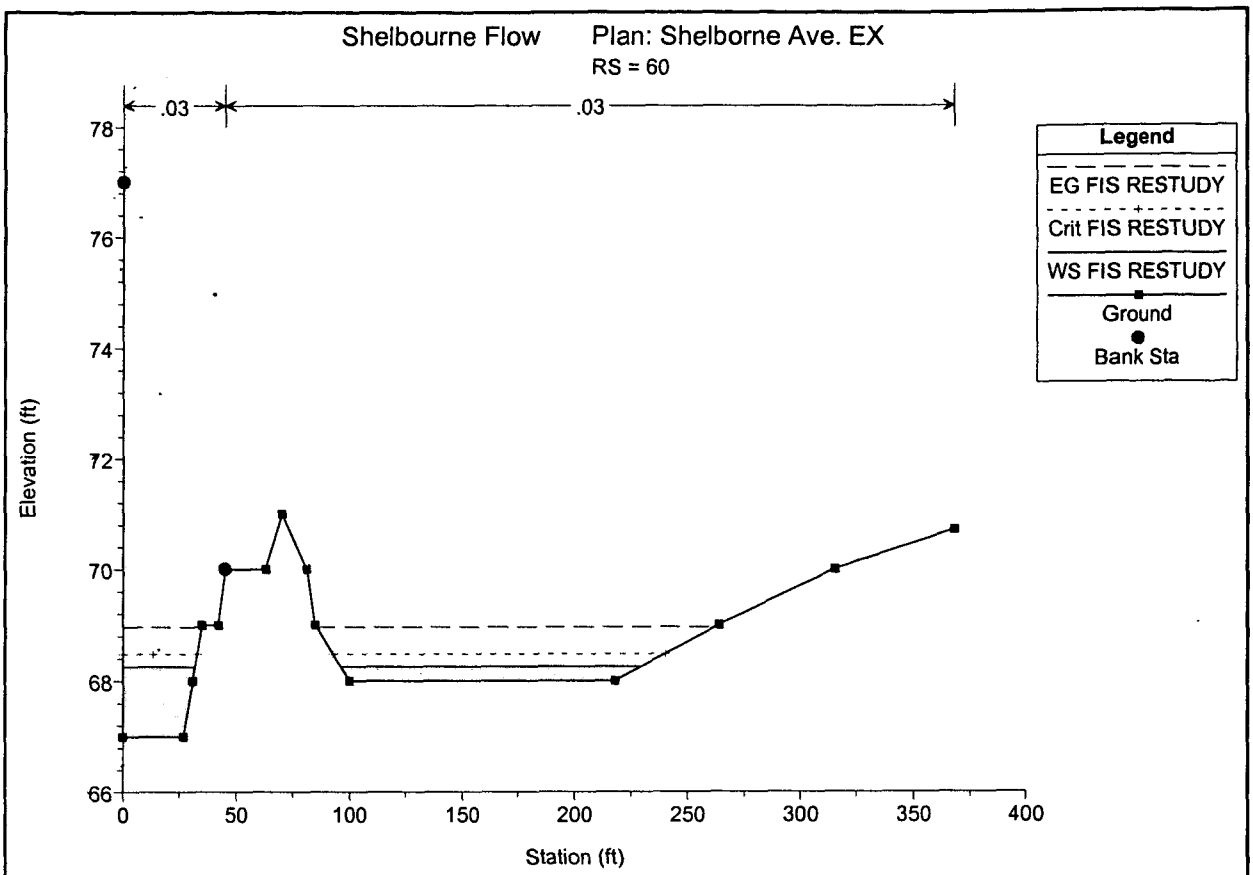

Shelbourne Flow Plan: Shelborne Ave. EX
RS = 567
.03
.03
.03
100
95
90
85
80
75
70
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Shelbourne Flow Plan: Shelborne Ave. EX
RS = 525
.03
.03
.03
79
78
77
76
75
74
73
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta

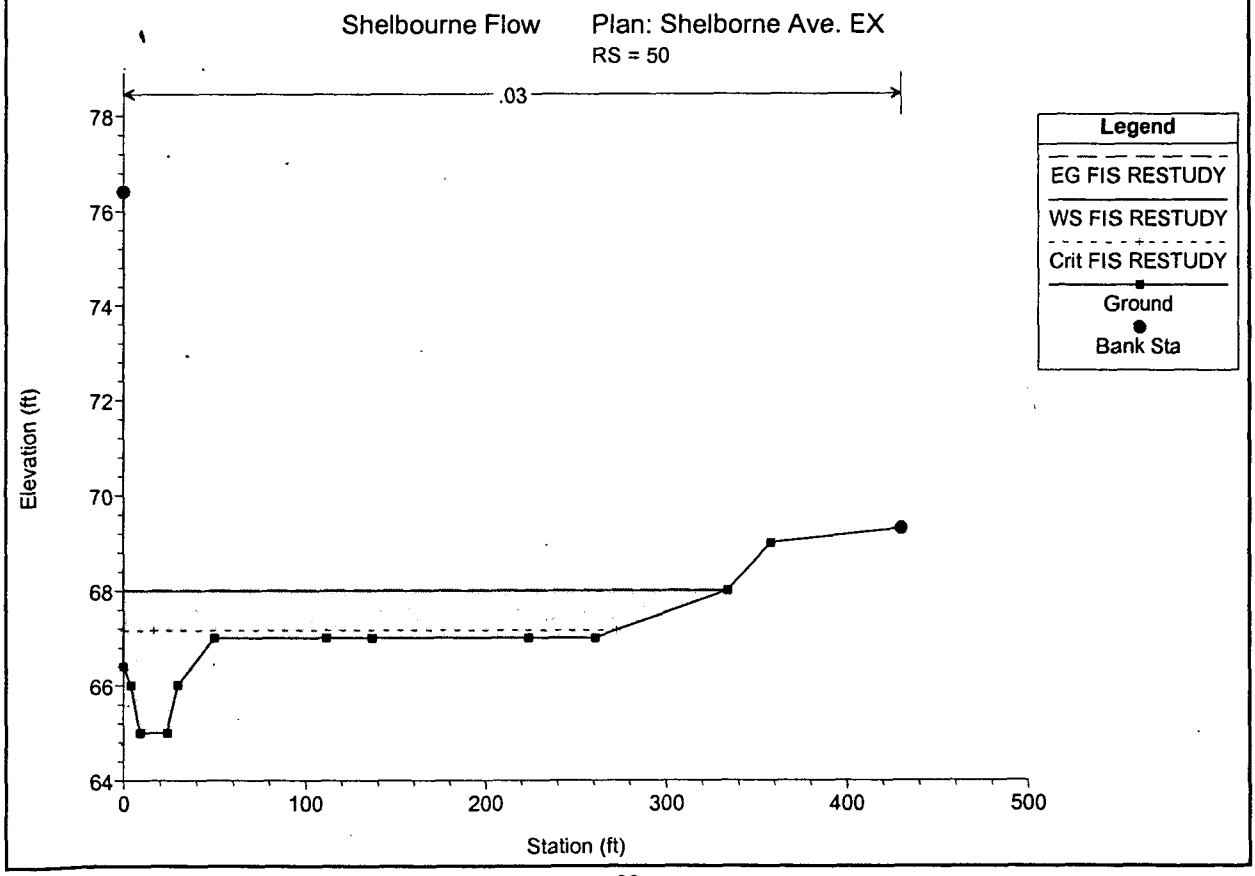

Shelbourne Flow Plan: Shelborne Ave. EX
RS = 514
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. EX
RS = 462
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)


Shelbourne Flow Plan: Shelborne Ave. EX
RS = 462
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. EX
RS = 412
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)


Shelbourne Flow Plan: Shelborne Ave. EX
RS = 376
.03
.03
.03
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
84
82
80
78
76
74
72
70
0
20
40
60
80
100
120
140
160
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. EX
RS = 299
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
95
90
85
80
75
70
0
20
40
60
80
100
120
140
160
Station (ft)


Shelbourne Flow
Plan: Shelborne Ave. EX
RS = 90
.03
.03
.03
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
80
78
76
74
72
70
68
0
50
100
150
200
250
Station (ft)
Shelbourne Flow
Plan: Shelborne Ave. EX
RS = 70
.03
.03
0
3
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
80
78
76
74
72
70
68
0
50
100
150
200
250
300
350
Station (ft)


Shelbourne Flow
Plan: Shelborne Ave. EX
RS = 60
.03
.03
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
78
76
74
72
70
68
66
0
50
100
150
200
250
300
350
400
Station (ft)


Shelbourne Flow
Plan: Shelborne Ave. EX
RS = 50
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
78
76
74
72
70
68
66
64
0
100
200
300
400
500
Station (ft)

HEC-RAS ANALYSIS FOR OVERTOPPING FLOWS THROUGH THE PARKING LOT ALONG SHELBORNE ALIGNMENT (PROPOSED CONDITION)

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park Profile: FIS RESTUDY

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV Park	796	373.00	77.00	78.97	78.97	79.49	0.010766	5.85	67.89	70.87	0.93
RV Park	667	373.00	75.00	76.92	77.05	77.77	0.015486	7.40	50.41	37.96	1.13
RV Park	567	373.00	73.00	76.42	75.24	76.62	0.001706	3.58	106.06	54.95	0.41
RV Park	525	373.00	73.00	76.43		76.55	0.000796	2.73	139.74	66.85	0.29
RV Park	514	373.00	71.60	76.31		76.53	0.001910	3.92	112.13	75.99	0.40
RV Park	494	47.00	75.16	76.44	76.20	76.45	0.000032	0.42	112.61	417.19	0.09
RV Park	456	47.00	76.08	76.36	76.36	76.43	0.007354	2.16	21.76	154.04	1.01
RV Park	420	47.00	75.24	75.54	75.67	75.89	0.019988	4.79	9.81	44.04	1.79
RV Park	376	47.00	73.29	73.42	73.66	74.89	0.170858	9.75	4.82	37.45	4.79
RV Park	299	47.00	72.50	72.94	72.94	73.05	0.006672	2.75	17.10	78.37	1.04
RV Park	207	47.00	71.70	72.05	72.09	72.21	0.012730	3.26	14.41	82.96	1.38
RV Park	100	47.00	70.50	70.84	70.87	70.97	0.010521	2.90	16.20	96.37	1.25
RV Park	90	47.00	70.00	70.30	70.32	70.40	0.008793	2.48	18.92	124.16	1.12
RV Park	70	47.00	67.01	68.00	67.33	68.00	0.000041	0.42	111.84	184.58	0.10
RV Park	60	47.00	66.70	68.00		68.00	0.000027	0.36	131.12	200.30	0.08
RV Park	50	47.00	64.38	68.00	65.25	68.00	0.000001	0.10	469.78	348.83	0.02

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Shelbourne Flow
Project File : Shelbourne.prj
Run Date and Time: 10/8/03 1:16:04 PM

Project in English units

PLAN DATA

Plan Title: Shelborne Ave. PR
Plan File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.p02

Geometry Title: Shelborne Ave. PR
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.g02

Flow Title : Shelborne Ave. PR
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.f02

Plan Summary Information:
Number of: Cross Sections = 16 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculaton tolerance = 0.003
Maximum number of interations = 20
Maximum difference tolerance = 0.1
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: Shelborne Ave. PR
Flow File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.f02

Flow Data (cfs)

River	Reach	RS	FIS RESTUDY
Shelborne Avenue	RV Park	796	373
Shelborne Avenue	RV Park	494	47

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Shelborne Avenue	RV Park	FIS RESTUDY	Normal S = .0103	Known WS = 68

GEOMETRY DATA

Geometry Title: Shelborne Ave. PR
Geometry File : g:\DRAINAGE\6923.2\Fema-CLOMR\HEC-RAS\Shelbourne.g02

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 796

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88	0	78.3	22	79	45	79	65	79
74	78	106	77	111	78	115	79	119	80
165	80								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	65	.03	119	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65	119	133	131	124	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	79.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	78.97	Reach Len. (ft)	133.00	131.00	124.00
Crit W.S. (ft)	78.97	Flow Area (sq ft)	7.15	60.74	
E.G. Slope (ft/ft)	0.010766	Area (sq ft)	7.15	60.74	
Q Total (cfs)	373.00	Flow (cfs)	17.44	355.56	
Top Width (ft)	70.87	Top Width (ft)	21.20	49.67	
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)	2.44	5.85	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)	0.34	1.22	
Conv. Total (cfs)	3594.9	Conv. (cfs)	168.1	3426.8	
Length Wtd. (ft)	131.05	Wetted Per. (ft)	21.89	49.96	
Min Ch El (ft)	77.00	Shear (lb/sq ft)	0.22	0.82	
Alpha	1.09	Stream Power (lb/ft s)	0.54	4.78	
Frctn Loss (ft)	1.48	Cum Volume (acre-ft)	0.02	1.44	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	2.32	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 667

INPUT
Description: .
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97	0	77.9	13.4	77	21.7	76	30.2	75
44.8	75	48.3	76	52.3	77	57.1	78	72.5	78
107.2	78	178.9	78.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	13.4	.03	57.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.4	57.1	107	101	87	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.77	Element			
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	76.92	Reach Len. (ft)	107.00	101.00	87.00
Crit W.S. (ft)	77.05	Flow Area (sq ft)		50.41	
E.G. Slope (ft/ft)	0.015486	Area (sq ft)		50.41	
Q Total (cfs)	373.00	Flow (cfs)		373.00	
Top Width (ft)	37.96	Top Width (ft)		37.96	
Vel Total (ft/s)	7.40	Avg. Vel. (ft/s)		7.40	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	2997.4	Conv. (cfs)		2997.4	
Length Wtd. (ft)	101.00	Wetted Per. (ft)		38.33	
Min Ch El (ft)	75.00	Shear (lb/sq ft)		1.27	
Alpha	1.00	Stream Power (lb/ft s)		9.41	
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	0.01	1.28	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	2.19	0.02

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: Shelborne Avenue
REACH: RV Park RS: 567

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	96	0	77.52	8.1	77	24.8	76	30.2	75
34.7	74	52.4	73	56.5	73	60.7	74	65	75
69.1	76	77.5	77	123.2	78	169.9	79	180	79.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.8	.03	69.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.8	69.1	43	43	63	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.62	Element			
Vel Head (ft)	0.20	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.42	Reach Len. (ft)	43.00	43.00	63.00
Crit W.S. (ft)	75.24	Flow Area (sq ft)	1.50	103.80	0.76
E.G. Slope (ft/ft)	0.001706	Area (sq ft)	1.50	103.80	0.76
Q Total (cfs)	373.00	Flow (cfs)	1.09	371.36	0.55
Top Width (ft)	54.95	Top Width (ft)	7.09	44.30	3.56
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)	0.73	3.58	0.72
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	0.21	2.34	0.21
Conv. Total (cfs)	9031.0	Conv. (cfs)	26.5	8991.2	13.3
Length Wtd. (ft)	43.05	Wetted Per. (ft)	7.10	44.88	3.59

Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.02	0.25	0.02
Alpha	1.03	Stream Power (lb/ft s)	0.02	0.88	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	1.10	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	2.10	0.02

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 525

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78	22.9	77.3	35.4	77	47	76.33	52.8	76
56.6	75	60.5	74	64.3	73	91.9	73	95.1	74
98.4	75	101.7	76	125.6	77	146.3	78	197.7	78.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	52.8	.03	101.7	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.8	101.7	17	10	18	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.55	Element			
Vel Head (ft)	0.12	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.43	Reach Len. (ft)	17.00	10.00	18.00
Crit W.S. (ft)		Flow Area (sq ft)	1.65	135.85	2.25
E.G. Slope (ft/ft)	0.000796	Area (sq ft)	1.65	135.85	2.25
Q Total (cfs)	373.00	Flow (cfs)	0.83	371.04	1.13
Top Width (ft)	66.85	Top Width (ft)	7.59	48.90	10.36
Vel Total (ft/s)	2.67	Avg. Vel. (ft/s)	0.50	2.73	0.50
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)	0.22	2.78	0.22
Conv. Total (cfs)	13217.5	Conv. (cfs)	29.5	13147.9	40.1
Length Wtd. (ft)	10.42	Wetted Per. (ft)	7.60	49.73	10.37
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.01	0.14	0.01
Alpha	1.04	Stream Power (lb/ft s)	0.01	0.37	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.98	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	2.05	0.01

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: Shelborne Avenue
REACH: RV Park RS: 514

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

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

74.77 102.75 21 21 21 .1 .3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.53	Element			
Vel Head (ft)	0.22	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.31	Reach Len. (ft)	21.00	21.00	21.00
Crit W.S. (ft)		Flow Area (sq ft)	15.66	85.04	11.43
E.G. Slope (ft/ft)	0.001910	Area (sq ft)	15.66	85.04	11.43
Q Total (cfs)	373.00	Flow (cfs)	22.45	333.02	17.53
Top Width (ft)	75.99	Top Width (ft)	28.90	27.98	19.11
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)	1.43	3.92	1.53
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	0.54	3.04	0.60
Conv. Total (cfs)	8534.3	Conv. (cfs)	513.7	7619.5	401.1
Length Wtd. (ft)	21.00	Wetted Per. (ft)	29.05	34.95	19.16
Min Ch El (ft)	71.60	Shear (lb/sq ft)	0.06	0.29	0.07
Alpha	1.26	Stream Power (lb/ft s)	0.09	1.14	0.11
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	0.95	0.00
C & E Loss (ft)	0.06	Cum SA (acres)	0.01	2.04	0.00

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 494

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77	75	76.68	160	76	190	76.16	220	75.16
231	75.58	340	76	363	75.8	485	76	568	77

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	568	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	568	45	38	38	.1 .3

Ineffective Flow num= 6

Sta L	Sta R	Elev	Permanent
888	T		
888	T		
888	T		
888	T		
888	T		
888	T		

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.45	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	76.44	Reach Len. (ft)	45.00	38.00	38.00
Crit W.S. (ft)	76.20	Flow Area (sq ft)		112.61	
E.G. Slope (ft/ft)	0.000032	Area (sq ft)		216.60	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	417.19	Top Width (ft)		417.19	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)		0.70	
Conv. Total (cfs)	8273.8	Conv. (cfs)		8273.8	
Length Wtd. (ft)	38.00	Wetted Per. (ft)		160.02	
Min Ch El (ft)	75.16	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.88	
C & E Loss (ft)	0.01	Cum SA (acres)		1.93	

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 parabolic search method failed to converge on critical depth. The program will try the

cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 456

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77	66	76.5	155	76.08	255	76.38	305	76.61
355	76.92								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	355	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	355	45	45	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.43	Element		0.016	
Vel Head (ft)	0.07	Wt. n-Val.			
W.S. Elev (ft)	76.36	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	76.36	Flow Area (sq ft)		21.76	
E.G. Slope (ft/ft)	0.007354	Area (sq ft)		21.76	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	154.04	Top Width (ft)		154.04	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	0.28	Hydr. Depth (ft)		0.14	
Conv. Total (cfs)	548.1	Conv. (cfs)		548.1	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		154.04	
Min Ch El (ft)	76.08	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.14	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		0.78	
C & E Loss (ft)	0.01	Cum SA (acres)		1.68	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 420

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.08	139.96	75.89	139.96	75.39	184	75.24	184	75.74
206	75.64	266	75.9	316	76.18	366	76.46	426	76.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	426	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	426	20	20	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	75.89	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.016	

W.S. Elev (ft)	75.54	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	75.67	Flow Area (sq ft)		9.81	
E.G. Slope (ft/ft)	0.019988	Area (sq ft)		9.81	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	44.04	Top Width (ft)		44.04	
Vel Total (ft/s)	4.79	Avg. Vel. (ft/s)		4.79	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.22	
Conv. Total (cfs)	332.4	Conv. (cfs)		332.4	
Length Wtd. (ft)	20.00	Wetted Per. (ft)		44.49	
Min Ch El (ft)	75.24	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.32	
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)		0.76	
C & E Loss (ft)	0.03	Cum SA (acres)		1.58	

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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 376

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.39	148.85	73.79	148.85	73.29	186.3	73.29	186.3	73.79
295.24	73.5	400	75						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	148.85	.016	186.3	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	400	77	71	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	74.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.42	Reach Len. (ft)	77.00	77.00	71.00
Crit W.S. (ft)	73.66	Flow Area (sq ft)		4.82	
E.G. Slope (ft/ft)	0.170858	Area (sq ft)		4.82	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	37.45	Top Width (ft)		37.45	
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)		9.75	
Max Chl Dpth (ft)	0.13	Hydr. Depth (ft)		0.13	
Conv. Total (cfs)	113.7	Conv. (cfs)		113.7	
Length Wtd. (ft)	77.00	Wetted Per. (ft)		37.71	
Min Ch El (ft)	73.29	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		13.30	
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)		0.76	
C & E Loss (ft)	0.11	Cum SA (acres)		1.56	

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: Shelborne Avenue
REACH: RV Park RS: 299

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.4	120	72.5	206.83		75	247.63	76.68	343.36	72.5
461	74.5									

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	461	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	461	91	93	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.05	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.94	Reach Len. (ft)	91.00	93.00	98.00
Crit W.S. (ft)	72.94	Flow Area (sq ft)		17.10	
E.G. Slope (ft/ft)	0.006672	Area (sq ft)		17.10	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	78.37	Top Width (ft)		78.37	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	0.44	Hydr. Depth (ft)		0.22	
Conv. Total (cfs)	575.4	Conv. (cfs)		575.4	
Length Wtd. (ft)	93.00	Wetted Per. (ft)		78.40	
Min Ch El (ft)	72.50	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)		0.74	
C & E Loss (ft)	0.41	Cum SA (acres)		1.46	

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 207

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.45	120	71.7	219.58	73.45	219.58	73.96	231.28	74.14
231.28	73.64	270	74.2	327.32	71.7	490	73.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	490	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	490	106	107	108	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.21	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.05	Reach Len. (ft)	106.00	107.00	108.00
Crit W.S. (ft)	72.09	Flow Area (sq ft)		14.41	
E.G. Slope (ft/ft)	0.012730	Area (sq ft)		14.41	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	82.96	Top Width (ft)		82.96	
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)		3.26	
Max Chl Dpth (ft)	0.35	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	416.6	Conv. (cfs)		416.6	
Length Wtd. (ft)	107.00	Wetted Per. (ft)		82.97	

Min Ch El (ft)	71.70	Shear (lb/sq ft)	0.14
Alpha	1.00	Stream Power (lb/ft s)	0.45
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.70
C & E Loss (ft)	0.00	Cum SA (acres)	1.29

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 100

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.19	160	70.5	297.76	71.67	297.76	72.17	303.71	72.26
303.71	71.76	339.73	72.3	339.73	72.8	345.72	72.89	345.72	72.39
395	70.5	520	72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	520	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	520	55	58	55	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.97	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.84	Reach Len. (ft)	55.00	58.00	55.00
Crit W.S. (ft)	70.87	Flow Area (sq ft)		16.20	
E.G. Slope (ft/ft)	0.010521	Area (sq ft)		16.20	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	96.37	Top Width (ft)		96.37	
Vel Total (ft/s)	2.90	Avg. Vel. (ft/s)		2.90	
Max Chl Dpth (ft)	0.34	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	458.2	Conv. (cfs)		458.2	
Length Wtd. (ft)	58.00	Wetted Per. (ft)		96.38	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.32	
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)		0.67	
C & E Loss (ft)	0.01	Cum SA (acres)		1.07	

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 90

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.9	160	70	291.55	70.64	291.55	71.14	303.54	72.17
303.54	71.67	339.43	71.35	339.43	71.85	345.43	71.95	345.43	71.45
400	70	520	71.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	520	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	520	120	115	120	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	70.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.30	Reach Len. (ft)	120.00	115.00	120.00
Crit W.S. (ft)	70.32	Flow Area (sq ft)		18.92	
E.G. Slope (ft/ft)	0.008793	Area (sq ft)		18.92	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	124.16	Top Width (ft)		124.16	
Vel Total (ft/s)	2.48	Avg. Vel. (ft/s)		2.48	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.15	
Conv. Total (cfs)	501.2	Conv. (cfs)		501.2	
Length Wtd. (ft)	115.00	Wetted Per. (ft)		124.16	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		0.64	
C & E Loss (ft)	0.01	Cum SA (acres)		0.92	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 70

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	13	70.6	20.81	70.61	20.81	71.11	26.92	70.97
26.92	70.67	45.53	70	68.34	69.16	68.34	69.66	73.41	69.46
73.41	68.96	115.87	68.17	115.87	68.67	119.9	68.54	119.9	68.04
163.4	67.49	163.4	67.99	166.39	67.99	166.39	67.49	210.93	67.01
210.93	67.51	212.88	67.51	212.88	67.01	258.46	67.12	258.46	67.62
259.37	67.62	259.37	67.12	304.93	67.82	304.93	68.32	316.93	68.46
316.93	67.96	352.93	68.49	352.93	68.99	358.92	69.09	358.92	68.59
383	69	493	70	583	71				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	583	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	583	45	45	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

E.G. Elev (ft)	68.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	68.00	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	67.33	Flow Area (sq ft)		111.84	
E.G. Slope (ft/ft)	0.000041	Area (sq ft)		111.84	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	184.58	Top Width (ft)		184.58	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.61	
Conv. Total (cfs)	7351.7	Conv. (cfs)		7351.7	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		187.82	
Min Ch El (ft)	67.01	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.47	
C & E Loss (ft)	0.00	Cum SA (acres)		0.51	

Warning: Divided flow computed for this cross-section.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 60

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	27	70	58	69.5	349.9	66.74	349.9	67.24
361.9	67.2	361.9	66.7	397.9	67.4	397.9	67.9	403.89	68.01
403.89	67.51	473	70	618	70.7				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	618	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	618	50	50	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.00	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	68.00	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		131.12	
E.G. Slope (ft/ft)	0.000027	Area (sq ft)		131.12	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	200.30	Top Width (ft)		200.30	
Vel Total (ft/s)	0.36	Avg. Vel. (ft/s)		0.36	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		0.65	
Conv. Total (cfs)	9119.2	Conv. (cfs)		9119.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		202.32	
Min Ch El (ft)	66.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.34	
C & E Loss (ft)	0.00	Cum SA (acres)		0.32	

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 50

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	37	69	70	68.5	305.33	65.5	307.87	64.38
408.38	67.7	408.38	67.2	480.41	68.36	480.41	68.86	597.68	70

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	597.68	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	597.68	0	0	.1	.3

CROSS SECTION OUTPUT Profile #FIS RESTUDY

			Left OB	Channel	Right OB
E.G. Elev (ft)	68.00	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.020	
W.S. Elev (ft)	68.00	Reach Len. (ft)			
Crit W.S. (ft)	65.25	Flow Area (sq ft)		469.78	
E.G. Slope (ft/ft)	0.000001	Area (sq ft)		469.78	
Q Total (cfs)	47.00	Flow (cfs)		47.00	
Top Width (ft)	348.83	Top Width (ft)		348.83	
Vel Total (ft/s)	0.10	Avg. Vel. (ft/s)		0.10	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	42497.8	Conv. (cfs)		42497.8	
Length Wtd. (ft)		Wetted Per. (ft)		349.65	

Min Ch El (ft)	64.38	Shear (lb/sq ft)	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

SUMMARY OF MANNING'S N VALUES

River:Shelborne Avenue

Reach	River Sta.	n1	n2	n3
RV Park	796	.03	.03	.03
RV Park	667	.03	.03	.03
RV Park	567	.03	.03	.03
RV Park	525	.03	.03	.03
RV Park	514	.03	.03	.03
RV Park	494	.016	.016	.016
RV Park	456	.016	.016	.016
RV Park	420	.016	.016	.016
RV Park	376	.025	.016	.025
RV Park	299	.016	.016	.016
RV Park	207	.016	.016	.016
RV Park	100	.016	.016	.016
RV Park	90	.016	.016	.016
RV Park	70	.016	.016	.016
RV Park	60	.016	.016	.016
RV Park	50	.02	.02	.02

SUMMARY OF REACH LENGTHS

River: Shelborne Avenue

Reach	River Sta.	Left	Channel	Right
RV Park	796	133	131	124
RV Park	667	107	101	87
RV Park	567	43	43	63
RV Park	525	17	10	18
RV Park	514	21	21	21
RV Park	494	45	38	38
RV Park	456	45	45	45
RV Park	420	20	20	20
RV Park	376	77	77	71
RV Park	299	91	93	98
RV Park	207	106	107	108
RV Park	100	55	58	55
RV Park	90	120	115	120
RV Park	70	45	45	45
RV Park	60	50	50	50
RV Park	50	0	0	0

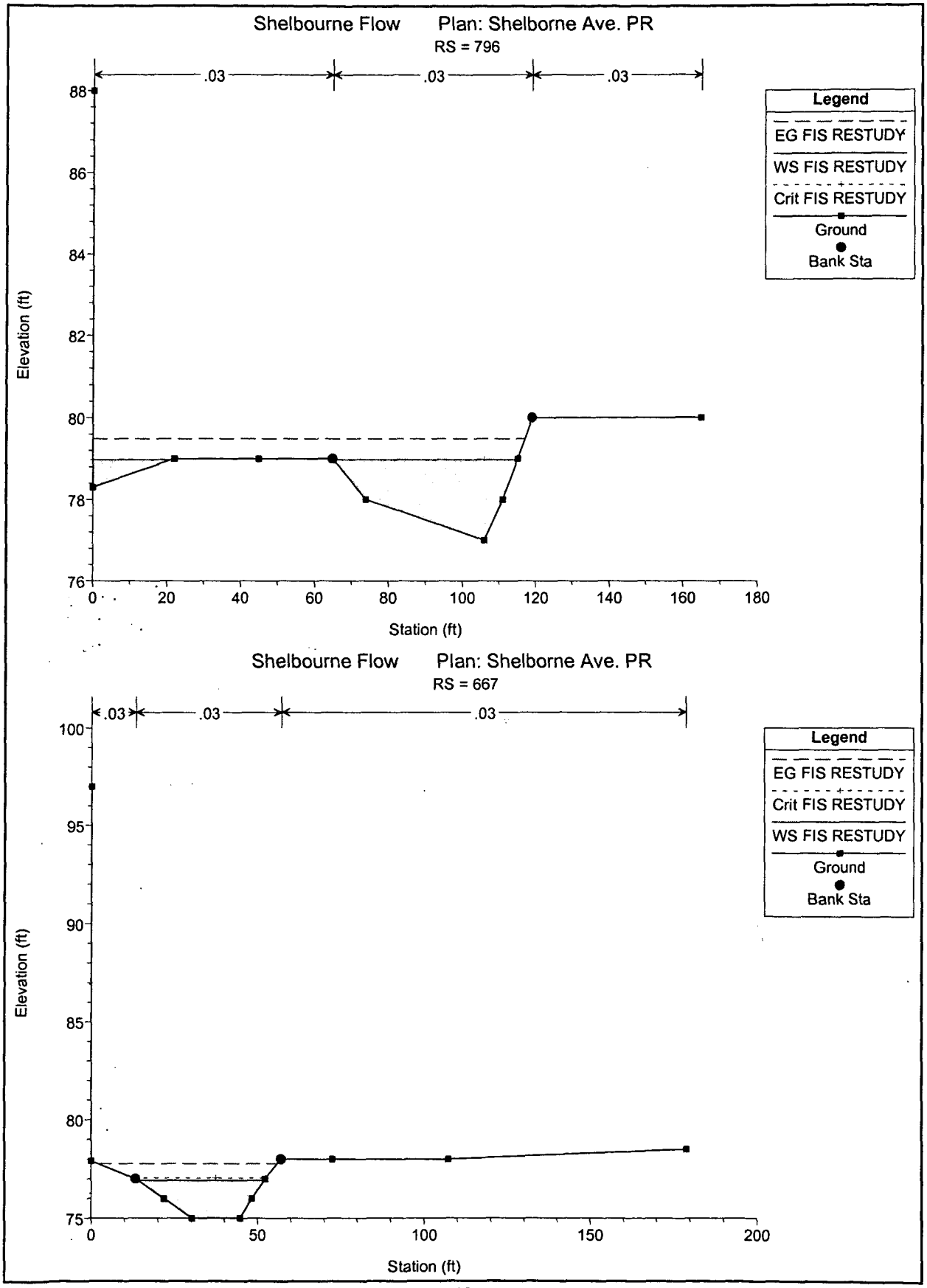
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Shelborne Avenue

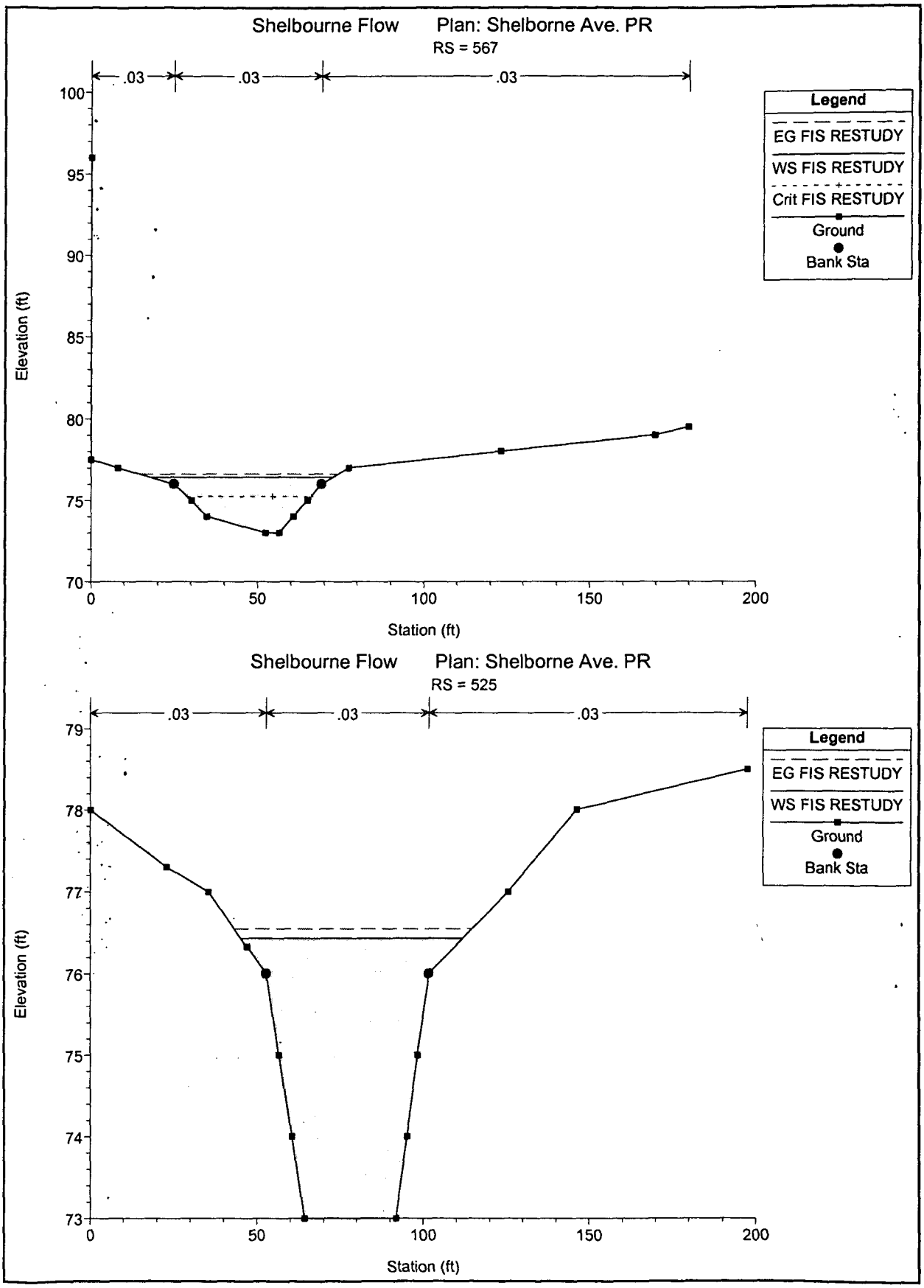
Reach	River Sta.	Contr.	Expan.
RV Park	796	.1	.3
RV Park	667	.1	.3

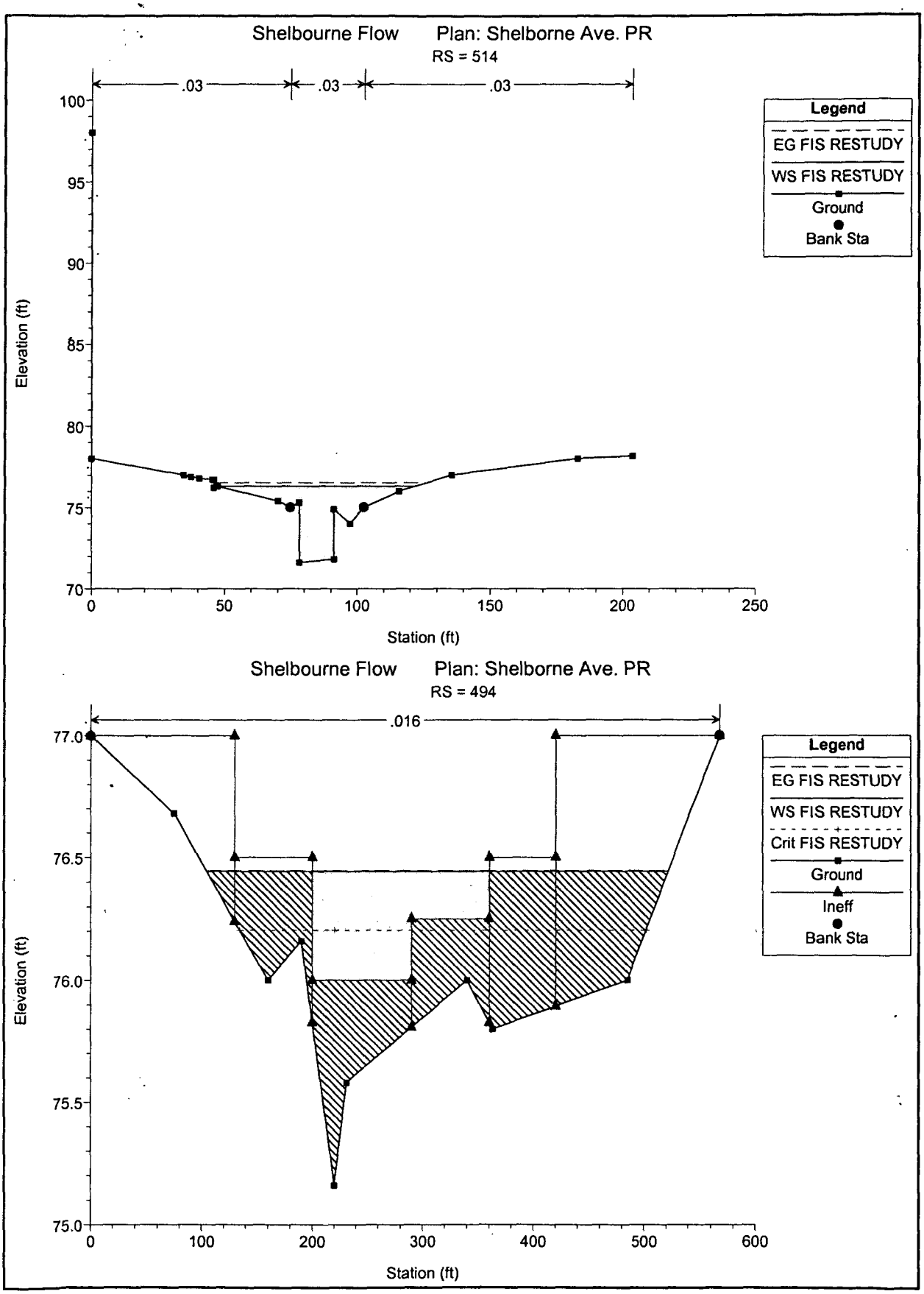
RV Park	567	.1	.3
RV Park	525	.1	.3
RV Park	514	.1	.3
RV Park	494	.1	.3
RV Park	456	.1	.3
RV Park	420	.1	.3
RV Park	376	.1	.3
RV Park	299	.1	.3
RV Park	207	.1	.3
RV Park	100	.1	.3
RV Park	90	.1	.3
RV Park	70	.1	.3
RV Park	60	.1	.3
RV Park	50	.1	.3

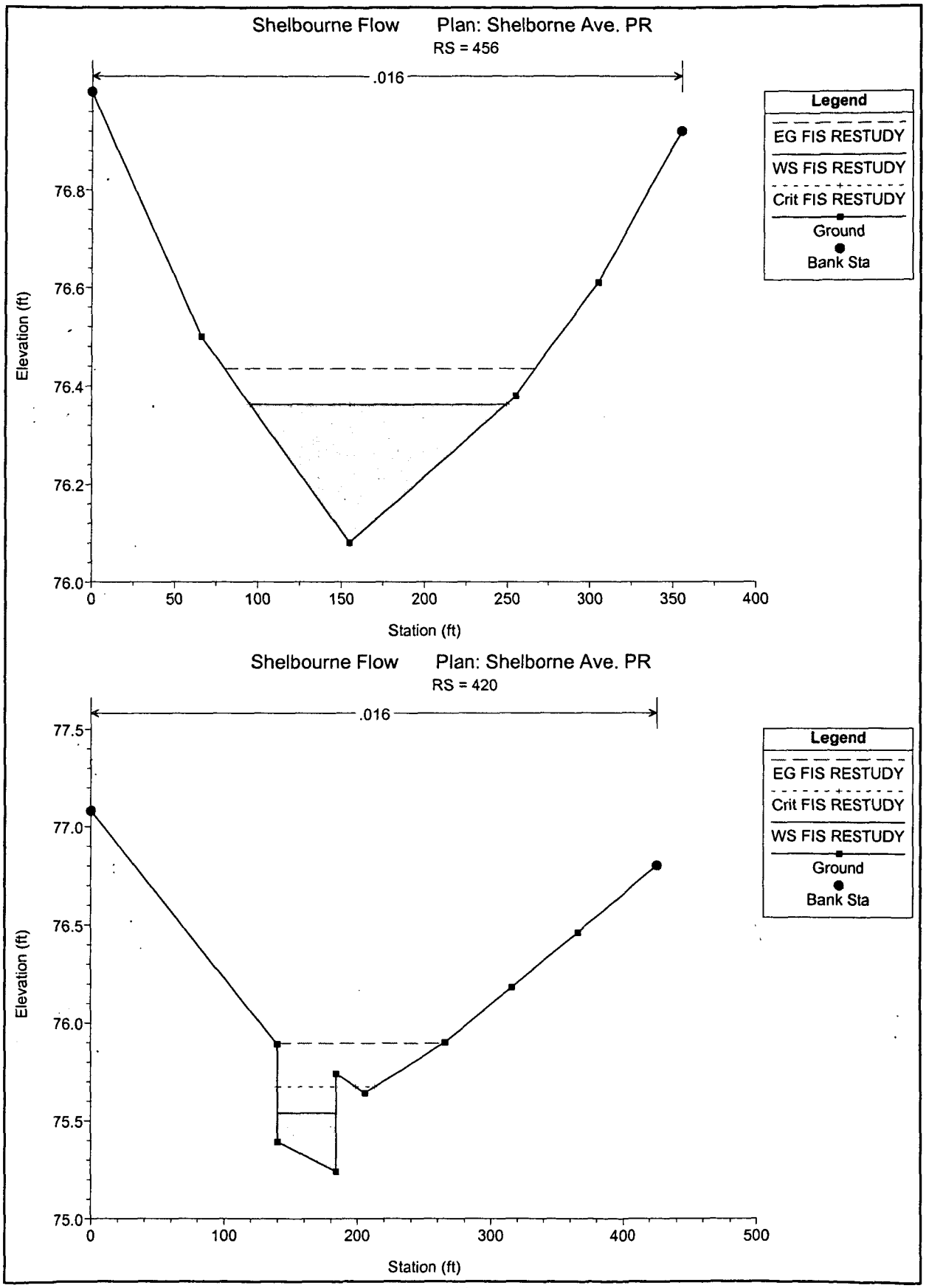
Profile Output Table - Standard Table 1

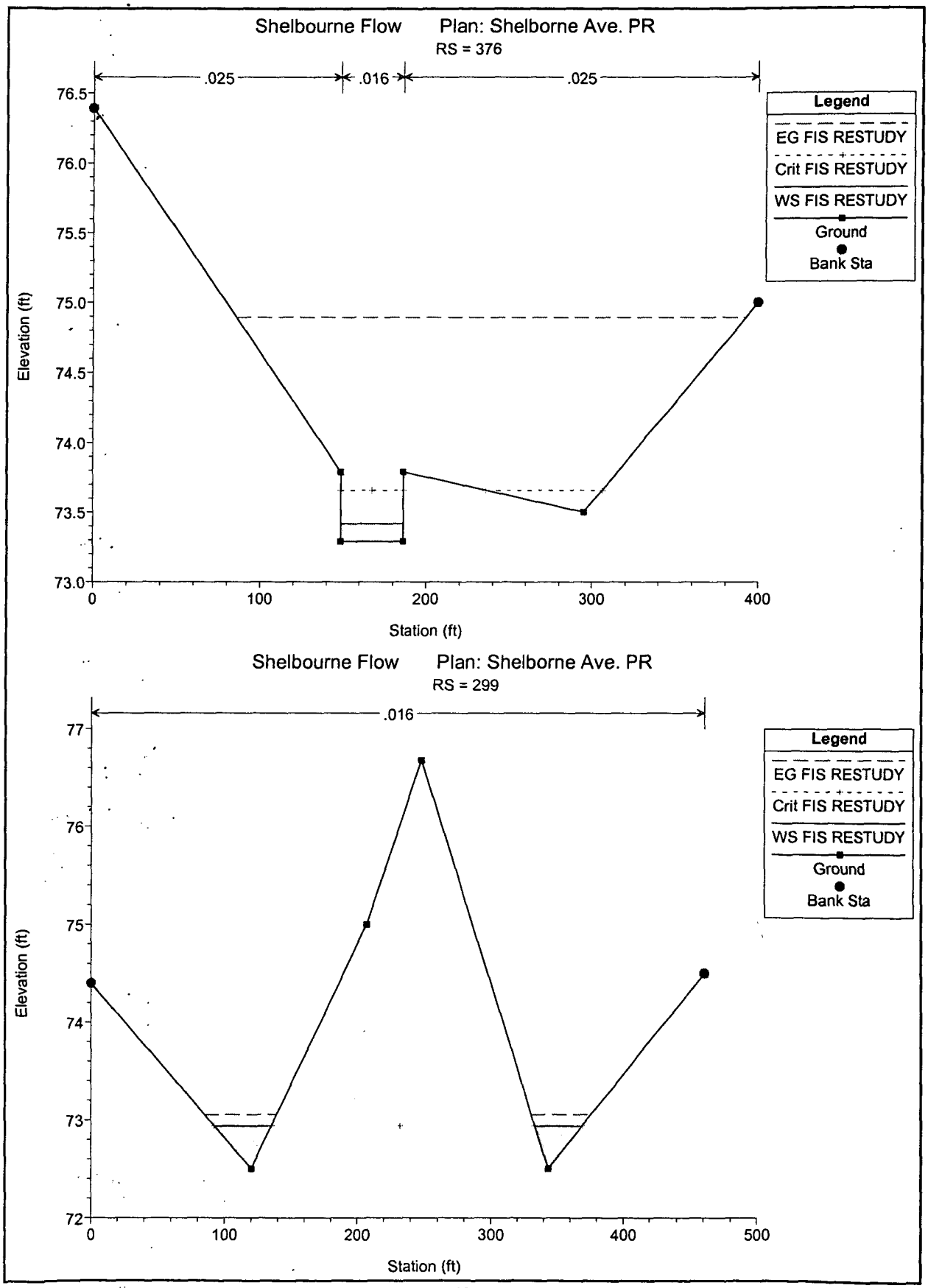
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
RV Park	796	373.00	77.00	78.97	78.97	79.49	0.010766	5.85	67.89	70.87	0.93
RV Park	667	373.00	75.00	76.92	77.05	77.77	0.015486	7.40	50.41	37.96	1.13
RV Park	567	373.00	73.00	76.42	75.24	76.62	0.001706	3.58	106.06	54.95	0.41
RV Park	525	373.00	73.00	76.43		76.55	0.000796	2.73	139.74	66.85	0.29
RV Park	514	373.00	71.60	76.31		76.53	0.001910	3.92	112.13	75.99	0.40
RV Park	494	47.00	75.16	76.44	76.20	76.45	0.000032	0.42	112.61	417.19	0.09
RV Park	456	47.00	76.08	76.36	76.36	76.43	0.007354	2.16	21.76	154.04	1.01
RV Park	420	47.00	75.24	75.54	75.67	75.89	0.019988	4.79	9.81	44.04	1.79
RV Park	376	47.00	73.29	73.42	73.66	74.89	0.170858	9.75	4.82	37.45	4.79
RV Park	299	47.00	72.50	72.94	72.94	73.05	0.006672	2.75	17.10	78.37	1.04
RV Park	207	47.00	71.70	72.05	72.09	72.21	0.012730	3.26	14.41	82.96	1.38
RV Park	100	47.00	70.50	70.84	70.87	70.97	0.010521	2.90	16.20	96.37	1.25
RV Park	90	47.00	70.00	70.30	70.32	70.40	0.008793	2.48	18.92	124.16	1.12
RV Park	70	47.00	67.01	68.00	67.33	68.00	0.000041	0.42	111.84	184.58	0.10
RV Park	60	47.00	66.70	68.00		68.00	0.000027	0.36	131.12	200.30	0.08
RV Park	50	47.00	64.38	68.00	65.25	68.00	0.000001	0.10	469.78	348.83	0.02

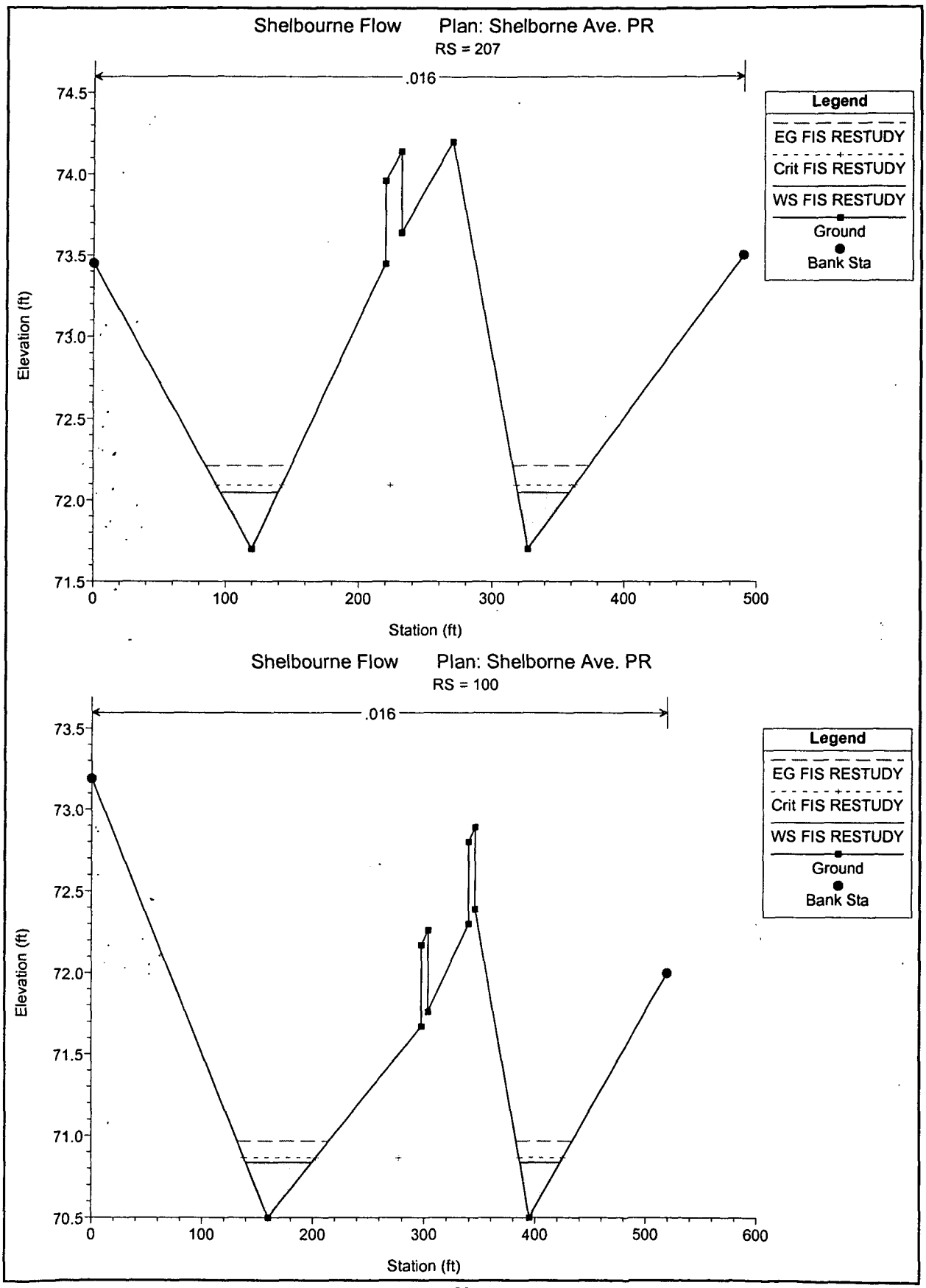

Shelbourne Flow Plan: Shelborne Ave. PR
RS = 796
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
88
86
84
82
80
78
76
0
20
40
60
80
100
120
140
160
180
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 667
.03
.03
.03
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
0
50
100
150
200
Station (ft)

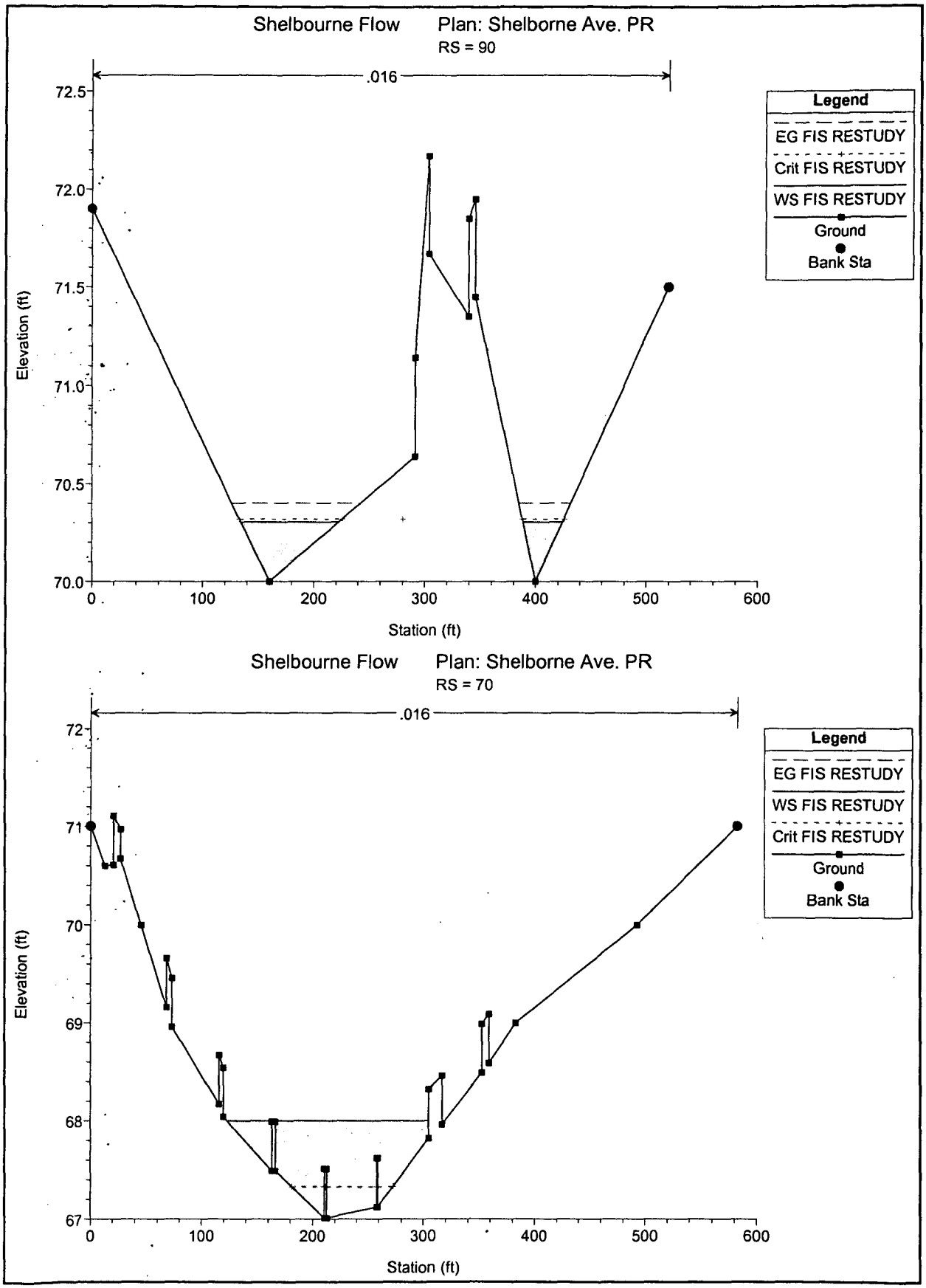

Shelbourne Flow Plan: Shelborne Ave. PR
RS = 567
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 525
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)

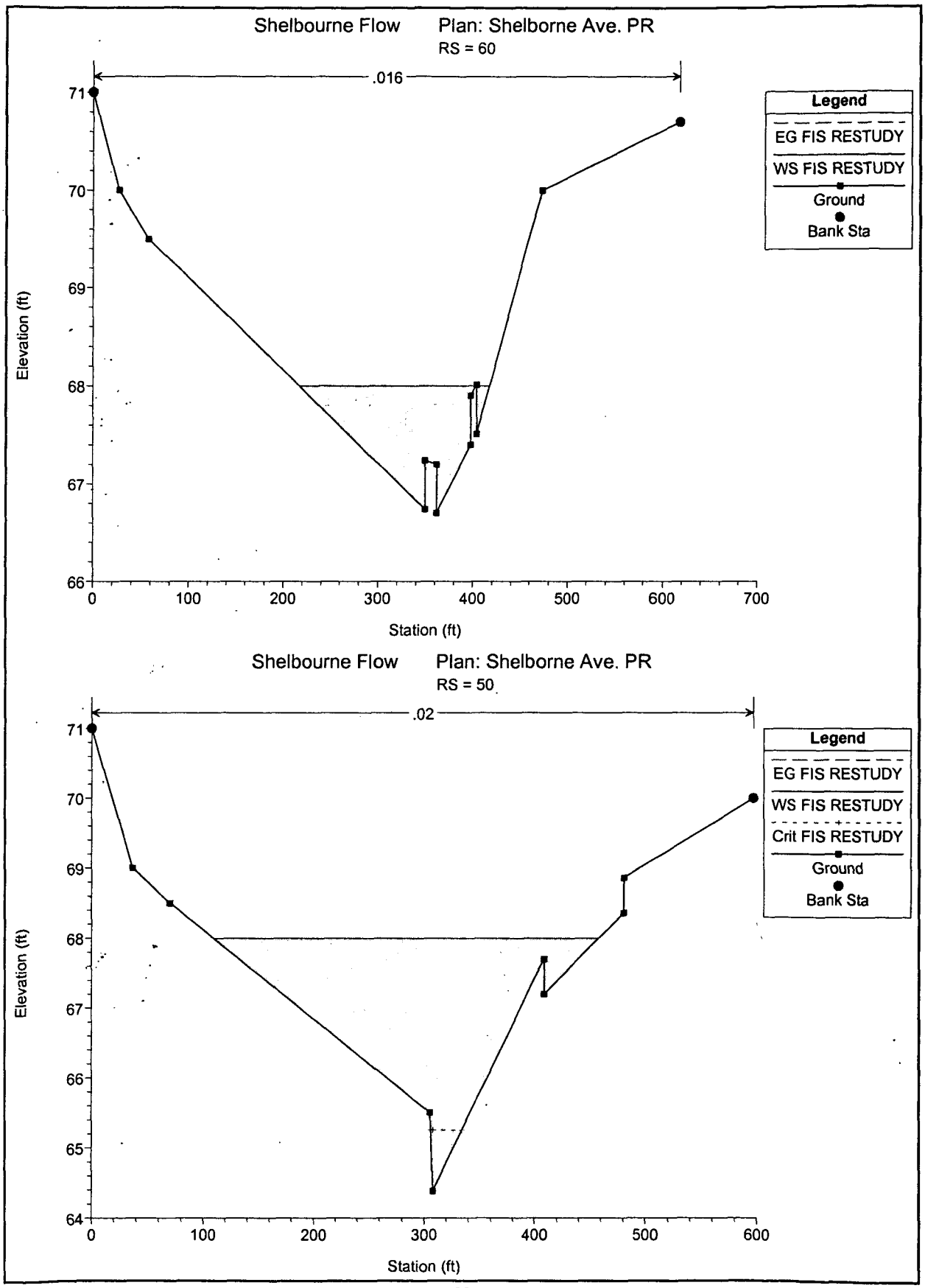

Shelbourne Flow Plan: Shelborne Ave. PR
RS = 514
.03
.03
.03
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 494
.016
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Shelbourne Flow Plan: Shelborne Ave. PR
RS = 456
.016
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
76.8
76.6
76.4
76.2
76.0
0
50
100
150
200
250
300
350
400
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 420
.016
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
77.5
77.0
76.5
76.0
75.5
75.0
0
100
200
300
400
500
Station (ft)


Shelbourne Flow Plan: Shelborne Ave. PR
RS = 376
.025
.016
.025
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
76.5
76.0
75.5
75.0
74.5
74.0
73.5
73.0
0
100
200
300
400
Station (ft)
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 299
.016
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
77
76
75
74
73
72
0
100
200
300
400
500
Station (ft)


Shelbourne Flow Plan: Shelborne Ave. PR
RS = 207
.016
74.5
74.0
73.5
73.0
72.5
72.0
71.5
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 100
.016
73.5
73.0
72.5
72.0
71.5
71.0
70.5
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta


Shelbourne Flow Plan: Shelborne Ave. PR
RS = 90
.016
72.5
72.0
71.5
71.0
70.5
70.0
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG FIS RESTUDY
Crit FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Shelbourne Flow Plan: Shelborne Ave. PR
RS = 70
.016
72
71
70
69
68
67
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta


Shelbourne Flow
Plan: Shelborne Ave. PR
RS = 60
.016
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
71
70
69
68
67
66
0
100
200
300
400
500
600
700
Station (ft)
Shelbourne Flow
Plan: Shelborne Ave. PR
RS = 50
.02
Legend
EG FIS RESTUDY
WS FIS RESTUDY
Crit FIS RESTUDY
Ground
Bank Sta
Elevation (ft)
71
70
69
68
67
66
65
64
0
100
200
300
400
500
600
Station (ft)

HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN
WSPG MODEL FOR LINE A
(PROPOSED CONDITION)

```
T1 SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
T2 PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
T3 EXISTING CONDITIN ( Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)
SO      0.00   63.50   1                                    68.00
R     116.94   63.79   1        .013
      173.68   63.93   1        .013                                        36.00
      185.16   63.98   1        .013
JX    213.16   63.99   2   3  3.013    163.0    163.0   64.00   64.00 40.00 40.00
      246.41   64.12   2        .013
X     247.91   64.12   2   4              5.0             66.12           59.00
R     422.42   64.56   2        .013
JX    424.42   64.56   2   5              5.0             66.33           90.00
      439.32   64.60   2        .013
X     440.82   64.60   2   4              4.0             66.63           55.00
R     601.07   65.00   2        .013                                                1
      698.15   65.25   2        .013                                        60.00
      738.96   65.35   2        .013
JX    740.96   65.35   2   5              7.0             67.15           53.00
R     878.03   65.69   2        .013                                                1
      936.91   65.84   2        .013                                        36.00
     1054.78   66.14   2        .013
JX   1060.78   66.15   6        .013
R    1090.13   66.23   6        .013
     1129.90   66.33   6        .013                                        25.00
     1148.18   66.37   6        .013
SH   1148.18   66.37   6
CD   1   3                 6.00    12.00
CD   2   3                 5.50     8.00
CD   3   3                 3.00     7.00
CD   4   4                 1.50
CD   5   4                 2.00
CD   6   3                 3.00     7.00
```

DATE: 10/ 8/2003
TIME: 12: 1

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	2	3	0	0.00	5.50	8.00	0.00	0.00	0.00										
CD	3	3	0	0.00	3.00	7.00	0.00	0.00	0.00										
CD	4	4			1.50														
CD	5	4			2.00														
CD	6	3	0	0.00	3.00	7.00	0.00	0.00	0.00										

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

HEADING LINE NO 2 IS -

PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)

HEADING LINE NO 3 IS -

EXISTING CONDITIN (Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	63.50	1	68.00

ELEMENT NO 2 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	116.94	63.79	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	173.68	63.93	1	0.013	0.00	36.00	0.00	0

ELEMENT NO 4 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	185.16	63.98	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	213.16	63.99	2	3	3	0.013	163.0	163.0	64.00	64.00	40.00	40.00

ELEMENT NO 6 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	246.41	64.12	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	247.91	64.12	2	4	0	0.014	5.0	0.0	66.12	0.00	59.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 8 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	422.42	64.56	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	424.42	64.56	2	5	0	0.014	5.0	0.0	66.33	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 10 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	439.32	64.60	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 11 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	440.82	64.60	2	4	0	0.014	4.0	0.0	66.63	0.00	55.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 12 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	601.07	65.00	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 13 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	698.15	65.25	2	0.013	0.00	60.00	0.00	0

ELEMENT NO 14 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	738.96	65.35	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 15 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	740.96	65.35	2	5	0	0.014	7.0	0.0	67.15	0.00	53.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 16 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	878.03	65.69	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 17 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	936.91	65.84	2	0.013	0.00	36.00	0.00	0

ELEMENT NO 18 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1054.78	66.14	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 19 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1060.78	66.15	6	0	0	0.013	0.0	0.0	0.00	0.00	0.00	0.00

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 20 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1090.13	66.23	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 21 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1129.90	66.33	6	0.013	0.00	25.00	0.00	0

ELEMENT NO 22 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1148.18	66.37	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 23 IS A SYSTEM HEADWORKS

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1148.18	66.37	6	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
EXISTING CONDITIN (Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	63.50	4.500	68.000	374.0	6.93	0.745	68.745	0.00	3.114		6.00	12.00	0.00	0	0.00
98.90	0.00248					.001115	0.11			3.306			0.00		
98.90	63.74	4.291	68.036	374.0	7.26	0.819	68.855	0.00	3.114		6.00	12.00	0.00	0	0.00
18.04	0.00248					.001203	0.02			3.306			0.00		
116.94	63.79	4.253	68.043	374.0	7.33	0.834	68.877	0.00	3.114		6.00	12.00	0.00	0	0.00
56.74	0.00247					.001266	0.07			3.312			0.00		
173.68	63.93	4.138	68.068	374.0	7.53	0.881	68.949	0.00	3.114		6.00	12.00	0.00	0	0.00
11.48	0.00436					.001343	0.02			2.720			0.00		
185.16	63.98	4.077	68.057	374.0	7.64	0.907	68.964	0.00	3.114		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00036					.000705	0.02						0.00		
213.16	63.99	4.972	68.962	48.0	1.21	0.023	68.985	0.00	1.038		5.50	8.00	0.00	0	0.00
33.25	0.00391					.000040	0.00			0.983			0.00		
246.41	64.12	4.843	68.963	48.0	1.24	0.024	68.987	0.00	1.038		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000043	0.00						0.00		
247.91	64.12	4.846	68.966	43.0	1.11	0.019	68.985	0.00	0.965		5.50	8.00	0.00	0	0.00
89.96	0.00252					.000035	0.00			1.056			0.00		
337.87	64.35	4.621	68.968	43.0	1.16	0.021	68.989	0.00	0.965		5.50	8.00	0.00	0	0.00
84.55	0.00252					.000039	0.00			1.056			0.00		
422.42	64.56	4.409	68.969	43.0	1.22	0.023	68.992	0.00	0.965		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000044	0.00						0.00		
424.42	64.56	4.419	68.979	38.0	1.07	0.018	68.997	0.00	0.888		5.50	8.00	0.00	0	0.00
14.90	0.00268					.000034	0.00			0.954			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
EXISTING CONDITIN (Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)

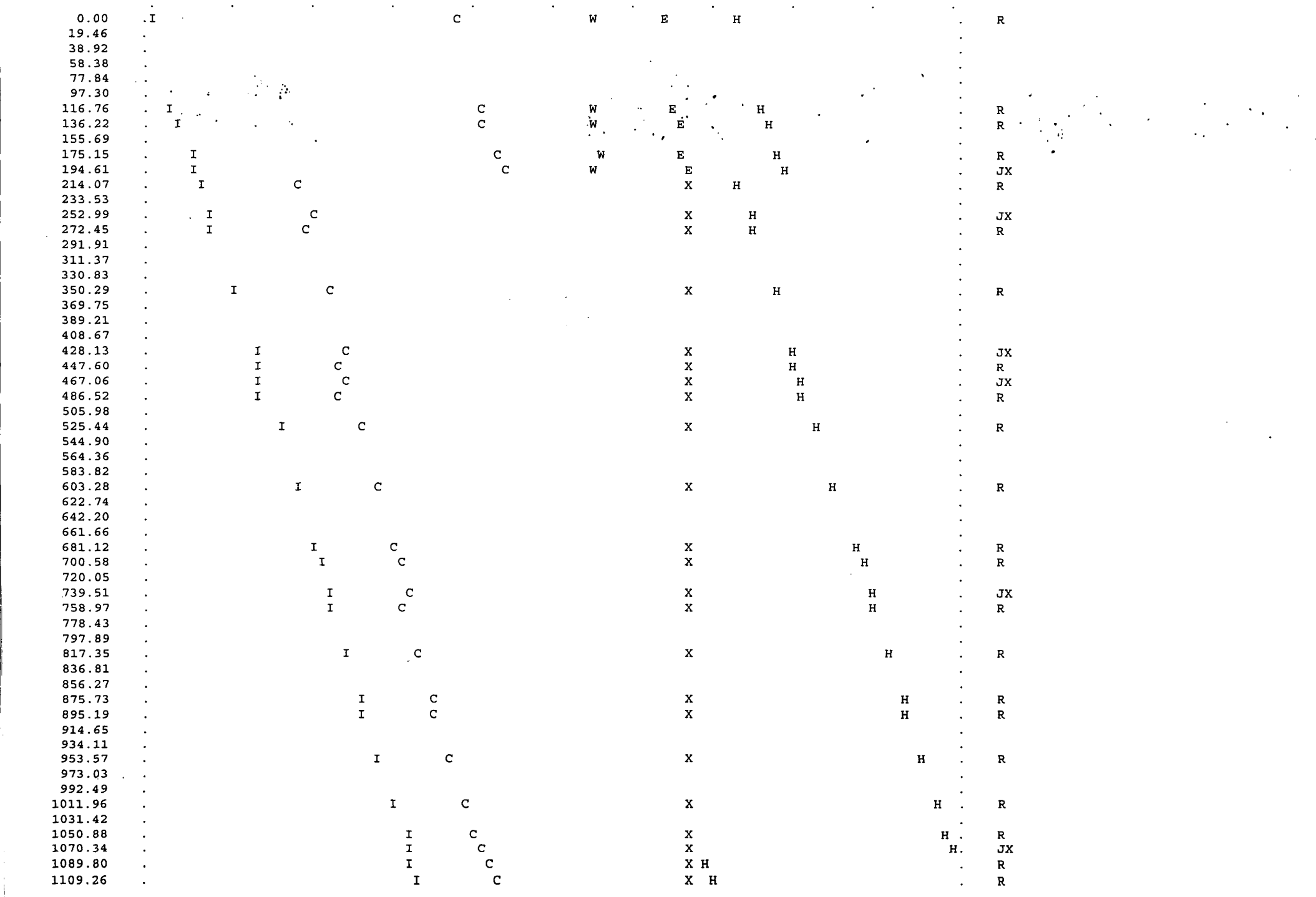
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
439.32	64.60	4.379	68.979	38.0	1.08	0.018	68.997	0.00	0.888		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000035	0.00						0.00		
440.82	64.60	4.382	68.982	34.0	0.97	0.015	68.997	0.00	0.825		5.50	8.00	0.00	0	0.00
82.06	0.00250					.000029	0.00			0.909			0.00		
522.88	64.81	4.178	68.983	34.0	1.02	0.016	68.999	0.00	0.825		5.50	8.00	0.00	0	0.00
78.19	0.00250					.000033	0.00			0.909			0.00		
601.07	65.00	3.984	68.984	34.0	1.07	0.018	69.002	0.00	0.825		5.50	8.00	0.00	0	0.00
72.35	0.00258					.000037	0.00			0.900			0.00		
673.42	65.19	3.798	68.984	34.0	1.12	0.019	69.003	0.00	0.825		5.50	8.00	0.00	0	0.00
24.73	0.00258					.000040	0.00			0.900			0.00		
698.15	65.25	3.735	68.985	34.0	1.14	0.020	69.005	0.00	0.825		5.50	8.00	0.00	0	0.00
40.81	0.00245					.000043	0.00			0.914			0.00		
738.96	65.35	3.636	68.986	34.0	1.17	0.021	69.007	0.00	0.825		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000041	0.00						0.00		
740.96	65.35	3.641	68.991	27.0	0.93	0.013	69.004	0.00	0.707		5.50	8.00	0.00	0	0.00
68.60	0.00248					.000030	0.00			0.785			0.00		
809.56	65.52	3.471	68.991	27.0	0.97	0.015	69.006	0.00	0.707		5.50	8.00	0.00	0	0.00
65.45	0.00248					.000034	0.00			0.785			0.00		
875.01	65.68	3.310	68.992	27.0	1.02	0.016	69.008	0.00	0.707		5.50	8.00	0.00	0	0.00
3.02	0.00248					.000036	0.00			0.785			0.00		
878.03	65.69	3.302	68.992	27.0	1.02	0.016	69.008	0.00	0.707		5.50	8.00	0.00	0	0.00
58.88	0.00255					.000039	0.00			0.778			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
EXISTING CONDITIN (Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
936.91	65.84	3.153	68.993	27.0	1.07	0.018	69.011	0.00	0.707		5.50	8.00	0.00	0	0.00
57.96	0.00254					.000044	0.00			0.779			0.00		
994.87	65.99	3.007	68.995	27.0	1.12	0.020	69.015	0.00	0.707		5.50	8.00	0.00	0	0.00
55.30	0.00254					.000050	0.00			0.779			0.00		
1050.17	66.13	2.867	68.995	27.0	1.18	0.022	69.017	0.00	0.707		5.50	8.00	0.00	0	0.00
4.61	0.00254					.000054	0.00			0.779			0.00		
1054.78	66.14	2.855	68.995	27.0	1.18	0.022	69.017	0.00	0.707		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00167					.000066	0.00						0.00		
1060.78	66.15	2.839	68.989	27.0	1.36	0.029	69.018	0.00	0.773		3.00	7.00	0.00	0	0.00
29.35	0.00273					.000081	0.00			0.839			0.00		
1090.13	66.23	2.759	68.989	27.0	1.40	0.030	69.019	0.00	0.773		3.00	7.00	0.00	0	0.00
39.77	0.00251					.000088	0.00			0.861			0.00		
1129.90	66.33	2.661	68.991	27.0	1.45	0.033	69.024	0.00	0.773		3.00	7.00	0.00	0	0.00
18.28	0.00219					.000095	0.00			0.901			0.00		
1148.18	66.37	2.621	68.991	27.0	1.47	0.034	69.025	0.00	0.773		3.00	7.00	0.00	0	0.00

[redacted] RTON [redacted] ANSI [redacted] ASE [redacted] BASS [redacted] SHO [redacted]
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
EXISTING CONDITIN (Q BOX = 27 CFS OUT OF 391CFS OF THE FIS RESTUDY)



[redacted]8.72[redacted]

1148.18 . I C X H . R

63.50 64.31 65.13 65.94 66.76 67.57 68.38 69.20 70.01 70.83 71.64

N O T E S

1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION.
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

HEC-1 MODEL FOR THE ONSITE BASINS DRAINING INTO THE PROPOSED ONSITE STORM DRAIN LINE A

DEVELOPMENT: SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS
CALCULATED BY: HMN
PROJECT NUMBER: 6923.2

DATE: OCTOBER 2003

SUB-BASIN DATA				INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)				tc CHECK (URBANIZED BASINS)		FINAL tc	REMARKS			
DESIGN (1)	K (2)	AREA Ac (3)	AREA Square Miles (4)	LENGTH Ft (5)	SLOPE % (6)	ti Min (7)	LENGTH Ft (8)	SLOPE % (9)	VELOCITY FPS (10)	tt Min (11)	TOTAL LENGTH Ft (12)	tc =(L/180)+10 Min (13)	Min (14)	CN (15)	tL Hrs (16)	Urbanized?	Soil Type
DI-1	0.9036	0.83	0.001299	70	2.0	2.3	150	0.5	1.5	1.6	220	11.2	4.0	98.0	0.050	YES	B
DI-2	0.9036	1.06	0.001656	120	2.0	3.1	140	2.0	2.5	0.9	260	11.4	4.0	98.0	0.050	YES	B
DI-3	0.9036	2.39	0.003729	100	2.0	2.8	300	2.0	2.7	1.8	400	12.2	4.6	98.0	0.050	YES	B
DI-4	0.9036	1.32	0.002055	100	2.0	2.8	300	2.0	2.4	2.1	400	12.2	4.9	98.0	0.050	YES	B

ti = 1.8 (1.1 - K) L^(0.5) / S^(1/3)

K = 0.0132 CN - 0.39

tt = L / (60 V)

tc = ti + tt

tL= tLAG = 0.6 tc

LOCATION: Onsite and Offsite

HYDROLOGIC CONDITION: Developed Onsite

TRIAL: Final Iteration

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-1**
Total Area: 0.83 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	0.83	B	100%	98	98.0
Total:	0.83	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-2**
Total Area: 1.06 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.06	B	100%	98	98.0
Total:	1.06	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-3**
Total Area: 2.39 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	2.39	B	100%	98	98.0
Total:	2.39	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-4**
Total Area: 1.32 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.32	B	100%	98	98.0
Total:	1.32	-------	100%	----------	98.0

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY  1991                  *
*          VERSION 4.0.1E               *
*      Lahey F77L-EM/32 version 5.01    *
*        Dodson & Associates, Inc.      *
*  RUN DATE 10/10/03  TIME 12:00:27     *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    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        MIDDLE BRANCH BLUE DIAMOND WASH CLOMR
    2         ID        TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
    3         ID        BASS PRO SHOPS
    4         ID        PROPOSED CONDITION - PROPOSED DEVELOPMENT
    5         ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
    6         ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
    7         ID        LOCHSA JOB# 6923.2
    8         ID
    9         ID
   10         ID        INPUT FILE NAME:  6923P100.DAT
   11         ID
   12         ID    OCTOBER 2003
   13         ID
   14         ID        **************************************************************************
   15         ID        **************************************************************************
   16         ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
   17         ID
   18         ID             10 & 100 YEAR - 6 HOUR STORM EVENT
   19         ID             PRECIPITATION BASED ON TABLE 505
   20         ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
   21         ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
   22         ID
   23         ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
   24         ID
   25         ID        **************************************************************************
   26         ID
   27         ID        **************************************************************************
              *DIAGRAM
   28         IT       5                    73
   29         IO       5       0
   30         IN       5
   31         JR     PREC    1.00    0.57

   32         KK     DI-1
   33         KM    RUNOFF FROM BASIN DI-1 DRAINING INTO THE PROPOSED DROP INLET
   34         PB     2.77
   35         PC      0.0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   36         PC      .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
   37         PC      .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
   38         PC     .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
   39         PC     .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
   40         PC      .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
   41         PC     .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
   42         PC     .998    .999     1.0
   43         BA   .00130
   44         LS       0    98.0
   45         UD     .050

   46         KK     DI-2
   47         KM    RUNOFF FROM BASIN DI-2 DRAINING INTO THE PROPOSED 4-FT DROP INLET
   48         BA   .00166
   49         LS       0    98.0
   50         UD     .050
```

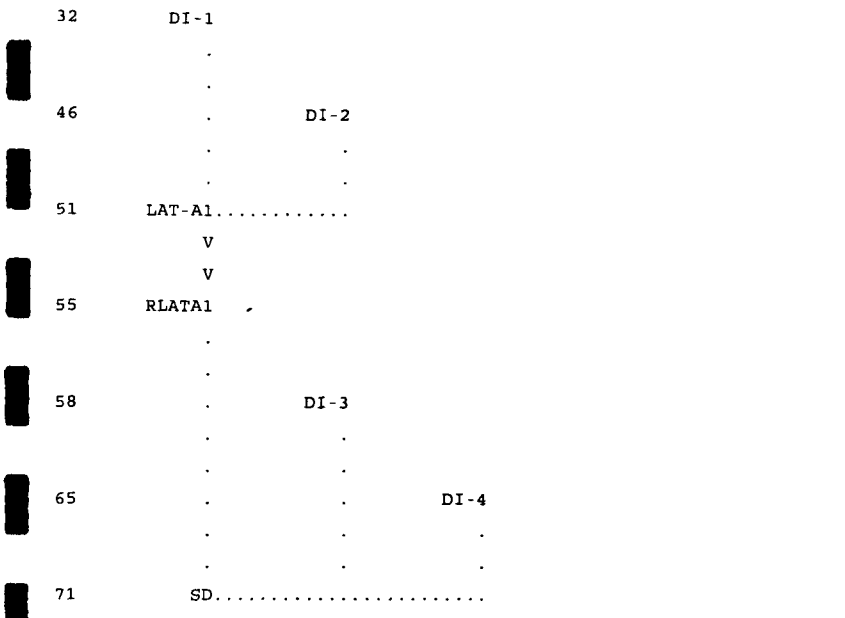
```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  51          KK  LAT-A1
  52          KM   COMBINE DI-1 AND DI-2
  53          KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-1"
  54          HC       2

  55          KK  RLATA1
  56          KM   ROUTE LAT-A1 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  57          RK     500    .0025    0.013        0     CIRC       6.

  58          KK    DI-3
  59          KM   RUNOFF FROM BASIN DI-3 DRAINING INTO THE PROPOSED 4-FT DROP INLET
  60          KM   THE RUNOFF REPRESENTS THE RUNOFF DRAINING INTO THE PROPOSED STORM DRAIN
  61          KM   FROM "LATERAL A-3" AND THE PROPOSED ROOF DRAIN "LATERAL A-5"
  62          BA  .00373
  63          LS       0     98.0
  64          UD    .050

  65          KK    DI-4
  66          KM   RUNOFF FROM BASIN DI-4 DRAINING INTO THE PROPOSED 4-FT DROP INLET
  67          KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-4"
  68          BA  .00206
  69          LS       0     98.0
  70          UD    .050

  71          KK      SD
  72          KM   COMBINE RLATA1, DI-3 AND DI-4
  73          KM   TOTAL ONSITE FLOWS DRAINING INTO THE PROPOSED STORM DRAIN
  74          HC       3
  75          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) *          *    U.S. ARMY CORPS OF ENGINEERS    *
*            MAY  1991               *          *    HYDROLOGIC ENGINEERING CENTER   *
*         VERSION 4.0.1E             *          *         609 SECOND STREET          *
*    Lahey F77L-EM/32 version 5.01   *          *       DAVIS, CALIFORNIA 95616      *
*      Dodson & Associates, Inc.     *          *           (916) 551-1748           *
* RUN DATE  10/10/03  TIME  12:00:27 *          *                                    *
**************************************          **************************************
```

MIDDLE BRANCH BLUE DIAMOND WASH CLOMR
TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PROPOSED CONDITION - PROPOSED DEVELOPMENT
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6923.2

INPUT FILE NAME: 6923P100.DAT

OCTOBER 2003

****
****
ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

10 & 100 YEAR - 6 HOUR STORM EVENT
PRECIPITATION BASED ON TABLE 505
10-YEAR ADJUSTED RAINFALL DEPTH = 1.58in
100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570

****

****

29 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		73	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		0600	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 6.00 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 0.57

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

					RATIOS APPLIED TO PRECIPITATION	
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2
					1.00	0.57
HYDROGRAPH AT	DI-1	0.00	1	FLOW	3.	2.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-2	0.00	1	FLOW	4.	2.
				TIME	3.50	3.50
2 COMBINED AT	LAT-A1	0.00	1	FLOW	7.	4.
				TIME	3.50	3.50
ROUTED TO	RLATA1	0.00	1	FLOW	7.	4.
				TIME	3.50	3.50
YDROGRAPH AT	DI-3	0.00	1	FLOW	9.	5.
				TIME	3.50	3.50
YDROGRAPH AT	DI-4	0.00	1	FLOW	5.	3.
				TIME	3.50	3.50
3 COMBINED AT	SD	0.01	1	FLOW	20.	11.
				TIME	3.50	3.50

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									
RLATA1	MANE	0.61	6.74	210.84	2.54	5.00	6.60	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4005E+00 EXCESS=0.0000E+00 OUTFLOW=0.4006E+00 BASIN STORAGE=0.2298E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RLATA1	MANE	0.55	3.78	211.25	1.36	5.00	3.66	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2141E+00 EXCESS=0.0000E+00 OUTFLOW=0.2142E+00 BASIN STORAGE=0.1436E-03 PERCENT ERROR= -0.1

*** NORMAL END OF HEC-1 ***

HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN
WSPG MODEL FOR LINE B
(PROPOSED CONDITION)

```
T1 SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
T2 PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FLOWS
T3 STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80
[redacted]    0.00  64.00  4                                  68.06
[redacted]    5.00  64.00  4       .013
JX           10.00  64.01  1  5    .013    48.0          64.00        40.00
[redacted]   76.34  64.19  1       .013                               52.50
[redacted]  263.53  64.66  1       .013                                          1
R           407.90  65.02  1       .013                               90.00      1
R           662.57  65.66  1       .013                                          1
[redacted]  796.40  71.60  1       .013
[redacted]  796.40  71.60  3
R           849.40  73.00  3       .030
R           949.40  75.00  3       .030
[redacted] 1079.40  77.00  3       .030
[redacted] 1079.40  77.00  3
CD    1  3    1    1.00    3.00    15.00
[redacted]    2  3    2    1.00    3.00    18.50
[redacted]    3  6
CD    4  3                 6.00    12.00
CD    5  3                 5.50     8.00
[redacted]S  315   0.00 96.00 00.00 77.52  8.10 77.00 24.80 76.00 30.20 75.00
[redacted]S       34.70 74.00 52.40 73.00 56.50 73.00 60.70 74.00 65.00 75.00
PTS               69.10 76.00 77.50 77.00123.20 78.00169.90 79.00180.00 79.50
```

DATE: 10/ 8/2003
TIME: 12: 2

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	1	1.00	3.00	15.00	0.00	0.00	0.00										
CD	2	3	2	1.00	3.00	18.50	0.00	0.00	0.00										
CD	3	6	0	0.00															
CD	4	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	5	3	0	0.00	5.50	8.00	0.00	0.00	0.00										

F0515P

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)	X(2) , Y(2) X(9) , Y(9)	X(3) , Y(3) X(10) ,Y(10)	X(4) , Y(4) X(11) ,Y(11)	X(5) , Y(5) X(N) , Y(N)	X(6) , Y(6) X(N+1),Y(N+1)	X(7) , Y(7) X(99) ,Y(99)
PTS	3	15	0.00 96.00	0.00 77.52	8.10 77.00	24.80 76.00	30.20 75.00	34.70 74.00	52.40 73.00
PTS			56.50 73.00	60.70 74.00	65.00 75.00	69.10 76.00	77.50 77.00	123.20 78.00	169.90 79.00
PTS			180.00 79.50						

ERROR MESSAGE NUMBER 2 IN SEQUENCE CHECKING CROSSSECTION POINTS CARDS
INVALID CARD CODE FOR CROSS SECTION POINTS

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION

HEADING LINE NO 2 IS -

PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL

HEADING LINE NO 3 IS -

STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	64.00	4	68.06

ELEMENT NO 2 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5.00	64.00	4	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	10.00	64.01	1	5	0	0.013	48.0	0.0	64.00	0.00	40.00	0.00

ELEMENT NO 4 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	76.34	64.19	1	0.013	0.00	52.50	0.00	0

ELEMENT NO 5 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	263.53	64.66	1	0.013	0.00	0.00	0.00	1

ELEMENT NO 6 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	407.90	65.02	1	0.013	0.00	90.00	0.00	1

ELEMENT NO 7 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	662.57	65.66	1	0.013	0.00	0.00	0.00	1

ELEMENT NO 8 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	796.40	71.60	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A WALL ENTRANCE

U/S DATA	STATION	INVERT	SECT	FP
	796.40	71.60	3	0.500

ELEMENT NO 10 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	849.40	73.00	3	0.030	0.00	0.00	0.00	0

ELEMENT NO 11 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	949.40	75.00	3	0.030	0.00	0.00	0.00	0

ELEMENT NO 12 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1079.40	77.00	3	0.030	0.00	0.00	0.00	0

ELEMENT NO 13 IS A SYSTEM HEADWORKS

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1079.40	77.00	3	0.00

WATER SURFACE PROFILE - ELEMENT CARD LISTING

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	64.00	4.060	68.060	374.0	7.68	0.915	68.975	0.00	3.114		6.00	12.00	0.00	0	0.00
5.00	0.00000					.001381	0.01			0.000			0.00		
5.00	64.00	4.073	68.073	374.0	7.65	0.909	68.982	0.00	3.114		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00200					.002935	0.01						0.00		
10.00	64.01	4.257	68.267	326.0	7.86	0.958	69.225	0.00	2.564		3.00	15.00	0.00	1	1.00
66.34	0.00271					.004496	0.30			2.882			0.00		
76.34	64.19	4.521	68.711	326.0	7.86	0.958	69.669	0.00	2.564		3.00	15.00	0.00	1	1.00
187.19	0.00251					.004496	0.84			2.965			0.00		
263.53	64.66	4.941	69.601	326.0	7.86	0.958	70.559	0.00	2.564		3.00	15.00	0.00	1	1.00
144.37	0.00249					.004496	0.65			2.973			0.00		
407.90	65.02	5.470	70.490	326.0	7.86	0.958	71.448	0.00	2.564		3.00	15.00	0.00	1	1.00
254.67	0.00251					.004496	1.14			2.964			0.00		
662.57	65.66	6.023	71.683	326.0	7.86	0.958	72.641	0.00	2.564		3.00	15.00	0.00	1	1.00
45.90	0.04439					.004496	0.21			1.092			0.00		
708.47	67.70	4.191	71.888	326.0	7.86	0.958	72.846	0.00	2.564		3.00	15.00	0.00	1	1.00
HYDRAULIC JUMP													0.00		
708.47	67.70	1.303	69.000	326.0	17.86	4.956	73.956	0.00	2.564		3.00	15.00	0.00	1	1.00
4.04	0.04439					.025820	0.10			1.092			0.00		
712.51	67.88	1.315	69.192	326.0	17.70	4.867	74.059	0.00	2.564		3.00	15.00	0.00	1	1.00
18.38	0.04439					.023796	0.44			1.092			0.00		
730.89	68.69	1.379	70.071	326.0	16.88	4.425	74.496	0.00	2.564		3.00	15.00	0.00	1	1.00
14.12	0.04439					.020669	0.29			1.092			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
745.01	69.32	1.447	70.766	326.0	16.10	4.023	74.789	0.00	2.564		3.00	15.00	0.00	1	1.00
11.17	0.04439					.017964	0.20			1.092			0.00		
756.18	69.81	1.517	71.332	326.0	15.35	3.657	74.989	0.00	2.564		3.00	15.00	0.00	1	1.00
8.98	0.04439					.015623	0.14			1.092			0.00		
765.16	70.21	1.591	71.805	326.0	14.63	3.324	75.129	0.00	2.564		3.00	15.00	0.00	1	1.00
7.30	0.04439					.013595	0.10			1.092			0.00		
772.46	70.54	1.669	72.206	326.0	13.95	3.022	75.228	0.00	2.564		3.00	15.00	0.00	1	1.00
5.93	0.04439					.011839	0.07			1.092			0.00		
778.39	70.80	1.751	72.552	326.0	13.30	2.747	75.299	0.00	2.564		3.00	15.00	0.00	1	1.00
4.83	0.04439					.010315	0.05			1.092			0.00		
783.22	71.02	1.836	72.851	326.0	12.68	2.498	75.349	0.00	2.564		3.00	15.00	0.00	1	1.00
3.88	0.04439					.008994	0.03			1.092			0.00		
787.10	71.19	1.926	73.113	326.0	12.09	2.271	75.384	0.00	2.564		3.00	15.00	0.00	1	1.00
3.08	0.04439					.007848	0.02			1.092			0.00		
790.18	71.32	2.020	73.344	326.0	11.53	2.064	75.408	0.00	2.564		3.00	15.00	0.00	1	1.00
2.37	0.04439					.006853	0.02			1.092			0.00		
792.55	71.43	2.118	73.547	326.0	10.99	1.877	75.424	0.00	2.564		3.00	15.00	0.00	1	1.00
1.75	0.04439					.005988	0.01			1.092			0.00		
794.30	71.51	2.222	73.729	326.0	10.48	1.706	75.435	0.00	2.564		3.00	15.00	0.00	1	1.00
1.19	0.04439					.005236	0.01			1.092			0.00		
795.49	71.56	2.330	73.890	326.0	9.99	1.551	75.441	0.00	2.564		3.00	15.00	0.00	1	1.00
0.69	0.04439					.004582	0.00			1.092			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
796.18	71.59	2.444	74.034	326.0	9.53	1.410	75.444	0.00	2.564		3.00	15.00	0.00	1	1.00
0.22	0.04439					.004010	0.00			1.092			0.00		
796.40	71.60	2.564	74.164	326.0	9.08	1.281	75.445	0.00	2.564		3.00	15.00	0.00	1	1.00
WALL ENTRANCE													0.00		
796.40	71.60	4.709	76.309	326.0	1.58	0.039	76.348		2.102			3		0	0.00
3.28	0.02642					.000470	0.00			1.759					
799.68	71.69	4.620	76.307	326.0	1.66	0.043	76.350		2.102			3		0	0.00
3.27	0.02642					.000523	0.00			1.759					
802.95	71.77	4.531	76.304	326.0	1.74	0.047	76.351		2.102			3		0	0.00
3.18	0.02642					.000577	0.00			1.759					
806.13	71.86	4.444	76.301	326.0	1.82	0.052	76.353		2.102			3		0	0.00
3.26	0.02642					.000628	0.00			1.759					
809.39	71.94	4.355	76.298	326.0	1.91	0.057	76.355		2.102			3		0	0.00
3.27	0.02642					.000680	0.00			1.759					
812.66	72.03	4.265	76.295	326.0	2.01	0.063	76.358		2.102			3		0	0.00
3.30	0.02642					.000731	0.00			1.759					
815.96	72.12	4.174	76.291	326.0	2.10	0.069	76.360		2.102			3		0	0.00
3.36	0.02642					.000781	0.00			1.759					
819.32	72.20	4.081	76.286	326.0	2.21	0.076	76.362		2.102			3		0	0.00
3.46	0.02642					.000830	0.00			1.759					
822.78	72.30	3.985	76.282	326.0	2.31	0.083	76.365		2.102			3		0	0.00
3.47	0.02642					.000906	0.00			1.759					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
826.25	72.39	3.888	76.277	326.0	2.43	0.092	76.369		2.102		3		0	0.00
3.42	0.02642					.001012	0.00		1.759					
829.67	72.48	3.792	76.271	326.0	2.55	0.101	76.372		2.102		3		0	0.00
3.32	0.02642					.001129	0.00		1.759					
832.99	72.57	3.698	76.265	326.0	2.67	0.111	76.376		2.102		3		0	0.00
3.30	0.02642					.001257	0.00		1.759					
836.29	72.65	3.604	76.258	326.0	2.80	0.122	76.380		2.102		3		0	0.00
3.23	0.02642					.001399	0.00		1.759					
839.52	72.74	3.511	76.250	326.0	2.94	0.134	76.384		2.102		3		0	0.00
3.16	0.02642					.001554	0.00		1.759					
842.68	72.82	3.419	76.241	326.0	3.08	0.147	76.388		2.102		3		0	0.00
3.13	0.02642					.001723	0.01		1.759					
845.81	72.91	3.327	76.232	326.0	3.23	0.162	76.394		2.102		3		0	0.00
3.05	0.02642					.001905	0.01		1.759					
848.86	72.99	3.236	76.222	326.0	3.39	0.178	76.400		2.102		3		0	0.00
0.54	0.02642					.002019	0.00		1.759					
849.40	73.00	3.220	76.220	326.0	3.42	0.182	76.402		2.102		3		0	0.00
4.13	0.02000					.002140	0.01		1.872					
853.53	73.08	3.128	76.211	326.0	3.59	0.200	76.411		2.102		3		0	0.00
4.02	0.02000					.002353	0.01		1.872					
857.55	73.16	3.037	76.200	326.0	3.76	0.220	76.420		2.102		3		0	0.00
3.98	0.02000					.002614	0.01		1.872					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH				ZR		
861.53	73.24	2.946	76.189	326.0	3.94	0.242	76.431		2.102			3		0	0.00
3.80	0.02000					.002962	0.01			1.872					
865.33	73.32	2.857	76.176	326.0	4.14	0.266	76.442		2.102			3		0	0.00
3.58	0.02000					.003383	0.01			1.872					
868.91	73.39	2.771	76.161	326.0	4.34	0.292	76.453		2.102			3		0	0.00
3.39	0.02000					.003864	0.01			1.872					
872.30	73.46	2.687	76.145	326.0	4.55	0.322	76.467		2.102			3		0	0.00
3.14	0.02000					.004415	0.01			1.872					
875.44	73.52	2.606	76.127	326.0	4.77	0.354	76.481		2.102			3		0	0.00
2.91	0.02000					.005046	0.01			1.872					
878.35	73.58	2.527	76.106	326.0	5.01	0.389	76.495		2.102			3		0	0.00
2.68	0.02000					.005768	0.02			1.872					
881.03	73.63	2.450	76.083	326.0	5.25	0.428	76.511		2.102			3		0	0.00
2.33	0.02000					.006596	0.02			1.872					
883.36	73.68	2.376	76.055	326.0	5.51	0.471	76.526		2.102			3		0	0.00
0.77	0.02000					.007228	0.01			1.872					
884.13	73.69	2.348	76.042	326.0	5.61	0.489	76.531		2.102			3		0	0.00
HYDRAULIC JUMP															
884.13	73.69	1.872	75.566	326.0	7.94	0.978	76.544		2.102			3		0	0.00
36.15	0.02000					.019977	0.72			1.872					
920.28	74.42	1.872	76.290	326.0	7.94	0.978	77.268		2.102			3		0	0.00
23.10	0.02000					.018827	0.43			1.872					

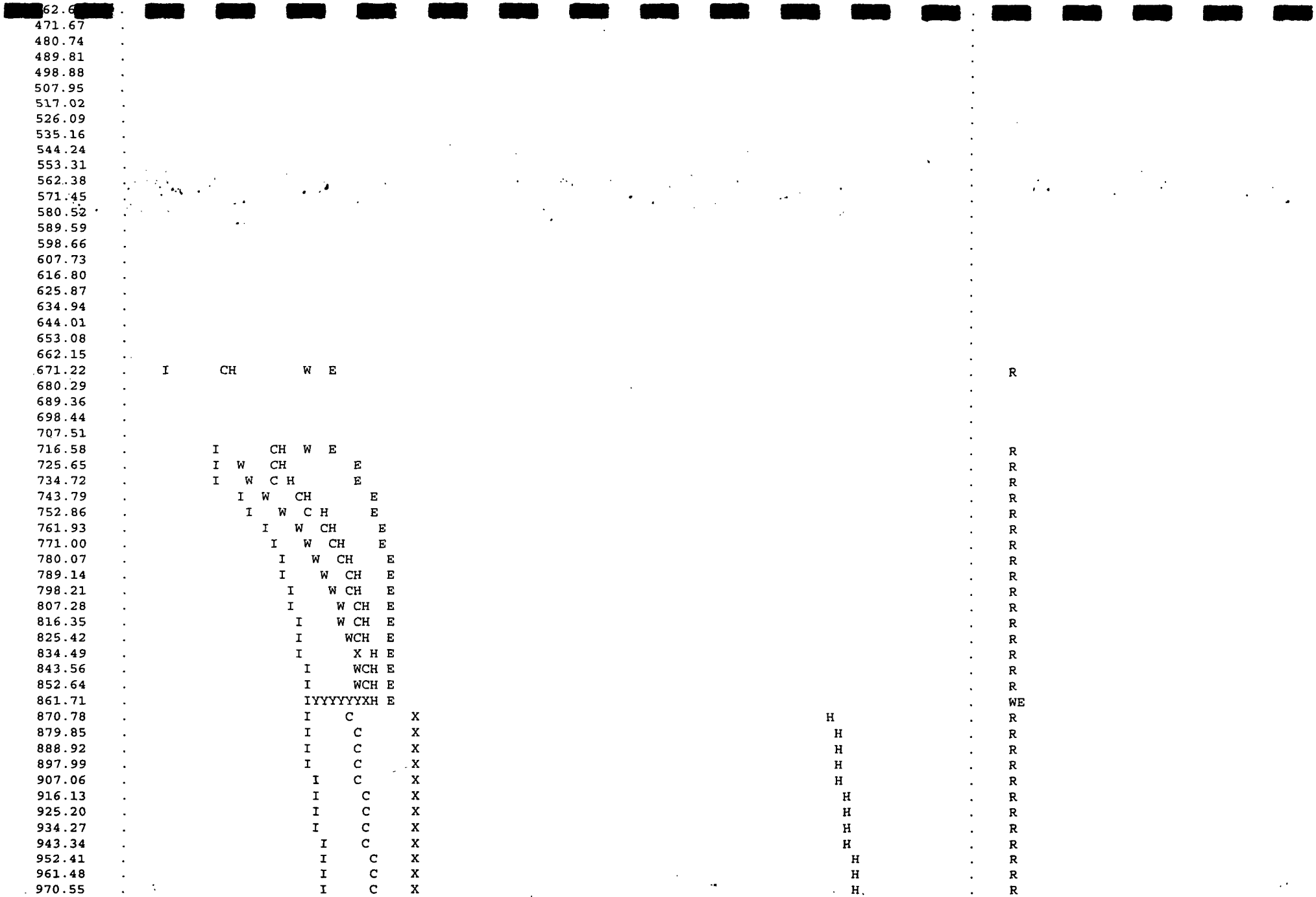
WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - PROPOSED CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
943.38	74.88	1.924	76.804	326.0	7.61	0.899	77.703		2.102		3		0	0.00
6.02	0.02000					.016539	0.10		1.872					
949.40	75.00	1.985	76.985	326.0	7.26	0.818	77.803		2.102		3		0	0.00
115.10	0.01538					.015401	1.77		1.985					
1064.50	76.77	1.985	78.756	326.0	7.26	0.818	79.574		2.102		3		0	0.00
13.38	0.01538					.014579	0.20		1.985					
1077.88	76.98	2.036	79.013	326.0	6.98	0.756	79.769		2.102		3		0	0.00
1.52	0.01538					.012875	0.02		1.985					
1079.40	77.00	2.102	79.102	326.0	6.65	0.686	79.788		2.102		3		0	0.00

[redacted] RTON [redacted] ANSI [redacted] ASE [redacted] BASS [redacted] SHO [redacted] PROP [redacted] CONI [redacted] N [redacted]
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

0.00	I	C W E H	R
9.07	I	C W E H	JX
18.14	I	CH W E	R
27.21			
36.28			
45.35			
54.42			
63.49			
72.56			
81.64	I	CH W E	R
90.71			
99.78			
108.85			
117.92			
126.99			
136.06			
145.13			
154.20			
163.27			
172.34			
181.41			
190.48			
199.55			
208.62			
217.69			
226.76			
235.84			
244.91			
253.98			
263.05			
272.12	I	C H W E	R
281.19			
290.26			
299.33			
308.40			
317.47			
326.54			
335.61			
344.68			
353.75			
362.82			
371.89			
380.96			
390.04			
399.11			
408.18	I	C H W E	R
417.25			
426.32			
435.39			
444.46			
453.53			


462.6
471.67
480.74
489.81
498.88
507.95
517.02
526.09
535.16
544.24
553.31
562.38
571.45
580.52
589.59
598.66
607.73
616.80
625.87
634.94
644.01
653.08
662.15
671.22
680.29
689.36
698.44
707.51
716.58
725.65
734.72
743.79
752.86
761.93
771.00
780.07
789.14
798.21
807.28
816.35
825.42
834.49
843.56
852.64
861.71
870.78
879.85
888.92
897.99
907.06
916.13
925.20
934.27
943.34
952.41
961.48
970.55
I CH W E
R
I CH W E
R
I W CH E
R
I W C H E
R
I W CH E
R
I W C H E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I W CH E
R
I WCH E
R
I X H E
R
I WCH E
R
I WCH E
R
IYYYYYYXH E
WE
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R
I C X
H
R

[redacted]	.	[redacted]	[redacted]	[redacted]	I	[redacted]	X	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	H	[redacted]	.	[redacted]	[redacted]	[redacted]	[redacted]
988.69	.				I	C	X							H		.	R			
997.76	.				I	C	X							H		.	R			
1006.84	.				I	C	WE							H		.	R			
1015.91	.				I	C	WE							H		.	R			
1024.98	.				I	C	WE							H		.	R			
1034.05	.				I	C	WE							H		.	R			
1043.12	.				I	C	WE							H		.	R			
1052.19	.				I	C	WE							H		.	R			
1061.26	.				I	C	WE							H		.	R			
1070.33	.				I	C	WE							H		.	R			
1079.40	.				I	C	WE							H		.	R			

64.00 67.60 71.20 74.80 78.40 82.00 85.60 89.20 92.80 96.40 100.00

N O T E S

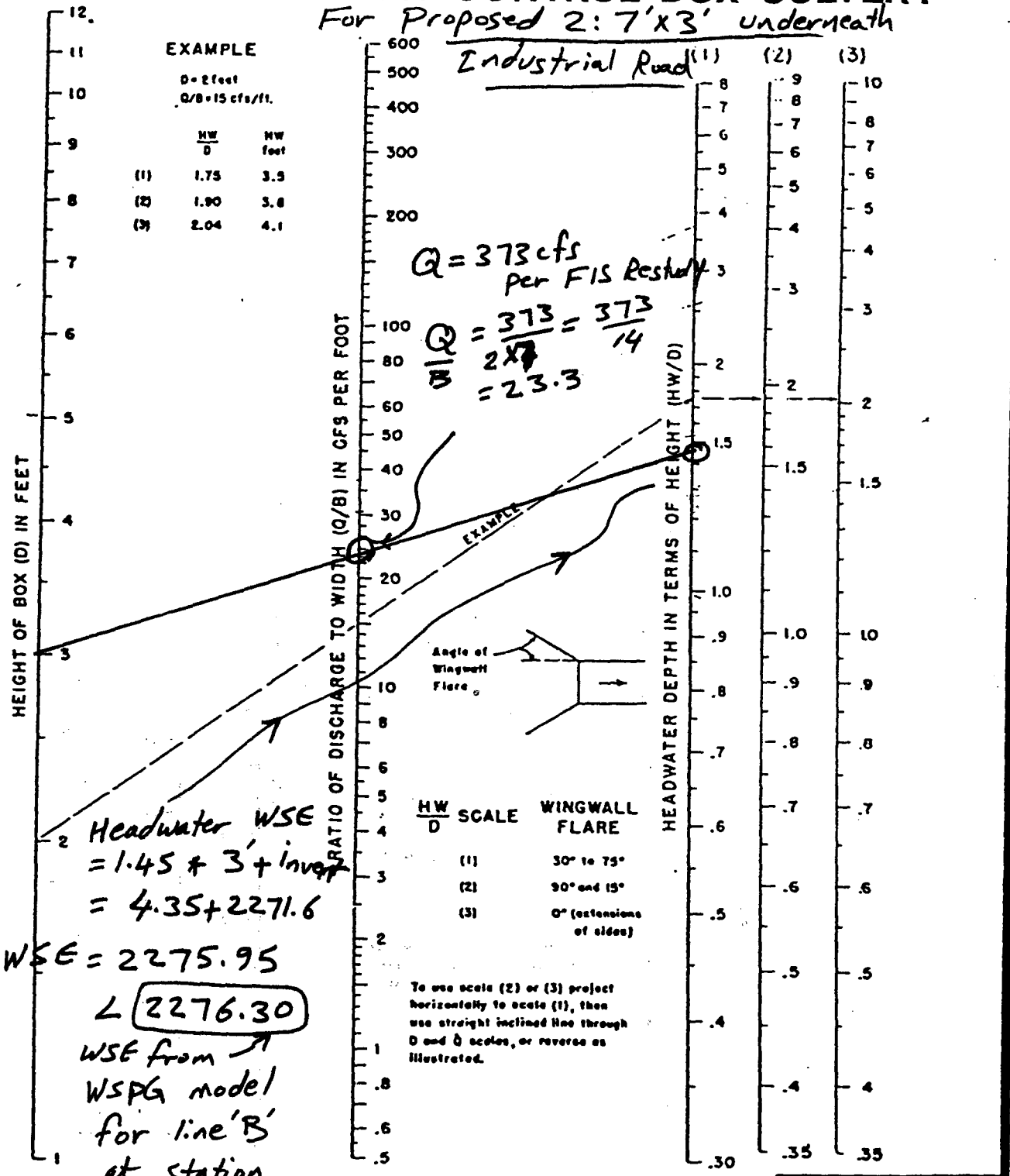
1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

INLET CONTROL NOMOPGRAPH FOR THE PROPOSED 2:7'X3' RCB UNDERNEATH INDUSTRIAL ROAD

(To Check That Hydraulics of Line B Controls The Wse Upstream Industrial Road Along Shelborne Alignment)

NOMOGRAPH – INLET CONTROL BOX CULVERT

For Proposed 2: 7'x3' underneath Industrial Road



Q = 373 cfs per FIS Restudy

$\frac{Q}{B} = \frac{373}{2 \times 7} = \frac{373}{14} = 23.3$

Headwater WSE
= 1.45 * 3' + invert
= 4.35 + 2271.6

WSE = 2275.95

< 2276.30

WSE from WSPG model for line 'B' at station 7+96.4

Hence, Line 'B' hydraulics controls WSE U/S.

Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS No.5, 1985

FIGURE 1004

REFERENCE MATERIAL FROM THE EFFECTIVE FIS RESTUDY

Federal Emergency Management Agency

Washington, D.C. 20472

AUG 13 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 03-09-0980X

The Honorable Mary J. Kincaid-Chauncey
Chair, Clark County Board
of Commissioners
500 South Grand Central Parkway
Las Vegas, NV 89155

Community: Clark County, NV
Community No.: 320003
Panels Affected: 32003C2562 E, 2566 E, 2567 E, 2568 E, 2569 E, 2580 E, 2583 E, 2585 E, 2590 E, and 2910 E

Effective Date of This Revision: **AUG 13 2003**

102-I-A-C

Dear Ms. Kincaid-Chauncey:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated April 30, 2002, Mr. Kevin Eubanks, P.E., Assistant General Manager, Clark County Regional Flood Control District, requested that FEMA revise the FIRM and FIS report to show the effects of an updated floodplain delineation study based on a revised hydrologic analysis and a revised hydraulic analysis that incorporated more detailed topographic information and construction of the Lower Duck Creek Detention Basin to reflect existing watershed conditions along Duck Creek from approximately 300 feet east of Hollywood Boulevard to just downstream of Industrial Road and along Blue Diamond Wash – North Branch (North Branch) and Blue Diamond Wash – Middle Branch (Middle Branch) from their respective confluences with Duck Creek to the Union Pacific Railroad (UPRR). In addition, this request included revisions to Duck Creek Tributary from its confluence with Duck Creek to approximately 300 feet west of Interstate Highway 15 (I-15) and to Duck Creek South Channel (South Channel) from its confluence with Duck Creek to its divergence from Duck Creek. In response to Mr. Eubanks's request, we issued a Letter of Map Revision (LOMR) on April 7, 2003 (Case No. 02-09-913P). On the annotated FIRM panels attached to that LOMR, we inadvertently used an incorrect digital projection of the floodplain and floodway boundary delineations. We therefore issued a LOMR on April 21, 2003 (Case No. 03-09-0861X), with the proper revised FIRM panels. Subsequent to the April 21 LOMR, Mr. Michael Ludwig, P.E., Senior Designer, G. C. Wallace, Inc., informed us of discrepancies between the revised FIRM and the flood profiles. In addition, Mr. Ludwig provided survey data to show the exact low chord and roadway elevations to be used for the flood profiles. This LOMR revises and supersedes the April 21 LOMR.

All data required to complete our review of this request were submitted with letters from Mr. Eubanks and Mr. Ludwig.

We have completed our review of the submitted data and the flood data shown on the effective FIRM and in the effective FIS report. We have revised the FIRM and FIS report to modify the elevations, floodplain and floodway boundary delineations, and zone designations of the flood having a 1-percent chance of

being equaled or exceeded in any given year (base flood) along the revised reaches of Duck Creek, Duck Creek Tributary, South Channel, North Branch, and Middle Branch. The revision request renamed the reach of Duck Creek shown on the effective FIRM from approximately 300 feet downstream of Giles Street to just downstream of Industrial Road as Duck Creek Tributary, and the reach of Duck Creek Tributary shown on the effective FIRM from its confluence with Duck Creek to approximately 300 feet west of I-15 was renamed as Duck Creek.

As a result of the modifications along Duck Creek, the effective Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, designated Zone A, with no Base Flood Elevations (BFEs) determined, from approximately 300 feet upstream of U.S. Highway 95 to approximately 200 feet upstream of Pebble Road was redesignated Zone AE, with BFEs determined; a regulatory floodway was added from just upstream of Patrick Lane to approximately 200 feet upstream of Pebble Road; the width of the SFHA and the BFEs increased in some areas and decreased in other areas; and new BFEs were added. As a result of the modifications along North Branch, the effective SFHAs designated Zone A and Zone AO (Depth 1), an SFHA subject to shallow flooding with an average depth of 1 foot, from the confluence with Duck Creek to just downstream of Amigo Street were redesignated Zone AE, and a regulatory floodway was added; the effective SFHA designated Zone AO (Depth 1, Velocity 3), an SFHA subject to alluvial fan flooding with an average depth of 1 foot and flood velocity of 3 feet per second, from I-15 to the UPRR was redesignated Zone A; and the width of the SFHA and the BFEs decreased. As a result of the modifications along Middle Branch, the effective SFHAs designated Zone AO (Depth 1) and Zone A were redesignated Zone AE, and a regulatory floodway was added, from the confluence with Duck Creek to Amigo Street; from Amigo Street to approximately 1,600 feet upstream, the base flood is contained in a culvert; the effective SFHA designated Zone AO (Depth 1, Velocity 4) from I-15 to the UPRR was redesignated Zone AE; the width of the SFHA and the BFEs decreased; and SFHAs resulting from the Blue Diamond Wash – Middle Branch (Right Bank Overflow) and (Left Bank Overflow) designated Zone AE were added from I-15 to Blue Diamond Road and Valley View Boulevard respectively. As a result of the modifications along South Channel, the width of the SFHA and the BFEs increased, and the width of the regulatory floodway decreased.

The modifications are shown on the enclosed annotated copies of FIRM Panels 32003C2562 E, 32003C2566 E, 32003C2567 E, 32003C2568 E, 32003C2569 E, 32003C2580 E, 32003C2583 E, 32003C2585 E, 32003C2590 E, and 32003C2910 E; Profile Panels 01P, 02P, 14P, and 15P; and affected portions of the Summary of Discharges Table and Floodway Data Table. In addition, Profile Panels 03P and 04P were added for Middle Branch; Profile Panels 07P and 08P were added for Blue Diamond Wash – Middle Branch (Right Bank Overflow) and Blue Diamond Wash – Middle Branch (Left Bank Overflow), respectively; Profile Panels 03P and 04P for North Branch were renumbered as Profile Panels 09P and 10P, and Profile Panel 11P was added; Profile Panels 07P, 08P, and 09P for Duck Creek and Profile Panels 10P through 13P for Duck Creek Downstream of Blue Diamond were deleted; and Profile Panels 102P through 113P were added to the FIS report. This LOMR hereby revises the above-referenced panels of the effective FIRM and the affected portions of the FIS report, both dated September 27, 2002.

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

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

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)	Modified BFE (feet)
Duck Creek:		
At Stephanie Street	1,667*	1,656*
At Patrick Lane	None	1,886*
At Interstate Highway 215	None	2,074*
At Silverado Ranch Boulevard	2,229*	2,230*
At I-15	2,284*	2,282*
Duck Creek Tributary:		
At Gabriel Street	2,258*	2,260*
At Industrial Road	2,289*	2,292*
Duck Creek South Channel:		
At Silverado Ranch Boulevard	2,224*	2,225*
Blue Diamond Wash – North Branch:		
At Paradise Road	1#	2,098*
At Las Vegas Boulevard	2,235*	2,230*
At UPRR	1#	None
Blue Diamond Wash – Middle Branch:		
At Vision Street	1#	2,114*
At Las Vegas Boulevard	2,240*	2,238*
At I-15	2,268*	2,264*
At Industrial Road	1#	2,292*
At UPRR	1#	2,428*
Blue Diamond Wash – Middle Branch (Right Bank Overflow):		
At Industrial Road	1#	2,277*
Blue Diamond Wash – Middle Branch (Left Bank Overflow):		
At Industrial Road	None	2,276*

*Referenced to the North American Vertical Datum, rounded to the nearest whole foot
#Depth in feet above ground, rounded to the nearest whole foot

Public notification of the proposed modified BFEs in the April 21 LOMR was given in the *Las Vegas Review-Journal* on May 1 and May 8, 2003, and a notice of the changes will be published in the *Federal Register*. The 90-day appeal period for any interested party to request that FEMA reconsider the determination made by the April 21 LOMR ended on August 6, 2003. FEMA received no valid requests for changes to the modified BFEs. Because the BFEs were not modified from those in the April 21 LOMR, public notification of the proposed modified BFEs will not be made for this LOMR.

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

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panels and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

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

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

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

Mr. Jack Eldridge
Chief, National Flood Insurance Program Branch
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7184

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness
and Response Directorate

Enclosures

cc: The Honorable James Gibson
Mayor, City of Henderson

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

Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

Mr. Robert Thompson, P.E.
Department of Public Works
Clark County

Mr. Jerry E. Pruitt, P.E.
Vice President
G. C. Wallace, Inc.

Table 3. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Alluvial Fan In Eastern Henderson	5.54	370	2,200	3,600	--[1]
Alluvial Fan In Western Henderson	76.0	1,490	13,300	23,370	--[1]
Abbott Wash At Interstate 15	7.1	1,050	1,940	2,340	3,690
Blue Diamond Fan At Apex	69.5	2,010	8,800	14,820	42,550
Bridge Canyon Wash At Apex	7.3	650	2,680	4,430	12,240
Colorado River At Laughlin	169,300	--[1]	--[1]	40,000[2]	--[1]
Dripping Springs Wash At Apex	4.5	460	1,910	3,150	8,710
Duck Creek					
At Interstate 15	--[3]	--[1]	--[1]	1,326	--[1]
Upstream of Lower Duck Creek Detention Basin	119.8	--[1]	--[1]	6,470	--[1]
At Mountain Vista Avenue	158.5	--[1]	--[1]	8,562	--[1]
At Boulder Highway	164.8	--[1]	--[1]	8,562	--[1]
Duck Creek Tributary					
At Interstate 15	--[3]	--[1]	--[1]	5,100	--[1]

[1]Discharge not available
[2]Established by the Colorado River Floodway Protection Act, Public Law 99-450
[3]Flow affected by upstream overflows, diversions, or obstructions; drainage area does not apply

Revised data

REVISED TO REFLECT LOMR DATED

Table 3. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Georgia Avenue Wash					
At Buchanan Boulevard	1.98	263	781	1,285	4,300
At Mendota Drive	0.95	177	459	727	2,000
At Cross Section E	0.45	68	189	310	1,000
Hemenway Wash					
At Cross Section C	2.86	290	635	815	1,380
At Cross Section E	1.06	80	195	260	420
Hiko Springs Wash					
At Apex	17.9	1,220	5,070	8,370	23,130
Las Vegas Creek					
At Las Vegas Boulevard	13	640	1,280	1,570	2,420
At Confluence with Las Vegas Wash	14	660	1,300	1,600	2,450
Las Vegas Wash					
At Carey Avenue[1]	836	3,050	8,750	11,800	21,400
At Charleston Boulevard	858	3,180	9,000	12,100	21,800
At Losee Road	568	3,960	7,300	8,820	17,000
Below Union Pacific Railroad	--[2]	2,100	2,330	2,440	2,700
Below Interstate 15	--[2]	2,100	2,330	2,370	3,150
Below Confluence with Middle Overflow Area	--[2]	2,720	3,040	3,120	4,500
Below East Cheyenne Avenue	--[2]	2,300	2,560	2,610	3,500
Below Confluence with Unnamed Tributary	--[2]	3,940	7,580	9,220	17,200
Below Las Vegas Boulevard	--[2]	3,940	6,400	6,660	9,300
Below Cutoff Channel	--[2]	3,940	6,530	6,860	10,700
Below Carey Avenue	--[2]	3,940	6,530	6,860	9,700
Below Lake Mead Boulevard	--[2]	3,940	5,500	5,710	7,250
Middle Branch Blue Diamond Wash					
At Union Pacific Railroad	--[2]	--[3]	--[3]	1,961	--[3]
At Interstate 15	97.5	--[3]	--[3]	1,462	--[3]

[1]Located outside Corporate Limits
[2]Flow affected by upstream overflows, diversions, or obstructions; drainage area does not apply
[3]Discharge not available

Revised data

REVISED TO REFLECT LOMR DATED

Table 3. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Muddy River					
At Cooper Avenue	4,035	5,250	14,750	21,300	45,900
Downstream of Wells Siding	3,950	5,270	14,800	21,400	45,500
Upstream of Confluence with Meadow Valley Wash	1,360	3,620	10,900	16,000	34,400
North Branch Blue Diamond Wash					
At Union Pacific Railroad	--[2]	--[1]	--[1]	244	--[1]
At Interstate 15	7.8	--[1]	--[1]	1,290	--[1]
Overton Wash					
At Upstream Limit of Detailed Study	21.7	2,170	4,510	5,680	8,200
Pulsifer Wash					
At Interstate 15	4.9	930	1,730	2,070	3,230
Southwest Unnamed Wash					
At Apex	3.9	260	1,070	1,770	4,890
Tropicana Wash – Central Branch					
At Flamingo Wash	20.1	--[1]	--[1]	5,300	--[1]
Upstream of Airport Wash	12.1	--[1]	--[1]	3,320	--[1]
Downstream of Koval Road	11.0	--[1]	--[1]	3,320	--[1]
Interstate 15 to 600 feet downstream of Union Pacific Railroad	8.9	--[1]	--[1]	800	--[1]
Just downstream of Union Pacific Railroad	8.1	--[1]	--[1]	710	--[1]

Revised data

[1]Discharge Not Available
[2]Flow affected by upstream overflows, diversions, or obstructions; drainage area does not apply

REVISED TO REFLECT LOMR DATED

SUMMARY OF DESIGN FLOWS
FOR
DUCK CREEK/ BLUE DIAMOND WASHES FIS RESTUDY

550.039

MARCH 2002

Prepared for:

Clark County Regional Flood Control District
600 S. Grand Central Parkway, Suite 300
Las Vegas, NV 89106-4511
Phone: (702) 455-3139
Fax: (702) 455-3870

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*        SEPTEMBER 1990                 *
*         VERSION 4.0                   *
*                                       *
*  RUN DATE  01/21/2002  TIME  15:40:42 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    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
* FREE ***
          1         ID   DUCK CREEK/BLUE DIAMOND WASHES FIS RESTUDY
          2         ID   "G.C. WALLACE, INC. BY MJL"
          3         ID   DUCK3.XLS
          4         ID   "MODEL BASED FROM HEC-1 FILE, BDE100UN, FROM 1991 LAS VEGAS VALLEY FIS"
          5         ID   "BY JAMES M. MONTGOMERY CONSULTING ENGINEERS, INC."
          6         ID   UPDATED PRECIPITATION VALUES
          7         ID   % IMPERVIOUS ADDED TO LS CARD FOR DEVELOPMENT SINCE 1990
          8         ID   ADDITIONAL DIVERSIONS ADDED
          9         ID   DESIGN STORM = 100-YEAR 6-HOUR STORM
         10         ID   STORM DISTRIBUTION = SDN3
                    *
         11         ID     JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
         12         ID
         13         ID     AREA (SQUARE MILES)    DARF
         14         ID    0 - 0.5   0.990
         15         ID    0.5 - 1   0.975
         16         ID    1 - 2   0.950
         17         ID    2 - 3   0.925
         18         ID    3 - 4   0.915
         19         ID    4 - 5   0.908
         20         ID    5 - 6   0.903
         21         ID    6 - 7   0.895
         22         ID    7 - 8   0.885
         23         ID
         24         IT       5       0       0     120
         25         IO       5       0       0
         26         JR    PREC   0.990   0.975   0.950   0.925   0.915   0.908   0.903   0.895   0.885
                    *

         27         KK    B13A
         28         BA   1.290
         29         PB    3.14
         30         PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
         31         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
         32         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
         33         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
         34         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
         35         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
         36         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
         37         PC   0.998   0.999   1.000
         38         LS       0    88.0
         39         UD   0.680
                    *

         40         KK   RB13A
         41         KM   ROUTE B13A TO PT1
         42         RM       7    0.64     0.1
                    *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  43      KK    B13B
  44      BA   0.538
  45      PB    2.96
  46      LS       0    88.0
  47      UD   1.440
          *

  48      KK     PT1
  49      KM   COMBINE BASINS B13A AND B13B
  50      HC       2
          *

  51      KK    RPT1
  52      KM   ROUTE PT1 TO PT2
  53      RM       3    0.28    0.15
          *

  54      KK     B17
  55      BA   0.816
  56      PB    2.80
  57      LS       0    88.0
  58      UD   0.940
          *

  59      KK     PT2
  60      KM   COMBINE PT1 AND BASIN B17
  61      HC       2
          *

  62      KK   DVBD2
  63      KM   "DIVERSION EAST THRU 2-36"" RCP'S AT UPRR LOCATED 300 FT SOUTH OF BLUE DIAMON
  64      DT   DVBD2
  65      DI       0     121     500    1000    1500    2000
  66      DQ       0     121     240     391     540     690
          *

  67      KK    RPT2
  68      KM   ROUTE BYPASS TO PT3
  69      RD    2000   0.008    0.03       0    TRAP      35       3
          *

  70      KK    B13C
  71      BA   2.005
  72      PB    2.82
  73      LS       0    88.1
  74      UD   0.510
          *

  75      KK     PT3
  76      KM   COMBINE BYPASS FROM DVBD2 AND BASIN B13C
  77      HC       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  78      KK   DVBD3
  79      KM   DIVERSION EAST THRU 8'x4' RCB AT UPRR LOCATED 1700 FT NORTH OF BLUE DIAMOND
  80      DT   DVBD3
  81      DI       0     238     500    1000    1500    2000
  82      DQ       0     238     252     271     288     304
          *

  83      KK   RPT3A
  84      KM   ROUTE BYPASS FROM DVBD3 NORTH ALONG WEST SIDE OF UPRR TO UPPR CULVERT BD4
  85      KM   MUSKINGUM ROUTING UNSTABLE
  86      RD    1200   0.008    0.03       0    TRAP      35       3
          *

  87      KK   DVBD4
  88      KM   "DIVERSION EAST THRU 2-36"" RCP'S AT UPRR LOCATED 3000 FT NORTH OF BLUE DIAMO
  89      DT   DVBD4
  90      DI       0      97     500    1000    1500    2000
  91      DQ       0      97     149     202     252     296
          *

  92      KK   RPT3B
  93      KM   ROUTE BYPASS FROM DVBD4 NORTH ALONG WEST SIDE OF UPRR TO UPPR BRIDGE
  94      RM       1   0.119    0.15
          *

  95      KK    B11S
  96      KM   SOUTHERN PORTION OF BASIN B11 TIES INTO HYDRO1 BOUNDARY AREA
  97      BA   1.121
  98      PB    2.82
  99      LS       0    78.0
 100      UD   0.580
          *

 101      KK  HYDRO1
 102      KM   INFLOW HYDROGRAPH
 103      KM   "REFERENCED FROM ""LOMR FOR AREA DOWNSTREAM OF UPPER BLUE DIAMOND D.B."""
 104      KM   "SEE COMBINATION POINT C-5, DARF RATIO 0.98, OF HEC-1 FROM REFERENCED LOMR"
 105      BA   0.630
 106      QI       0       0       0       0       0       0       0       0       0       0
 107      QI       0       0       0       0       0       0       0       0       0       0
 108      QI       0       0       1       7      14      29      45      58      69      76
 109      QI      82      86      90      94      99     100     101     100     100     100
 110      QI     102     109     126     161     223     318     430     538     604     623
 111      QI     607     569     525     480     437     397     363     335     316     306
 112      QI     304     310     321     333     339     332     314     289     264     239
 113      QI     217     198     182     169     159     150     143     137     131     127
 114      QI     122     118     114     110     107     104     102     101     100      99
 115      QI      98      98      97      97      97      97      97      96      96      96
 116      QI      96      96      96      97      96      96      96      96      96      96
 117      QI      96      96      96      96      96      96      96      96      96      96
 118      QI      96      96      96      96      96      96      96      96      96      96
 119      QI      96      96      96      96      96      96      96      96      96      96
 120      QI      96      96      96      96      96      96      96      96      96      96
 121      QI      96      96      96      96      96      95      95      95      95      95
```

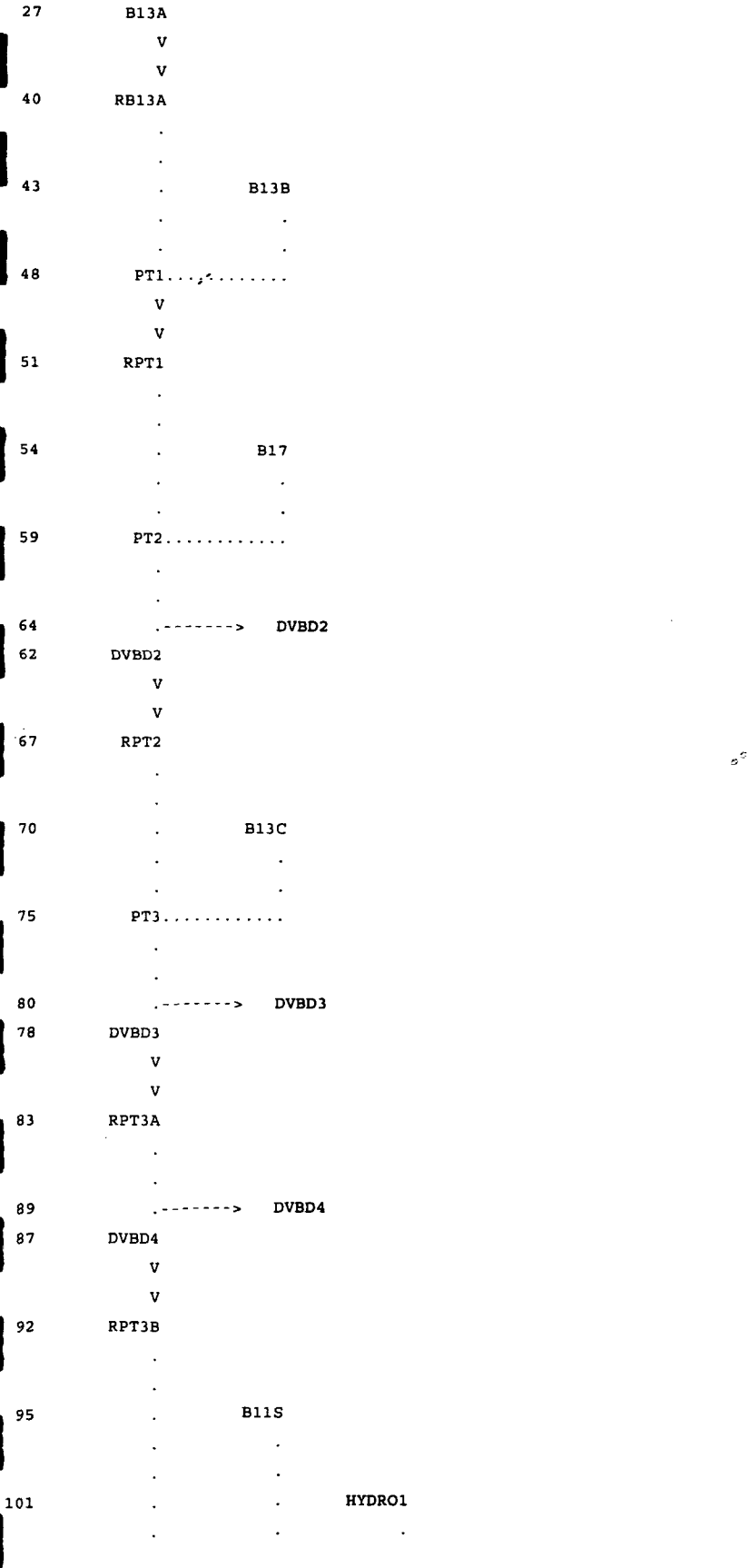
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  122     QI      95      95      95      95      95      95      95      95      95      95
  123     QI      95      95      95      95      95      95      95      95      95      95
  124     QI      95      95      95      95      95      95      95      95      95      95
  125     QI      95      95      95      95      95      95      95      95      95      95
  126     QI      95      95      95      95      95      95      95      95      95      95
  127     QI      95      95      95      95      95      95      95      95      95      95
  128     QI      95      95      95      95      95      95      95      95      95      95
  129     QI      95      95      94      94      94      94      94      94      94      94
  130     QI      94      94      94      94      94      94      94      94      94      94
  131     QI      94      94      94      94      94      94      94      94      94      94
  132     QI      94      94      94      94      94      94      94      94      94      94
  133     QI      94      94      94      94      94      94      94      94      94      94
  134     QI      94      94      94      94      94      94      94      94      94      94
  135     QI      94      94      94      94      94      94      94      94      94      94
          *

  136     KK    PT4
  137     KM   "COMBINE BASIN B11S, HYDRO2, AND BYPASS FROM DVBD4"
  138     KM   SEE COMBINATION POINT C-5 OF HEC-1 FROM REFERENCED LOMR
  139     KM   "PT C-5 REFERENCED FROM ""LOMR FOR AREA DOWNSTREAM OF UPPER BLUE DIAMOND D.B.
  140     HC       3
          *

  141     KK   RPT4A
  142     KM   ROUTE PT4 TO DIVERSION DVBD7
  143     RM       3    0.22    0.15
          *

  144     KK   DVBD7
  145     KM   DIVERSION NORTH TO NORTH BRANCH BLUE DIAMOND WASH
  146     KM   DIVERSION LOCATED NEAR INTERSECTION OF HINSON AND WINDMILL
  147     KM   "REFERENCED FROM BLUE DIAMOND/I-15 INTERCHANGE REPORT, BY PBS&J, JAN 2001"
  148     DT   DVBD7
  149     DI       0    1200    1500    1800    2100    2400    2700    3000
  150     DQ       0     800    1000    1200    1400    1600    1800    2000
          *

  151     KK   RPT4B
  152     KM   ROUTE BYPASS TO PT22W
  153     RM       1    0.11    0.15
          *

  154     KK    B14B
  155     BA   0.992
  156     PB    2.77
  157     LS       0    73.4     9.0
  158     UD    0.42
          *

  159     KK   PT22W
  160     KM   COMBINE PT4 AND BASIN B14B
  161     HC       2
          *
```

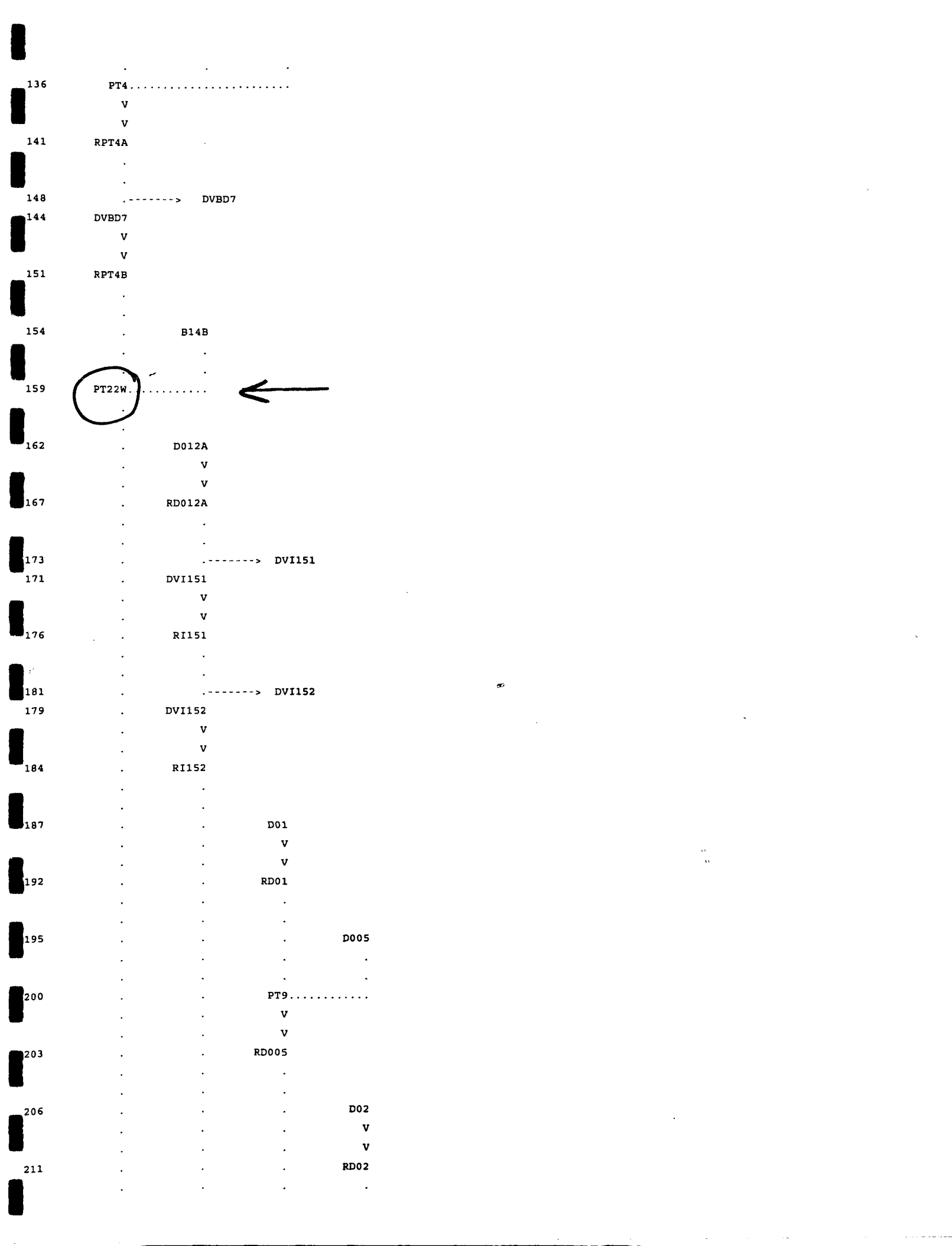
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW




136 PT4
141 RPT4A
148 DVBD7
144 DVBD7
151 RPT4B
154 B14B
159 PT22W.
162 D012A
167 RD012A
173 DVI151
171 DVI151
176 RI151
181 DVI152
179 DVI152
184 RI152
187 D01
192 RD01
195 D005
200 PT9
203 RD005
206 D02
211 RD02

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 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT	B13A	1.29	1	FLOW	988.	967.	933.	898.	884.	875.	868.	857.	843.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RB13A	1.29	1	FLOW	889.	870.	839.	807.	795.	786.	780.	770.	757.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.83	4.83
HYDROGRAPH AT	B13B	.54	1	FLOW	228.	223.	215.	207.	204.	201.	200.	197.	194.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
2 COMBINED AT	PT1	1.83	1	FLOW	1113.	1089.	1050.	1011.	995.	984.	976.	964.	948.
				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
UTED TO	RPT1	1.83	1	FLOW	1082.	1059.	1021.	982.	967.	956.	949.	937.	921.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
DROGRAPH AT	B17	.82	1	FLOW	428.	418.	402.	387.	381.	376.	373.	368.	362.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
2 COMBINED AT	PT2	2.64	1	FLOW	1379.	1350.	1301.	1252.	1232.	1219.	1209.	1193.	1174.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
VERSION TO	DVBD2	2.64	1	FLOW	504.	495.	481.	466.	460.	456.	453.	449.	443.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
DROGRAPH AT	DVBD2	2.64	1	FLOW	875.	855.	820.	786.	772.	763.	756.	745.	731.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
ROUTED TO	RPT2	2.64	1	FLOW	874.	853.	819.	785.	771.	761.	755.	744.	730.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
HYDROGRAPH AT	B13C	2.01	1	FLOW	1582.	1548.	1490.	1432.	1409.	1393.	1382.	1363.	1340.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	PT3	4.65	1	FLOW	1780.	1738.	1668.	1598.	1570.	1550.	1536.	1514.	1486.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO	DVBD3	4.65	1	FLOW	297.	296.	293.	291.	290.	290.	289.	288.	288.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DROGRAPH AT	DVBD3	4.65	1	FLOW	1483.	1442.	1375.	1307.	1280.	1261.	1247.	1226.	1199.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
UTED TO	RPT3A	4.65	1	FLOW	1471.	1429.	1361.	1293.	1267.	1249.	1235.	1214.	1186.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
VERSION TO	DVBD4	4.65	1	FLOW	249.	245.	238.	231.	229.	227.	226.	223.	221.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DROGRAPH AT	DVBD4	4.65	1	FLOW	1222.	1184.	1123.	1062.	1039.	1022.	1010.	990.	966.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
UTED TO	RPT3B	4.65	1	FLOW	1179.	1144.	1085.	1026.	1003.	986.	974.	956.	932.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DROGRAPH AT	B11S	1.12	1	FLOW	499.	484.	459.	435.	425.	419.	414.	406.	397.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DROGRAPH AT	HYDRO1	.63	1	FLOW	623.	623.	623.	623.	623.	623.	623.	623.	623.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
3 COMBINED AT	PT4	6.40	1	FLOW	2278.	2227.	2143.	2060.	2027.	2004.	1987.	1961.	1927.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO	RPT4A	6.40	1	FLOW	2197.	2148.	2067.	1986.	1954.	1932.	1916.	1890.	1858.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
DIVERSION TO	DVBD7	6.40	1	FLOW	1465.	1432.	1378.	1324.	1303.	1288.	1277.	1260.	1239.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT	DVBD7	6.40	1	FLOW	732.	716.	689.	662.	651.	644.	639.	630.	619.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
OUTED TO	RPT4B	6.40	1	FLOW	713.	697.	671.	645.	634.	627.	622.	613.	603.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
YDROGRAPH AT	B14B	.99	1	FLOW	454.	440.	417.	395.	385.	379.	375.	368.	359.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	PT22W	7.39	1	FLOW	915.	892.	856.	821.	806.	797.	789.	778.	764.
				TIME	4.33	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
YDROGRAPH AT	D012A	10.21	1	FLOW	3668.	3576.	3423.	3271.	3211.	3169.	3139.	3091.	3031.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
OUTED TO	RD012A	10.21	1	FLOW	3665.	3572.	3420.	3268.	3207.	3165.	3135.	3087.	3027.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
DIVERSION TO	DVI151	10.21	1	FLOW	1452.	1441.	1422.	1404.	1396.	1391.	1388.	1382.	1374.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
HYDROGRAPH AT	DVI151	10.21	1	FLOW	2212.	2131.	1997.	1864.	1811.	1774.	1748.	1705.	1652.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
ROUTED TO	RI151	10.21	1	FLOW	2205.	2124.	1991.	1858.	1805.	1768.	1742.	1700.	1647.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
DIVERSION TO	DVI152	10.21	1	FLOW	718.	699.	666.	635.	622.	613.	607.	597.	584.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
YDROGRAPH AT	DVI152	10.21	1	FLOW	1487.	1426.	1324.	1223.	1183.	1155.	1135.	1103.	1063.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
OUTED TO	RI152	10.21	1	FLOW	1470.	1409.	1309.	1209.	1169.	1141.	1122.	1090.	1051.
				TIME	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
YDROGRAPH AT	D01	9.54	1	FLOW	5256.	5131.	4923.	4717.	4634.	4577.	4536.	4470.	4389.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
OUTED TO	RD01	9.54	1	FLOW	4748.	4635.	4448.	4262.	4188.	4136.	4099.	4040.	3966.

LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

September 23, 2003

Mr. Thomas Buist, P.E.
WILLDAN
2725 East Desert Inn Road
Suite 100
Las Vegas, Nevada 89121

RE: Technical Drainage Study for Silverton Retail Phase I – Bass Pro Shop
HTE No. 03-23295
Lochsa Engineering Project No. 6923.2

Dear Mr. Buist:

The following are responses to comments regarding the Technical Drainage Study listed above.

Comment No. 1: The following comments pertain to the structural calculations and must be addressed:

a. Sheet SD-8: Calculations, page 13, shows #11 @ 12" o.c. bottom reinforcing and #9 @ 12" o.c. top. Detail D shows #9 @ 12" o.c. bottom and #5 @ 12" o.c. top. Revise plan.

Response 1a: Sheet SD-8 has been modified to show wall reinforcement as #11's @ 12" o.c. (1.56 in^2/ft). Page 13 of the structural calculations require 0.76 in^2/ ft for negative reinforcement and 0.85 in^2/ft for positive reinforcement. The wall reinforcement as shown on sheet SD-8 is detailed to provide the tensile steel for the top and bottom slabs in the negative moment regions.

b. Sheet SD-8: Calculations, page 27, shows the same reinforcing in the bottom slab as the top. Plan shows incorrect reinforcing. See Item A above. Revise plans.

Response 1b: Page 27 of the structural calculations require 0.95 in^2/ ft for negative reinforcement and 0.9 in^2/ft for positive reinforcement. The positive bending region (top surface of bottom slab) as shown on SD-8 is reinforced with #9's @ 12" o.c. (1.0 in^2/ft) See comment 1a for discussion of negative reinforcement and detailing.

c. Boxes are designed using 4,500 psi concrete. Specify special inspection for both concrete and reinforcement placement on plans.

Response 1c: Noted and included in added general notes.

d. Plans show epoxy dowels:

- Specify epoxy manufacturer and model on plans. Installation requirements vary by manufacturer.
- Specify both the hole diameter and minimum embedment as required by manufacturer on the plans.

Response 1d: **Noted and included in added general notes.**

e. Details E and F/SD-8: Provide dimension for depth of beam on plan. Page 35 of calculations shows 4'.

Response 1e: **Beam dimension not required. Transition structure height indicated as height of tallest RCB = 6'. The shortest RCB = 3'. The beam dimension is equal to the difference of the two plus the top slab thickness (12"). The bottom of the top slab must remain flush with the bottom of the top slab of the tallest RCB in order to achieve constant flow.**

f. Specify special inspection for epoxy installation.

Response 1f: **Noted and included in the added general notes**

g. Sheet SD-8: Calculations call for #11 @ 12" o.c. for the box walls. Detail D shows "#8 @ 12" o.c. vertical outside layer" then shows arrow pointing to both inside and outside face steel. Coordinate plans and calculation.

Response 1g: **Section D/8 has been modified to show #11's @ 12" o.c. each face.**

h. Sheet SD-8: Top and bottom slabs are designed for a 16' span. Clear span on plan is 12'. Side walls are designed as 9' span. Clear span on plan is 6'. Clarify why large difference in dimensions.

Response 1h: **At the time of design, dimensions were scaled from the drawings with lack of exact knowledge of intersecting RCB's. The used for design were taken conservatively.**

i. Sheet SD-7: Calculations, page 48, requires 0.41 square inch of reinforcement in the 7' span for the top slab. Detail A shows #4 @18" o.co. top or 7' square inch per foot of width. Bottom requires 0.74 square inch per foot of width and shows 0.07 square inch. Revise plan.

Response 1i: **New steel requirements have been calculated for increased span length of top and bottom slabs per comment 1j and 1k. See attached calculations and revised detail A/7. Refer to responses to comments 1a and 1b in regard to tensile steel used in negative moment regions.**

j. Page 51 of calculations is shown for "top slab spanning other direction" and shows a 6' span. This design matches steel requirements for a 6' span on plans. This appears to conflict with item (i) above in that the design in the calculations on pages 37-50 are for a 7.7' span. Plan shows span in long direction as 9' - 8" clear. Clarify and coordinate calculations.

Response 1j: **Refer to response 1i.**

k. Pages 52-65 of calculations for design have the same concerns with regards to span and required steel top and bottom as Items i and j above. Review and coordinate plans and calculations.

Response 1k: **Refer to response 1i.**

l. Pages 66 - 69 of calculations: Clarify span used in design of side wall of box.

Response 1l: **The side wall span is equal to 6'-4". This dimension is the tallest RCB height intersecting a typical junction structure (5'-6") plus the distance to the centerline of the 10" top and bottom slabs (10").**

m. Detail 41, Sheet SD-7, specifies detail H/8 for inlet of RCB. This detail shows top of box and top of RCB as flush. No beam or dotted line should be shown on Detail 41. Revise plan.

Response 1m: **The junction structure at station 10+88.26 shows a 3' tall RCB connecting to a 5'-6" RCB. In this case a beam is present on one side. Detail 41/SD7 has been modified to reflect this condition.**

n. Page 70 of calculations is designed for a 7' span. Plans shown an 8' span. Revise design and details.

Response 1n: **Wu = 8k/ft, WuL^2/12 with L = 8' = 42.67k'= 512k". Per calculation sheet 70 Mn = 1242k". The section has sufficient strength for increased span length.**

o. Detail C/7: Show depth of beam on plan.

Response 1o: **Refer to response 1e.**

p. Recommend providing a standard structural note sheet with the plan set clarifying concrete, reinforcing, epoxy and soils.

Response 1p: **Noted and sheet added.**

Comment No. 2: Show a 35-foot wide underground easement to be publicly maintained for Line A;

Response No. 2: **The plans have been revised to indicate the 35-foot underground easement for Line A;**

Comment No. 3: Delineate the limits of the 191-foot to 632-foot drainage easement to be privately maintained on sheets PG-7 through PG-10;

Response No. 3: **The plans have been revised to show the limits of the drainage easements; Copies of the revised grading plans are provided with this submittal.**

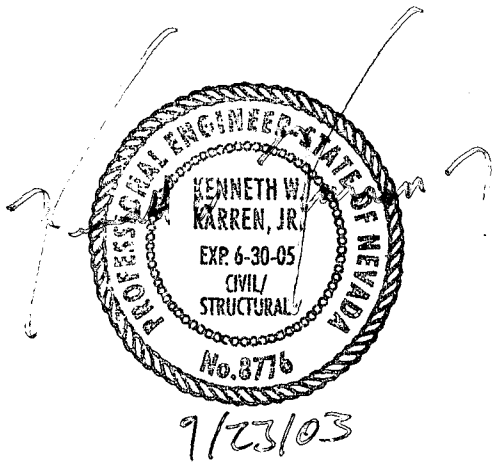
If you have any further questions or concerns please feel free to contact us.

Sincerely,

LOCHSA ENGINEERING

Cameron Sankovich

Hani M. Noshi, Ph.D., P.E.
Director of Flood Control and Drainage



WILLDAN
Consulting Professional Services

2735 E. Desert Inn Road, Suite 100
Las Vegas, Nevada 89121
(702) 734-3001 Fax (702) 734-0888
www.willdan.com

FAX MEMORANDUM

TO: Hani Noshi, P.E./Lochsa Engineering

FROM: Thomas R. Buist, P.E. cos for ORB
Isabel Pennington IP

DATE: September 18, 2003

OFFICE: Las Vegas

SUBJECT: **Technical Drainage Study** for Silverton Retail Phase I – Bass Pro Shop **(4319)**
H.T.E.# 03-23295

This memo is being faxed in lieu of a typical mailed memorandum in order to expedite the review process. The following items are required in order to produce an approval memorandum for the above referenced **Technical Drainage Study**:

1. The following comments pertain to the structural calculations and must be addressed:

   a. Sheet SD-8: Calculations, page 13, shows #11 @ 12" o.c. bottom reinforcing and #9 @ 12" o.c. top. Detail D shows #9 @12" o.c. bottom and #5 @ 12" o.c. top. Revise plan.

   b. Sheet SD-8: Calculations, page 27, shows the same reinforcing in the bottom slab as the top. Plan shows incorrect reinforcing. See Item a above. Revise plans.

   c. Boxes are designed using 4,500 psi concrete. Specify special inspection for both concrete and reinforcement placement on plans.

   d. Plans show epoxy dowels:

      - Specify epoxy manufacturer and model on plans. Installation requirements vary by manufacturer.
      - Specify both the hole diameter and minimum embedment as required by manufacturer on the plans.

WILLDAN

e. Details E and F/SD-8: Provide dimension for depth of beam on plan. Page 35 of calculations shows 4'.

f. Specify special inspection for epoxy installation.

g. Sheet SD-8: Calculations call for #11 @ 12" o.c. for the box walls. Detail D shows "#8 @ 12" o.c. vertical outside layer" then shows arrows pointing to both inside and outside face steel. Coordinate plans and calculation.

h. Sheet SD-8: Top and bottom slabs are designed for a 16' span. Clear span on plan is 12'. Side walls are designed as 9' span. Clear span on plan is 6'. Clarify why large difference in dimensions.

i. Sheet SD-7: Calculations, page 48, requires 0.41 square inch of reinforcement in the 7' span for the top slab. Detail A shows #4 @ 18" o.c. top or 0.07 square inch per foot of width. Bottom requires 0.74 square inch per foot of width and shows 0.07 square inch. Revise plan.

j. Page 51 of calculations is shown for "top slab spanning other direction" and shows a 6' span. This design matches steel requirements for a 6' span on plans. This appears to conflict with Item (i) above in that the design in the calculations on pages 37 - 50 are for a 7.7' span. Plan shows span in long direction as 9'-8" clear. Clarify and coordinate calculations.

k. Pages 52 - 65 of calculations for design have the same concerns wth regards to span and required steel top and bottom as Items i and j above. Review and coordinate plans and calculations.

l. Pages 66 - 69 of calculations: Clarify span used in design of side wall of box.

m. Detail 41, Sheet SD-7, specifies detail H/8 for inlet of RCB. This detail shows top of box and top of RCB as flush. No beam or dotted line should be shown on Detail 41. Revise plan.

WILLDAN
Serving Public Agencies

n. Page 70 of calculations is designed for a 7' span. Plans show an 8' span. Revise design and details.

o. Detail C/7: Show depth of beam on plan.

p. Recommend providing a standard structural note sheet with the plan set clarifying concrete, reinforcing, epoxy and soils.

2. Show a 35-foot wide underground drainage easement to be publicly maintained for Line A;

3. Delineate the limits of the 191-foot to 632-foot drainage easement to be privately maintained on sheets PG-7 through PG-10;

Two copies of the supplemental information must be submitted directly to WILLDAN.

The items listed herein must be thoroughly addressed and submitted for review within 5 days of the above date.

cc: Phu Simpson, Dave Betley, P.E. / CCDSD
Silverton Hotel and Casino

REVISED STRUCTURAL CALCULATIONS

REVISED TOP SLAB TYPICAL JUNCTION STRUCTURE

```
 pppppp    ccccc    aaaaa
 p     p  c     c  a     a
 p     p  c     c        a
 p     p  c           aaaaa
 p     p  c     c  a     a
 p     p  c     c  a     a
 pppppp    ccccc    aaaaa
 p
 p

  AAA    DDDDD      OOO     SSSSS    SSSSS
 A   A   D    D    O   O   S     S  S     S
A     A  D     D  O     O  S        S
AAAAAAA  D     D  O     O   SSSSS    SSSSS
A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
A     A  D    D    O   O   S     S  S     S   (   t   m m m m   )
A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

FILE NAME C:\PROGRA~1\ADOSS\DATA\TYPJUNC.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox typ MH

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.00 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

SPAN/LOADING DATA

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	10.0	.5	.5	6	1.0	1.0	480.0	240.0
2	10.3	10.0	.5	.5	6	1.0	1.0	480.0	240.0
3*	.3+	10.0	.5	.5	6	1.0	1.0	480.0	240.0

* -Indicates cantilever span information.
** -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
"E"-Indicates exterior strip.
\+ -Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA

SPAN No.	LOAD No.	TYPE	PARTIAL DEAD LOADS Wa	Wb	La	Lb	LOAD No.	TYPE	PARTIAL LIVE LOADS Wa	Wb	La	Lb
1*												
2							1	CONC	3.2	.0	5.2	.0
3*												

* -Indicates cantilever span information.

UNITS FOR:
UNIFORM LOAD: Wa.....plf La & Lb... ft
CONCENTRATED LOAD: Wa.....kips La..... ft
TRAPEZOIDAL LOAD: Wa & Wb..plf La & Lb... ft
MOMENT: Wa.....ft-k La..... ft
NOTE: Local effects of partial loadings are NOT considered by ADOSS, compute manually.

COLUMN/TORSIONAL DATA

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
* -Strip width used for negative flexure.
**-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

* -Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

OUTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

OUTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 6.486 kips
LIVE LOAD = 5.839 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.2	-4.0	.0
	LIVE	2.1	-3.4	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.2	-4.0	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.2	-4.0	.0
	LIVE	2.1	-3.4	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.2	-4.0	.0
	LIVE	2.8	-4.6	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.2	4.0	.0
	LIVE	2.3	3.6	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.2	4.0	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.2	4.0	.0
	LIVE	2.2	3.6	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.2	4.0	.0
	LIVE	3.0	4.8	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	14.9	.0	-14.8	-.1	5.2	.0	-5.2
2	-15.3	.1	.0	15.3	-5.2	.1	.0	5.2

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	14.9	.0	-14.9	-.1	18.1	.0	-18.1
2	-15.3	.0	.0	15.3	-18.7	.1	.0	18.6

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.4	9.8	-.4	4.0	-.2	9.8	-.4	11.7
2	-10.2	.4	-4.0	.4	-10.2	.2	-12.3	.4

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	.0	.058	4	.333	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	14.3	.333	4	1.549	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-14.7	.333	4	1.549	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.0	.058	4	.333	1
			BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	5.423	TOP	.0	0	.000	0	.000	0
			BOT	24.3	4	3.874	1	3.357	1

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	.0	.0	(0)	.0	(0)	.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	14.3	.0	(0)	.0	(0)	14.3	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-14.7	.0	(0)	.0	(0)	-14.7	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.0	.0	(0)	.0	(0)	.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	5.42 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	24.3	.0	(0)	.0	(0)	24.3	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
1	4		R	14.3	.44	1.0
2	4	L		-14.7	.45	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
2	4	5.4	24.3	.84	1.0

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.84*	.79	17.1

* - Indicates REQ'D reinforcement is greater than PROV'D (check bar selection)

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	1000.	-.001	-.001	-.003	Not applicable		
2	1000.	.015	.021	.036	Not applicable		
3	1000.	-.001	-.001	-.003	Not applicable		

* Program completed as requested *

REVISED BOTTOM SLAB TYPICAL JUNCTION STRUCTURE

```
pppppp    ccccc    aaaaa
p     p  c     c  a     a
p     p  c     c        a
p     p  c          aaaaaa
p     p  c     c  a     a
p     p  c     c  a     a
pppppp    ccccc    aaaaaa
p
p
```

```
  AAA     DDDDD      OOO     SSSSS    SSSSS
 A   A    D    D    O   O   S     S  S     S
A     A   D     D  O     O  S        S
AAAAAAA   D     D  O     O   SSSSS    SSSSS
A     A   D     D  O     O        S        S    ( ttttt mm   mm  )
A     A   D    D    O   O   S     S  S     S   (   t   m m m m   )
A     A   DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

FILE NAME C:\PROGRA~1\ADOSS\DATA\TYPJUNC2.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox typ MH

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.00 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

SPAN/LOADING DATA

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0
2	10.3	10.0	.5	.5	6	1.0	1.0	630.0	500.0
3*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0

* -Indicates cantilever span information.
** -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
"E"-Indicates exterior strip.
\+ -Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA

PARTIAL LOADINGS ARE NOT SPECIFIED

COLUMN/TORSIONAL DATA

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
* -Strip width used for negative flexure.
**-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

* -Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA

****

LATERAL LOADS ARE NOT SPECIFIED

OUTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

OUTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 8.136 kips
LIVE LOAD = 5.498 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.1	-5.0	.0
	LIVE	2.1	-2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.1	-5.0	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.1	-5.0	.0
	LIVE	1.9	-2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.1	-5.0	.0
	LIVE	2.7	-3.3	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.1	5.0	.0
	LIVE	2.1	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.1	5.0	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.1	5.0	.0
	LIVE	1.9	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.1	5.0	.0
	LIVE	2.7	3.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	13.6	.0	-13.5	-.1	6.5	.0	-6.4
2	-13.6	.1	.0	13.5	-6.5	.1	.0	6.4

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	13.5	.0	-13.5	-.1	15.9	.0	-15.8
2	-13.5	.0	.0	13.5	-15.9	.1	.0	15.8

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.6	10.5	-.6	5.0	-.3	10.5	-.7	12.3
2	-10.5	.6	-5.0	.6	-10.5	.3	-12.3	.7

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	-.1	.058	4	.333	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	11.9	.333	4	1.549	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-11.9	.333	4	1.549	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.1	.058	4	.333	1
			BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	5.423	TOP	.0	0	.000	0	.000	0
			BOT	16.0	4	3.874	1	3.357	1

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.1	.0	(0)	.0	(0)	-.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	11.9	.0	(0)	.0	(0)	11.9	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-11.9	.0	(0)	.0	(0)	-11.9	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.1	.0	(0)	.0	(0)	.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	5.42 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	16.0	.0	(0)	.0	(0)	16.0	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
1	4		R	11.9	.37	1.0
2	4	L		-11.9	.37	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
2	4	5.4	16.0	.53	1.0

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.53	.60	27.9

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	1000..	-.002	-.001	-.003	Not applicable		
2	1000.	.019	.013	.032	Not applicable		
3	1000.	-.002	-.001	-.003	Not applicable		

* Program completed as requested *

Project: Silverton Expansion Phase 1-Bass Pro Shop
Project Number: 6923.2

Date: August 2003

Drop Inlet Capacity To Drain Basins DI-1, DI-2, DI-3 and DI-4

Orifice Equation: Q=KCA(2gh)^0.5

Side Opening		**Grate**	
Length of Opening (Ls)(ft):	4.0	Length of Opening (Lg)(ft):	2.5
Orifice Coefficient (Cs):	0.67	Orifice Coefficient (Cg):	0.70
Clogging Factor (Ks):	0.50	Clogging Factor (Kg):	0.50
		Effective Area Coeficient =	0.75
		*** As = 0.75 x Lg x 1.5 ft (grate width)**	

Depth of Flow (ft)	Head Above Side Opening (Hs) (ft)	Area of Side Opening (As) (sf)	Flow into Side Opening (Qs) (cfs)	Head Above Grate (Hg) (ft)	Area of Grate (As) (sf)	Flow into Grate (Qs) (cfs)	Total Flow (Qt) (cfs)	
0.10	0.1	0.4	0	0.1	2.8	2	3	**<---DI-1**
0.15	0.1	0.6	0	0.2	2.8	3	4	**<---DI-2, Portion of DI-3**
0.25	0.1	1.0	1	0.3	2.8	4	5	**<---DI-4**
0.35	0.2	1.4	2	0.4	2.8	5	6	**<---Proposed DI in Industrial Road**
0.45	0.2	1.8	2	0.5	2.8	5	8	**will intercept the eastern half**
0.55	0.3	2.0	3	0.6	2.8	6	9	**of Basin INDUST(7/12cfs)**
0.65	0.4	2.0	3	0.7	2.8	6	10	**When the western portion is improved,**
0.75	0.5	2.0	4	0.7	2.8	7	11	**a second DI should be installed**
0.85	0.6	2.0	4	0.8	2.8	7	11	
0.95	0.7	2.0	4	0.9	2.8	8	12	
1.05	0.8	2.0	5	1.1	2.8	8	13	
1.15	0.9	2.0	5	1.2	2.8	8	14	

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

October 14, 2003

Gale Wm. Fraser, II, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Chip Maxfield
Vice-Chairman
Clark County

Shari Buck
City of North Las Vegas

Karla Burton
City of Boulder City

Mayor James Gibson
City of Henderson

Michael Mack
City of Las Vegas

Mayor Bill Nicholes
City of Mesquite

Bruce L. Woodbury
Clark County

Mr. Dave Betley, P.E.
Department of Development Services
500 S. Grand Central Parkway
Las Vegas, NV 89155

DISTRICT CONCURRENCE: SILVERTON RETAIL PHASE 1 – BASS PRO SHOPS (HTE #033-23295) (RFCD NO. 03-5457)

Dear Mr. Betley:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated August 5, 2003, Addendum No, 1 dated September 3, 2003, Supplement No. 1 dated September 12, 2003 and Supplement No. 2 dated September 23, 2003, for the above-mentioned project as submitted by Lochsa Engineering. In addition, District is in receipt of the Conditional Letter of Acceptance from Clark County Public Works dated October 1, 2003.

District concurs with acceptance of this Technical Drainage Study by Clark County 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, the site resides in a Special Flood Hazard Area (SFHA) designated as "Zone AE" 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, information submitted by Lochsa Engineering 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 of 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: Hani M. Noshi, P.E., Lochsa Engineering

File: 22-61-17.LOC

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870
Website: *http://www.ccrfcd.org*

Land Development Report

10/14/2003

5457

Development:	SILVERTON RETAIL PHSE 1 - BASS PRO SHOPS			
Property Owner:	SILVERTON HOTEL & CASINO	**Incomplete Submittal**	No	
Date Recorded:	10/02/2003	**Pending Entity Approval**	No	
Entity Number:	HTE #03-23295	**Additional Info Request**	No	
Development Type:	COMMERCIAL	**Comment:**	No	
Entity:	CLA	**Ready to Review:**	No	10/06/2003
Review Type:	TECHNICAL	**Prev Reviewed:**	No	
Firm Name	LOCHSA ENGINEERING	**Scanned**	No	
Responsible Eng:	HANI M NOSHI PE (702) 365 9312	**Other:**	No	
Firm Address:	5828 SPRING MOUNTAIN RD STE 308 LV NV 89102	**Approval Date:**	10/01/2003	
Township:	22	**Comment Date:**		
Range:	61	**Concurrence Date:**	10/14/2003	
Section:	17 LOC			

	Doc Date	Received Date		Doc Date	Received Date
Study	08/05/2003	10/02/2003	**Entity Comment I**		
Addendum I	09/03/2003	10/02/2003	**Entity Comment II**		
Addendum II			**Entity Comment I**		
Addendum III			**Entity Approval**	10/01/2003	10/06/2003
Addendum IV			**RFCD Comment**		
Addendum V			**Letter I**		
Supplement I	09/12/2003	10/02/2003	**Letter II**		
Supplement II	09/23/2003	10/02/2003	**Letter III**		
Supplement III	09/30/2003	10/02/2003	**Letter IV**	10/14/2003	
Plan I	10/04/2003	10/13/2003	**Letter V**		
Plan II					
Plan III					

22-61-17.10C

Department of Development Services
Civil Engineering Division

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

Phil Rosenquist, Director • Carla J. Pearson, Assistant Director

October 1, 2003

Rec. 10-2-03
MLH

Lochsa Engineering
5828 Spring Mountain Road, #308
Las Vegas, NV 89102

Dear Sirs:

SUBJECT: WILLDAN / Clark County Development Services Dept. Plan Review Contract
Technical Drainage Study for Silverton Retail Phase I - Bass Pro Shop
(4319)
Study Dated: August 5, 2003
Addendum Dated: September 3, 2003
First Supplemental Dated: September 12, 2003
Second Supplemental Dated: September 23, 2003
Supplemental Information Received: September 30, 2003 ?
Location: Southwest corner of Blue Diamond Road and I-15 Interchange
(Sec. 17, T. 22 S., R. 61 E.)
HTE #03-23295

The referenced **Technical Drainage Study** has been reviewed and is accepted as complying with minimum improvement standards. As set forth in the subject drainage study, the following measures will be taken to mitigate flood hazards.

1. As indicated in the addendum to the technical drainage study, FEMA must be notified for any changes to the special flood hazard area. In addition, a CLOMR application must be submitted prior to grading permit issuance. Approval of the CLOMR is required prior to Certificates of Occupancy. Approval of LOMR by FEMA is required prior to release of bond. Bond to include $40,000 for LOMR approval;

2. The site shall be graded with respect to drainage as shown on Silverton Expansion Phase I Grading Plan, Bass Pro Shops," sheets PG-1 through PG-17 of 17and SD-1 through SD-9 of 9, signed and sealed by Fred K. Cornwell, P.E., on September 22, 2003, and as shown on "Industrial Road Improvements, sheets C2.01 and C2.02, signed and sealed by Mark L. Hedge, P.E., on September 3, 2003;

BOARD OF COUNTY COMMISSIONERS
MARY KINCAID-CHAUNCEY, Chair • CHIP MAXFIELD, Vice-Chairman
YVONNE ATKINSON GATES • MARK A. JAMES • RORY REID • MYRNA WILLIAMS • BRUCE L. WOODBURY
THOM REILLY, County Manager

3. The following drainage facilities shall be constructed:

   a. An onsite storm drain system (Line A) within a 35-foot wide underground drainage easement to be publicly maintained beginning near the northwest corner of the proposed site and exiting south and east to the existing RCB beneath I-15. The storm drain system will consist of the following facilities:

      - A 40-foot long modified Type C drop inlet with 13 grates (station 9+98.86)
      - Approximately 86 lf of 7' x 3' precast RCB
      - Approximately 841 lf of 8' x 5.5' precast RCB
      - Junction structure (station 19+49.61)
      - Approximately 185 lf of 12' x 6' precast RCB
      - NDOT concrete headwall at outlet
      - 4 storm drain manholes

   b. A storm drain system (Line B) located within a 40-foot wide underground drainage easement to be publicly maintained crossing Industrial Road and continuing onsite easterly and northerly tying into Line A, mentioned in 3(a), at the junction structure. The storm drain system will consist of the following facilities:

      - NDOT concrete headwall at the inlet west of Industrial Road
      - Approximately 18 lf of double 7' x 3' precast RCB west of Industrial Road
      - Approximately 80 lf of double 7' x 3' precast RCB beneath Industrial Road
      - Approximately 697 lf of double 7' x 3' precast RCB onsite
      - 6 storm drain manholes

   c. A rip-rap pad at the outlet of Line A mentioned in 3(a) as shown on sheet PG-6, with the following dimensions:

      d_{50} = 6 inches
      Thickness = 12 inches

d. Approximately 31 lf of 24-inch RCP lateral and 4-foot long Type C drop inlet in Industrial Road at station 10+98

e. A 5-foot wide concrete u-channel and rip-rap pad (d_{50} = 6-inches, thickness = 12-inches) near the northeast corner of the project site within NDOT right-of-way as shown on sheet PG-4

f. A 5-foot wide concrete u-channel and rip-rap pad (d_{50} = 6-inches, thickness = 12-inches) located north of the RCB outlet within NDOT right-of-way as shown on sheet PG-6

g. A 5-foot wide concrete u-channel and rip-rap pad (d_{50} = 6 inches, thickness = 12-inches) located in the southern portion of the site within NDOT right-of-way as shown on sheet PG-8

h. A drainage easement to be privately maintained varying in width from 191 feet to 632 feet will be dedicated onsite as shown on sheets PG-7 through PG-10

i. Onsite 24-inch RCP and 18-inch RCP laterals and five Type C drop inlets conveying flows to Line A mentioned in 3(a) as shown on the grading plans

j. Onsite 3-foot wide valley gutters and 1.5-foot u-channels as shown on the plans

4. A bond estimate must be submitted to Clark County Civil Engineering Division for the above-mentioned stormwater management facilities, except items 3(i) and 3(j);

5. The minimum finished floor elevation for the proposed structure with the designated Base Flood Elevation (BFE) shall be constructed as shown on the above-mentioned grading plans;

6. As a condition of final approval, a waiver to allow the finished floor elevation of the building to be set below the current Clark County criteria must be approved;

7. The subject site is located within Zone AE, as shown on FIRM Community-Panel Number 320003C2566E, revised September 27, 2002 and revised to reflect LOMR dated August 13, 2003. Zone AE is subject to inundation by the 1% annual chance flood event. Base flood elevations have been determined by FEMA;

8. Clark County Regional Flood Control District (CCRFCD) concurrence is required since the site lies within a FEMA designated Special Flood Hazard Area and is adjacent to existing and proposed master planned facilities. As a condition of final approval, the applicant must submit a copy of the drainage study and any addenda to the CCRFCD. Permits will not be issued until concurrence is obtained from the CCRFCD;

9. Mylars of the grading plan must be submitted to the Clark County Civil Engineering Division Plan Check for approval signatures prior to permit issuance;

10. The grading plan will be reviewed by the Building Office Operations Division to ensure compliance with the handicap access requirements. Revisions to the grading plan may be required if the site accessibility design does not comply with the requirements set forth in the Accessibility Chapter of the Clark County Building Code;

11. The project proposes structures located within a Special Flood Hazard Area. A FEMA Elevation Certificate, completed by a licensed surveyor, must be submitted to and approved by Clark County Civil Engineering Division Plan Check prior to the issuance of Certificates of Occupancy for those structures;

12. Nevada Department of Transportation (NDOT) concurrence is required for the work being performed in NDOT ROW;

13. Right-of-way dedication must be verified;

14. Section 2 of the Clark County Building Office Operations Division Drainage Compliance Report must be completed by the engineer for the facilities listed in Item 3 above;

15. As a condition of final approval, the site must be delineated on the most recent FIRM dated September 22, 2002 and revised to reflect LOMR dated August 13, 2003;

16. At the request of Clark County Development Services Department, drainage/grading plans for the proposed development have been reviewed for compliance to the requirements set forth in the "Minimum Drainage Study Criteria Checklist," "Drainage Plan Information," dated July 15, 1997. **As a condition of final approval, the drainage/grading plans submitted for this project require the following modifications to meet the minimum standards outlined in the above-referenced regulation:**

    a. Indicate 174.25 lf of 8-foot by 5.5 foot RCB between station 10+91.26 and 12+65.51

    b. Revise HGL ult to HGL int shown on sheet SD-3 upstream of station 13+88.78

No liability is assumed by the County for information, data, and conclusions of the consulting engineer.

DEPARTMENT OF DEVELOPMENT SERVICES

BY: Valerie Flock

Valerie Flock, P.E.
Senior Civil Engineer
Civil Engineering Division

VF/gh/IP/bk

cc: Silverton Hotel and Casino
Development File

WILLDAN
Serving Public Agencies

2251 Corporate Circle, Suite 100
Las Vegas, Nevada 89121
702/734-1001 fax 702/734-0888
www.willdan.com

FAX MEMORANDUM

TO: Hani Noshi, P.E./Lochsa Engineering

FROM: Thomas R. Buist, P.E. TRB
Isabel Pennington IP

DATE: September 12, 2003

OFFICE: Las Vegas

SUBJECT: **Technical Drainage Study** for Silverton Retail Phase I – Bass Pro Shop **(4319)**
H.T.E.# 03-23295

This memo is being faxed in lieu of a typical mailed memorandum in order to expedite the review process. The following items are required in order to produce an approval memorandum for the above referenced **Technical Drainage Study**:

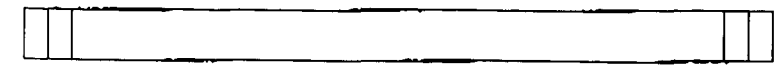
1. Per a conversation between Tom Buist, P.E., and your structural engineer on September 11, 2003, a complete and comprehensive set of structural calculations must be provided. The structural calculations provided are not applicable to this project and the calculation sheets were disorganized and could not be reviewed at this time. The engineer indicated that complete and coordinated calculations would be provided;

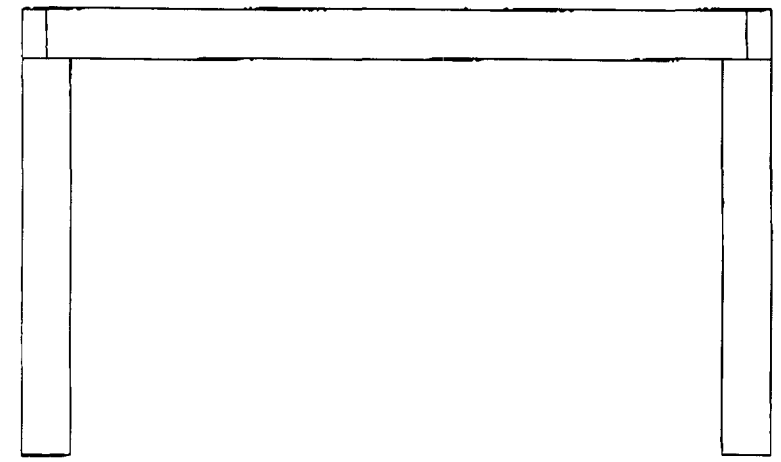
Two copies of the supplemental information must be submitted directly to WILLDAN.

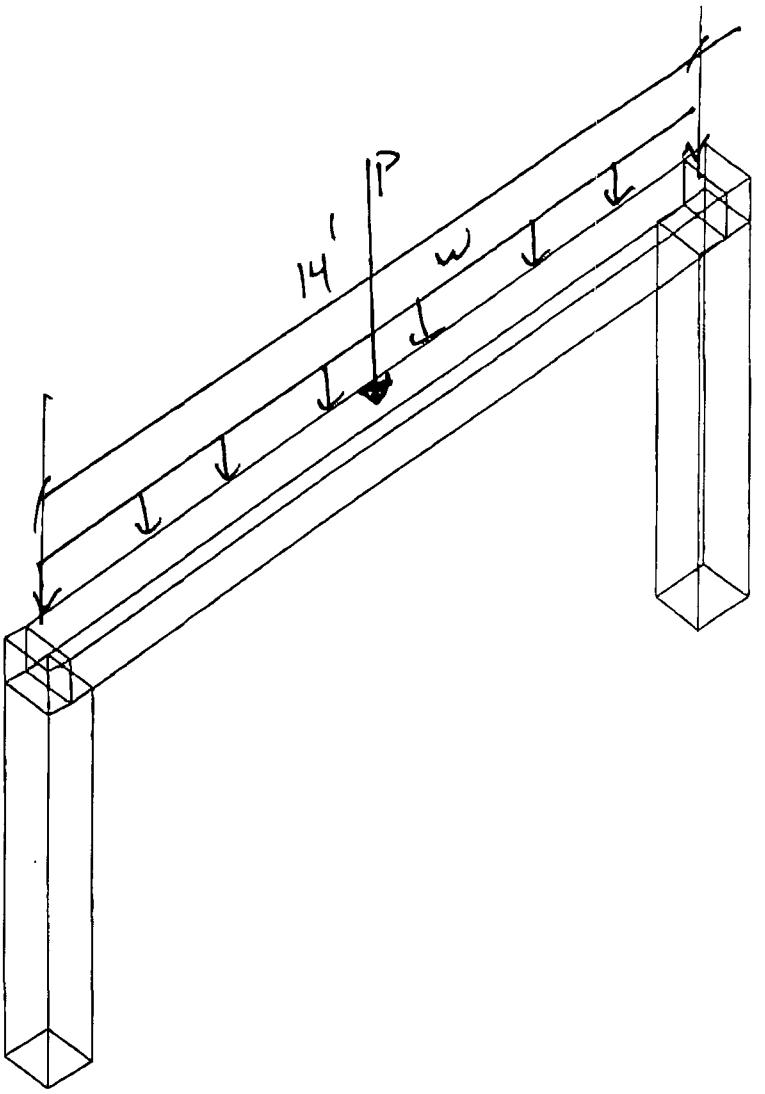
The items listed herein must be thoroughly addressed and submitted for review within 5 days of the above date.

cc: Phu Simpson, Dave Betley, P.E. / CCDSD
Silverton Hotel and Casino

Supplement #3 dated 9/30/03

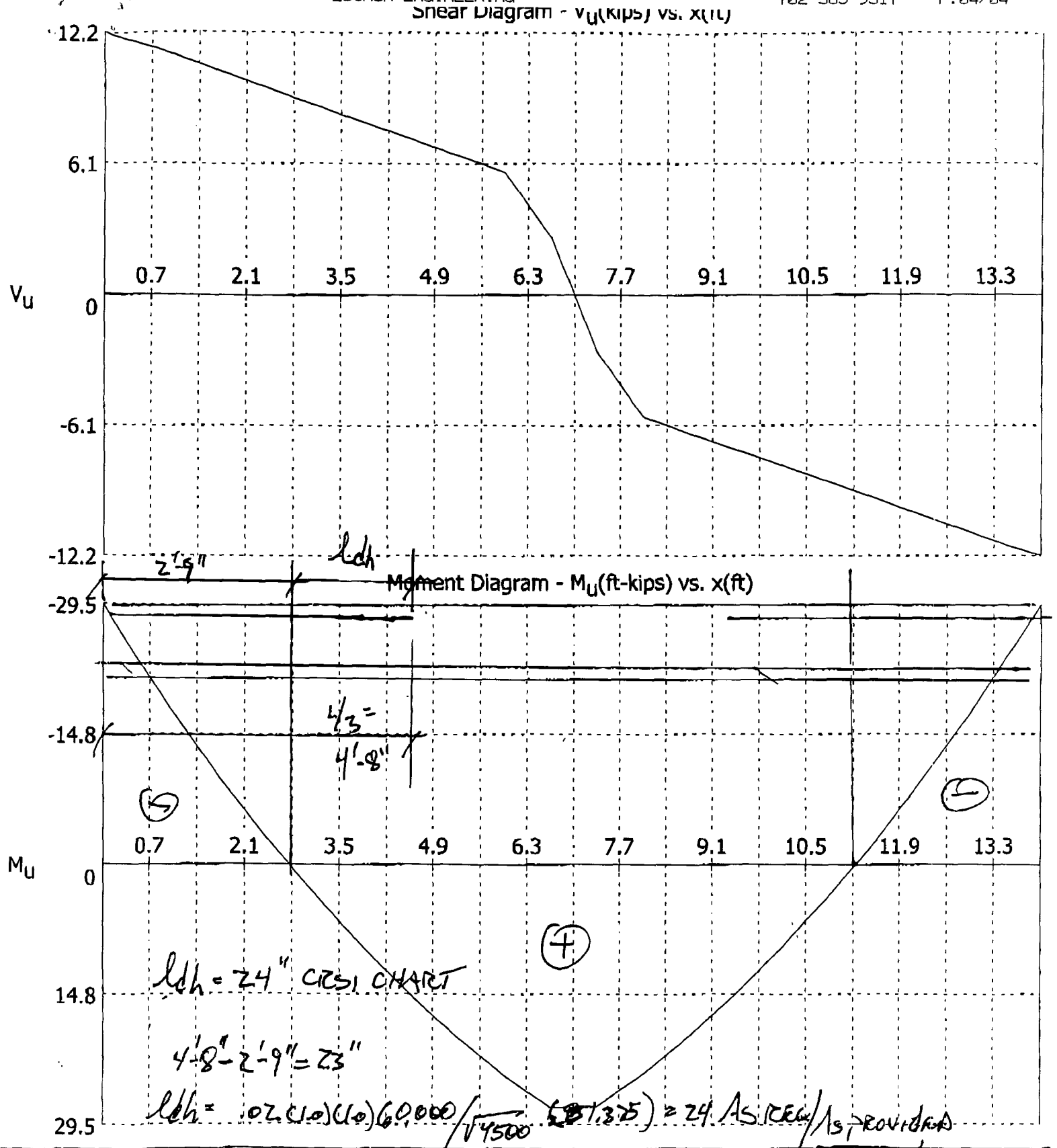






Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA-1\ADOSS\DATA\1920TOP.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab



l_{dh} = 24" CRSI CHART

4'-8" − 2'-9" = 23"

$l_{dh} = .02(1.0)(1.0)60{,}000/\sqrt{4500}\,(1.375) = 24$ AS REQ'D / AS PROVIDED

$= 24"\,(0.57/1.56) =$

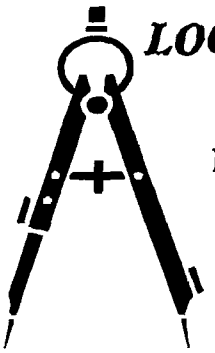
$= 24\,(0.36) = 8.7"$ OR

14' SPAN

(ACI 318-02 12.5.3 a.d)

Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\1920TOP.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/28/2003 Time: 15:58:36



LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

FAX COVER SHEET

Date: 9-29-03

PLEASE DELIVER TO:

NAME: TOM BUIST

FIRM: WILLDAN

FAX NO.: 734-0888

SENT BY:

NAME: CAMERON S.

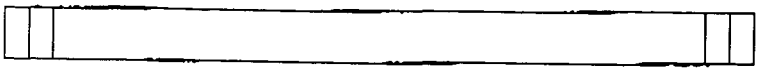
JOB # 6923.2

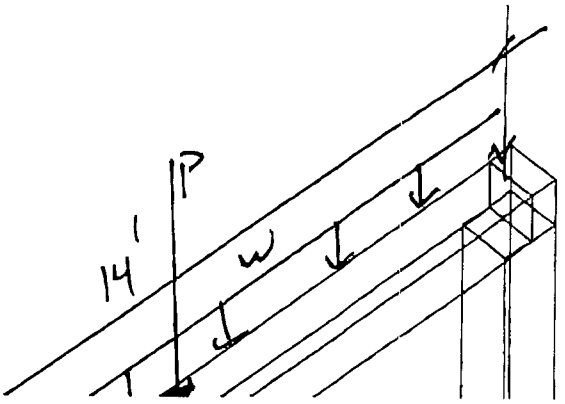
JOB NAME: BASS PRO SHOP

SUBJECT: REVIEW COMMENTS

COMMENTS: PLEASE CALL IF YOU HAVE ANY FURTHER QUESTIONS OR CONCERNS

WE ARE TRANSMITTING 3 PAGES INCLUDING THIS COVER SHEET. IF YOU HAVE NOT RECEIVED THIS TRANSMISSION COMPLETELY, PLEASE CONTACT US AT (702) 365-9312 OR FAX US AT (702) 365-9317.
THANK YOU, **LOCHSA ENGINEERING**




P
14'
w

LOCHSA ENGINEERING
5828 Spring Mountain Rd.
Suite 308
Las Vegas, Nevada 89146

ATTACHMENT TO ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR SILVERTON RETAIL PHASE I BASS PRO SHOP (HTE # 03-23295)

REVISED STRUCTURAL CALCULATIONS

LOCHSA ENGINEERING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 1 of ____
Project Bass Pro Shops Job No. _____
_____ Date _____
_____ Engineer CS

TABLE OF CONTENTS

TRANSITION STRUCTURE "A-30"

LOADS TO TOP & BOTTOM SLAB	1
TOP SLAB DESIGN	2
BOTTOM SLAB DESIGN	16
DESIGN IN SIDE WALL LOADING	30
SIDE WALL DESIGN	31
IN-WALL BEAM DESIGN	35

TYPICAL MANHOLE TRANSITION STRUCTURE

LOADS TO TOP SLAB, BOTTOM SLAB, & SIDE WALL	36
TOP SLAB DESIGN	37
TOP SLAB SPANNING OTHER DIRECTION	51
BOTTOM SLAB DESIGN	52
SIDE WALL DESIGN	66
IN-WALL BEAM DESIGN	70

STRUCTURAL CONTACT AT LOCHSA ENGINEERING
CAMERON SANKOVICH
702-365-9312
CAMERON@LOCHSA.COM

PROFESSIONAL ENGINEER-STATE OF NEVADA
KENNETH W. KARREN, JR.
EXP. 6-30-05
CIVIL/ STRUCTURAL
No. 8775

LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 1 of ____
Project _____ Job No. ____
_____ Date ____
_____ Surveyor ____

AASHTO LOAD FACTORS

$1.3(1.0DL + 2.2(1.3)LL) + IE)$

TRANSITION STRUCTURE STA 14-20 TOP SLAB

TOP SLAB

DL

1.5' FILL = $120(18/12) = 180$ PSF

LL

2'-SURCHARGE = 240 PSF

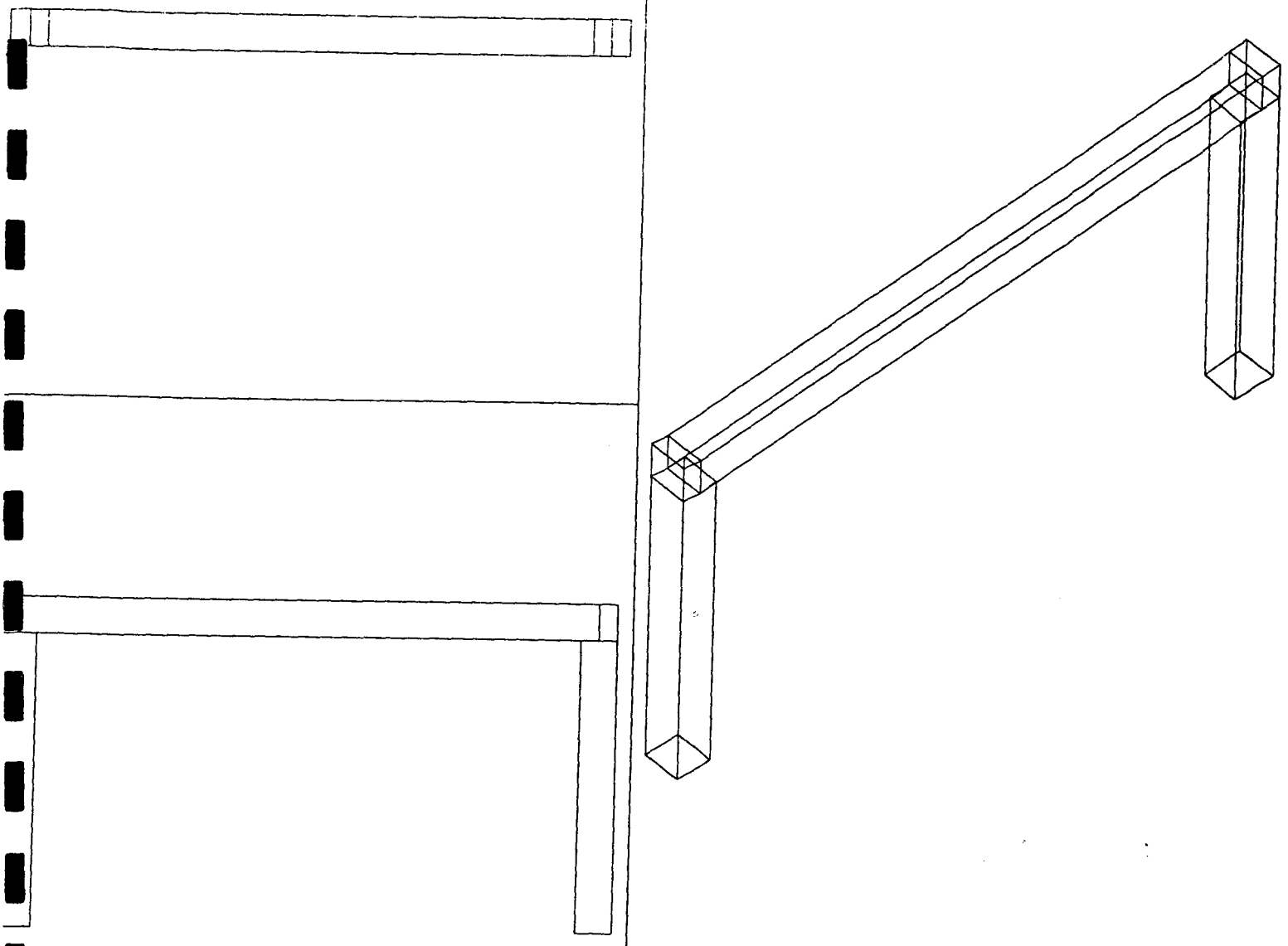
32K/10' LANE = 3.2K

BOTTOM SLAB

DL = 180 PSF + $2.2K(2)/16' = .66$ — DL SLAB = 330 PSF
(2 WALLS; ↳ FROM ADDSS OUTPUT)

LL = $\frac{3.2(2)/16}{\text{LL REACTION}}$ = 643 PSF

TOP SLAB
1-WAY WORST
CASE SPAN



censed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\1920TOP.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
stem Type: One-way Slab

3

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

    AAA    DDDDD      OOO     SSSSS    SSSSS
   A   A   D    D    O   O   S     S  S     S
  A     A  D     D  O     O  S        S
  AAAAAAA  D     D  O     O   SSSSS    SSSSS
  A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
  A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
  A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

omputer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) not and cannot be responsible for either the accuracy or adequacy of the erial supplied as input for processing by the ADOSS(tm) computer program. rthermore, PCA neither makes any warranty expressed nor implied with respect the correctness of the output prepared by the ADOSS(tm) program. Although has endeavored to produce ADOSS(tm) error free the program is not and nnot be certified infallible. The final and only responsibility for alysis, design and engineering documents is the licensees. Accordingly, PCA claims all responsibility in contract, negligence or other tort for any alysis, design or engineering documents prepared in connection with the use the ADOSS(tm) program.

e: Further information and technical support on the ADOSS computer program available through the CPCA Web site at: "www.cpca.ca".

4

E NAME C:\PROGRA~1\ADOSS\DATA\1920TOP.ADS

OJECT ID. bass pro shop

N ID. junctionbox ST19-2

INEER cls

TE 8/28/2003
E 15:58:36

ITS U.S. in-lb
E ACI 318-95

AB SYSTEM ONE WAY SLAB
ME LOCATION INTERIOR

SIGN METHOD STRENGTH DESIGN

BER OF SPANS 3

NCRETE FACTORS	SLABS	BEAMS	COLUMNS
ENSITY(pcf)	150.00	150.00	150.00
YPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
ensity factor	1.00	1.00	1.00
r (psi)	503.10	503.10	503.10

NFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
ISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.00 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

5

SPAN/LOADING DATA

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.5	12.0	.5	.5	6	1.0	1.0	180.0	240.0
2	16.0	12.0	.5	.5	6	1.0	1.0	180.0	240.0
3*	.5	12.0	.5	.5	6	1.0	1.0	180.0	240.0

-Indicates cantilever span information.
-Strip width used for positive flexure.
**-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.

PARTIAL LOADING DATA

SPAN No.	LOAD No.	TYPE	PARTIAL DEAD LOADS Wa	Wb	La	Lb	LOAD No.	TYPE	PARTIAL LIVE LOADS Wa	Wb	La	Lb
1*												
2							1	CONC	3.2	.0	8.0	.0
3*												

-Indicates cantilever span information.

TS FOR:
UNIFORM LOAD: Wa.....plf La & Lb... ft
CONCENTRATED LOAD: Wa.....kips La..... ft
TRAPEZOIDAL LOAD: Wa & Wb..plf La & Lb... ft
MOMENT: Wa.....ft-k La..... ft
NOTE: Local effects of partial loadings are NOT considered by ADOSS, compute manually.

6

COLUMN/TORSIONAL DATA
****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0
2	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
*-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

7

LATERAL LOAD/OUTPUT DATA
****

ATERAL LOADS ARE NOT SPECIFIED

TPUT DATA
TTERN LOADINGS: 1 THRU 4
ATTERN LIVE LOAD FACTOR (1-3) = 75%

AD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

TPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

TOTAL UNFACTORED DEAD LOAD = 5.310 kips
LIVE LOAD = 7.280 kips

8

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.7	-6.3	.0
	LIVE	2.7	-7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.7	-6.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.7	-6.3	.0
	LIVE	2.6	-7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.7	-6.3	.0
	LIVE	3.6	-10.3	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.7	6.3	.0
	LIVE	2.7	7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.7	6.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.7	6.3	.0
	LIVE	2.6	7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.7	6.3	.0
	LIVE	3.6	10.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

9

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	30.0	.0	-29.9	-.1	8.2	.0	-8.1
2	-30.0	.1	.0	29.9	-8.2	.1	.0	8.1

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	30.0	.0	-30.0	-.1	37.3	.0	-37.2
2	-30.0	.0	.0	30.0	-37.3	.1	.0	37.2

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.4	10.8	-.4	3.3	-.1	10.8	-.5	13.3
2	-10.8	.4	-3.3	.4	-10.8	.1	-13.3	.5

$V_{u@d} = 12.4k$

$\phi V_c = .085\sqrt{4500}(12)(7.5) = 13k > V_u$

10

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	-.1	.087	4	.500	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	30.8	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-30.8	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.1	.087	4	.500	1
			BOT	.0	.000	0	.000	0

11

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)	DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	7.600	TOP .0	0	.000	0	.000	0
			BOT 32.3	4	4.400	1	5.200	1

12

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.1	.0	(0)	.0	(0)	-.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	30.8	.0	(0)	.0	(0)	30.8	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-30.8	.0	(0)	.0	(0)	-30.8	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.1	.0	(0)	.0	(0)	.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	7.60 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	32.3	.0	(0)	.0	(0)	32.3	(100)	.0	(0)

13

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
1	4	R	30.8	.76	1.0
2	4	L	-30.8	.76	1.0

USE H 11½ @ 12" O.C

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
2	4	7.6	32.3	.85	1.0

USE H9½ @ 12" O.C

14

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.85*	.79	31.1

- Indicates REQ'D reinforcement is greater than PROV'D (check bar selection)

15

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

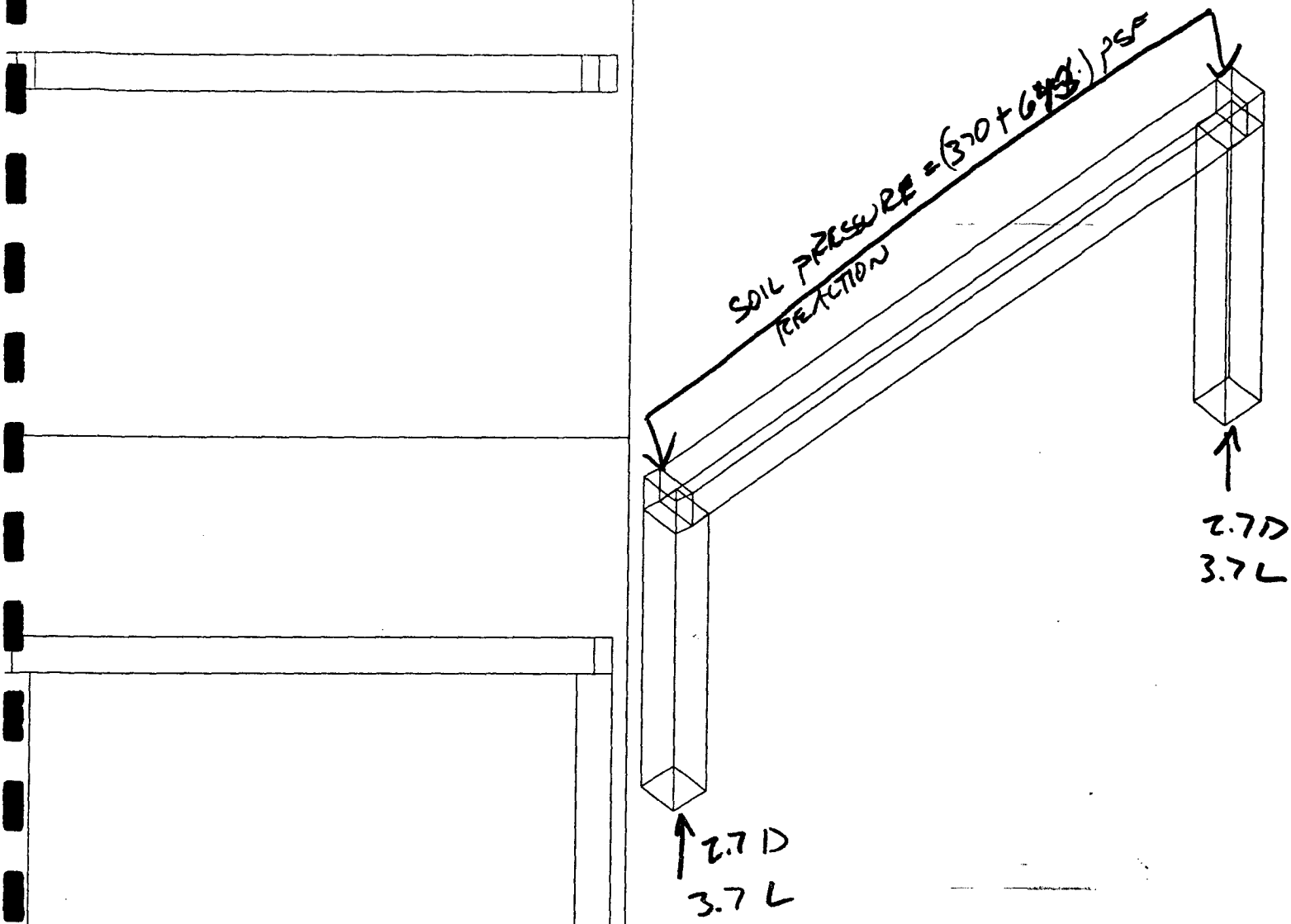
--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	LIVE (in)	TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	LIVE (in)	TOTAL (in)
1	1728.	-.001	-.002	-.003	Not applicable		
2	1728.	.020	.045	.065	Not applicable		
3	1728.	-.001	-.002	-.003	Not applicable		

* Program completed as requested *

$\Delta = 0.027(3) + 0.045 = .1105 = \ell/1808$ ✓ok

BOTTOM SLAB
1-WAY WORST
CASE SPAN



Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\1920BOT.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/26/2003 Time: 15:58:36
System Type: One-way Slab

17

```
          ppppp     ccccc     aaaaa
          p    p  c     c  a     a
          p    p  c     c        a
          p    p  c          aaaaaa
          p    p  c     c  a     a
          p    p  c     c  a     a
          ppppp     ccccc     aaaaaa
          p
          p

   AAA    DDDDD      OOO     SSSSS    SSSSS
  A   A   D    D    O   O   S     S  S     S
 A     A  D     D  O     O  S        S
 AAAAAAA  D     D  O     O   SSSSS    SSSSS
 A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
 A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
 A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

omputer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) not and cannot be responsible for either the accuracy or adequacy of the terial supplied as input for processing by the ADOSS(tm) computer program. rthermore, PCA neither makes any warranty expressed nor implied with respect the correctness of the output prepared by the ADOSS(tm) program. Although A has endeavored to produce ADOSS(tm) error free the program is not and nnot be certified infallible. The final and only responsibility for nalysis, design and engineering documents is the licensees. Accordingly, PCA claims all responsibility in contract, negligence or other tort for any alysis, design or engineering documents prepared in connection with the use f the ADOSS(tm) program.

e: Further information and technical support on the ADOSS computer program s available through the CPCA Web site at: "www.cpca.ca".

18

E NAME C:\PROGRA-1\ADOSS\DATA\1920BOT.ADS

OJECT ID. bass pro shop

N ID. junctionbox ST19-2

INEER cls

TE 8/28/2003
E 15:58:36

ITS U.S. in-lb
E ACI 318-95

AB SYSTEM ONE WAY SLAB
ME LOCATION INTERIOR

SIGN METHOD STRENGTH DESIGN

BER OF SPANS 3

NCRETE FACTORS	SLABS	BEAMS	COLUMNS
ENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
ensity factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

NFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
ISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.50 in OUTER LAYER
INIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
INIMUM SPACING:
IN SLAB = 6.00 in

19

SPAN/LOADING DATA

SPAN MBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.5	12.0	.5	.5	6	1.0	1.0	370.0	645.0
2	16.0	12.0	.5	.5	6	1.0	1.0	370.0	645.0
3*	.5	12.0	.5	.5	6	1.0	1.0	370.0	645.0

-Indicates cantilever span information.
-Strip width used for positive flexure.
*-L2 widths are 1/2 dist. to transverse column.
-Indicates exterior strip.

PARTIAL LOADING DATA

RTIAL LOADINGS ARE NOT SPECIFIED

20

COLUMN/TORSIONAL DATA
****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0
2	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
*-Strip width used for negative flexure.
**-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

21

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

TPUT DATA
TTERN LOADINGS: 1 THRU 4
ATTERN LIVE LOAD FACTOR (1-3) = 75%

AD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

TPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

TOTAL UNFACTORED DEAD LOAD = 8.540 kips
LIVE LOAD = 10.965 kips

22

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.3	-9.9	.0
	LIVE	4.1	-9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.3	-9.9	.0
	LIVE	.2	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.3	-9.9	.0
	LIVE	3.9	-9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.3	-9.9	.0
	LIVE	5.5	-12.3	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.3	9.9	.0
	LIVE	4.1	9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.3	9.9	.0
	LIVE	.2	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.3	9.9	.0
	LIVE	3.9	9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.3	9.9	.0
	LIVE	5.5	12.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

23

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.2	39.0	.0	-38.8	-.2	12.9	.0	-12.7
2	-39.0	.2	.0	38.8	-12.9	.2	.0	12.7

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	-.1	39.0	.0	-38.9	-.3	47.7	.0	-47.4
2	-39.0	.1	.0	38.9	-47.7	.3	.0	47.4

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.9	16.2	-.9	5.3	-.2	16.2	-1.1	19.9
2	-16.2	.9	-5.3	.9	-16.2	.2	-19.9	1.1

24

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	-.2	.087	4	.500	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	38.1	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-38.1	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.2	.087	4	.500	1
			BOT	.0	.000	0	.000	0

25

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS
****

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	8.400	TOP	.0	0	.000	0	.000	0
			BOT	32.1	4	5.200	1	4.400	1

2C

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k) (%)	COLUMN STRIP MOMENT (ft-k) (%)	SLAB MOMENT (ft-k) (%)	MIDDLE STRIP MOMENT (ft-k) (%)
1	LEFT TOP	-.2	.0 (0)	.0 (0)	-.2 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	RGHT TOP	38.1	.0 (0)	.0 (0)	38.1 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
2	LEFT TOP	-38.1	.0 (0)	.0 (0)	-38.1 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	RGHT TOP	.2	.0 (0)	.0 (0)	.2 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k) (%)	COLUMN STRIP MOMENT (ft-k) (%)	SLAB MOMENT (ft-k) (%)	MIDDLE STRIP MOMENT (ft-k) (%)
2	8.40 TOP	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	BOT	32.1	.0 (0)	.0 (0)	32.1 (100)	.0 (0)

27

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
1	4	R	38.1	.95	1.0
2	4	L	-38.1	.95	1.0

USE #11's @ 12" O.C

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
2	4	8.4	32.1	.90	1.0

USE #9's @ 12" O.C

28

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.90*	.79	70.2

* - Indicates REQ'D reinforcement is greater than PROV'D (check bar selection)

29

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

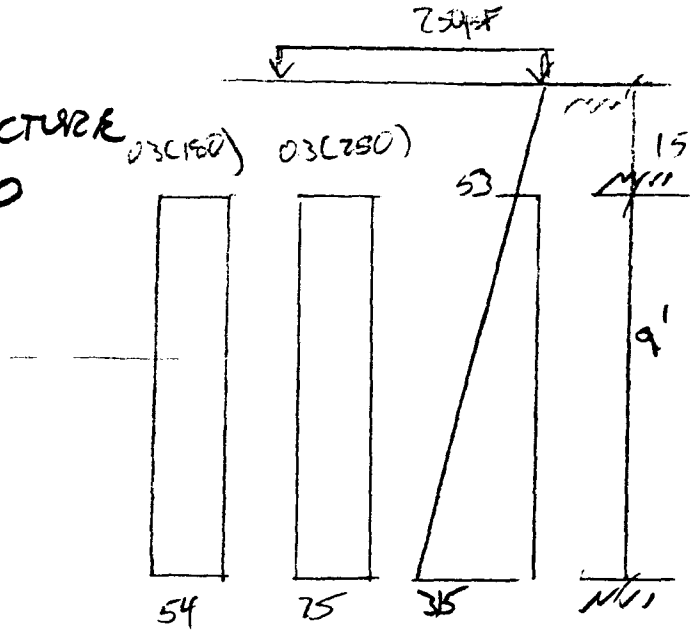
SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP LIVE (in)	COLUMN STRIP TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP LIVE (in)	MIDDLE STRIP TOTAL (in)
1	1728.	-.002	-.002	-.004	Not applicable		
2	1728.	.031	.086	.117	Not applicable		
3	1728.	-.002	-.002	-.004	Not applicable		

* Program completed as requested *

LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-6896
Tel: 702-365-9312
FAX: 702-365-9317

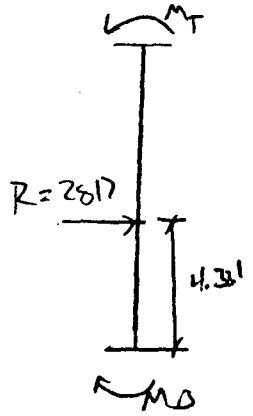
Client _____ Sheet 30 of _____
Project _____ Job No. _____
_____ Date _____
_____ Surveyor _____

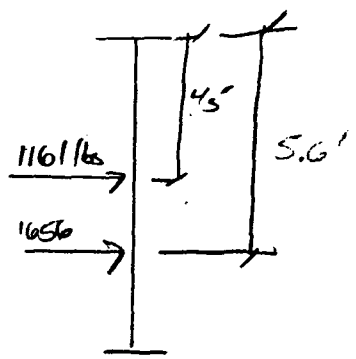
WALL FOR
TRANSITION STRUCTURE
BTWN STA 19-20



M_T = 4k' 1' WIDTH
8k' 2' WIDTH

M_B = 3k' 1' WIDTH
6k' 2' WIDTH

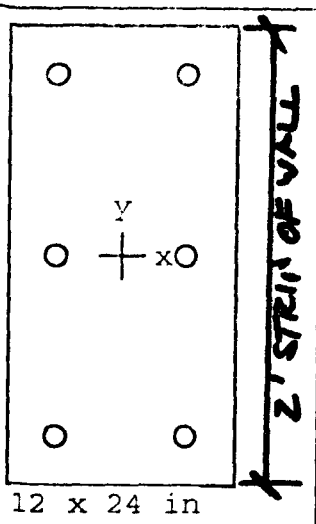


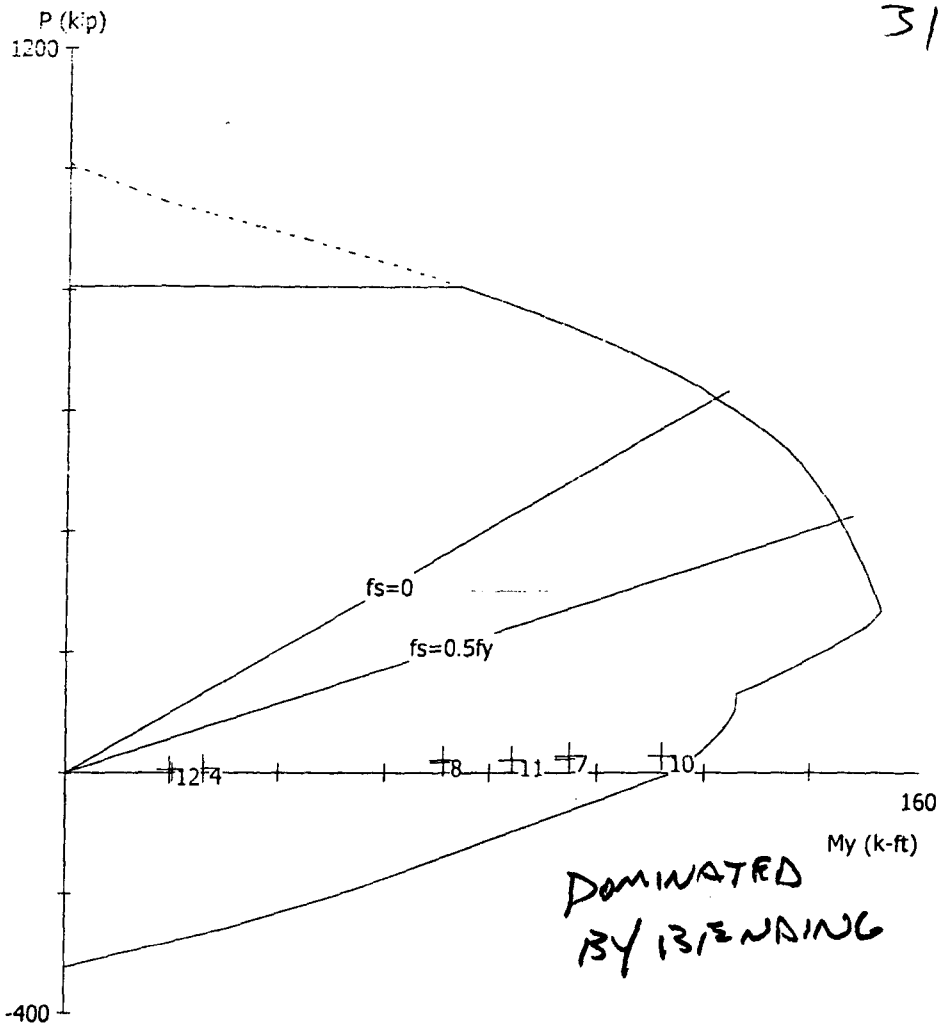


TOP & BOTTOM WALL MOMENTS
FROM ADOSS

TOP	D	L	
1	12.6	23.4	(7.7Ω(1.25)+8) TYP
2	12.6	0	
3	12.6	23.4	
4	12.6	28.6	

BOT	D	L	
1	20	(9.2x2') + 6 =	24.4
2	20	0	
3	20	24.4	
4	20	30.6	





DOMINATED BY BENDING

Code: ACI 318-95

Units: English

Run axis: About Y-axis

Run option: Design

Slenderness: Not considered

Column type: User-defined

Bars: ASTM A615

Date: 08/29/03

Time: 12:47:52

PCACOL V3.00 (PCA 1999) - Licensed to: Lochsa Engineering, Las Vegas, NV

File: C:\PROGRA~1\PCACOL\DATA\STA1920.COL

Project: bass pro shop

Column: oSpan 1, Colu

Engineer: cls

f'c = 4.5 ksi	fy = 60 ksi	Ag = 288 in^2	6 #9 bars
Ec = 4067 ksi	Es = 29000 ksi	As = 6.00 in^2	Rho = 2.08%
fc = 3.825 ksi	e_rup = Infinity	Xo = 0.00 in	Ix = 13824 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 3456 in^4
Beta1 = 0.825		Clear spacing = 5.74 in	Clear cover = 2.00 in
Confinement: Other	phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7		

$= 3 in^2$ PER SIDE

USE # 11's @ 12" o.c.

$A_S = 3.12 in^2/ft$

$> \frac{3 in^2}{2} = 1.5 in^2/ft$

32

```
 OOOOOOO    OOOOO    OOOOO    OOOOO    OOOOO   OO
 OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO    OO   OO       OO  OO   OO       OO  OO  OO
 OO    OO   OO       OOOOOOO  OO       OO  OO  OO
 OOOOOOO    OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO         OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO          OOOO    OO  OO    OOOO     OOOO   OOOO   (TM)
```

==========
Computer program for the Strength Design of Reinforced Concrete Sections
==========

Licensee stated above acknowledges that Portland Cement Association (PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the PCACOL(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the PCACOL(tm) program. Although PCA has endeavored to produce PCACOL(tm) error free, the program is not and can't be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the PCACOL(tm) program.

General Information:
==========
File Name: C:\PROGRA~1\PCACOL\DATA\STA1920.COL
Project: bass pro shop
Column: cSpan 1, Colu Engineer: cls
Code: ACI 318-95 Units: English

Run Option: Design Slenderness: Not considered
Run Axis: Y-axis Column Type: User-defined

Material Properties:
==========
f'c = 4.5 ksi fy = 60 ksi
Ec = 4066.84 ksi Es = 29000 ksi
fc = 3.825 ksi Rupture strain = Infinity
Ultimate strain = 0.003 in/in
Beta1 = 0.825

Section:
==========
Rectangular: Width = 12 in Depth = 24 in

Gross section area, Ag = 288 in^2
Ix = 13824 in^4 Iy = 3456 in^4
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Rebar Database: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: User-defined; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

Layout: Rectangular
Pattern: Sides Different (Cover to longitudinal reinforcement)
Total steel area, As = 6.00 in^2 at 2.08%

	Top	Bottom	Left	Right
Bars	2 # 9	2 # 9	1 # 9	1 # 9
Cover(in)	2	2	2	2

Load Combinations:
==========
U1 = 1.300*Dead + 2.820*Live + 0.000*Lateral
U2 = 0.975*Dead + 2.115*Live + 1.275*Lateral
U3 = 0.975*Dead + 0.000*Live + 1.275*Lateral

Service Loads:
==========

No.	Load Case	Axial Load kip	Mx @ Top k-ft	Mx @ Bot k-ft	My @ Top k-ft	My @ Bot k-ft
1	Dead	5.2	0.0	0.0	12.6	20.0
	Live	5.4	0.0	0.0	23.4	24.4
	Lat1	0.0	0.0	0.0	0.0	0.0

ADOSS REACTIONS x 2' STRIP

ADOSS + LAT EARTH PRESSURE

34

2	Dead	5.2	0.0	0.0	12.6	20.0
	Live	0.1	0.0	0.0	0.0	0.0
	Latl	0.0	0.0	0.0	0.0	0.0
3	Dead	5.3	0.0	0.0	12.6	20.0
	Live	7.2	0.0	0.0	23.4	24.4
	Latl	0.0	0.0	0.0	0.0	0.0
4	Dead	5.4	0.0	0.0	12.6	20.0
	Live	7.2	0.0	0.0	28.6	30.6
	Latl	0.0	0.0	0.0	0.0	0.0

Factored Loads and Moments with Corresponding Capacities: (see user's manual for notation)

No.	Load Combo	Pu kip	Muy k-ft	fMny k-ft	fMn/Mu
1	1 U1	22.0	94.8	117.8	1.243
2	U2	16.5	71.1	117.1	1.646
3	U3	5.1	19.5	115.3	5.911
4	2 U1	7.0	26.0	115.7	4.450
5	U2	5.3	19.5	115.3	5.913
6	U3	5.1	19.5	115.3	5.911
7	3 U1	27.2	94.8	118.5	1.250
8	U2	20.4	71.1	117.6	1.654
9	U3	5.2	19.5	115.3	5.912
10	4 U1	27.3	112.3	118.5	1.056
11	U2	20.5	84.2	117.6	1.397
12	U3	5.3	19.5	115.3	5.913

*** Program completed as requested! ***

LOCHSA ENGINEERING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 35 of ____
Project _____ Job No. _____
_____ Date _____
_____ Engineer _____

BEAM AT TRANSITION STRUCTURE DEPTH = 4'-0"
SUPPORTING 1-WAY T&B SLABS

UNFACTORED REACTIONS

D = 5.3 k
L = 7.3 k
} FROM ADOSS OUTPUT

U = 1.3(5.3) + 2.52(7.3) = 14.8 k/ft

DESIGN TOP STEEL

T = C

$A_s f_y = .85 f'_c a (b)$

$a = \frac{A_s(60)}{.85(4)(12)}$

$a = 1.31 A_s$

$M_u = \phi A_s f_y (d - a/2)$

$600(12) = .9(60) A_s (45 - \frac{1.31 A_s}{2})$

$7200 = 2430 A_s - 35.1 A_s^2$

$A_s = 0.3 in^2$

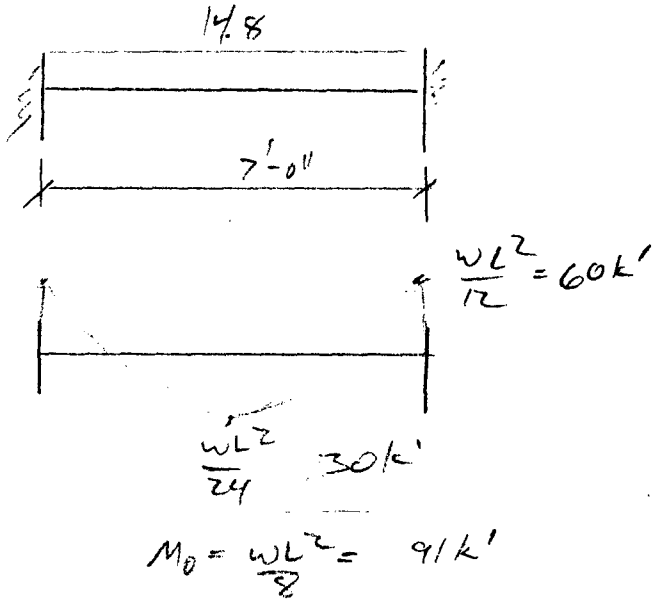
DESIGN FOR A_s AT MID RANGE

$M_u(12) = 2700 A_s - 35.1 A_s^2$

$A_s = 0.41 in^2$

$V_{max} = 14.8(7/2)$ 52k

$\phi V_c = 0.85 2\sqrt{4500}(12)(45)/1000 = 61 k$ ✓ OK



$M_0 = \frac{WL^2}{8} = 91 k'$

USE 2 - #6 = 70 k
2 #4 = 13 0 T
#4 TIES @ 12" o.c.

LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 34 of ____
Project _____ Job No. _____
_____ Date _____
_____ Surveyor _____

TYP MANHOLE DESIGNED FOR WORST CASE

- TOP SLAB

DL

4' OVERBURDEN — 4(120) = 480 PSF
SELFWT

LL

2' OVERBURDEN 2(120) = 240 PSF

32 K/10 = 3.2 K

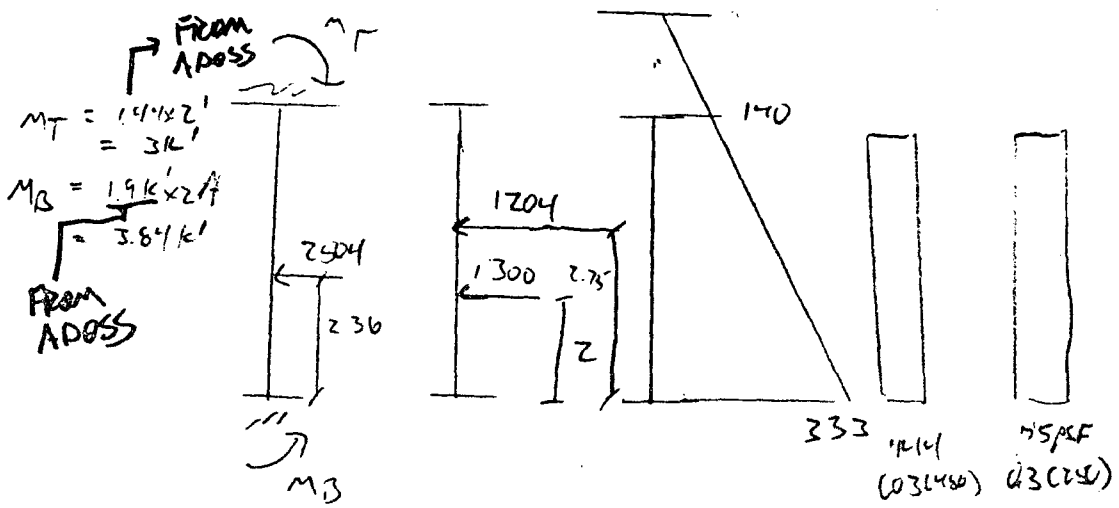
- BOTTOM SLAB

DL REACTION FROM ADOSS

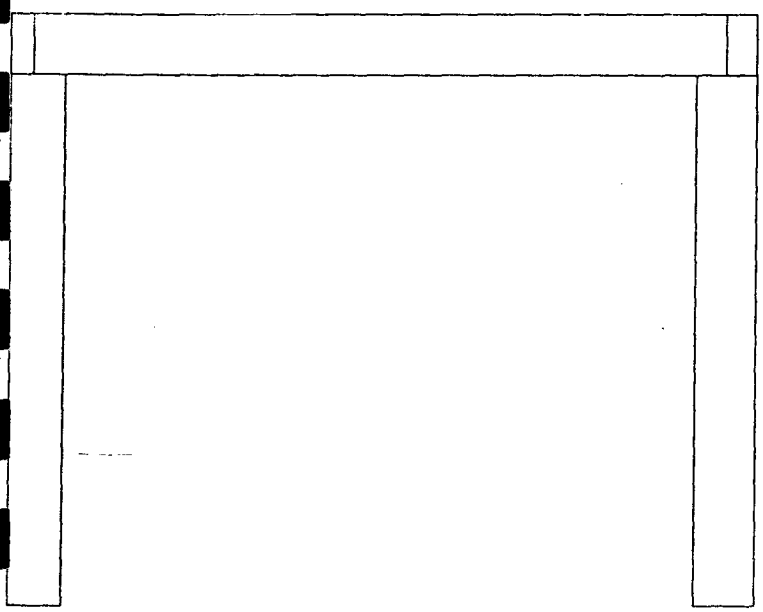
DL = (180 PSF + 2.4(2))/8 ÷ 150 = 630 PSF
SLAB WEIGHT

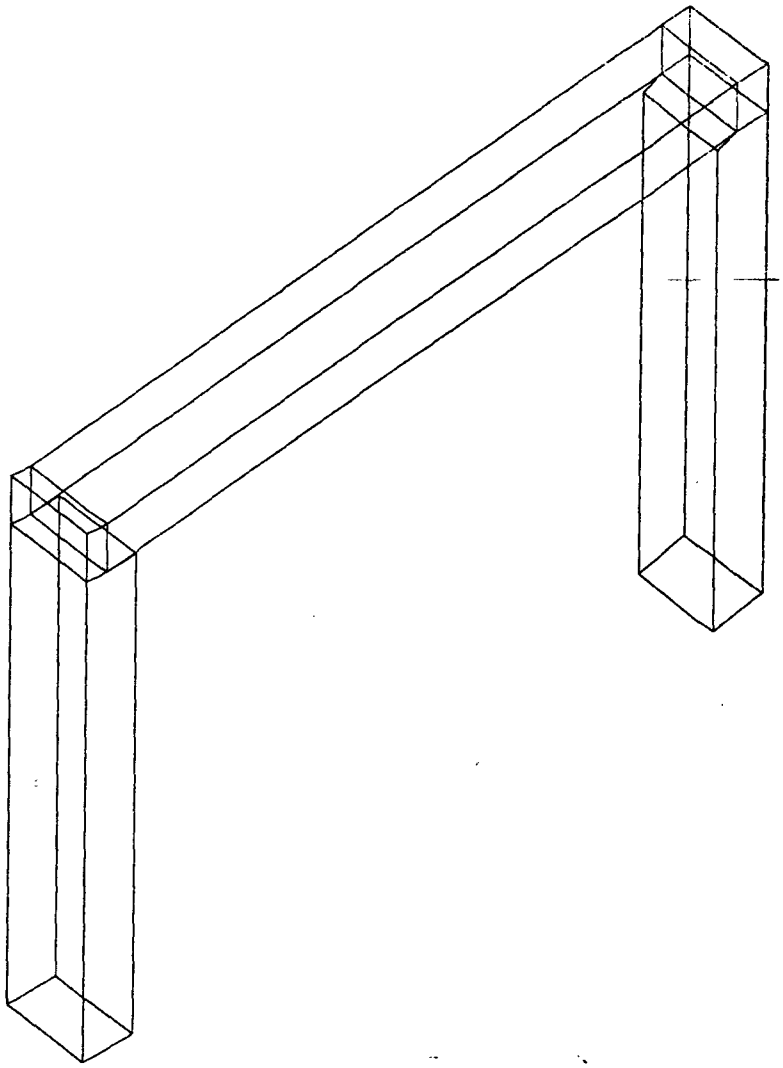
LL = 2(2)/8 = 500 PSF
LL REACTION FROM ADOSS

WALL



TOP SLAB 3>
1-WAY





Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\TYPMH.ADS
Project: bass pro shop
Span ID: junctionbox typ MH
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab

38

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

   AAA    DDDDD      OOO     SSSSS    SSSSS
  A   A   D    D    O   O   S     S  S     S
 A     A  D     D  O     O  S        S
 AAAAAAA  D     D  O     O   SSSSS    SSSSS
 A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
 A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
 A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

mputer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) not and cannot be responsible for either the accuracy or adequacy of the erial supplied as input for processing by the ADOSS(tm) computer program. rthermore, PCA neither makes any warranty expressed nor implied with respect the correctness of the output prepared by the ADOSS(tm) program. Although has endeavored to produce ADOSS(tm) error free the program is not and not be certified infallible. The final and only responsibility for alysis, design and engineering documents is the licensees. Accordingly, PCA claims all responsibility in contract, negligence or other tort for any lysis, design or engineering documents prepared in connection with the use the ADOSS(tm) program.

e: Further information and technical support on the ADOSS computer program available through the CPCA Web site at: "www.cpca.ca".

39

ILE NAME C:\PROGRA~1\ADOSS\DATA\TYPMH.ADS

PROJECT ID. bass pro shop

PAN ID. junctionbox typ MH

NGINEER cls

ATE 8/28/2003
IME 15:58:36

NITS U.S. in-lb
ODE ACI 318-95

LAB SYSTEM ONE WAY SLAB
RAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

UMBER OF SPANS 3

ONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

EINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.00 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

40

SPAN/LOADING DATA

****

SPAN MBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	8.0	.5	.5	6	1.0	1.0	480.0	240.0
2	7.7	8.0	.5	.5	6	1.0	1.0	480.0	240.0
3*	.3+	8.0	.5	.5	6	1.0	1.0	480.0	240.0

-Indicates cantilever span information.
-Strip width used for positive flexure.
*-L2 widths are 1/2 dist. to transverse column.
-Indicates exterior strip.
-Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA

****

AN No.	LOAD No.	TYPE	PARTIAL DEAD LOADS Wa	Wb	La	Lb	LOAD No.	TYPE	PARTIAL LIVE LOADS Wa	Wb	La	Lb
1*												
2							1	CONC	3.2	.0	3.8	.0
3*												

-Indicates cantilever span information.

ITS FOR:

UNIFORM LOAD: Wa.....plf La & Lb... ft
ONCENTRATED LOAD: Wa.....kips La..... ft
TRAPEZOIDAL LOAD: Wa & Wb..plf La & Lb... ft
MOMENT: Wa.....ft-k La..... ft

NOTE: Local effects of partial loadings are NOT considered by ADOSS, compute manually.

41

COLUMN/TORSIONAL DATA
****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
**-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

4/2

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

OUTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

OUTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 4.700 kips
LIVE LOAD = 5.200 kips

43

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.4	-2.3	.0
	LIVE	2.0	-2.6	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.4	-2.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.4	-2.3	.0
	LIVE	2.0	-2.6	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.4	-2.3	.0
	LIVE	2.7	-3.5	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.4	2.3	.0
	LIVE	1.9	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.4	2.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.4	2.3	.0
	LIVE	1.8	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.4	2.3	.0
	LIVE	2.5	3.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

44

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	PATTERN-1 RIGHT	PATTERN-1 TOP	PATTERN-1 BOTTOM	PATTERN-2 LEFT	PATTERN-2 RIGHT	PATTERN-2 TOP	PATTERN-2 BOTTOM
1	-.1	10.4	.0	-10.4	-.1	3.0	.0	-2.9
2	-10.1	.1	.0	10.0	-3.0	.1	.0	2.9

JOINT NUMBER	PATTERN-3 LEFT	PATTERN-3 RIGHT	PATTERN-3 TOP	PATTERN-3 BOTTOM	PATTERN-4 LEFT	PATTERN-4 RIGHT	PATTERN-4 TOP	PATTERN-4 BOTTOM
1	.0	10.4	.0	-10.4	-.1	12.9	.0	-12.8
2	-10.1	.0	.0	10.0	-12.4	.1	.0	12.4

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	PATTERN-1 RIGHT	PATTERN-2 LEFT	PATTERN-2 RIGHT	PATTERN-3 LEFT	PATTERN-3 RIGHT	PATTERN-4 LEFT	PATTERN-4 RIGHT
1	-.4	8.4	-.4	2.8	-.2	8.4	-.4	10.2
2	-8.0	.4	-2.8	.4	-8.0	.2	-9.7	.4

45

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS
****

COL NUM	LOAD TYPE	CROSS SECTN	DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL LEFT	TOP	.0	.058	4	.333	1
		BOT	.0	.000	0	.000	0
	RGHT	TOP	9.6	.333	4	1.533	3
		BOT	.0	.000	0	.000	0
2	TOTL LEFT	TOP	-9.3	.333	4	1.533	3
		BOT	.0	.000	0	.000	0
	RGHT	TOP	.0	.058	4	.333	1
		BOT	.0	.000	0	.000	0

46

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS
****

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	3.642	TOP	.0	0	.000	0	.000	0
			BOT	15.1	4	2.492	2	2.875	2

47

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS
****

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k) (%)	COLUMN STRIP MOMENT (ft-k) (%)	SLAB MOMENT (ft-k) (%)	MIDDLE STRIP MOMENT (ft-k) (%)
1	LEFT TOP	.0	.0 (0)	.0 (0)	.0 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	RGHT TOP	9.6	.0 (0)	.0 (0)	9.6 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
2	LEFT TOP	-9.3	.0 (0)	.0 (0)	-9.3 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	RGHT TOP	.0	.0 (0)	.0 (0)	.0 (100)	.0 (0)
	BOT	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS
****

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k) (%)	COLUMN STRIP MOMENT (ft-k) (%)	SLAB MOMENT (ft-k) (%)	MIDDLE STRIP MOMENT (ft-k) (%)
2	3.64 TOP	.0	.0 (0)	.0 (0)	.0 (0)	.0 (0)
	BOT	15.1	.0 (0)	.0 (0)	15.1 (100)	.0 (0)

78

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
1	4	R	9.6	.41	1.0
2	4	L	-9.3	.39	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
2	4	3.6	15.1	.74	1.0

49

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

****

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.74	.79	8.8

50

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	512.	-.001	-.001	-.002	Not applicable		
2	512.	.008	.014	.021	Not applicable		
3	512.	-.001	-.001	-.002	Not applicable		

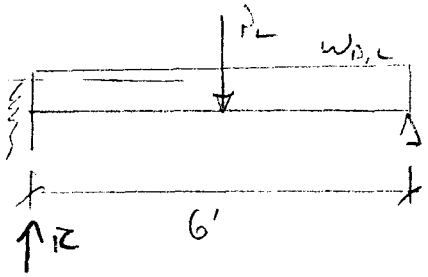
* Program completed as requested *

LOCHSA ENGINEERING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 51 of ____
Project _____ Job No. _____
_____ Date _____
_____ Engineer _____

TOP SLAB SPANNING OTHER DIRECTION

W_{D_L} = 450
W_L = 240
P_L = 3.2/2
$U = 1.3D + 1.5L$
W_U = 1.3 k/ft
P_U = 4.5 k



#5's @ 12" O.C A_S = 0.31 in²/ft
+ #4's @ 18" O.C A_S = .2/1.5 = .133 in²/ft

$T = C \rightarrow a = \frac{A_s f_y}{.85 f'_c b} = (12)$

$a = 0.87$

$M_{NT} = \phi A_s f_y (d - a/2)$

$= .9(0.443)(60)(9 - 0.87/2) = 164.8'' > 109(12) = 1311^k{}''$ √OK

M_{NT}

#6's @ 12" O.C A_S = 0.44 in²/ft

$M_N \approx 164^k{}''$

$M_{MAX-} = \frac{WL^2}{8} + \frac{3P_L}{16}$

$M_{MAX+} = \frac{9}{128} WL^2 + \frac{5P_L}{32}$

$M_- = \frac{13(6)^2}{8} + \frac{3(4.5)(6)}{16} = 109^k{}'$

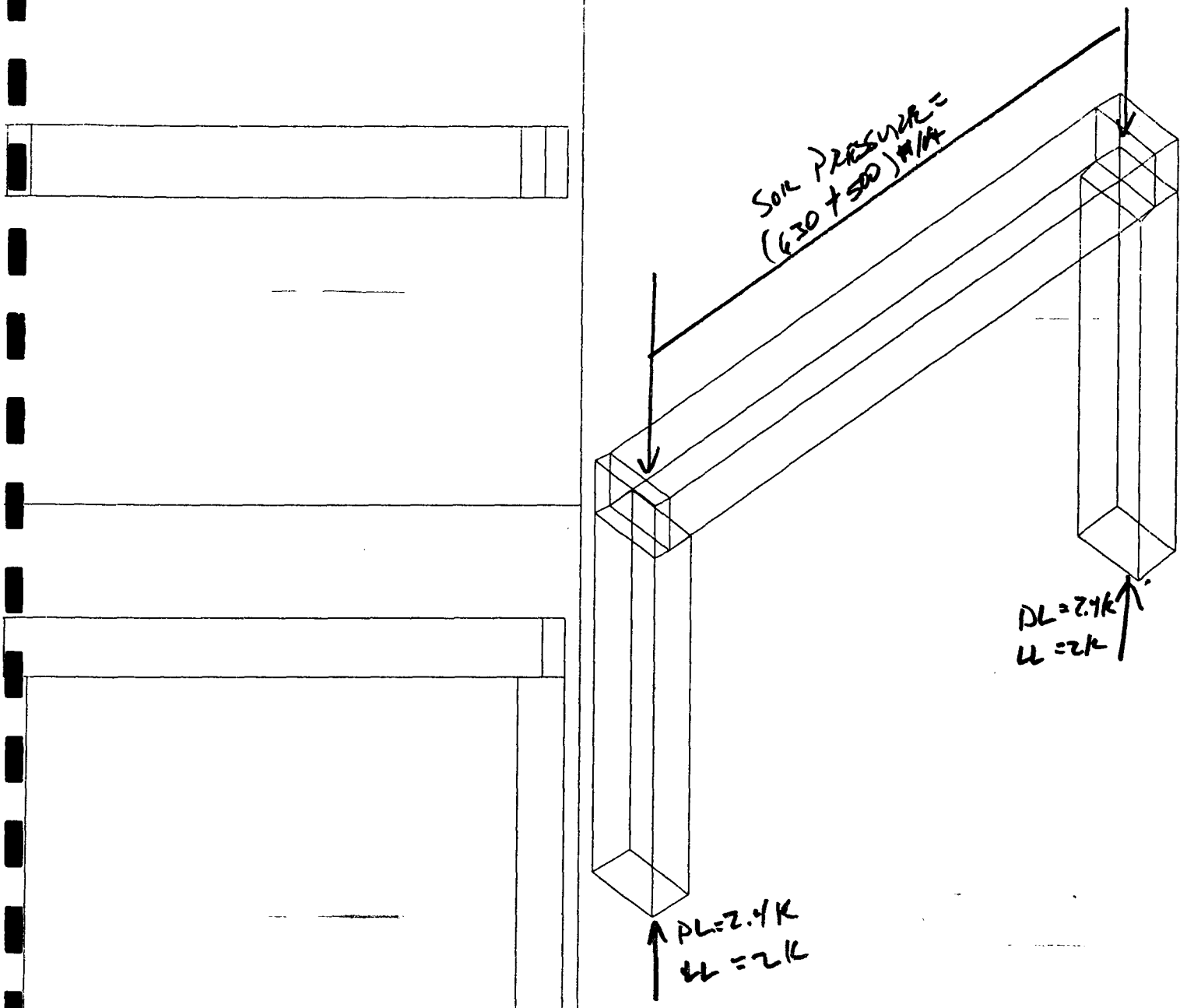
$M_+ = \frac{9}{128}(13)(6)^2 + \frac{5(4.5)(6)}{32} = 73.5^k{}'$

$R = \frac{11P}{16} + \frac{5WL}{8} = \frac{11(4.5)}{16} + \frac{5(13)(6)}{8}$

$7.96^k \rightarrow 8^k$

USE TOP #4's @ 18" O.C
+ #5 DOWEL's @ 12" O.C
+ #6's @ 12" O.C BOT

Bottom Slab 1-way



Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\TYPMHBOT.ADS
Project: bass pro shop
Span ID: junctionbox typ MH
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab

53

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

    AAA    DDDDD      OOO     SSSSS    SSSSS
   A   A   D    D    O   O   S     S  S     S
  A     A  D     D  O     O  S        S
  AAAAAAA  D     D  O     O   SSSSS    SSSSS
  A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
  A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
  A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

54

FILE NAME C:\PROGRA~1\ADOSS\DATA\TYPMHBOT.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox typ MH

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 3.50 in OUTER LAYER
AT SLAB BOTTOM = 4.50 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

55

SPAN/LOADING DATA
****

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0
2	7.7	10.0	.5	.5	6	1.0	1.0	630.0	500.0
3*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0

-Indicates cantilever span information.
* -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.
-Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA
****

PARTIAL LOADINGS ARE NOT SPECIFIED

56

COLUMN/TORSIONAL DATA
****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
*-Strip width used for negative flexure.
**-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

*-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

57

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

OUTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

OUTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 6.125 kips
LIVE LOAD = 4.167 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.1	-2.5	.0
	LIVE	1.6	-1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.1	-2.5	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.1	-2.5	.0
	LIVE	1.4	-1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.1	-2.5	.0
	LIVE	2.1	-1.6	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.1	2.5	.0
	LIVE	1.6	1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.1	2.5	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.1	2.5	.0
	LIVE	1.4	1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.1	2.5	.0
	LIVE	2.1	1.6	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

57

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	6.7	.0	-6.6	-.1	3.3	.0	-3.2
2	-6.7	.1	.0	6.6	-3.3	.1	.0	3.2

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	6.7	.0	-6.7	-.1	7.9	.0	-7.8
2	-6.7	.0	.0	6.7	-7.9	.1	.0	7.8

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.6	7.8	-.6	3.7	-.3	7.8	-.7	9.1
2	-7.8	.6	-3.7	.6	-7.8	.3	-9.1	.7

60

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN	DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL LEFT	TOP	-.1	.058	4	.333	1
		BOT	.0	.000	0	.000	0
	RGHT	TOP	5.0	.333	4	1.150	2
		BOT	.0	.000	0	.000	0
2	TOTL LEFT	TOP	-5.0	.333	4	1.150	2
		BOT	.0	.000	0	.000	0
	RGHT	TOP	.1	.058	4	.333	1
		BOT	.0	.000	0	.000	0

61

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS
****

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	4.025	TOP	.0	0	.000	0	.000	0
			BOT	9.7	4	2.875	1	2.492	1

62

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.1	.0	(0)	.0	(0)	-.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	5.0	.0	(0)	.0	(0)	5.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-5.0	.0	(0)	.0	(0)	-5.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.1	.0	(0)	.0	(0)	.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	4.03 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	9.7	.0	(0)	.0	(0)	9.7	(100)	.0	(0)

63

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
1	4	R	5.0	.22	1.0
2	4	L	-5.0	.22	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB STRIP AREA (sq.in)	STRIP WIDTH (ft)
2	4	4.0	9.7	.41	1.0

64

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

****

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.41	.44	14.6

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

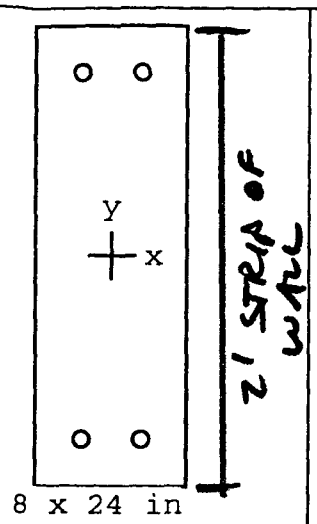
--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

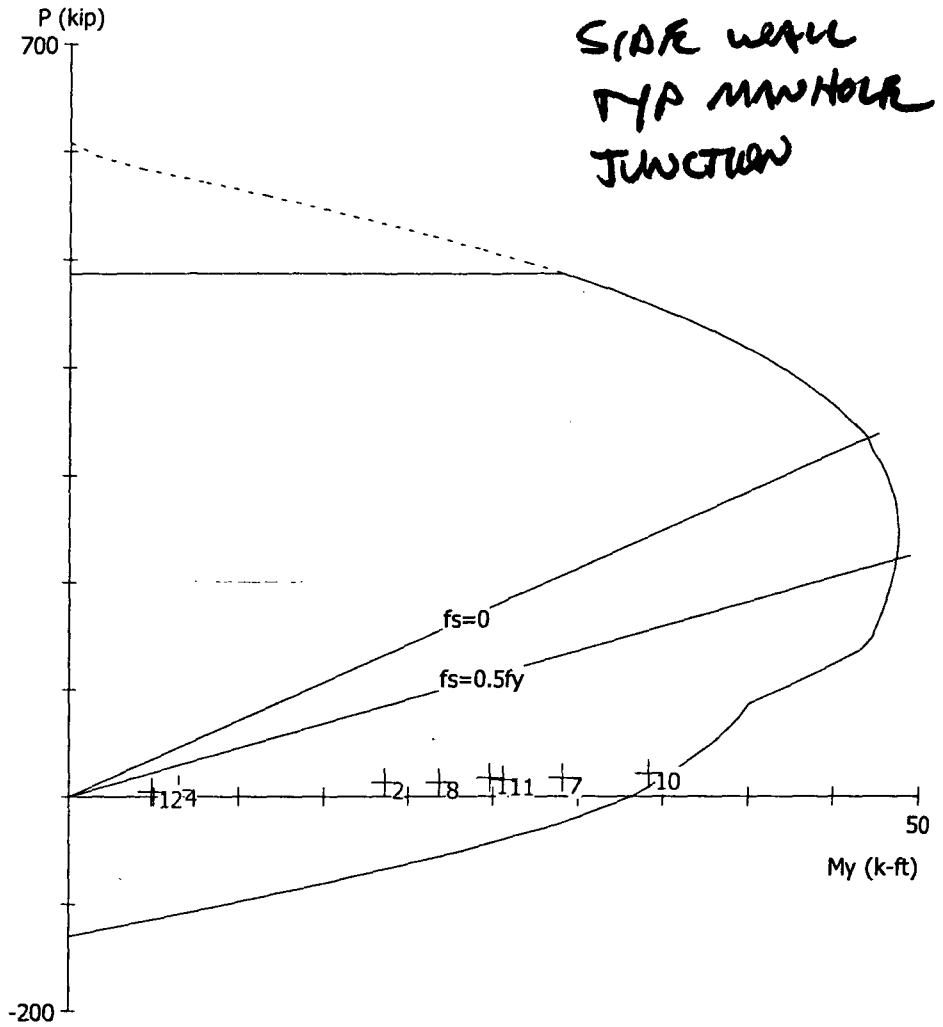
--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP LIVE (in)	COLUMN STRIP TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP LIVE (in)	MIDDLE STRIP TOTAL (in)
1	1000.	-.001	-.001	-.001	Not applicable		
2	1000.	.007	.004	.011	Not applicable		
3	1000.	-.001	-.001	-.001	Not applicable		

* Program completed as requested *



SIDE WALL TYP MANHOLE JUNCTION



Code: ACI 318-95

Units: English

Run axis: About Y-axis

Run option: Design

Slenderness: Not considered

Column type: User-defined

Bars: ASTM A615

Date: 09/12/03

Time: 08:58:46

PCACOL V3.00 (PCA 1999) - Licensed to: Lochsa Engineering, Las Vegas, NV

File: C:\PROGRA~1\ADOSS\DATA\ADOSS.COL

Project: bass pro shop

Column: oSpan 1, Colu

Engineer: cls

f'c = 4.5 ksi	fy = 60 ksi	Ag = 192 in^2	4 #7 bars
Ec = 4067 ksi	Es = 29000 ksi	As = 2.40 in^2	Rho = 1.25%
fc = 3.825 ksi	e_rup = Infinity	Xo = 0.00 in	Ix = 9216 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 1024 in^4
Beta1 = 0.825		Clear spacing = 2.25 in	Clear cover = 2.00 in
Confinement: Other	phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7		

USE #7's @12" O.C. EA FACE

67

```
OOOOOOO    OOOOO    OOOOO    OOOOO    OOOOO   OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
OO    OO   OO       OO  OO   OO       OO  OO  OO
OO    OO   OO       OOOOOOO  OO       OO  OO  OO
OOOOOOO    OO  OO   OO  OO   OO  OO   OO  OO  OO
OO         OO  OO   OO  OO   OO  OO   OO  OO  OO
OO          OOOO    OO  OO    OOOO     OOOO   OOOO   (TM)
```

==========
Computer program for the Strength Design of Reinforced Concrete Sections
==========

Licensee stated above acknowledges that Portland Cement Association (PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the PCACOL(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the PCACOL(tm) program. Although PCA has endeavored to produce PCACOL(tm) error free, the program is not and can't be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the PCACOL(tm) program.

48

General Information:
==========
File Name: C:\PROGRA~1\ADOSS\DATA\ADOSS.COL
Project: bass pro shop
Column: oSpan 1, Colu Engineer: cls
Code: ACI 318-95 Units: English

Run Option: Design Slenderness: Not considered
Run Axis: Y-axis Column Type: User-defined

Material Properties:
==========
f'c = 4.5 ksi fy = 60 ksi
Ec = 4066.84 ksi Es = 29000 ksi
fc = 3.825 ksi Rupture strain = Infinity
Ultimate strain = 0.003 in/in
Beta1 = 0.825

Section:
==========
Rectangular: Width = 8 in Depth = 24 in

Gross section area, Ag = 192 in^2
Ix = 9216 in^4 Iy = 1024 in^4
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Rebar Database: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: User-defined; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

Layout: Rectangular
Pattern: All Sides Equal (Cover to longitudinal reinforcement)
Total steel area, As = 2.40 in^2 at 1.25%
4 #7 Cover = 2 in

Load Combinations:
==========
U1 = 1.300*Dead + 2.820*Live + 0.000*Lateral
U2 = 0.975*Dead + 2.115*Live + 1.275*Lateral
U3 = 0.975*Dead + 0.000*Live + 1.275*Lateral

ADOSS REACTIONS X 2' WIDTH

ADOSS + LAT EARTH PRESSURE

Service Loads:
==========

No.	Load Case	Axial Load kip	Mx @ Top k-ft	Mx @ Bot k-ft	My @ Top k-ft	My @ Bot k-ft
1	Dead	4.8	0.0	0.0	4.6	5.0
	Live	4.0	0.0	0.0	5.2	6.5
	Latl	0.0	0.0	0.0	0.0	0.0
2	Dead	4.8	0.0	0.0	4.6	5.0
	Live	0.1	0.0	0.0	0.0	0.0
	Latl	0.0	0.0	0.0	0.0	0.0
3	Dead	4.8	0.0	0.0	4.6	5.0
	Live	4.0	0.0	0.0	8.2	6.5
	Latl	0.0	0.0	0.0	0.0	0.0

4	Dead	4.8	0.0	0.0	4.6	5.0
	Live	5.4	0.0	0.0	10.0	7.0
	Latl	0.0	0.0	0.0	0.0	0.0

Factored Loads and Moments with Corresponding Capacities: (see user's manual for notation)

No.	Load Combo	Pu kip	Muy k-ft	fMny k-ft	fMn/Mu
1	1 U1	17.5	24.8	35.0	1.410
2	U2	13.1	18.6	34.6	1.856
3	U3	4.7	4.9	33.7	6.917
4	2 U1	6.4	6.5	33.9	5.214
5	U2	4.8	4.9	33.7	6.919
6	U3	4.7	4.9	33.7	6.917
7	3 U1	17.5	29.1	35.0	1.203
8	U2	13.1	21.8	34.6	1.584
9	U3	4.7	4.9	33.7	6.917
10	4 U1	21.5	34.2	35.4	1.035
11	U2	16.1	25.6	34.9	1.360
12	U3	4.7	4.9	33.7	6.917

*** Program completed as requested! ***

LOCHSA ENGINEERING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet 20 of ____
Project _____ Job No. _____
_____ Date _____
_____ Engineer _____

N WALL BEAM

W_U = 2 k/ft

L = 7'

$M_U^- = \frac{WL^2}{12} = 32.7\ k' \rightarrow 392\ k''$

2 #6's d = 27"

$\phi M_N = 0.9(0.85)(4.00)\left[22 - \frac{60.85}{.85(4)(12)}\right]$

$= 1242\ k''$ VOK

USE 2 #6's TOP
2 #7's BOT

LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

September 3, 2003

Valerie Flock, P.E.
Clark County Department of Development Services
500 South Grand Central Parkway
Las Vegas, Nevada 89155

Subject: Addendum #1 to the Technical Drainage Study for Silverton Retail Phase I-Bass Pro Shop
Lochsa Job #6923.2
HTE #03-23295

Dear Ms. Flock:

This The following are responses to comments regarding the Technical Drainage Study listed above. It is also proposed in this submittal to improve the eastern half of a portion of Industrial Road south of Shelbourne alignment. The plan and profile for the improved portion is provided with this submittal. The improvement of this portion of Industrial Road does not impact the drainage patterns or values analyzed in the original submittal.

Comment #1: As indicated on the FIRM map provided in the study, the site is within special flood hazard area. This study must establish base flood elevations (BFE's) based on conditions that existed when the effective FIRM was created. A regulatory floodway must be selected, per 60.3(b)(4) of the NFIP Regulation. Per a memorandum dated June 17, 2003 from Clark County Department of Development Services Civil Engineering, "anything other than using the effective BFE will require the development to obtain a FEMA approved letter of Map Revision (LOMR) for the drainage facilities that were used to change the storm water flow rate in the 100-year flood plains... A CLOMR must be obtained prior to issuance of grading and/or building permits in the area within the 100-year flood plain." This must be addressed and all BFE's revised appropriately;

CCDS Comment: The engineer must notify FEMA for any changes to the SFHA Zone.

Response #1: **Noted, FEMA notification will be initiated upon the approval of the study. As shown in Figure 2 of the original submittal, the BFE for the proposed building has been established utilizing the BFE from the effective FIRM. The proposed building's finish floor elevation is more than 18" above the FEMA effective BFE. As shown in the attached referenced cross section exhibit (exhibit BD-1 and BD-2) from the Duck Creek/Blue Diamond Washes FIS Restudy, the FIS determined the 100-year runoff flows impacting the Silverton Casino parking lot to be 391 cfs. The FIS Restudy also determined the runoff through Shelborne alignment to be 373 cfs for the 100-year storm events. These flows are much less than the conservative values used in the subject study of 1945 cfs and 646 cfs for the Silverton parking and Shelbourne alignment, respectively. The large difference in flows impacting Silverton parking in the subject study and the FIS Restudy is due to a flow split that the FIS has adopted at Hinson/Windmill intersection. We agree with the flow split analysis adopted in the effective FIS, but since there is no permanent split structure, the subject study adopted Clark County's more conservative policy of assuming the entire flows impacting the subject site.**

Comment #2: The finished floor elevations of the proposed structures do not meet the requirements of being at least eighteen (18) inches above the street centerline of top-of-curb. The finished floor elevations must be raised or a waiver must be obtained;

Response #2: **A waiver for the 18-inches above Industrial Road center line was submitted to Clark County. A copy of the finish floor waiver form being submitted is included with this submittal.**

Comment #3: Nevada Department of Transportation (NDOT) concurrence is required for the work proposed in NDOT right of way;

Response #3: **The Silverton Casino LLC has applied in May, 2003 for NDOT encroachment permit for the work proposed in NDOT right of way. A copy of the granted NDOT encroachment permit is provided with this submittal.**

Comment #4: Clark County Regional Flood Control District (CCRFCD) concurrence is required since the site lies within a FEMA designated Special Flood Hazard Area. It is the responsibility of the applicant to submit a copy of the drainage study and any addenda to the CCRFCD;

Response #4: **Acknowledged. The drainage study and all addenda will be submitted to CCRFCD for concurrence upon the approval of the drainage study.**

Comment #5: Per NAC 625.610, effective April 29, 2002, the date of expiration of the engineers license must be entered below the seal;

Response #5: **Noted.**

Comment #6: Structural calculations, details, and geotechnical report must be submitted for the proposed junction structure, and the proposed manholes, as the Type II manhole is not allowable for the pipe sizes proposed;

Response #6: **The requested structural calculations, details and geotechnical report are provided with this submittal.**

Comment #7: The HGL is above the manhole rim at station 4+07.91 of Storm Drain Line "B". Per Section 802.1 of the CCRFCD Manual, the HGL is to be 1-foot below finished grade this must be addressed;

Response #7: **Due to the high HGL and EGL at the downstream end of Line B which is driven by the high ponding WSE along I-15, it was not feasible to meet the 1-foot below finished grade at station 4+07.90. Therefore, the grading plans are revised to proposed a bolt-down type manhole at this station.**

Comment #8: The drop inlet calculations appear to be for a Type C drop inlet whereas the plans indicate Type A drop inlets. Also, the runoff captured at each drop inlet do not agree between the WSPG and the HEC-1 models. Appropriate revisions must be provided;

Response #8: **The hydraulic calculations for the drop inlets used a 4-ft curb opening with 3-ft grates. The grading plans have been revised to indicate a 4-ft Type C drop inlets with 2.5-ft grates. The drop inlet hydraulic calculations are provided with this submittal.**

The flow values used in original submittal in the WSPG agrees with the HEC-1 model. The flow values used in the WSPG and their corresponding HEC-1 cards are summarized in the following table. Please note that portion of the runoff generated from basin DI-3(5/9 cfs) drains into Line A through the proposed 24-inch roof-drain at station 4+24.42. The remaining portion of DI-3 is intercepted through the proposed drop inlet to drain into Line A at station 4+40.82.

WSPG Station (Line A)	Basin and Q from HEC-1	Runoff Flow Used in WSPG	Comment
Junction at 7+40.96	LAT-A1(4/7 cfs)	7 cfs	-
Junction at 4+40.82	DI-3 (5/9 cfs)	4 cfs	* Estimated portion of DI-3
Junction at 4+24.42	DI-3 (5/9 cfs)	5 cfs	* Estimated portion of DI-3
Junction at 2+47.91	DI-4 (3/5 cfs)	5 cfs	-

Please also note the large difference in peak time between the offsite flows in Line A(185 cfs) and the local onsite flows from the drop inlets into the storm drain. Therefore, in practice, insignificant flows will be contributing from the drop inlets to the storm drain during the 100-year storm event.

Comment #9: At the request of Clark County Development Services, drainage/grading plans for the proposed development have been reviewed for compliance to the requirements set forth in the *"Minimum Drainage Study Criteria Checklist, Drainage Plan Information,"* dated July 15, 1997. **The plans submitted do not meet the minimum requirements and must be revised prior to Drainage Study approval, to address the following:**

a. Revise FIRM panel and LOMR date as necessary on all sheets

Response #9a: The grading plan has been revised accordingly.

b. Provide NDOT Standard Drawings on the plans

Response #9b: The plans have been revised to provide the NDOT Standard Drawings.

c. Coordinate all drop inlet an junction invert elevations between grading plans, storm drain plans, and lateral profile.

Response #9c: The plans have been revised accordingly.

d. Provide NDOT Standard Drawings on the plans.

Response #9d: Please refer to response # 9b.

e. Sheet SD-3: Revise the invert at station 6+62.58 of Storm Drain Line "B".

Response #9e: The invert has been revised.

f. Sheet SD-3: Label the invert elevation at station 4+07.91 of Storm Drain Line "B".

Response #9f: The invert elevation has been labeled.

g. Provide Sheet SD-6.

Response #9g: Sheet SD-6 is provided in this submittal.

h. Provide details for the connection of the cast in place transition structure near Industrial Road. The details must clarify the connection to the existing double RCB's and the proposed precast RCB.

Response #9h: Line B has been revised to double 7'x3' RCB to address comment #10. In addition, the cast in place transition has been eliminated and the 2:7'x3' RCB's will be extended underneath Industrial Road replacing the existing double 5.5'x3' RCB's.

CCDS Comment: i. Label the drainage easements within the parking lot areas.

Response #9i: The plans have been revised to label the drainage easement within the parking lot. The drainage easement widths are determined as the top width of flows as determined from the HEC-RAS model. Please note that to address comment #10, Line B storm drain has been revised to 2:7'x3' RCB's. As described in the response to comment #10, Line B will intercept and convey approximately 314 cfs in the interim condition during the 100-year storm events. The surface runoff conveyed through the parking lot near Shelbourne alignment is therefore reduced to 332 cfs (instead of 476 cfs in the original submittal) during the 100-year storm events. In the future condition, the revised Line B is designed to intercept and convey the entire runoff flows impacting Shelbourne alignment (258 cfs). Therefore, no runoff flows will over top Industrial Road towards the parking lot in the future condition. The HEC-RAS model has been revised to reduce the flows within the parking lot for interim condition. Copy of the revised HEC-RAS model is provided with this submittal.

CCDS Comment: j. Label the underground drainage easement to be publicly maintained.

Response #9j: The underground easement has been revised accordingly.

CCDS Comment: k. The drop inlets appear to be sized with a grate, but are shown as Type A, the type of inlet proposed must be clarified.

Response #9k: The hydraulic calculations for the drop inlets used a 4-ft curb opening with 3-ft grates. The grading plans have been revised to indicate a 4-ft Type C drop inlets with 2.5-ft

grates. Please also refer to response to comment #8.

CCDS Comment: 1. Show rip rap pads on the storm drain exits on the profile drawings.

Response #91: The plans have been revised to show the rip rap pads.

Clark County Development Services Department Additional Comments:

Comment #10: The study must improve the culvert capacity crossing Industrial Road to convey the 100-year future condition flows. The onsite storm drain capacity must be increased accordingly and the easement width revised, if necessary. The interim condition over flows into the parking lot area must be contained within a drainage easement to be privately maintained.

Response #10: Line B has been revised to double 7'x3' RCB to eliminate the flows overtopping of the Road during the 100-year future condition. In addition, the 2:7'x3' RCB's will be extended underneath Industrial Road replacing the existing double 5.5'x3' RCB's. The hydraulic analysis for the revised Line "B" is provided with this submittal. As shown in the attached WSPG model for Line B for the future condition, the storm drain system is designed to maintain the WSE just upstream Industrial Road (WSPG station 7+96.40) at 2275.41-ft. Therefore, overtopping of Industrial Road is eliminated in the future condition. The runoff flows intercepted and conveyed through Line B during the interim condition was determined through an iterative procedure. The flows in the storm drain was increased systematically until the Energy Grade Line (EGL) at WSPG station 7+96.40 approximately matched the EGL from the HEC-RAS model at River Station 514. The analysis determined 314cfs to be intercepted and conveyed in the interim condition through Line B during the 100-year storm events, whereas 332cfs will continue through the parking lot.

The hydraulic analysis for storm drain Line A has also been revised to account for the increase in flow at the downstream segment of Line A due to the increased flows in Line B. The size of storm drain Line "A" has been increased upstream of the junction box between line "A" and Line "B". A 8'x5.5' RCB is proposed for Line "A" to replace the previous 72" RCP segment whereas a 7'x3' RCB is proposed to replace the previous 6'x3' RCB segment. The hydraulic analysis for the revised Line "A" and "B" is provided with this submittal for interim and future condition. The revised HEC-RAS model for the surface flows within the parking lot near Shelbourne alignment is also provided.

The grading plans are revised to label the private drainage easement to be privately maintained in the parking lot for the interim condition overflows. The drainage easements width is determined as the top width of flows as determined from the HEC-RAS model.

The HEC-1 model for ultimate analysis has also been revised to incorporate routing the entire flows along Shelbourne towards Line A. A copy of the revise HEC-1, Q-Table and exhibit DR3 is provided with this submittal. Exhibit DR2 for interim condition has also been revised, but no HEC-1 was necessary and the diverted flows were calculated mathematically(since a constant Hydrograph was used for offsite flows in interim conditions).

Comment #11: The conveyance of interim flows through the parking lot must be contained within a drainage easement equal to the top width of flow. Computations for the conveyance of the

over flows must adhere to Clark County RFCD Design Manual section 903.6.

Response #11: The grading plans are revised to label the private drainage easement to be privately maintained in the parking lot for the interim condition overflows. The drainage easements width is determined as the top width of flows as determined from the HEC-RAS model. As shown in the attached table, the interim overflows within the parking lot meets the CCRFCD criteria of Velocity x Depth being less than 6. However, due to the parking lot layout, it was not feasible to exclude the parking stalls area from the conveyance areas. Per our phone discussion with David Betley, it was agreed that the parking stalls areas may be included in the conveyance areas if the flow depth within the parking lot is maintained to only few inches (i.e. less than the clearance height for a typical vehicle). The parking lot was therefore designed to maintain flow depths of less than 1-ft throughout effective flow areas. Sections with larger flow depths at the east side of the parking lot near I-15 right-of-way (HEC-RAS sections 50, 60 and 70) does not represent effective flow areas but rather a pond-like pattern (as noted in the very low velocities <0.50 ft/sec).

Comment #12: Offsite flows are being concentrated and diverted from their historical flow paths. The study must address any adverse impacts to the existing facilities and downstream properties.

Response #12: As determined in the approved Conceptual Study for Silverton Hotel/Casino and the effective FIS Restudy (please refer to exhibits BD-1 and BD2), the offsite flows impacting the Silverton Hotel/Casino will flow eastward towards the pond created along I-15 right-of-way to drain through the 4:12'x4' RCB underneath I-15. The subject study proposes to intercept the portion of these flows south of the Casino(Line "A") and return it to I-15 right-of-way to the pond created upstream of the 4:12'x4' RCB, i.e. return the flows to its historical path. Similarly, the eastbound runoff flows within Shelbourne Avenue alignment travel towards I-15 to drain through the 4:12'x4' RCB. As shown in the approved Conceptual Study and the FIS Restudy, flows further south of Shelbourne alignment (and up to Cactus Road in the far south) will drain through the 4:12'x4' RCB. The study proposes to intercept portion of Shelbourne flows (Line "B") and convey it to Line "A" to drain closer to the 4:12'x4' RCB. Therefore, the proposed drainage facilities return the flows to their historical path draining through the 4:12'x4' RCB. The outlet of the proposed storm drain into I-15 right-of-way is designed as required by the CCRFCD Design Manual to protect against scour.

The proposed drainage facilities does not increase the 100-year storm flows impacting the downstream facilities or properties, and downstream flows are controlled only by the flow capacity for the 4:12'x4' RCB underneath I-15. Therefore, the proposed development does not introduce any adverse impacts to the existing downstream facilities or properties.

Comment #13: HEC-RAS cross sections must be provided along the edge of pavement and centerline of Shelbourne Avenue to evaluate the potential for any flow split within the right-of-way.

Response #13: Additional HEC-RAS section (River Station 456) is provided along the Industrial Road Centerline for the interim flow condition. In addition, HEC-RAS section with RS 420 is extended to contain the WSE along Industrial Road. As shown in the revised HEC-RAS model, the entire runoff flows crossing Industrial Road impact the parking lot and no flows split southward along Industrial Road right-of-way. Copies of the

revised HEC-RAS mode and the revised VxD table for flows within the parking lot are provided with this submittal.

Overtopping flows will be eliminated in the future condition and the entire flows will be conveyed through the proposed 2:7'x3' RCB.

Comment #14: It is not clear whether the proposed/future HEC-RAS cross sections in the Shelbourne Avenue alignment matches the elevations shown on the exhibits and must be addressed.

Response #14: The proposed/future HEC-RAS cross sections in Shelbourne Avenue alignment does match the elevations shown in the exhibit. The exhibit has also been revised to show the proposed contours in addition to the spot grades.

Comment #15: The hydraulic cross sections at the eastern end of the site must be extended to contain the entire flow. The limits of the ponded flows on the site must be defined.

Response #15: The northern boundaries of the hydraulic cross sections at the eastern end of the site has been extended to contain the entire flow. However, extending the hydraulic cross sections to contain the ponding water surface elevations along the south boundaries was not possible. As described in the approved Conceptual Study and indicated in the referenced exhibit BD-1 from the Duck Creek/Blue Diamond FIS Restudy, the ponding water surface elevation extends along I-15 further south outside of the project limits. Please note that the hydraulic sections at the eastern end does not represent effective flow areas but rather a pond-like pattern as noted in the very low velocities(<0.50 ft/sec) in the Shelbourne HEC-RAS model. Therefore, not containing the flows within these eastern sections, will not impact the accuracy of the WSE or flow velocities determined within the parking lot.

Comment #16: A pier must be added to the existing double barrel, 5.5-foot by 3-foot culvert in the WSPG model for Line B.

Response #16: In the original submittal, a 0.6-foot pier was provided to the existing double barrel 5.5'x3' culvert in the WSPG model for Line B.

Comment #17: An additional hydraulic cross section must be added to the upstream end of the existing, double barrel 5.5-foot by 3-foot culvert in the Storm drain Line B WSPG model.

Response #17: Additional hydraulic sections upstream of the proposed 2:7'x3' RCB's underneath Industrial Road has been added. A copy of the revised WSPG model for Line B is provided with this submittal.

Comment #18: The study must demonstrate by hydraulic calculation how the proposed improvements to the site will change the SFHA flood plain delineation. The analysis must be included with the next submittal and with the notification to FEMA.

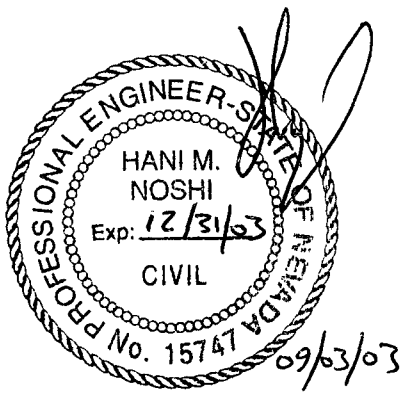
Response #18: Utilizing the hydraulic analysis for the flows along Shelbourne Avenue and the approved WSE for the flows north of the Silverton Hotel/Casino from the Conceptual Study, the 100-year areas of inundation is illustrated on the attached Exhibit F1. Please note that the offsite runoff flows determined by the effective FIS to impact the site is much less than the conservative flow values adopted in the subject study, as explained in the response to comment #1. In addition, a FlowMaster analysis is

provided at Section AA (in exhibit F1) for the flows determined by the effective FIS to flow northward along I-15. As shown in the FlowMaster analysis, the WSE determined from the FIS analysis is much less than the ponding elevation of 70.75-ft assumed in the analysis of the subject study.

Please feel free contact our office at your convenience if you have any questions or further comments.

Sincerely,

LOCHSA ENGINEERING



Hani M. Noshi, Ph.D., P.E.
Director of Flood Control and Drainage

8/5/03 5-20-03

WILLDAN
Serving Public Agencies

2725 E. Desert Inn Road, Suite 100
Las Vegas, Nevada 89121
702/734-3001 fax 702/734-0888
www.willdan.com

MEMORANDUM

TO: Chris O. Stone, P.E. COS

FROM: Isabel Pennington IP

OFFICE: Las Vegas

DATE: August 11, 2003

SUBJECT: WILLDAN / Clark County Development Services Dept. Plan Review Contract
Technical Drainage Study for Silverton Retail Phase I - Bass Pro Shop
(4319)
Study Dated: August 5, 2003
Location: Southwest corner of Blue Diamond Road and I-15 Interchange
(Sec. 17, T. 22 S., R. 61 E.)
HTE #03-23295
Prepared by Lochsa Engineering

We have completed our initial review of the above-referenced **Technical Drainage Study**, and have the following comments:

α 1. As indicated on the FIRM map provided in the study, the site is within special flood hazard area. This study must establish base flood elevations (BFE's) based on conditions that existed when the effective FIRM was created. A regulatory floodway must be selected, per 60.3(b)(4) of the NFIP Regulation. Per a memorandum dated June 17, 2003 from the Clark County Department of Development Services Civil Engineering Division, "anything other than using the effective BFE will require the development to obtain a FEMA approved Letter of Map Revision (LOMR) for the drainage facilities that were used to change the storm water flow rate in the 100-year flood plains... A CLOMR must be obtained prior to issuance of grading and/or building permits in the area within the 100-year flood plain." This must be addressed and all BFE's revised appropriately;

2. The finished floor elevations of the proposed structures do not meet the requirements of being at least eighteen (18) inches above the street centerline or top-of-curb. The finished floor elevations must be raised or a waiver must be obtained;

3. Nevada Department of Transportation (NDOT) concurrence is required for the work proposed in NDOT right of way;

4. Clark County Regional Flood Control District (CCRFCD) concurrence is required since the site lies within a FEMA designated Special Floor Hazard Area. It is the responsibility of the applicant to submit a copy of the drainage study and any addenda to the CCRFCD;

5. Per NAC 625.610, effective April 29, 2002, the date of expiration of the engineers' license must be entered below the seal;

6. Structural calculations, details, and a geotechnical report must be submitted for the proposed junction structure, and the proposed manholes, as the Type II manhole is not allowable for the pipe sizes proposed;

7. The HGL is above the manhole rim at station 4+07.91 of Storm Drain Line "B". Per Section 802.1 of the CCRFCD Manual, the HGL is to be 1-foot below finished grade. This must be addressed;

8. The drop inlet calculations appear to be for a Type C drop inlet whereas the plans indicate Type A drop inlets. Also, the runoff captured at each drop inlet do not agree between the WSPG and the HEC-1 models. Appropriate revisions must be provided;

α 9. At the request of Clark County Development Services Department, drainage/grading plans for the proposed development have been reviewed for compliance to the requirements set forth in the "Minimum Drainage Study Criteria Checklist, "Drainage Plan Information," dated July 15, 1997. **The plans submitted do not meet the minimum requirements and must be revised prior to Drainage Study approval, to address the following:**

   a. Revise FIRM panel and LOMR date as necessary on all sheets

   b. Provide NDOT Standard Drawings on the plan

   c. Coordinate all drop inlet and junction invert elevations between grading plans, storm drain plans, and lateral profiles

   d. Provide NDOT Standard Drawings on the plans

   e. Sheet SD-3: Revise the invert at station 6+62.58 of Storm Drain Line "B"

f. Sheet SD-3: Label the invert elevation at station 4+07.91 of Storm Drain Line "B"

g. Provide sheet SD-6

h. Provide details for the connection of the cast in place transition structure near Industrial Road. The details must clarify the connection to the existing double RCB's and the proposed precast RCB

The grading plan has been red-lined and is being returned to the engineer. The red-lined grading plan must be resubmitted with the revised drawings. Failure to resubmit the red-lined grading plan will prevent further review of the project.

All addenda must be submitted directly to Clark County. Any drainage studies or addenda submitted directly to WILLDAN will be returned to Clark County for the necessary log-in procedures.

The items listed herein must be thoroughly addressed and submitted for review prior to acceptance of this study.

A study review workshop with WILLDAN may be scheduled if there are questions concerning the above listed comments.

CONCURRENCE BY CLARK COUNTY DEVELOPMENT SERVICES DEPARTMENT:

Valerie Flock — Signature

8/18/03 — Date

COMMENTS: _____

cc: Kevin K. Elliott, P.E.
Silverton Hotel & Casino

Item – 1. The engineer must notify FEMA for any changes to the SFHA Zone.

Item – 9.

i. Label the drainage easements within the parking lot areas

j. Label the underground drainage easement to be publicly maintained

k. The drop inlets appear to be sized with a grate, but are shown as Type A the type of inlet proposed must be clarified

l. Show rip rap pads on the storm drain exits on the profile drawings

10. The study must improve the culvert capacity crossing Industrial Road to convey the 100-year future condition flows. The onsite storm drain capacity must be increased accordingly and the easement width revised, if necessary. The interim condition over flows into the parking lot area must be contained within a drainage easement to be privately maintained.

11. The conveyance of interim flows through the parking lot must be contained within a drainage easement equal to the top width of flow. Computations for the conveyance of the over flows must adhere to Clark County RFCD Design Manual section 903.6.

12. Offsite flows are being concentrated and diverted from their historical flow paths. The study must address any adverse impacts to the existing facilities and downstream properties.

13. HEC-RAS cross sections must be provided along the edge of pavement and centerline of Shelbourne Avenue to evaluate the potential for any flow split within the right-of-way.

14. It's not clear whether the proposed/future HEC-RAS cross sections in the Shelbourn Avenue alignment matches the elevations shown on the exhibits and must be addressed.

15. The hydraulic cross sections at the eastern end of the site must be extended to contain the entire flow. The limits of the ponded flows on the site must be defined.

16. A pier must be added to the existing double barrel, 5.5-foot by 3-foot culver in the WSPG model for the Storm drain Line B.

17. An additional hydraulic cross section must be added to the upstream end of the

existing, double barrel, 5.5-foot by 3-foot culvert in the Storm drain Line B WSPG model.

18. The study must demonstrate by hydraulic calculation how the proposed improvements to the site will change the SFHA flood plain delineation. The analysis must be included with the next submittal and with the notification to FEMA.

VF/gsh

RESPONSE TO COMMENT #2

COPY OF THE FINISH FLOOR WAIVER FORM BEING SUBMITTED

TITLE 30 ADMINISTRATIVE APPLICATION

CLARK COUNTY DEVELOPMENT SERVICES DEPARTMENT

FOR SUBMITTAL REQUIREMENTS, PLEASE SEE REVERSE

ADMINISTRATIVE APPLICATION TYPE

- ☐ MINOR DEVIATION (AV)
- ☑ FINISH FLOOR ELEVATION (AV)
- ☐ STREET NAMING (SN)
- ☐ EXTENSION OF TIME (ADET)
  Original App # _____
- ☐ EXTENSION OF TIME (ADET)
  Bond # _____
- ☐ NOTES:

DATE FILED: _____ APPLICATION NUMBER: _____

PLANNER INITIALS: _____ ZONE / AE DISTRICT: _____

FEE: _____ SEC / TWP / RANGE: _____

CHECKLIST: _____ REFERENCE FILES: _____

CHECK # : _____

PROCESSED BY: _____

LETTER DUE DATE: _____

PROPERTY OWNER: Commerce Construction Company, L.P.

ALL MAIL FOR THIS APPLICATION SHOULD BE ADDRESSED TO:

NAME: William A. Gray

☑ APPLICANT/(CORRESPONDENT) ☐ LESSEE

ADDRESS: 4155 W. Russell Road, Suite C

CITY: Las Vegas STATE: NV ZIP CODE: 89118

TELEPHONE: 702-896-5564 FAX/CELL: _____

E-MAIL ADDRESS (OPTIONAL): _____

ASSESSOR'S PARCEL NUMBER(S): 177-17-103-002, 177-17-204-007

PROPERTY ADDRESS AND/OR NEAREST CROSS STREETS:
Blue Diamond Road and US I-15

PLEASE BRIEFLY DESCRIBE THIS PROJECT: ☑ *ATTACH JUSTIFICATION LETTER*

This is for the Bass Pro Shops at the Silverton Casino Expansion, Phase 1 for Commerce Construction Company.

Property owner (Signature) W. A. Gray VP.

Property owner (Print) W. A. Gray VP.

STAFF USE ONLY

Application for Administrative: _____ is APPROVED / DENIED to run through _____

subject to the following conditions/justification: _____

By: _____ Date: _____
CURRENT PLANNING DIVISION

By: _____ Date: _____
CIVIL ENGINEERING DIVISION

Revised 9/13/02

RESPONSE TO COMMENT #3

COPY OF NDOT ENCROACHMENT PERMIT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
P. O. Box 170
Las Vegas, Nevada 89125-0170

July 24, 2003

KENNY C. GUINN, *Governor*

JEFF FONTAINE, P.E., *Director*

Mr. Richard Lane
SILVERTON CASINO,LLC
3333 Blue Diamond Road
Las Vegas, NV 89139

SUBJECT: District Permit No. 329-2003

To Whom It May Concern:

You are hereby advised to read and abide by the "Terms and Conditions Relating to Right-of-Way Occupancy Permits" booklet attached and any additional conditions which have been added to and listed on page 2 of your permit.

If you have any questions or desire further information on this matter, please feel free to contact me at 385-6509.

Sincerely,

Eugene F. Wright

FOR William H. Bagley
District I Permit Coordinator

Fee: #400 Permit No.:
I-15, cl, 33.23 to 33.31 (Milepost) DNE (District)
District No.: 329-2003
Applicant: Silverton Casino
Type of Work: Const RCB Section & Headwall, Rip Rap
Rmv & Replace Fence
34340 FOR DEPARTMENT USE ONLY

PERMITTEE'S COPY
Notify The District Office
at (702) 385-6509
48 HOURS IN ADVANCE

APPLICATION AND PERMIT FOR OCCUPANCY OF
NEVADA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY
(Under the provisions of NRS 408.423 and 408.210)

1. Location where excavation, construction, installation and/or occupancy is proposed
INTERSTATE 15 FR: STA. 105+48.97 TO STA ~~107+06.66~~ 108+15.50 MP 33.31
(Local name of highway) MP 33.23 (Street address or nearest cross street)
between Milepost 33.20 and Milepost 33.27

2. Describe in detail the type and scope of work; capacity or size of facility; stages and time frame for development; scheduled dates for start and completion. Attach 4 sets of detailed plans or drawings.

WORK CONSISTS OF THE LABOR, MATERIALS, & EQUIPMENT TO PERFORM THE FOLLOWING:

1) CONST. 8'x4' R.C. BOX
2) GRADING OUTLET OF BOX TO FLOW LINE OF EXIST. CHANNEL
3) CONSTRUCTION OF CONC. HEADWALL FOR R.C. BOX PER NDOT B-20.1.4
4) REPLACE FENCING AS NEEDED
5) PLACING OF RIP-RAP CHANNEL PROTECTION
6) OFF-SET DISTANCE FROM "L" LINE
7) WIDTH OF RIP-RAP TO BE ~~20~~ FT IN WIDTH x 30' L
8) PER NDOT STD R-3.14 : 25W x 20L

3. PERMITTEE hereby acknowledges that he has read and received a copy of the Terms and Conditions Relating to Right-of-Way Occupancy Permits issued by the State of Nevada Department of Transportation, and accepts said terms and conditions and any additional terms and conditions stated in this permit.

4. SPECIFIC TERMS AND CONDITIONS APPURTENANT TO THIS PERMIT ARE LISTED ON PAGE 2.

Silverton Casino, LLC.
Name of PERMITTEE

Richard B. Lane
Signature of PERMITTEE or Authorized Agent

3333 Blue Diamond Rd
Address

Project Manager (702) 896-5564
Title Telephone No.

Las Vegas, NV 89139
City, State, Zip

5-28-03
Date of Application

(702) 263-7777
Telephone No.

Permittee's I.D. No. or Parcel No.

RESPONSE TO COMMENT #6

STRUCTURAL CALCULATIONS AND GEOTECHNICAL REPORT

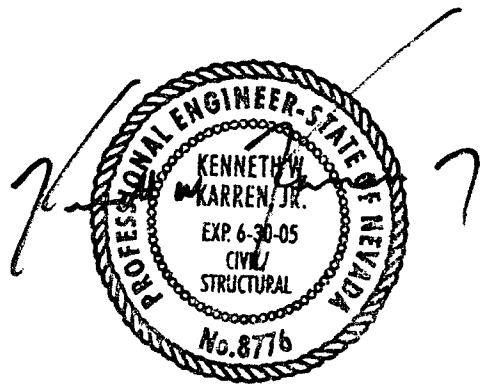
LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

Structural Calculations

For:

Bass Pro Shop Drainage Transition Structures



CIVIL AND STRUCTURAL ENGINEERING

5828 Spring Mountain Rd. • Suite 308 • Las Vegas, NV 89146-8896 • Phone (702) 365-9312 • Fax (702) 365-9317

LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet ___ of ___
Project _____ Job No. _____
_____ Date _____
_____ Surveyor _____

AASHTO LOAD FACTORS

$1.3(1.0DL + 2.2(1.3)LL) + IE)$

TRANSITION STRUCTURE STA 19-20 TOP SLAB

TOP SLAB

DL

1.5' FILL = $120(18/12)$ = 180 PSF

LL

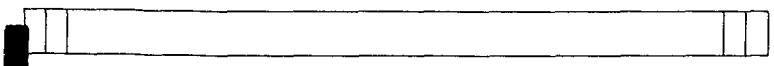
2'-SURCHARGE = 240PSF

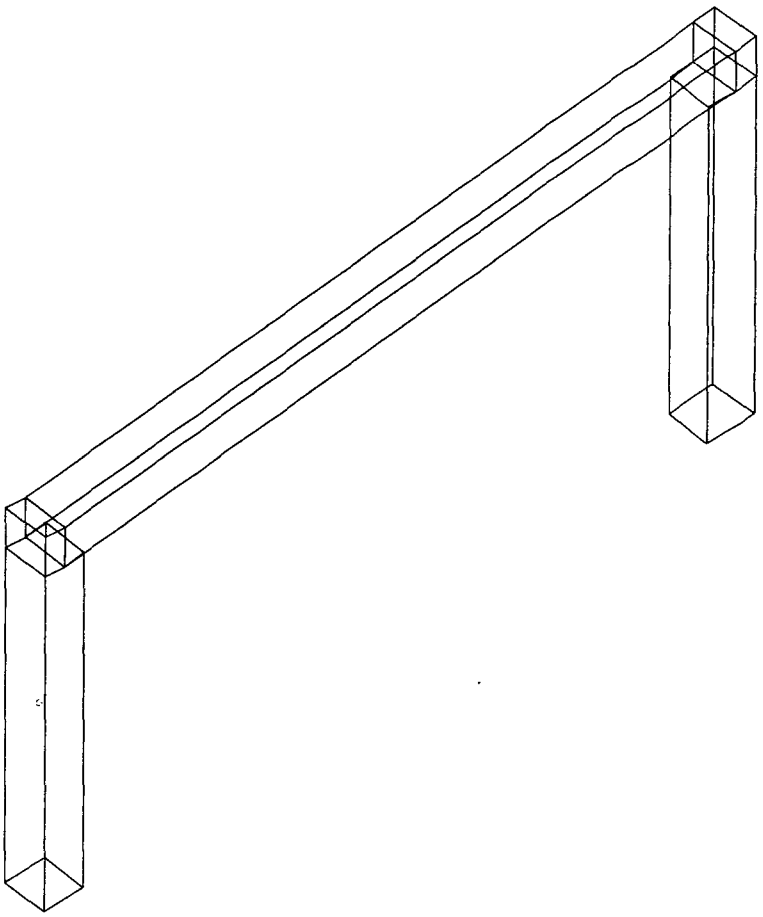
32K/10' LANE = 3.2K

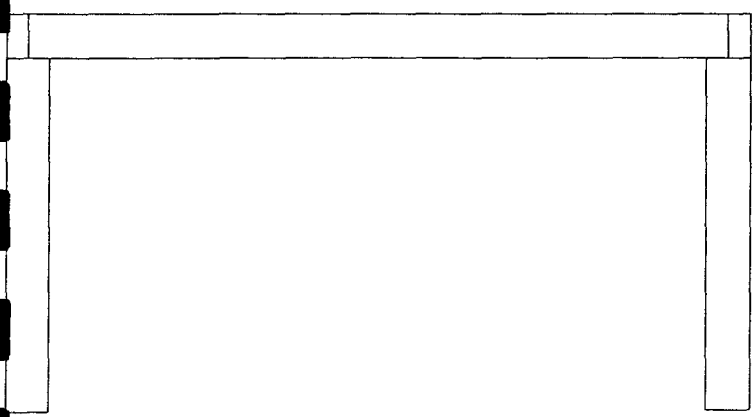
BOTTOM SLAB

DL = 180 PSF + $2.2K(2)/16$ = .66 – DL SLAB = 330 PSF
↳ FROM ADOSS OUTPUT

LL = $3.2(2)/16$ = 643 PSF







Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\1920TOP.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

   AAA    DDDDD      OOO     SSSSS    SSSSS
  A   A   D    D    O   O   S     S  S     S
 A     A  D     D  O     O  S        S
 AAAAAAA  D     D  O     O   SSSSS    SSSSS
 A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
 A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
 A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) s not and cannot be responsible for either the accuracy or adequacy of the aterial supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect o the correctness of the output prepared by the ADOSS(tm) program. Although CA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA isclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

    AAA    DDDDD      OOO     SSSSS    SSSSS
   A   A   D    D    O   O   S     S  S     S
  A     A  D     D  O     O  S        S
  AAAAAAA  D     D  O     O   SSSSS    SSSSS
  A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
  A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
  A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

FILE NAME C:\PROGRA~1\ADOSS\DATA\1920BOT.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox ST19-2

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.50 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

SPAN/LOADING DATA

****

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.5	12.0	.5	.5	6	1.0	1.0	370.0	645.0
2	16.0	12.0	.5	.5	6	1.0	1.0	370.0	645.0
3*	.5	12.0	.5	.5	6	1.0	1.0	370.0	645.0

-Indicates cantilever span information.
* -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.

PARTIAL LOADING DATA

****

PARTIAL LOADINGS ARE NOT SPECIFIED

COLUMN/TORSIONAL DATA

****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0
2	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
*-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

UTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

UTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 8.540 kips
LIVE LOAD = 10.965 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.3	-9.9	.0
	LIVE	4.1	-9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.3	-9.9	.0
	LIVE	.2	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.3	-9.9	.0
	LIVE	3.9	-9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.3	-9.9	.0
	LIVE	5.5	-12.3	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	4.3	9.9	.0
	LIVE	4.1	9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	4.3	9.9	.0
	LIVE	.2	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	4.3	9.9	.0
	LIVE	3.9	9.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	4.3	9.9	.0
	LIVE	5.5	12.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	PATTERN-1 RIGHT	PATTERN-1 TOP	PATTERN-1 BOTTOM	PATTERN-2 LEFT	PATTERN-2 RIGHT	PATTERN-2 TOP	PATTERN-2 BOTTOM
1	-.2	39.0	.0	-38.8	-.2	12.9	.0	-12.7
2	-39.0	.2	.0	38.8	-12.9	.2	.0	12.7

JOINT NUMBER	PATTERN-3 LEFT	PATTERN-3 RIGHT	PATTERN-3 TOP	PATTERN-3 BOTTOM	PATTERN-4 LEFT	PATTERN-4 RIGHT	PATTERN-4 TOP	PATTERN-4 BOTTOM
1	-.1	39.0	.0	-38.9	-.3	47.7	.0	-47.4
2	-39.0	.1	.0	38.9	-47.7	.3	.0	47.4

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	PATTERN-1 RIGHT	PATTERN-2 LEFT	PATTERN-2 RIGHT	PATTERN-3 LEFT	PATTERN-3 RIGHT	PATTERN-4 LEFT	PATTERN-4 RIGHT
1	-.9	16.2	-.9	5.3	-.2	16.2	-1.1	19.9
2	-16.2	.9	-5.3	.9	-16.2	.2	-19.9	1.1

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN	DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL LEFT	TOP	-.2	.087	4	.500	1
		BOT	.0	.000	0	.000	0
	RGHT	TOP	38.1	.500	4	3.200	2
		BOT	.0	.000	0	.000	0
2	TOTL LEFT	TOP	-38.1	.500	4	3.200	2
		BOT	.0	.000	0	.000	0
	RGHT	TOP	.2	.087	4	.500	1
		BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	8.400	TOP	.0	0	.000	0	.000	0
			BOT	32.1	4	5.200	1	4.400	1

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.2	.0	(0)	.0	(0)	-.2	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	38.1	.0	(0)	.0	(0)	38.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-38.1	.0	(0)	.0	(0)	-38.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.2	.0	(0)	.0	(0)	.2	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	8.40 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	32.1	.0	(0)	.0	(0)	32.1	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
1	4		R	38.1	.95	1.0
2	4	L		-38.1	.95	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
2	4	8.4	32.1	.90	1.0

A D D I T I O N A L I N F O R M A T I O N F O R
I N - S P A N C O N D I T I O N S

****

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.90*	.79	70.2

* - Indicates REQ'D reinforcement is greater than PROV'D (check bar selection)

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

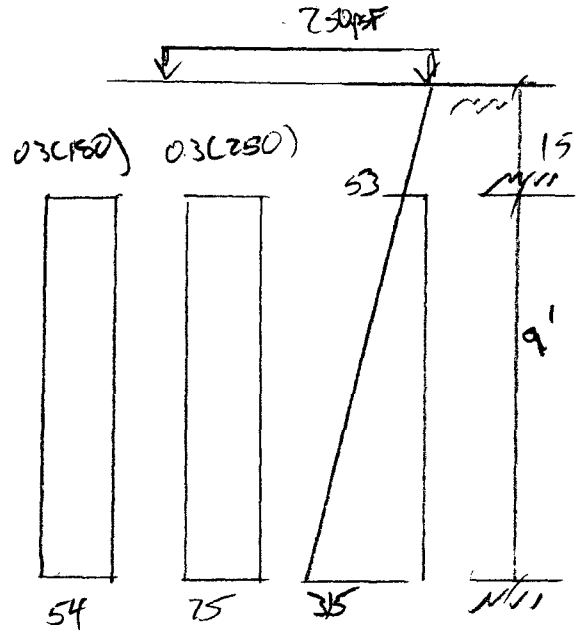
--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	1728.	-.002	-.002	-.004	Not applicable		
2	1728.	.031	.086	.117	Not applicable		
3	1728.	-.002	-.002	-.004	Not applicable		

* Program completed as requested *

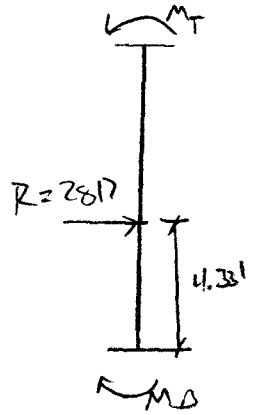
LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

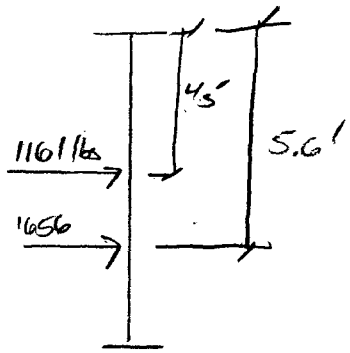
Client _____ Sheet ___ of ___
Project _____ Job No. _____
_____ Date _____
_____ Surveyor _____



M_T = 4k' 1' WIDTH
8k' 2' WIDTH

M_B = 3k' 1' WIDTH
6k' 2' WIDTH

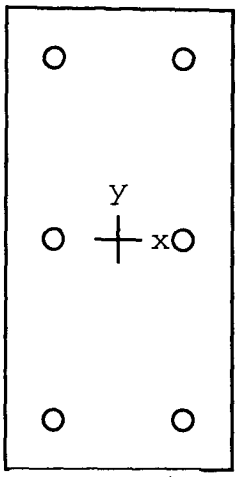




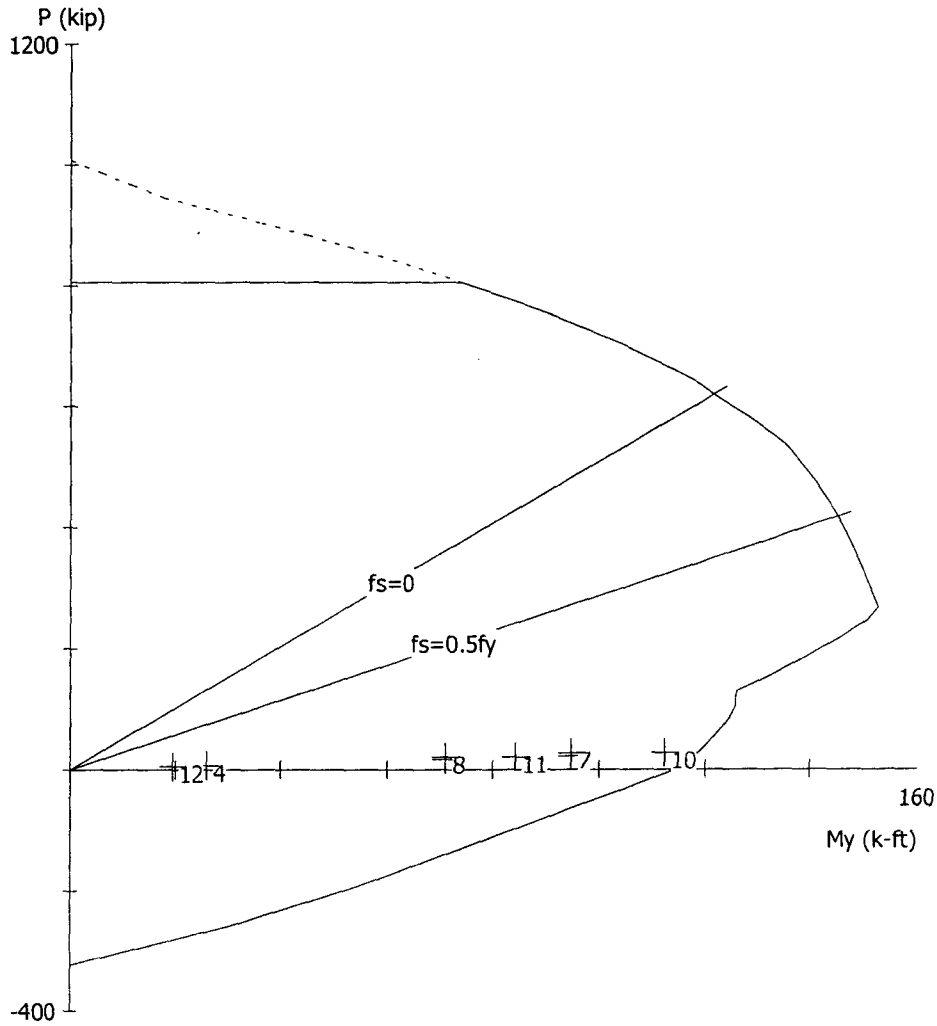
TOP & BOTTOM WALL MOMENTS FROM ADOSS

TOP	D	L	
1	12.6	23.4	(7.72(1.25)+8) TYP
2	12.6	0	
3	12.6	23.4	
4	12.6	28.6	

BOT	D	L	
1	20	(9.2x2') + 6 =	24.4
2	20	0	
3	20	24.4	
4	20	30.6	



12 x 24 in



Code: ACI 318-95

Units: English

Run axis: About Y-axis

Run option: Design

Slenderness: Not considered

Column type: User-defined

Bars: ASTM A615

Date: 08/29/03

Time: 12:47:52

PCACOL V3.00 (PCA 1999) - Licensed to: Lochsa Engineering, Las Vegas, NV

File: C:\PROGRA~1\PCACOL\DATA\STA1920.COL

Project: bass pro shop

Column: oSpan 1, Colu

Engineer: cls

f'c = 4.5 ksi	fy = 60 ksi	Ag = 288 in^2	6 #9 bars
Ec = 4067 ksi	Es = 29000 ksi	As = 6.00 in^2	Rho = 2.08%
fc = 3.825 ksi	e_rup = Infinity	Xo = 0.00 in	Ix = 13824 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 3456 in^4
Beta1 = 0.825		Clear spacing = 5.74 in	Clear cover = 2.00 in

Confinement: Other phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

```
 OOOOOOO    OOOOO    OOOOO    OOOOO    OOOOO   OO
 OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO    OO   OO       OO  OO   OO       OO  OO  OO
 OO    OO   OO       OOOOOOO  OO       OO  OO  OO
 OOOOOOO    OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO         OO  OO   OO  OO   OO  OO   OO  OO  OO
 OO          OOOOO   OO  OO    OOOOO    OOOOO   OOOOO  (TM)
```

==========
Computer program for the Strength Design of Reinforced Concrete Sections
==========

Licensee stated above acknowledges that Portland Cement Association (PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the PCACOL(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the PCACOL(tm) program. Although PCA has endeavored to produce PCACOL(tm) error free, the program is not and can't be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the PCACOL(tm) program.

General Information:
==========
File Name: C:\PROGRA~1\PCACOL\DATA\STA1920.COL
Project: bass pro shop
Column: oSpan 1, Colu Engineer: cls
Code: ACI 318-95 Units: English

Run Option: Design Slenderness: Not considered
Run Axis: Y-axis Column Type: User-defined

Material Properties:
==========
f'c = 4.5 ksi fy = 60 ksi
Ec = 4066.84 ksi Es = 29000 ksi
fc = 3.825 ksi Rupture strain = Infinity
Ultimate strain = 0.003 in/in
Betal = 0.825

Section:
==========
Rectangular: Width = 12 in Depth = 24 in

Gross section area, Ag = 288 in^2
Ix = 13824 in^4 Iy = 3456 in^4
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Rebar Database: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: User-defined; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

Layout: Rectangular
Pattern: Sides Different (Cover to longitudinal reinforcement)
Total steel area, As = 6.00 in^2 at 2.08%

	Top	Bottom	Left	Right
Bars	2 # 9	2 # 9	1 # 9	1 # 9
Cover(in)	2	2	2	2

Load Combinations:
==========
U1 = 1.300*Dead + 2.820*Live + 0.000*Lateral
U2 = 0.975*Dead + 2.115*Live + 1.275*Lateral
U3 = 0.975*Dead + 0.000*Live + 1.275*Lateral

Service Loads:
==========

No.	Load Case	Axial Load kip	Mx @ Top k-ft	Mx @ Bot k-ft	My @ Top k-ft	My @ Bot k-ft
1	Dead	5.2	0.0	0.0	12.6	20.0
	Live	5.4	0.0	0.0	23.4	24.4
	Latl	0.0	0.0	0.0	0.0	0.0

LOCHSA SURVEYING
5828 Spring Mountain Rd. Ste. 308
Las Vegas, Nevada 89146-8896
Tel: 702-365-9312
FAX: 702-365-9317

Client _____ Sheet ___ of ___
Project _____ Job No. _____
_____ Date _____
_____ Surveyor _____

TYP MANHOLE

- TOP SLAB

DL

4' OVERBURDEN — 4(120) = 480 PSF
SELFWT

LL

2' OVERBURDEN — 2(120) = 240 PSF

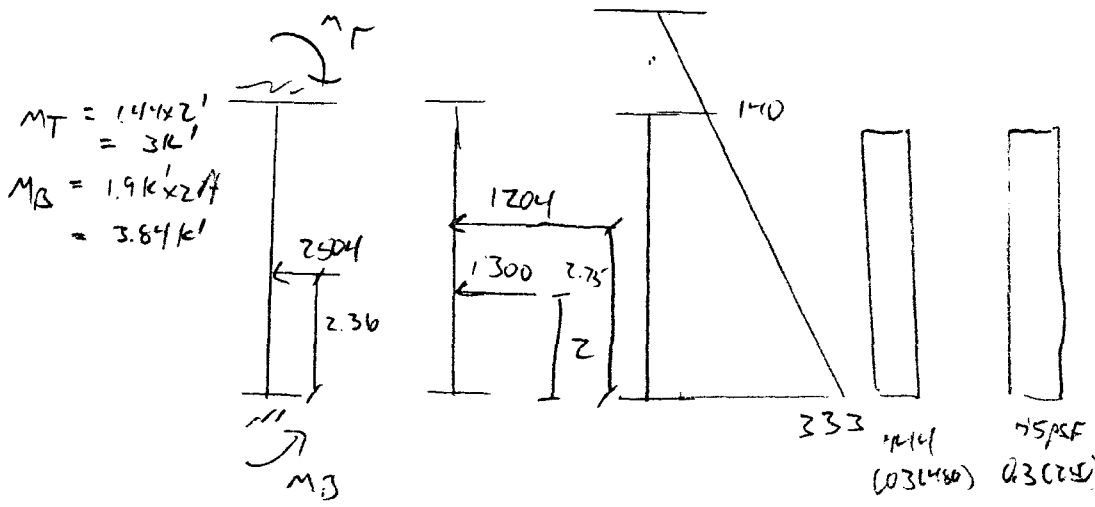
32 K / 10 = 3.2 K

- BOTTOM SLAB

DL = (480 PSF + 2.4CZ)/8 ÷ .85Φ = 630 PSF

LL = 2(2)/8 = 500 PSF

WALL



FILE NAME C:\PROGRA~1\ADOSS\DATA\1920TOP.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox ST19-2

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 2.50 in OUTER LAYER
AT SLAB BOTTOM = 3.00 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

SPAN/LOADING DATA

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.5	12.0	.5	.5	6	1.0	1.0	180.0	240.0
2	16.0	12.0	.5	.5	6	1.0	1.0	180.0	240.0
3*	.5	12.0	.5	.5	6	1.0	1.0	180.0	240.0

-Indicates cantilever span information.
* -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.

PARTIAL LOADING DATA

SPAN No.	LOAD No.	TYPE	PARTIAL DEAD LOADS Wa	Wb	La	Lb	LOAD No.	TYPE	PARTIAL LIVE LOADS Wa	Wb	La	Lb
1*												
2							1	CONC	3.2	.0	8.0	.0
3*												

* -Indicates cantilever span information.

UNITS FOR:
UNIFORM LOAD: Wa.....plf La & Lb... ft
CONCENTRATED LOAD: Wa.....kips La..... ft
TRAPEZOIDAL LOAD: Wa & Wb..plf La & Lb... ft
MOMENT: Wa.....ft-k La..... ft
NOTE: Local effects of partial loadings are NOT considered by ADOSS, compute manually.

COLUMN/TORSIONAL DATA

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0
2	.0	.0	.0	12.0	12.0	9.0	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
*-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA

****

LATERAL LOADS ARE NOT SPECIFIED

UTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

UTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 5.310 kips
LIVE LOAD = 7.280 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.7	-6.3	.0
	LIVE	2.7	-7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.7	-6.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.7	-6.3	.0
	LIVE	2.6	-7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.7	-6.3	.0
	LIVE	3.6	-10.3	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.7	6.3	.0
	LIVE	2.7	7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.7	6.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.7	6.3	.0
	LIVE	2.6	7.7	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.7	6.3	.0
	LIVE	3.6	10.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	30.0	.0	-29.9	-.1	8.2	.0	-8.1
2	-30.0	.1	.0	29.9	-8.2	.1	.0	8.1

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	30.0	.0	-30.0	-.1	37.3	.0	-37.2
2	-30.0	.0	.0	30.0	-37.3	.1	.0	37.2

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.4	10.8	-.4	3.3	-.1	10.8	-.5	13.3
2	-10.8	.4	-3.3	.4	-10.8	.1	-13.3	.5

$V_{u@d} = 12.4k$

$\phi V_c = .85\, 2\sqrt{4500}(12)(7.5) = 13k > 0k$

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	-.1	.087	4	.500	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	30.8	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-30.8	.500	4	3.200	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.1	.087	4	.500	1
			BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	7.600	TOP	.0	0	.000	0	.000	0
			BOT	32.3	4	4.400	1	5.200	1

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.1	.0	(0)	.0	(0)	-.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	30.8	.0	(0)	.0	(0)	30.8	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-30.8	.0	(0)	.0	(0)	-30.8	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.1	.0	(0)	.0	(0)	.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	7.60 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	32.3	.0	(0)	.0	(0)	32.3	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
1	4		R	30.8	.76	1.0
2	4	L		-30.8	.76	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
2	4	7.6	32.3	.85	1.0

ADDITIONAL INFORMATION FOR IN-SPAN CONDITIONS

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.85*	.79	31.1

* - Indicates REQ'D reinforcement is greater than PROV'D (check bar selection)

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

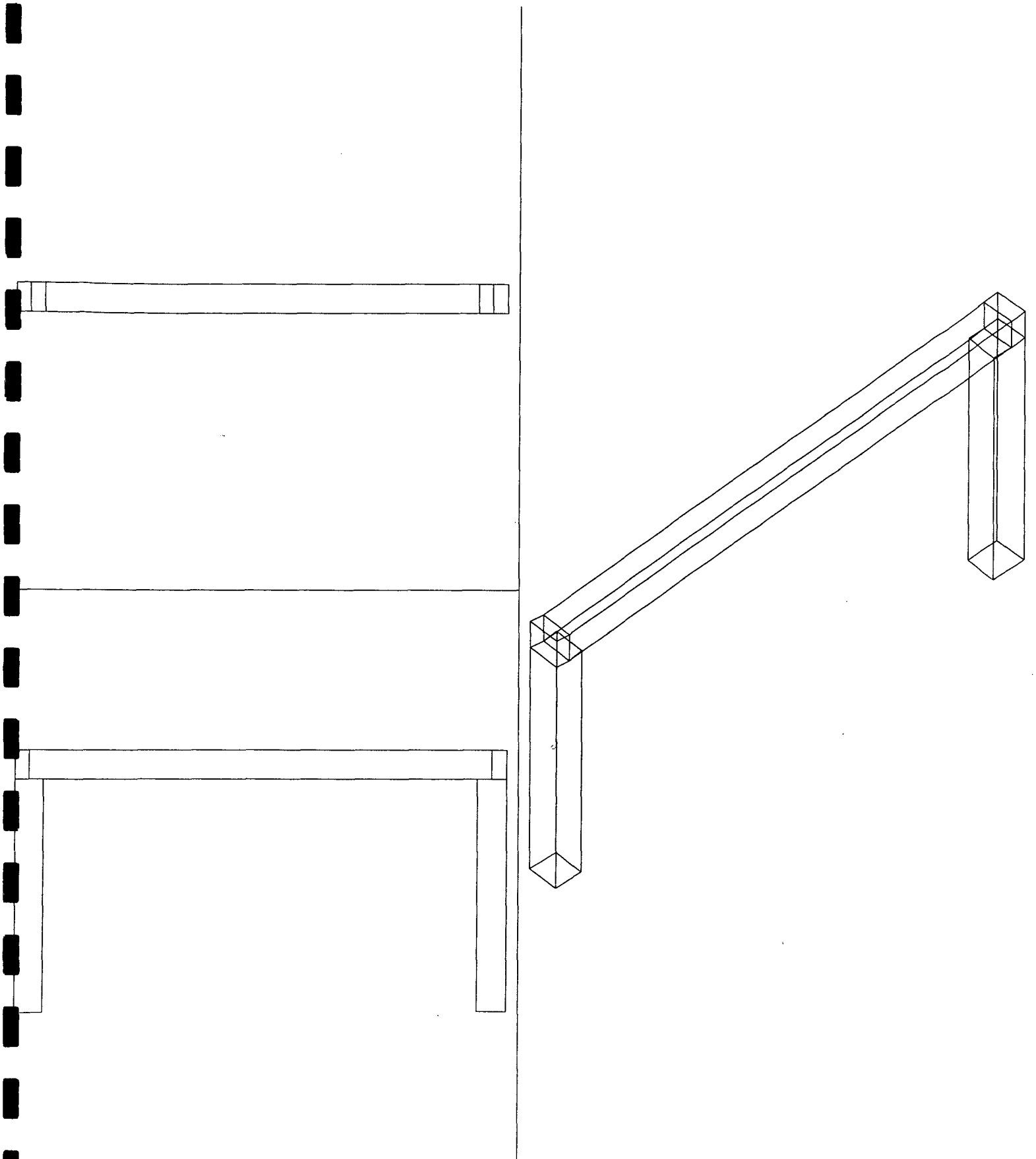
--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	1728.	-.001	-.002	-.003	Not applicable		
2	1728.	.020	.045	.065	Not applicable		
3	1728.	-.001	-.002	-.003	Not applicable		

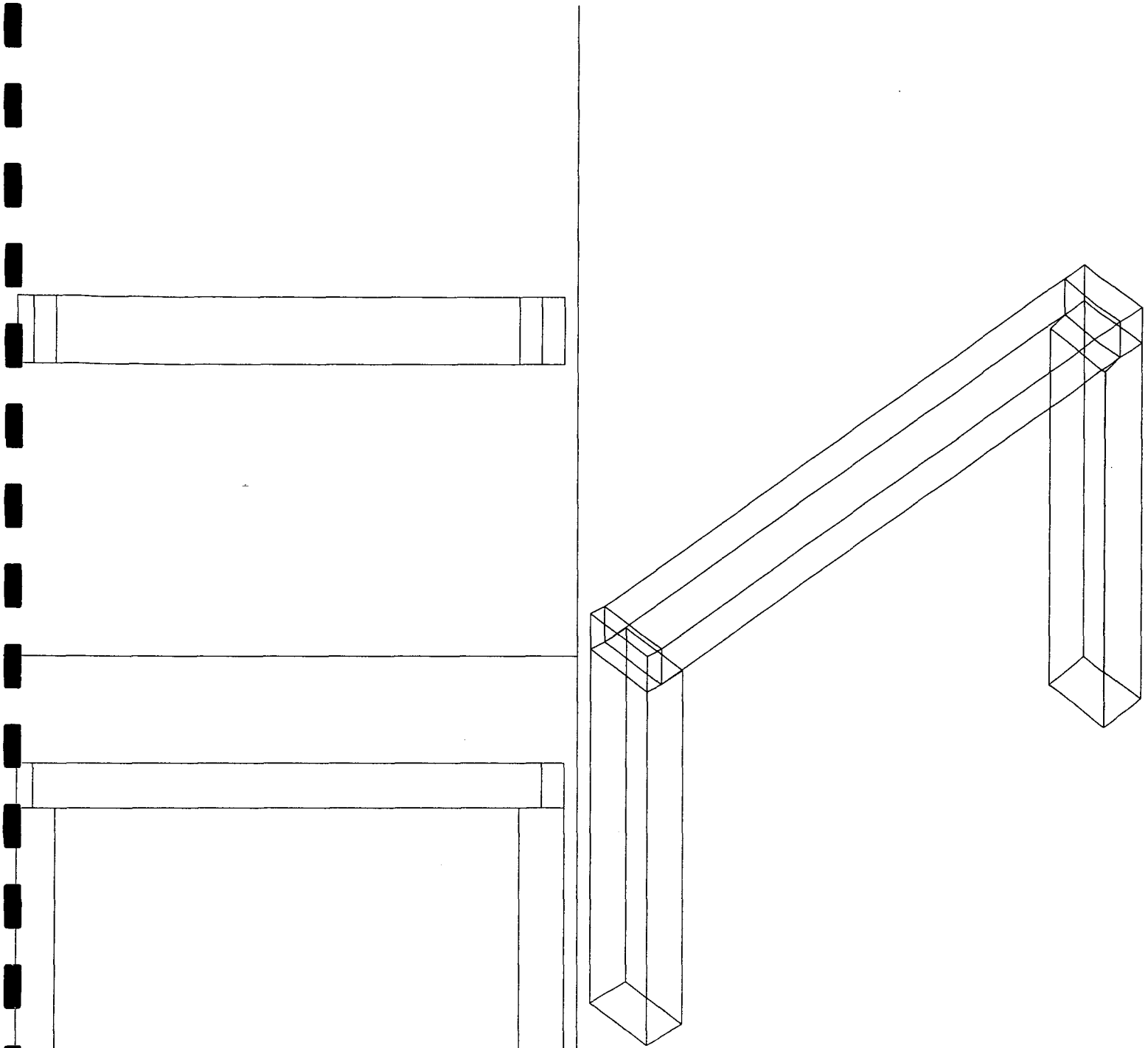
* Program completed as requested *

$\Delta = 0.027(3) + 0.045 = .105 = \ell/1,828$ ✓ok



Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\1920BOT.ADS
Project: bass pro shop
Span ID: junctionbox ST19-20
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab



Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\TYPMH.ADS
Project: bass pro shop
Span ID: junctionbox typ MH
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

    AAA    DDDDD      OOO     SSSSS    SSSSS
   A   A   D    D    O   O   S     S  S     S
  A     A  D     D  O     O  S        S
  AAAAAAA  D     D  O     O   SSSSS    SSSSS
  A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
  A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
  A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

SPAN/LOADING DATA

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	8.0	.5	.5	6	1.0	1.0	480.0	240.0
2	7.7	8.0	.5	.5	6	1.0	1.0	480.0	240.0
3*	.3+	8.0	.5	.5	6	1.0	1.0	480.0	240.0

-Indicates cantilever span information.
* -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.
-Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA

SPAN No.	LOAD No.	TYPE	PARTIAL DEAD LOADS Wa	Wb	La	Lb	LOAD No.	TYPE	PARTIAL LIVE LOADS Wa	Wb	La	Lb
1*												
2							1	CONC	3.2	.0	3.8	.0
3*												

-Indicates cantilever span information.

UNITS FOR:
UNIFORM LOAD: Wa.....plf La & Lb... ft
CONCENTRATED LOAD: Wa.....kips La..... ft
TRAPEZOIDAL LOAD: Wa & Wb..plf La & Lb... ft
MOMENT: Wa.....ft-k La..... ft
NOTE: Local effects of partial loadings are NOT considered by ADOSS, compute manually.

COLUMN/TORSIONAL DATA

****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
*-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA

****

LATERAL LOADS ARE NOT SPECIFIED

UTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

OAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

UTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 4.700 kips
LIVE LOAD = 5.200 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.4	-2.3	.0
	LIVE	2.0	-2.6	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.4	-2.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.4	-2.3	.0
	LIVE	2.0	-2.6	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.4	-2.3	.0
	LIVE	2.7	-3.5	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	2.4	2.3	.0
	LIVE	1.9	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	2.4	2.3	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	2.4	2.3	.0
	LIVE	1.8	2.5	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	2.4	2.3	.0
	LIVE	2.5	3.3	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	10.4	.0	-10.4	-.1	3.0	.0	-2.9
2	-10.1	.1	.0	10.0	-3.0	.1	.0	2.9

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	10.4	.0	-10.4	-.1	12.9	.0	-12.8
2	-10.1	.0	.0	10.0	-12.4	.1	.0	12.4

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.4	8.4	-.4	2.8	-.2	8.4	-.4	10.2
2	-8.0	.4	-2.8	.4	-8.0	.2	-9.7	.4

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	.0	.058	4	.333	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	9.6	.333	4	1.533	3
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-9.3	.333	4	1.533	3
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.0	.058	4	.333	1
			BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	3.642	TOP	.0	0	.000	0	.000	0
			BOT	15.1	4	2.492	2	2.875	2

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	.0	.0	(0)	.0	(0)	.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	9.6	.0	(0)	.0	(0)	9.6	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-9.3	.0	(0)	.0	(0)	-9.3	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.0	.0	(0)	.0	(0)	.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	3.64 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	15.1	.0	(0)	.0	(0)	15.1	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
1	4	||	R	9.6	.41	1.0
2	4	L ||		-9.3	.39	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
2	4	3.6	15.1	.74	1.0

A D D I T I O N A L I N F O R M A T I O N F O R
I N - S P A N C O N D I T I O N S

****

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.74	.79	8.8

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

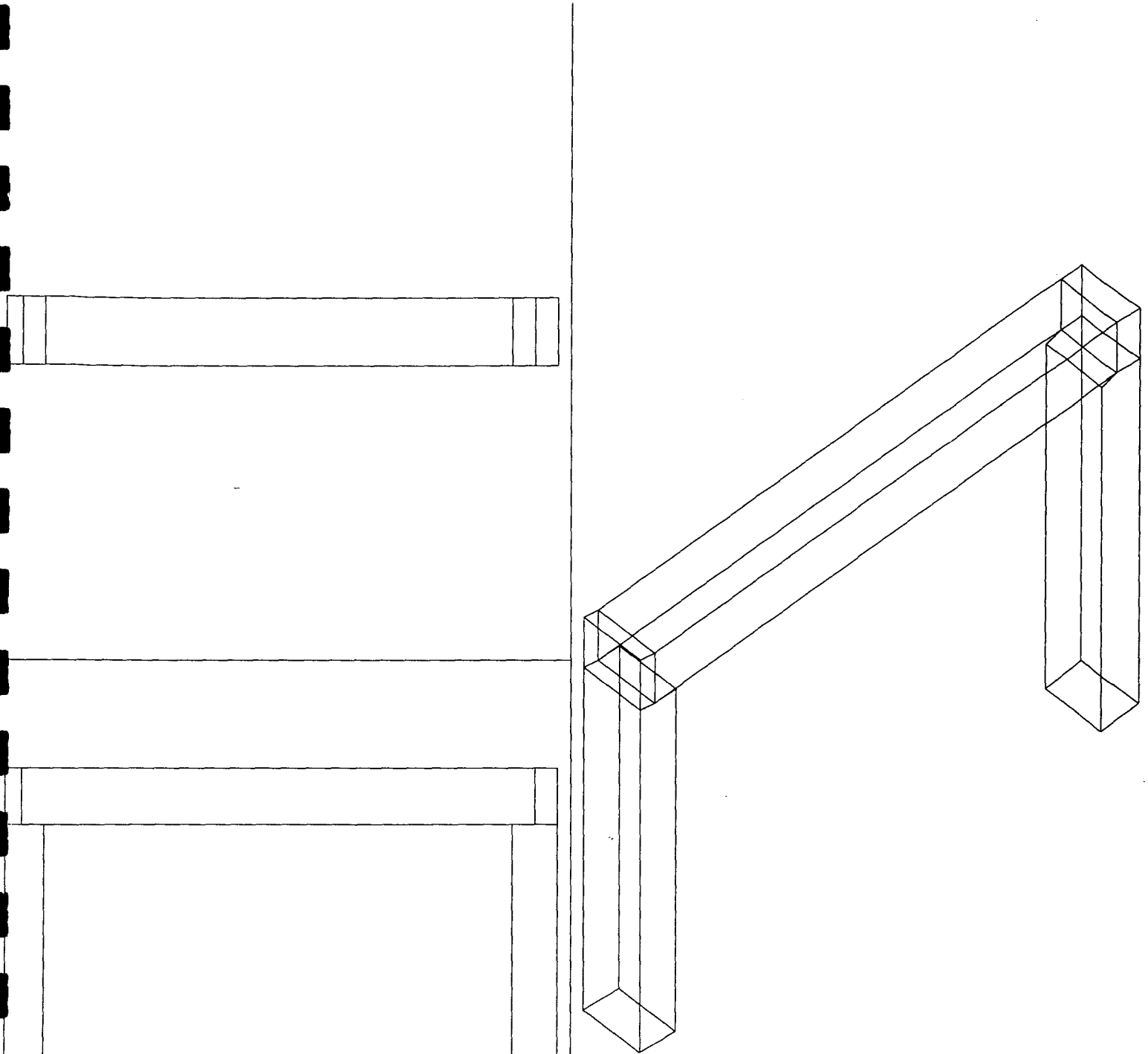
--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	512.	-.001	-.001	-.002	Not applicable		
2	512.	.008	.014	.021	Not applicable		
3	512.	-.001	-.001	-.002	Not applicable		

* Program completed as requested *



Licensed To: Lochsa Engineering, Las Vegas, NV

File Name: C:\PROGRA~1\ADOSS\DATA\TYPMHBOT.ADS
Project: bass pro shop
Span ID: junctionbox typ MH
Engineer: cls
Date: 8/28/2003 Time: 15:58:36
System Type: One-way Slab

```
          pppppp    ccccc    aaaaa
          p     p  c     c  a     a
          p     p  c     c        a
          p     p  c         aaaaaa
          p     p  c     c  a     a
          p     p  c     c  a     a
          pppppp    ccccc    aaaaaa
          p
          p

   AAA    DDDDD      OOO     SSSSS    SSSSS
  A   A   D    D    O   O   S     S  S     S
 A     A  D     D  O     O  S        S
 AAAAAAA  D     D  O     O   SSSSS    SSSSS
 A     A  D     D  O     O        S        S    ( ttttt mm   mm  )
 A     A  D    D    O   O   S     S  S     S   (    t   m m m m   )
 A     A  DDDDD      OOO     SSSSS    SSSSS     (   t   m  m  m  )
```

****

Computer program for ANALYSIS AND DESIGN OF SLAB SYSTEMS

****

Licensee stated above acknowledges that Portland Cement Association(PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the ADOSS(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the ADOSS(tm) program. Although PCA has endeavored to produce ADOSS(tm) error free the program is not and cannot be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the ADOSS(tm) program.

Note: Further information and technical support on the ADOSS computer program is available through the CPCA Web site at: "www.cpca.ca".

FILE NAME C:\PROGRA~1\ADOSS\DATA\TYPMHBOT.ADS

PROJECT ID. bass pro shop

SPAN ID. junctionbox typ MH

ENGINEER cls

DATE 8/28/2003
TIME 15:58:36

UNITS U.S. in-lb
CODE ACI 318-95

SLAB SYSTEM ONE WAY SLAB
FRAME LOCATION INTERIOR

DESIGN METHOD STRENGTH DESIGN

NUMBER OF SPANS 3

CONCRETE FACTORS	SLABS	BEAMS	COLUMNS
DENSITY(pcf)	150.00	150.00	150.00
TYPE	NORMAL WGT	NORMAL WGT	NORMAL WGT
f'c (ksi)	4.50	4.50	4.50
density factor	1.00	1.00	1.00
fr (psi)	503.10	503.10	503.10

REINFORCEMENT DETAILS: NON-PRESTRESSED
YIELD STRENGTH Fy = 60.00 ksi
DISTANCE TO RF CENTER FROM TENSION FACE:
AT SLAB TOP = 3.50 in OUTER LAYER
AT SLAB BOTTOM = 4.50 in OUTER LAYER
MINIMUM FLEXURAL BAR SIZE:
AT SLAB TOP = # 4
AT SLAB BOTTOM = # 4
MINIMUM SPACING:
IN SLAB = 6.00 in

SPAN/LOADING DATA

****

SPAN NUMBER	LENGTH L1 (ft)	Tslab (in)	WIDTH LEFT (ft)	L2*** RIGHT (ft)	SLAB SYSTEM	DESIGN STRIP (ft)	COLUMN STRIP** (ft)	UNIFORM LOADS S. DL (psf)	LIVE (psf)
1*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0
2	7.7	10.0	.5	.5	6	1.0	1.0	630.0	500.0
3*	.3+	10.0	.5	.5	6	1.0	1.0	630.0	500.0

  -Indicates cantilever span information.
* -Strip width used for positive flexure.
***-L2 widths are 1/2 dist. to transverse column.
E"-Indicates exterior strip.
  -Indicates change in dimension due to support conditions.

PARTIAL LOADING DATA

****

PARTIAL LOADINGS ARE NOT SPECIFIED

COLUMN/TORSIONAL DATA
****

COLUMN NUMBER	COLUMN ABOVE SLAB C1 (in)	C2 (in)	HGT (ft)	COLUMN BELOW SLAB C1 (in)	C2 (in)	HGT (ft)	CAPITAL** EXTEN. (in)	DEPTH (in)	COLUMN STRIP* (ft)	MIDDLE STRIP* (ft)
1	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0
2	.0	.0	.0	8.0	12.0	6.5	.0	.0	1.0	.0

Columns with zero "C2" are round columns.
-Strip width used for negative flexure.
*-Capital extension distance measured from face of column.

COLUMN NUMBER	SUPPORT FIXITY* %
1	100%
2	100%

-Support fixity of 0% denotes pinned condition.
Support fixity of 999% denotes fixed end condition.

LATERAL LOAD/OUTPUT DATA
****

LATERAL LOADS ARE NOT SPECIFIED

OUTPUT DATA
PATTERN LOADINGS: 1 THRU 4
PATTERN LIVE LOAD FACTOR (1-3) = 75%

LOAD FACTORS:
U = 1.30*D + 2.82*L
U = .75(1.30*D + 2.82*L + 1.70*W)
U = .90*D + 1.30*W

OUTPUT OPTION(S):
Input Echo
Column Service Load Table
Centerline Moments and Shears
Column Strip Distribution Fac
Shear Table
Reinforcing Required
Additional Information
Deflections

**TOTAL UNFACTORED DEAD LOAD = 6.125 kips
LIVE LOAD = 4.167 kips

SERVICE LOAD TABLE FOR INPUT TO PCACOL SLENDER COLUMN DESIGN
****

COLUMN NUMBER 1		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.1	-2.5	.0
	LIVE	1.6	-1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.1	-2.5	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.1	-2.5	.0
	LIVE	1.4	-1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.1	-2.5	.0
	LIVE	2.1	-1.6	.0
	LATL	.0	.0	.0

COLUMN NUMBER 2		AXIAL LOAD (kips)	MOMENT AT TOP (ft-k)	MOMENT AT BOT (ft-k)
LOAD PTRN 1	DEAD	3.1	2.5	.0
	LIVE	1.6	1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 2	DEAD	3.1	2.5	.0
	LIVE	.1	.0	.0
	LATL	.0	.0	.0
LOAD PTRN 3	DEAD	3.1	2.5	.0
	LIVE	1.4	1.2	.0
	LATL	.0	.0	.0
LOAD PTRN 4	DEAD	3.1	2.5	.0
	LIVE	2.1	1.6	.0
	LATL	.0	.0	.0

NOTE: Add dead, live and lateral axial loads as appropriate.
Top moments are those at joint bottom.
Bottom moments are those at joint top.
Moments are positive when counter-clockwise.
Axial forces positive when compressive.

---- STATICS PRINT-OUT FOR GRAVITY LOAD ANALYSIS ----
****

J O I N T M O M E N T S (ft - kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	TOP	BOTTOM	PATTERN-2 LEFT	RIGHT	TOP	BOTTOM
1	-.1	6.7	.0	-6.6	-.1	3.3	.0	-3.2
2	-6.7	.1	.0	6.6	-3.3	.1	.0	3.2

JOINT NUMBER	PATTERN-3 LEFT	RIGHT	TOP	BOTTOM	PATTERN-4 LEFT	RIGHT	TOP	BOTTOM
1	.0	6.7	.0	-6.7	-.1	7.9	.0	-7.8
2	-6.7	.0	.0	6.7	-7.9	.1	.0	7.8

J O I N T S H E A R S (kips)

JOINT NUMBER	PATTERN-1 LEFT	RIGHT	PATTERN-2 LEFT	RIGHT	PATTERN-3 LEFT	RIGHT	PATTERN-4 LEFT	RIGHT
1	-.6	7.8	-.6	3.7	-.3	7.8	-.7	9.1
2	-7.8	.6	-3.7	.6	-7.8	.3	-9.1	.7

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS FROM SUPPORTS

COL NUM	LOAD TYPE	CROSS SECTN		DESIGN MOMENT (ft-k)	DISTANCE CR.SECTN (ft)	LOAD PTRN	MAX.I.P. DISTANCE (ft)	LOAD PTRN
1	TOTL	LEFT	TOP	-.1	.058	4	.333	1
			BOT	.0	.000	0	.000	0
		RGHT	TOP	5.0	.333	4	1.150	2
			BOT	.0	.000	0	.000	0
2	TOTL	LEFT	TOP	-5.0	.333	4	1.150	2
			BOT	.0	.000	0	.000	0
		RGHT	TOP	.1	.058	4	.333	1
			BOT	.0	.000	0	.000	0

DESIGN MOMENT ENVELOPES AT CRITICAL SECTIONS ALONG SPANS

SPAN NUM	LOAD TYPE	CRITICAL SECTION (ft)		DESIGN MOMENT (ft-k)	LOAD PTRN	MAX. I.P. DIST LEFT (ft)	LOAD PTRN	MAX. I.P. DIST RGHT (ft)	LOAD PTRN
2	TOTL	4.025	TOP	.0	0	.000	0	.000	0
			BOT	9.7	4	2.875	1	2.492	1

DISTRIBUTION OF DESIGN MOMENTS AT SUPPORTS

COL NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
1	LEFT TOP	-.1	.0	(0)	.0	(0)	-.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	5.0	.0	(0)	.0	(0)	5.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
2	LEFT TOP	-5.0	.0	(0)	.0	(0)	-5.0	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	RGHT TOP	.1	.0	(0)	.0	(0)	.1	(100)	.0	(0)
	BOT	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)

DISTRIBUTION OF DESIGN MOMENTS IN SPANS

SPAN NUM	CROSS SECTN	TOTAL MOMENT (ft-k)	TOTAL-VERT DIFFERENCE (ft-k)	(%)	COLUMN STRIP MOMENT (ft-k)	(%)	SLAB MOMENT (ft-k)	(%)	MIDDLE STRIP MOMENT (ft-k)	(%)
2	4.03 TOP	.0	.0	(0)	.0	(0)	.0	(0)	.0	(0)
	BOT	9.7	.0	(0)	.0	(0)	9.7	(100)	.0	(0)

N E G A T I V E R E I N F O R C E M E N T

COLUMN NUMBER	PATT NO.	LOCATION @COL FACE		TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
1	4	||	R	5.0	.22	1.0
2	4	L ||		-5.0	.22	1.0

P O S I T I V E R E I N F O R C E M E N T

SPAN NUMBER	PATT NO.	LOCATION FROM LEFT (ft)	TOTAL DESIGN (ft-k)	SLAB AREA (sq.in)	STRIP WIDTH (ft)
2	4	4.0	9.7	.41	1.0

A D D I T I O N A L I N F O R M A T I O N F O R
I N - S P A N C O N D I T I O N S

****

SPAN NUMBER	REINF. SUMMARY AT MIDSPAN REQ'D. (sq.in)	REINF. SUMMARY AT MIDSPAN PROV'D. (sq.in)	TOTAL FACTORED SPAN STATIC DESIGN MOMENT (W/O PARTIAL LOADS) (ft-k)
2	.41	.44	14.6

D E F L E C T I O N A N A L Y S I S

NOTES--Spans 1 and 3 are cantilevers.

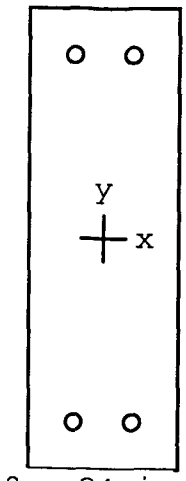
--Time-dependent deflections are in addition to those shown and must be computed as a multiplier of the dead load(DL) deflection. See "CODE" for range of multipliers.

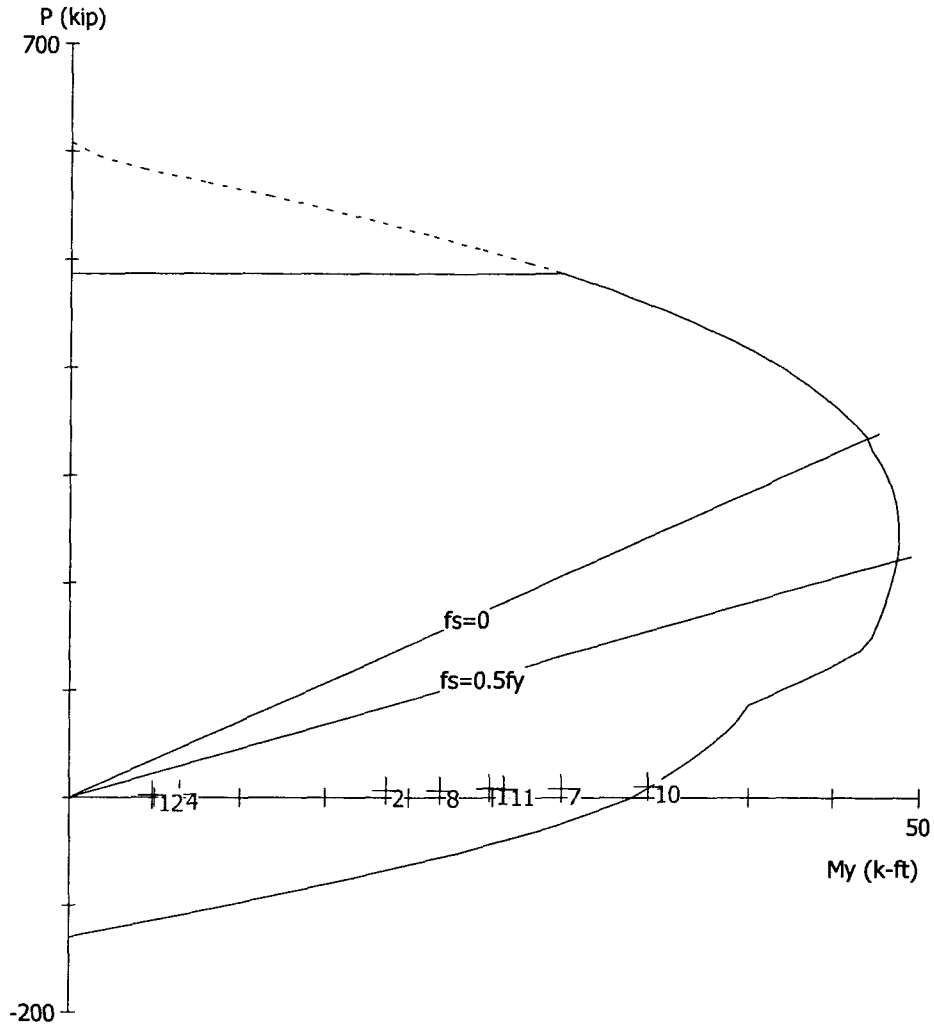
--Deflections due to concentrated or partial loads may be larger at the point of application than those shown at the centerline.

--Modulus of elasticity of concrete, Ec = 4067. ksi

SPAN NUMBER	DEAD LOAD Ieff. (in^4)	COLUMN STRIP DEFLECTION DUE TO: DEAD (in)	COLUMN STRIP DEFLECTION DUE TO: LIVE (in)	COLUMN STRIP DEFLECTION DUE TO: TOTAL (in)	MIDDLE STRIP DEFLECTION DUE TO: DEAD (in)	MIDDLE STRIP DEFLECTION DUE TO: LIVE (in)	MIDDLE STRIP DEFLECTION DUE TO: TOTAL (in)
1	1000.	-.001	-.001	-.001	Not applicable		
2	1000.	.007	.004	.011	Not applicable		
3	1000.	-.001	-.001	-.001	Not applicable		

* Program completed as requested *





Code: ACI 318-95

Units: English

Run axis: About Y-axis

Run option: Design

Slenderness: Not considered

Column type: User-defined

Bars: ASTM A615

Date: 08/29/03

Time: 07:05:47

PCACOL V3.00 (PCA 1999) - Licensed to: Lochsa Engineering, Las Vegas, NV

File: C:\PROGRA~1\ADOSS\DATA\ADOSS.COL

Project: bass pro shop

Column: oSpan 1, Colu

Engineer: cls

f'c = 4.5 ksi	fy = 60 ksi	Ag = 192 in^2	4 #7 bars
Ec = 4067 ksi	Es = 29000 ksi	As = 2.40 in^2	Rho = 1.25%
fc = 3.825 ksi	e_rup = Infinity	Xo = 0.00 in	Ix = 9216 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 1024 in^4
Beta1 = 0.825		Clear spacing = 2.25 in	Clear cover = 2.00 in

Confinement: Other phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

```
OOOOOOO    OOOOO    OOOOO    OOOOO    OOOOO   OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO  OO
OO    OO   OO       OO  OO   OO      OO  OO  OO
OO    OO   OO       OOOOOOO  OO      OO  OO  OO
OOOOOOO    OO  OO   OO  OO   OO  OO  OO  OO  OO
OO         OO  OO   OO  OO   OO  OO  OO  OO  OO
OO          OOOOO   OO  OO    OOOOO    OOOOO   OOOOO  (TM)
```

==========
Computer program for the Strength Design of Reinforced Concrete Sections
==========

Licensee stated above acknowledges that Portland Cement Association (PCA) is not and cannot be responsible for either the accuracy or adequacy of the material supplied as input for processing by the PCACOL(tm) computer program. Furthermore, PCA neither makes any warranty expressed nor implied with respect to the correctness of the output prepared by the PCACOL(tm) program. Although PCA has endeavored to produce PCACOL(tm) error free, the program is not and can't be certified infallible. The final and only responsibility for analysis, design and engineering documents is the licensees. Accordingly, PCA disclaims all responsibility in contract, negligence or other tort for any analysis, design or engineering documents prepared in connection with the use of the PCACOL(tm) program.

General Information:
==========
File Name: C:\PROGRA~1\ADOSS\DATA\ADOSS.COL
Project: bass pro shop
Column: oSpan 1, Colu Engineer: cls
Code: ACI 318-95 Units: English

Run Option: Design Slenderness: Not considered
Run Axis: Y-axis Column Type: User-defined

Material Properties:
==========
f'c = 4.5 ksi fy = 60 ksi
Ec = 4066.84 ksi Es = 29000 ksi
fc = 3.825 ksi Rupture strain = Infinity
Ultimate strain = 0.003 in/in
Beta1 = 0.825

Section:
==========
Rectangular: Width = 8 in Depth = 24 in

Gross section area, Ag = 192 in^2
Ix = 9216 in^4 Iy = 1024 in^4
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Rebar Database: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: User-defined; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.7

Layout: Rectangular
Pattern: All Sides Equal (Cover to longitudinal reinforcement)
Total steel area, As = 2.40 in^2 at 1.25%
4 #7 Cover = 2 in

Load Combinations:
==========
U1 = 1.300*Dead + 2.820*Live + 0.000*Lateral
U2 = 0.975*Dead + 2.115*Live + 1.275*Lateral
U3 = 0.975*Dead + 0.000*Live + 1.275*Lateral

Service Loads:
==========

No.	Load Case	Axial Load kip	Mx @ Top k-ft	Mx @ Bot k-ft	My @ Top k-ft	My @ Bot k-ft
1	Dead	2.4	0.0	0.0	4.6	5.0
	Live	2.0	0.0	0.0	5.2	6.5
	Latl	0.0	0.0	0.0	0.0	0.0
2	Dead	2.4	0.0	0.0	4.6	5.0
	Live	0.1	0.0	0.0	0.0	0.0
	Latl	0.0	0.0	0.0	0.0	0.0
3	Dead	2.4	0.0	0.0	4.6	5.0
	Live	2.0	0.0	0.0	8.2	6.5
	Latl	0.0	0.0	0.0	0.0	0.0

4	Dead	2.4	0.0	0.0	4.6	5.0
	Live	2.7	0.0	0.0	10.0	7.0
	Latl	0.0	0.0	0.0	0.0	0.0

Factored Loads and Moments with Corresponding Capacities: (see user's manual for notation)

No.	Load Combo	Pu kip	Muy k-ft	fMny k-ft	fMn/Mu
1	1 U1	8.8	24.8	34.1	1.374
2	U2	6.6	18.6	33.9	1.821
3	U3	2.3	4.9	33.5	6.865
4	2 U1	3.2	6.5	33.6	5.164
5	U2	2.4	4.9	33.5	6.868
6	U3	2.3	4.9	33.5	6.865
7	3 U1	8.6	29.1	34.1	1.172
8	U2	6.5	21.8	33.9	1.553
9	U3	2.3	4.9	33.5	6.865
10	4 U1	10.7	34.2	34.3	1.004
11	U2	8.0	25.6	34.1	1.328
12	U3	2.3	4.9	33.5	6.865

*** Program completed as requested! ***

GEOTECHNICAL EXPLORATION REPORT
BASS PRO SHOPS
SILVERTON HOTEL CASINO
CLARK COUNTY, NEVADA

PROJECT NO.: E-02-288
MARCH 19, 2003

Prepared for:

COMMERCE CONSTRUCTION COMPANY, L.P.

Prepared by:

OWENS GEOTECHNICAL, INC.
4480 WEST HACIENDA AVENUE
SUITE 104
LAS VEGAS, NEVADA 89118
Phone: (702) 873-3478
Fax: (702) 873-2199

TABLE OF CONTENTS

Page No.

1.0 INTRODUCTION 1

2.0 PROJECT INFORMATION 1

3.0 SITE EXPLORATION 2

4.0 SITE CONDITIONS 2

4.1 Surface 2

4.2 Subsurface 2

5.0 GEOLOGIC INFORMATION 3

6.0 RECOMMENDATIONS 3

6.1 General 3

6.2 Foundations 4

6.3 Soil Profile Type 4

6.4 Lateral Earth Pressures 4

6.5 Earthwork 5

6.5.1 General 5

6.5.2 Site Clearing 5

6.5.3 Excavation 6

6.5.4 Fill Materials 7

6.5.5 Fill Placement and Compaction 7

6.6 Pavement 7

6.7 Drainage and Moisture Protection 8

6.8 Floor Slabs 9

6.9 Corrosivity 9

7.0 OTHER SERVICES 9

8.0 CLOSURE 10

Figure No.

Vicinity Map 1

Site Map 2

APPENDIX **Plate No.**

Boring Logs ..... 1 through 10
Explanation of Material Classifications 11
Chemical Test Results 12

GEOTECHNICAL EXPLORATION REPORT
BASS PRO SHOPS
SILVERTON HOTEL CASINO
CLARK COUNTY, NEVADA

1.0 INTRODUCTION

This report presents the results of our geotechnical exploration for the proposed Bass Pro Shops. The site is located at the southeast corner of Industrial Road and Blue Diamond Road, at the Silverton Hotel Casino, in Clark County, Nevada. The general location of the site is shown on Figure No. 1, Vicinity Map.

The purpose of our services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- General geology of the area
- Foundation design and construction
- Retaining wall design and construction
- Floor slab design and construction
- Pavement design and construction
- Earthwork

This report is for the purpose of providing geotechnical engineering and/or testing information and requirements. The scope of our services for this project did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic material in structures, soil, surface water, groundwater or air, below or around this site.

2.0 PROJECT INFORMATION

The project consists of a Bass Pro Shops retail store. It is assumed the structure will be one-story in height, of concrete tilt-up construction with a concrete slab-on-grade floor. There will be on-site paved areas. It is further assumed that final grades will generally be at or near existing site grades (plus or minus 4 feet).

3.0 SITE EXPLORATION

The scope of our services for this project included a subsurface exploration program. The subsurface exploration program consisted of drilling 10 borings to depths ranging from approximately 10 to 20 feet below existing site grades. The borings were logged during drilling and samples were obtained to aid in material classification and for possible laboratory testing. The approximate locations of the borings are shown on Figure No. 2, Site Map. The location of the borings were determined in the field by measuring from existing features or improvements. The location of the borings should be accurate only to the degree implied by the method used. Results of the borings are presented in the Appendix.

4.0 SITE CONDITIONS

4.1 Surface

At the time of our exploration most of the site was occupied by a parking lot for the existing hotel casino and a recreational vehicle (RV) park. The developed areas included paved drives, parking areas, spaces for RV's and numerous landscaped areas. The area south of Shelbourne Avenue was undeveloped native desert land. Shelbourne Avenue was undeveloped with the exception of a roughly excavated drainage channel (approximately 30 feet wide and 4 to 5 feet deep) running down the approximate centerline. The developed portion of the site was covered by what appeared to be approximately one to four feet of spread fill and asphaltic concrete. The small native area was sparsely vegetated with creosotes, ambrosia, and a little grass with a loose sandy surface. Industrial Road was fully developed four lanes wide. Site drainage was by sheetflow to the east.

4.2 Subsurface

Fill was encountered in all explorations except B-7. The fill generally consisted of asphalt paving, aggregate base and sandy gravel. Where encountered, the depth of fill observed ranged from 1½ to 4 feet below existing site grades. There could be deeper and/or poorer quality fill in other areas of the site beyond our explorations.

Natural soils at the site generally consisted of loose to very dense silty sand, clayey sand and sandy gravel and stiff to very stiff sandy clay. Moderately hard to hard caliche (cemented sand and gravel) was encountered in only one exploration (B-5) at 4 feet below ground surface. Groundwater was not encountered within the depths explored. The boring logs and laboratory test results presented in the Appendix should be referred to for more detailed information.

5.0 GEOLOGIC INFORMATION

The site is located in the south central portion of the Las Vegas Valley. This location places the site in an area underlain by thick alluvial deposits (hundreds of feet).

The nearest mapped fissure zone is approximately 2½-miles east of the site.[1] The cumulative evidence indicates that fissures are the result of a subsurface erosional process. The erosional process occurs in tensional fractures at or near the surface in uncemented, relatively fine-grained soils.

The nearest mapped compaction fault scarp is approximately 1 mile north of the site.[1] Compaction faults are generally accepted as a phenomena resulting from deep-seated differential consolidation of alluvial materials with dissimilar grain size and compressibility characteristics. The origin of compaction faults is uncertain. One theory indicates compaction faults are a phenomena resulting from deep-seated differential consolidation of alluvial materials, with dissimilar grain size and compressibility characteristics, due to prehistoric large scale reductions in groundwater levels. Another theory is that they may have originated from tectonic processes and are part of a valley wide fault system. It is also possible that a combination of these factors could have resulted in these features. However, no historic earthquakes have been attributed to any compaction fault in the Las Vegas Valley.[2]

The site is located within Zone 2B as defined by the Uniform Building Code (1997 edition) on Figure 16-2 entitled Seismic Zone Map of the United States. Numerous seismic events, most of which are a probable result of underground blasting at the Nevada Test Site (about 90 miles north of Las Vegas), have been felt in and around the Las Vegas area. There is a noticeable lack of earthquakes which have epicenters in the Southern Nevada area and are directly attributable to deep-seated tectonic movement. A few events recorded in the Henderson area and in Lincoln County registered between 5.0 and 6.0 Richter magnitude. Most of the recorded events in the area range between 4.0 and 4.9.

6.0 RECOMMENDATIONS

6.1 General

Our recommendations are based on the assumption that the soil conditions are similar to those disclosed by the explorations. If variations are noted during construction or if changes are made

---

[1] Bell, John W. and Jonathan G. Price, 1991, "Subsidence in Las Vegas Valley, 1980-91, Final Project Report", Nevada Bureau of Mines and Geology, Figure No. 2.

[2] Slemmons, Burt, 1990 "Earthquakes in Las Vegas", Address to first meeting of Southwestern Section of Association of Engineering Geologist, Las Vegas, Nevada, October 1990.

in site plan, structural loading, foundation type or floor level, we should be notified so we can supplement our recommendations, as applicable.

As indicated, there was fill on-site. This fill would be considered uncontrolled fill unless observation and testing was performed during placement. All uncontrolled fill should be removed and replaced with properly compacted fill. The uncontrolled fill soils can be re-used for controlled fill provided almost all oversize material, unsuitable material (as determined by the geotechnical engineer), vegetation and debris is removed.

6.2 Foundations

If the grading recommendations presented in the Earthwork section of this report are complied with, the proposed structure and any retaining walls may be supported by conventional foundations. Foundations should be established on undisturbed natural soils having a consistency of at least medium dense and/or properly compacted fill.

Foundations should be at least 12 inches wide and the bottom of the footing should be established at least 12 inches below the lowest adjacent final compacted subgrade (generally pad grade). Foundations established as recommended, may be designed to impose a net dead- plus live-load pressure of 2500 pounds per square foot psf. The bearing value may be increased by 1000 psf for each additional 12 inches of embedment. However, the maximum net bearing value should not exceed 3500 psf. A one-third increase may be used for wind or seismic loads.

Settlement of the proposed structure, supported as recommended, should be within acceptable limits (less than 1 inch). Differential settlement should be less than ½-inch.

6.3 Soil Profile Type

The soil profile type was determined using the generalized soil characteristic given in Table 16-J of the 1997 Uniform Building Code. Based on our knowledge of the site, the soil profile type is S_C. However, if the 2000 International Building Code (IBC) is used for design, seismic design criteria provided by the IBC (based on site location) should be utilized.

6.4 Lateral Earth Pressures

For soils above any free water surface, with level backfill and no surcharge loads, we recommend the following equivalent fluid pressures and coefficient of friction:

- Active.....35 pcf
- Passive..... 250 pcf
- Coefficient of Friction.....0.40

Notes:

1. Active pressure assumes unrestrained (cantilever) wall and assumes no loading from heavy compaction equipment.
2. Passive pressure should not exceed a maximum of 3000 psf. A one-third increase may be used for wind or seismic loads.
3. The passive pressure and the frictional resistance of the soils may be combined without reduction in determining the total lateral resistance.

Any surcharge from adjacent loadings should be added to the above pressure using a factor of 0.30. As indicated, the aforementioned pressure assumes that there will be no build-up of hydrostatic pressure. Therefore, if walls will be subject to saturated conditions, we recommend that weep holes (if practical) or a wall drainage system be provided, and that the structural fill behind retaining walls be granular and free draining. All walls below grade should be waterproofed or at least dampproofed.

Fill against foundations, grade beams and retaining walls should be properly placed and compacted. Backfill should be mechanically compacted in layers (6 to 8 inches maximum thickness); flooding should not be permitted. Backfill within 2 feet of the back of retaining walls should be compacted to at least 90 percent of the maximum dry density obtainable by the ASTM D1557 method. Care should be taken when placing backfill so as not to damage the walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movements.

6.5 Earthwork

6.5.1 General

- All earthwork should be performed in accordance with the guidelines presented in chapters 18 and 33 of the 1997 UBC or chapter 18 of the IBC, except where specific recommendations are presented in this report. It is recommended that contractors perform their own reconnaissance of the site. If the contractors have any questions regarding site conditions, site preparation or recommendations in this report, they should contact a representative of Owens Geotechnical, Inc.

6.5.2 Site Clearing

- Strip and remove existing vegetation, debris, uncontrolled fill, all loose, soft or disturbed natural soils, and other deleterious materials from proposed building areas, adjacent walks and slabs, and in areas to be paved. Excavations should extend at least 5 feet beyond the areas to be improved. Uncontrolled fill is defined as any existing fill that was not properly placed, observed and tested.

- All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

- If unexpected fills or underground facilities are encountered during site clearing, such features should be removed and the excavation thoroughly cleaned and backfilled. All excavations should be observed by the geotechnical engineer prior to backfill placement.

- Demolition of existing structures should include removal of any foundation system and utilities. Any excavations as a result of demolition and removal should be properly filled.

- All materials derived from the demolition of existing structures should be removed from the site, and not be allowed for use in any fills. In some cases, existing pavements, if properly broken up, can be used in required fills. The geotechnical engineer should determine the suitability for use based on conditions in the field.

6.5.3 Excavation

- It is anticipated that excavation of the on-site natural non-cemented deposits for the proposed project can be accomplished with conventional earthmoving equipment.

- Excavations penetrating moderately hard or relatively thin (less than one foot) hard layers of caliche should be able to be excavated using heavy-duty equipment.

- Excavations penetrating hard or very hard caliche will require special consideration where they are to be performed.

- Contractors, especially those digging utilities, should satisfy themselves as to the hardness of materials and equipment required.

- Trenching and shoring operations should be conducted in accordance with Section 10 Nos. 1926.650 through 1926.652 of the State of Nevada Occupational Safety and Health Standards for the Construction Industry (with amendments as of August, 1991) and in accordance with 29 CFR Part 1926, Occupational Safety and Health Standards - Excavations; Final Rule (October 31, 1989). Safety of construction personnel is the responsibility of the contractor.

6.5.4 Fill Materials

- On-site soils, minus almost all debris, oversized material (greater than 6 inches in diameter) or organic matter, may be used in required fills.

- Fill containing oversize material (greater than 6 inches in diameter) should not be used in any utility trenches, behind retaining walls or against foundations or grade beams.

- Imported material should be compatible with on-site soils in addition to being suitable for its intended use. All imported materials should be approved, by the geotechnical firm providing testing during construction, prior to importing. In general, imported soils should be non-expansive, have a maximum solubility of 0.5 % and a maximum sulfate content of 0.09 %.

- Select free draining granular materials should be used as backfill behind retaining walls.

6.5.5 Fill Placement and Compaction

- After performing required excavations, the exposed soils should be carefully observed to verify removal of all unsuitable deposits. Exposed soils should then be scarified to a depth of 6 inches (not necessary if caliche exposed), watered as necessary, and compacted as recommended.

- Fill materials should be placed on a horizontal plane unless otherwise accepted by the geotechnical engineer.

- All required fill should be placed in loose lifts generally not over 8 inches in thickness.

- Materials should be compacted to the following:

PERCENT COMPACTION (ASTM D1557)	MOISTURE CONTENT
92 minimum	optimum (minimum)

6.6 Pavement

The pavement area subgrade should be properly prepared as outlined in the Earthwork section of this report before placing any asphalt or base materials. Proper drainage of the paved areas should be provided to increase the pavement life. In addition, pavements must be maintained for durability and integrity during their life. Therefore, periodic seal coating, crack sealing, and/or patching may be required.

Based on the soil classifications and assumed traffic volumes, the following minimum pavement sections are recommended for on-site paved areas:

TRAFFIC AREA	ASPHALT (Inches)	TYPE II BASE COURSE (Inches)
Automobile Parking	2	6
Main Corridors and Truck Access	3	6

Asphalt and base course materials and compaction should meet the criteria set forth in the Uniform Standard Specifications for Public Works' Construction, Off-Site Improvements, Clark County Area, Nevada. Field and laboratory testing of asphalt and base materials should be performed to determine whether specified requirements have been met.

6.7 Drainage and Moisture Protection

Foundation soils should not be allowed to become saturated during or after construction. Infiltration of water into foundation or utility excavations should be prevented during construction. Utility lines should be properly installed and the backfill properly compacted to avoid possible sources for subsurface saturation.

Positive drainage away from the structures should be provided during construction and maintained throughout the life of the structures. Any downspouts, roof drains or scuppers should discharge into splash blocks or extensions and away from the structures. Backfill against footings, exterior walls and in utility trenches should be properly compacted and free of all construction debris to reduce the possibility of moisture infiltration.

If practical, planters, landscaping, and/or other surface features which could retain water should not be adjacent to the structures or pavements. If this is not practical, we recommend the following:

- Planters should be sealed.
- Grades should slope away from the proposed structures (2% minimum).
- Watering should be kept to a minimum.

6.8 Floor Slabs

If grading recommendations are complied with, concrete floor slabs may be supported on a 4-inch layer of Type II. If the potential for a damp floor slab is a concern, the Type II should be overlain by a visqueen membrane (6 mil) covered with 2 inches of sand or, as an alternative, a visqueen membrane (10 mil) may be placed under the Type II and the sand eliminated. The Type II or sand should be moistened (but not saturated) prior to placement of concrete.

Recommendations presented by the American Concrete Institute for slabs-on-grade should be complied with for all concrete placement and curing operations. Improper curing techniques and/or excessive slump (water-cement ratio) could cause excessive drying/shrinkage resulting in random cracking and/or slab curling. Concrete slabs should be allowed to cure adequately before placing vinyl or other moisture sensitive floor coverings.

6.9 Corrosivity

Based on test results and Table 19-A-4 of the 1997 UBC or Table 1904.3 of the 2000 IBC, the on-site soils classify as having a moderate sulfate exposure. We recommend that Type V cement or equivalent sulfate resistant cement be used in all concrete. Consideration should be given to providing protection to buried metal pipes or use of nonmetallic pipe where permitted by local building codes. Non-corrosive backfill, protective coatings and wrappings, sacrificial anodes, or a combination of these methods could be considered. It should be understood that Owens Geotechnical, Inc. personnel are not experts regarding corrosion and/or corrosion protection and that we recommend a "Corrosion Engineer" be consulted for actual recommendations regarding the necessity and/or method of cathodic protection.

7.0 OTHER SERVICES

It is recommended that Owens Geotechnical, Inc. be retained to provide a general review of final design plans and specifications in order that grading and foundation recommendations may be interpreted and implemented. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

Owens Geotechnical, Inc. should also be retained to provide services during excavation, grading, foundation and construction phases of work. Observation of foundation excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Field and laboratory testing of concrete and soils should be performed to determine whether applicable requirements have been met.

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the locations of the explorations may

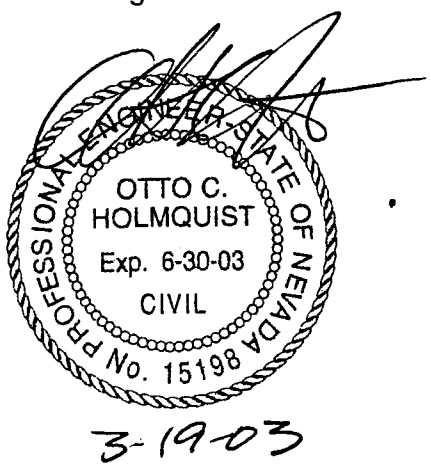
not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

8.0 CLOSURE

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No warranties, either expressed or implied, are intended or made. We prepared this report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction techniques to be used on this project.

OWENS GEOTECHNICAL, INC.

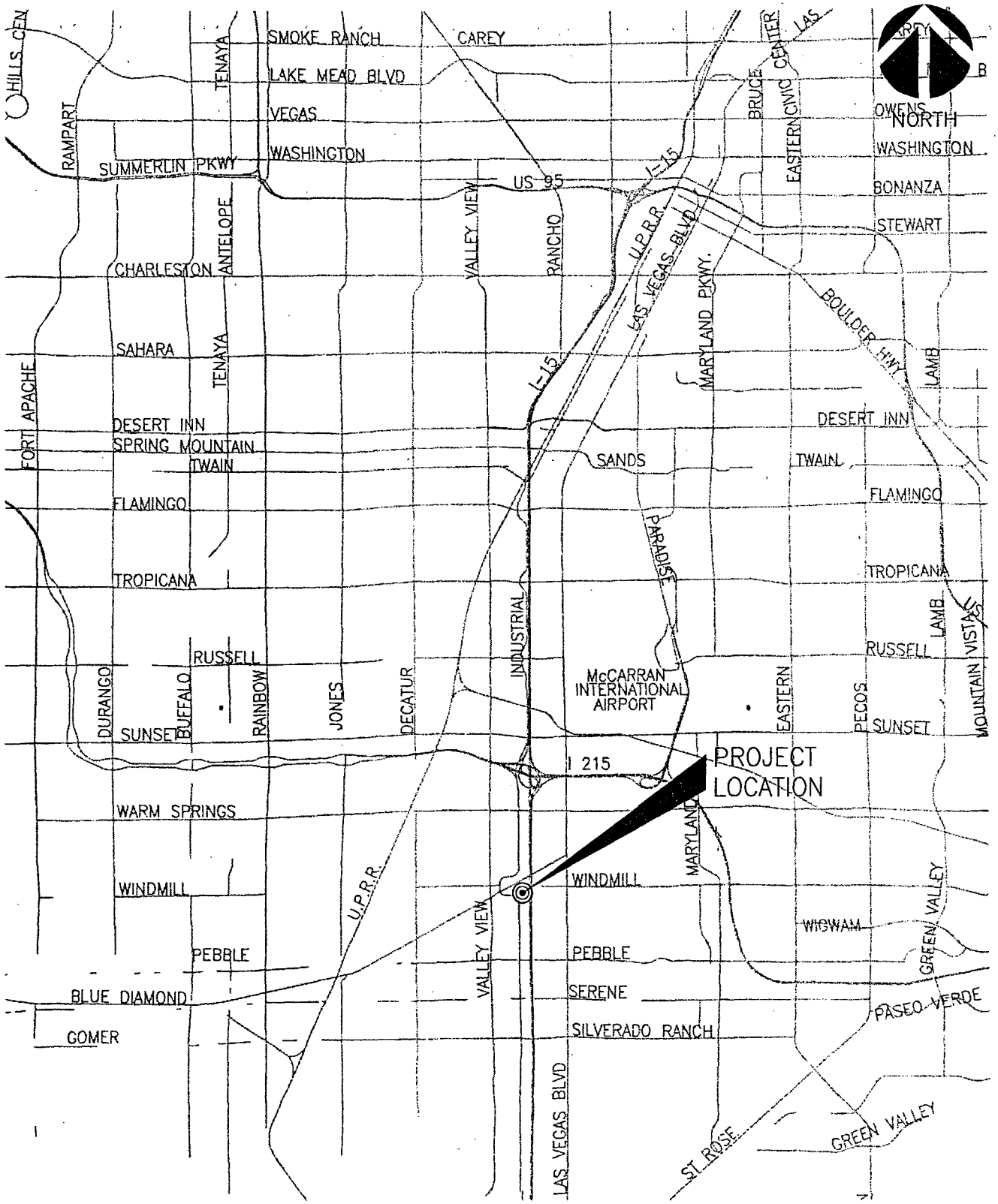
Prepared by:
Otto C. Holmquist, P.E.
Senior Engineer



3-19-03

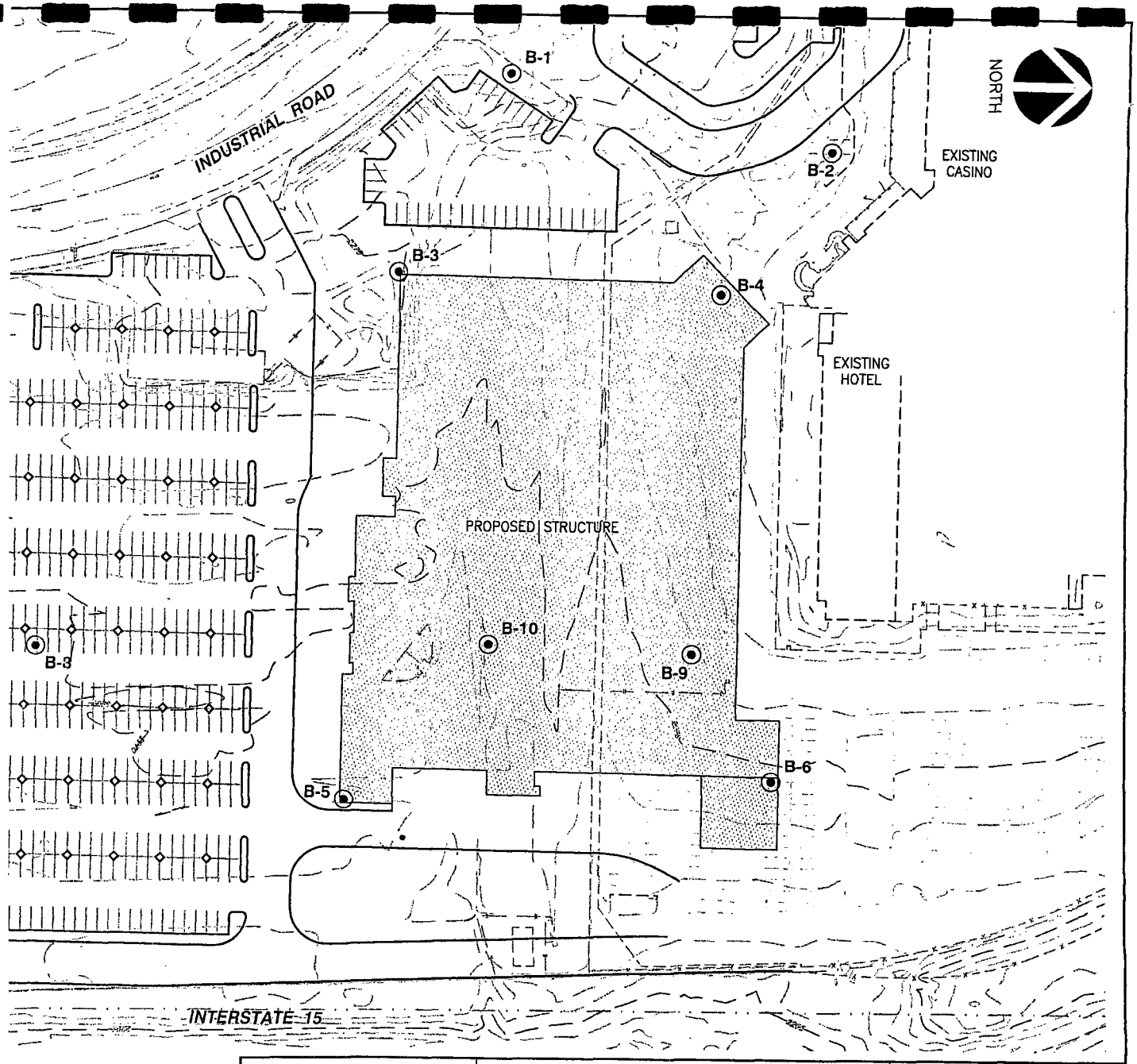
Reviewed by:

Mark J. Owens, P.E.
President



OWENS GEOTECHNICAL INC.	CLIENT: BASS PRO SHOPS	VICINITY MAP
	PROJECT: COMMERCE CONSTRUCTION CO., L.P.	PROJECT NO.: E-02-288 / FIGURE NO.: 1

E:\ACAD\Jobs\E0228801.dwg, Layout1, 03/04/03 01:21:28 PM



TE BORE LOCATION

OWENS GEOTECHNICAL INC.	CLIENT: BASS PRO SHOPS	**SITE MAP**	
	PROJECT: COMMERCE CONSTRUCTION CO., L.P.	PROJECT NO.: E-02-288	FIGURE NO.: 2

APPENDIX

APPENDIX

Site Explorations

The subsurface conditions of the site were explored by drilling 10 borings to depths ranging from approximately 10 to 20 feet below existing site grades. Borings were drilled using a rotary-air drill rig (Mobil B-80) with a 5-inch diameter bit.

Soils were logged during drilling and samples were obtained to aid in material classification and for possible laboratory testing. Boring logs are presented on Plates 1 through 10. The number of blows required to drive a 2½-inch diameter sampler 12 inches are shown on the logs. The soils are generally classified by the Unified Soil Classification System. Plate 11 presents an explanation of material classifications used in this report.

Laboratory Testing

Laboratory testing was performed on selected samples of on-site soils. Tests were performed in general accordance with applicable ASTM or local standards.

Chemical tests were performed on representative samples by Atlas Chemical Testing Laboratories, Inc. Tests were performed to determine the percent water soluble sulfate. Test results are presented on Plate 12.

LOG OF BORING NO. 1

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -3 IN. ASPHALT OVER 6 IN. AGG. BASE -brown, sl. moist	
								FILL -SANDY GRAVEL -w/silt, brown, moist	
		SPT		35	2				
					4	SC		CLAYEY SAND -w/gravel, brown, sl. moist	dense
					5	GM		SANDY GRAVEL -w/silt, cobbles, lt. brown, moist	very dense
		SPT		49	6	SC		CLAYEY SAND -w/gravel, lt. brown, moist	dense
					7	CL		SANDY CLAY -w/gravel, lt. brown, moist	very stiff
		B			8				
					10			Bottom of Boring at 10 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/11/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 1

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

LOG OF BORING NO. 2

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -3 IN. ASPHALT OVER 5 IN. AGG. BASE -brown, sl. moist	
					1			FILL -SANDY GRAVEL -w/silt, brown, sl. moist	
					2				
		SPT	X	22	3	GM		SANDY GRAVEL -w/silt,	med. dense
					4	SC		CLAYEY SAND -w/silt, brown, sl. moist	
					5	SM		GRAVELLY SAND -w/silt, brown, sl. moist	
					6				
					7	CL		SANDY CLAY -w/gravel, brown, moist	stiff
		SPT	X	25	8	SM		SILTY SAND -w/trace gravel, brown, moist	med. dense
					9				
					10			Bottom of Boring at 10 feet	
					11				
					12				
					13				
					14				
					15				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/11/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 2

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/17/03

LOG OF BORING NO. 3

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL 2½ IN. ASPHALT OVER 5 IN. AGG. BASE - sl. moist	
					1			FILL - SANDY GRAVEL -w/silt, brown, sl. moist	
					2	SM		GRAVELLY SAND -w/silt, lt. brown, sl. moist	m. dense
					3				dense
		SPT		78/11"	3	GM		SANDY GRAVEL -w/silt, lt. brown, sl. moist	very dense
		B			4				
					5				
					6				
					7				
					8				
		SPT		53	9				
					10			Bottom of Boring at 10 feet	
					11				
					12				
					13				
					14				
					15				

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/12/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 3

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

LOG OF BORING NO. 4

CLIENT:	PROJECT:
Commerce Construction Co., L.P.	Bass Pro Shops
BORING LOCATION:	**ELEVATION:** / **SITE:**
See Site Map	Not Measured / Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -3 IN. ASPHALT OVER 5 IN. AGG. BASE -dark brown, sl. moist	
								FILL -SANDY GRAVEL -w/silt, cobbles, brown, sl. moist to moist	
		SPT		52	1–2				
					3	SM		GRAVELLY SAND -w/silt, lt. brown, sl. moist	med. dense
					4–5				
		SPT		33	6			SILTY SAND -w/gravel, lt. brown, sl. moist	dense
					7–9				
					10	GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	very dense
		SPT B		50/4"	11				
					12	SM		SILTY SAND -w/gravel, brown, sl. moist	dense
					13	GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	very dense
					14–15				
								(Continued Next Page)	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES:
Groundwater not encountered

DATE DRILLED:	PAGE NO.:
2/11/03	1 of 2
PROJECT NO.:	**PLATE NO.:**
E-02-288	4a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/17/03

LOG OF BORING NO. 4

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
		SPT	⊠	50/3"	16	GM		SANDY GRAVEL -w/silt, cobbles, partially cemented, lt. brown, sl. moist	v. dense to m. hard
					17				very dense
					18				
					19				
					20			Bottom of Boring at 20 feet	
					21				
					22				
					23				
					24				
					25				
					26				
					27				
					28				
					29				
					30				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/11/03

PAGE NO.: 2 of 2

PROJECT NO.: E-02-288

PLATE NO.: 4b

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

LOG OF BORING NO. 5

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -3 IN. ASPHALT OVER 4 IN. AGG. BASE -brown, sl. moist	
					1			FILL -SANDY CLAY -w/silt, brown, v. moist	
						SC		CLAYEY SAND -w/trace gravel, brown, moist	dense
		SPT		64	2	GM		SANDY GRAVEL -w/silt, lt. brown, sl. moist	very dense
					3				
					4			CALICHE (Cemented Sand and Gravel) -lt. brown, dry to sl. moist	m. hard
		SPT		50/2"	5				m. hard to hard
		B			6				
						GM		SANDY GRAVEL -w/silt, cobbles, lt. brown, sl. moist	very dense
					7			CALICHE (Cemented Sand and Gravel) -lt. brown, dry to sl. moist	m. hard
					8	GM		SANDY GRAVEL -w/silt, brown, sl. moist	very dense
					9				dense
					10				
		SPT		76/11"	11	CL		SANDY CLAY -w/trace gravel, brown, moist	very stiff
		B			12	GC		SANDY GRAVEL w/clay, brown, sl. moist	very dense
					13				
					14				
					15				

(Continued Next Page)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/12/03

PAGE NO.: 1 of 2

PROJECT NO.: E-02-288

PLATE NO.: 5a

LOG OF BORING NO. 5

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
						GC		CLAYEY GRAVEL -w/sand, brown, sl. moist	v. dense
		SPT	X	93/11"	16	CL		SANDY CLAY -w/trace gravel, brown, moist	very stiff
						SC		GRAVELLY SAND -w/clay, lt. brown, sl. moist	very dense
					17			w/small clay layer	
					18				
					19				
					20			Bottom of Boring at 20 feet	
					21				
					22				
					23				
					24				
					25				
					26				
					27				
					28				
					29				
					30				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/12/03

PAGE NO.: 2 of 2

PROJECT NO.: E-02-288

PLATE NO.: 5b

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

LOG OF BORING NO. 6

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -2 ¾ IN. ASPHALT OVER 4 IN. AGG. BASE -brown, sl. moist	
								FILL -SANDY GRAVEL -w/silt, brown, sl. moist	
					1				
					2				
					3	GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	dense
					4				
		SPT		90/9"	5	SC		CLAYEY SAND -w/silt, lt. brown, sl. moist	very dense
		B							
					6	GM		SILTY GRAVEL -w/silt, lt. brown, sl. moist	
					7				
					8	SM		SILTY SAND -w/gravel, lt. brown, sl. moist	
					9				
		SPT		50/3"	10	SC		CLAYEY SAND -w/trace gravel, lt. brown, sl. moist	
								Bottom of Boring at 10 feet	
					11				
					12				
					13				
					14				
					15				

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/11/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 6

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/19/03

LOG OF BORING NO. 7

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	SM		SILTY SAND -w/gravel, brown, moist	loose
					1	GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	med. dense
		SPT		27	3				
		B			5				very dense
		SPT		50/5"	7	SC		CLAYEY SAND -w/gravel, brown, sl. moist	
					10			Bottom of Boring at 10 feet	
					15				

THIS SUMMARY APPLIES ONLY AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/12/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 7

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/17/03

LOG OF BORING NO. 8

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
						FILL		FILL - 2 ¾ IN. ASPHALT OVER 5 IN. AGG. BASE - brown, sl. moist	
					1			FILL - SANDY GRAVEL -w/silt, brown, sl. moist	
						GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	dense
					2				
					3	CL		SANDY CLAY -w/silt, brown, sl. moist	v. stiff
		SPT		86/10"	4				very dense
						GC		SANDY GRAVEL -w/clay, brown, sl. moist	
					5				
		B			6				
					7				
		SPT B		50/4"	8				
					9				
					10			Bottom of Boring at 10 feet	
					11				
					12				
					13				
					14				
					15				

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/12/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 8

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/19/03

LOG OF BORING NO. 9

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -2 ¾ IN. ASPHALT OVER 4 IN. AGG. BASE -brown, sl. moist	
					1			FILL -GRAVELLY SAND -w/silt, brown, sl. moist	
					2	SM		SILTY SAND -w/gravel, brown, sl. moist	med. dense
		SPT		11	4				
					6	GM		SANDY GRAVEL -w/silt, cobbles, brown, sl. moist	dense
					8	SM		SILTY SAND -w/trace gravel, occ. small clay layer	
		SPT		36	9				
					10			Bottom of Boring at 10 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

DATE DRILLED: 2/11/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 9

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 3/19/03

LOG OF BORING NO. 10

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

BORING LOCATION: See Site Map

ELEVATION: Not Measured

SITE: Silverton Hotel Casino

MOISTURE CONTENT, %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	Consistency
					0	FILL		FILL -3 IN. ASPHALT OVER 3 IN. AGG. BASE -brown, sl. moist	
								FILL -SANDY GRAVEL -w/silt, brown, moist	
					1				
						GM		SANDY GRAVEL -w/silt, cobbles, brown, moist	med. dense
					2			small firm clay layer	
					3	SM		GRAVELLY SAND -w/silt, brown, moist	
					4				
		SPT		20	5			SILTY SAND -w/gravel, brown, moist	
					6				
					7	SC		CLAYEY SAND -w/gravel, brown, moist	dense
					8	GM		SANDY GRAVEL -w/silt, brown, moist	very dense
					9				
		SPT		93/9"	10			Bottom of Boring at 10 feet	
					11				
					12				
					13				
					14				
					15				

THIS SUMMARY APPLIES ONLY AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

OWENS GEOTECHNICAL INC.

NOTES: Groundwater not encountered

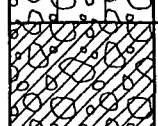
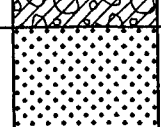
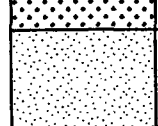
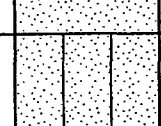
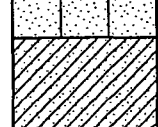
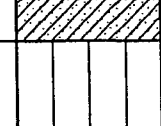
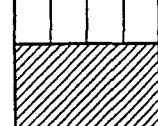
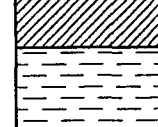
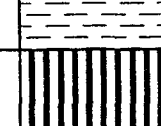
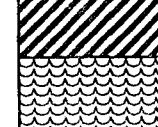
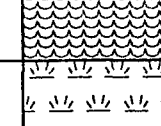
DATE DRILLED: 2/12/03

PAGE NO.: 1 of 1

PROJECT NO.: E-02-288

PLATE NO.: 10

LOG OF BORING E-02-288.GPJ OWENS GEO.GDT 2/20/03

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

USCS LEGEND E-02-288.GPJ OWENS GEO.GDT 2/20/03

OWENS GEOTECHNICAL INC.

CLIENT: Commerce Construction Co., L.P.

PROJECT: Bass Pro Shops

SOIL LEGEND

PROJECT NO.: E-02-288

PLATE NO.: 11

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Atlas Consultants, Inc.

6000 S. Eastern Avenue, Suite 10J • Las Vegas, Nevada 89119
(702) 383-1199 • Fax (702) 383-4983

member of
AMERICAN SOCIETY FOR
TESTING MATERIALS

LABORATORY NO: 11451(c) **DATE:** February 18, 2003

MARKED: E-02-288 **P.O.:**

ANALYZED BY: Robert L. Summers **LAB ID:**

REPORT OF DETERMINATION

AWWA 4500 E

SOIL SIEVE SIZE = -10 MESH

Sample No.	Location	Depth (Feet)	Water Soluble Sulfate (SO_4) in soil Percent By Weight
	B-3	3.0	0.15
	B-4	1.0	0.01
	B-5	1.0	0.01
	B-6	4.0	0.01
	B-9	3.0	0.02
	B-10	4.0	0.02

Robert L. Summers
LABORATORY MANAGER

Notes: The results for each constituent denote the percentage of that analyte, at a 1:5 (soil:water) extraction ratio, which is present in the soil.

RESPONSE TO COMMENT #8

REVISED HYDRAULIC CALCULATIONS FOR DROP INLETS
(NOTE: to Revise The Grate Length to 2.5-ft Instead of The Previously Used 3-ft)

RESPONSE TO COMMENT #9i, 10 and 13

REVISED HEC-RAS MODEL FOR SHELBOURNE FLOWS THROUGH THE PROPOSED PARKING LOT
(INTERIM CONDITION)
(NOTE: Due to the proposed double 7'x3', no surface runoff flows are expected to flow through the parking lot in ultimate condition)

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park Profile: Interim

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV Park	796	646.00	77.00	79.37	79.48	80.00	0.010309	6.77	112.78	116.49	0.95
RV Park	667	646.00	75.00	77.72	77.75	78.63	0.010130	7.72	86.27	53.01	0.97
RV Park	567	646.00	73.00	76.82	75.95	77.24	0.002955	5.22	129.70	64.86	0.56
RV Park	525	646.00	73.00	76.85		77.10	0.001439	4.03	171.27	84.07	0.40
RV Park	514	646.00	71.60	76.61		77.05	0.003656	5.77	135.72	81.95	0.56
RV Park	494	332.00	75.16	76.89	76.34	76.91	0.000130	1.09	304.24	534.27	0.19
RV Park	456	332.00	76.08	76.70	76.70	76.88	0.005431	3.39	97.92	280.85	1.01
RV Park	420	332.00	75.24	76.06	76.20	76.50	0.012918	5.30	62.65	175.14	1.56
RV Park	376	332.00	73.29	73.73	74.07	75.78	0.097678	11.47	28.93	142.04	4.48
RV Park	299	332.00	72.50	73.37	73.46	73.74	0.008330	4.87	68.17	156.49	1.30
RV Park	207	332.00	71.70	72.44	72.56	72.84	0.011212	5.07	65.48	176.84	1.47
RV Park	100	332.00	70.50	71.18	71.30	71.57	0.012501	5.05	65.80	194.22	1.53
RV Park	90	332.00	70.00	70.62	70.69	70.90	0.009777	4.21	78.78	253.35	1.33
RV Park	70	332.00	67.01	70.75	67.83	70.75	0.000004	0.30	1103.27	546.27	0.04
RV Park	60	332.00	66.70	70.75		70.75	0.000004	0.28	1194.47	611.25	0.04
RV Park	50	332.00	64.38	70.75	66.20	70.75	0.000001	0.18	1833.70	593.06	0.02

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA -
Project Title: Bass Pro Shops
Project File : 6923.prj
Run Date and Time: 9/2/03 5:56:58 PM

Project in English units

PLAN DATA

Plan Title: Shelborne Ave. PR
Plan File : g:\DRAINAGE\6923.2\HEC-RAS\6923.p02

Geometry Title: Shelborne Ave. PR
Geometry File : g:\DRAINAGE\6923.2\HEC-RAS\6923.g02

Flow Title : Shelborne Ave. PR
Flow File : g:\DRAINAGE\6923.2\HEC-RAS\6923.f02

Plan Summary Information:
Number of: Cross Sections = 16 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculaton tolerance = 0.003
Maximum number of interations = 20
Maximum difference tolerance = 0.1
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: Shelborne Ave. PR
Flow File : g:\DRAINAGE\6923.2\HEC-RAS\6923.f02

Flow Data (cfs)

River	Reach	RS	Interim
Shelborne Avenue	RV Park	796	646
Shelborne Avenue	RV Park	494	332

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Shelborne Avenue	RV Park	Interim	Normal S = .0103	Known WS = 70.75

GEOMETRY DATA

Geometry Title: Shelborne Ave. PR
Geometry File : g:\DRAINAGE\6923.2\HEC-RAS\6923.g02

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 796

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88	0	78.3	22	79	45	79	65	79
74	78	106	77	111	78	115	79	119	80
165	80								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	65	.03	119	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65	119	133	131	124	.1	.3

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 667

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97	0	77.9	13.4	77	21.7	76	30.2	75
44.8	75	48.3	76	52.3	77	57.1	78	72.5	78
107.2	78	178.9	78.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	13.4	.03	57.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.4	57.1	107	101	87	.1	.3

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 567

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	96	0	77.52	8.1	77	24.8	76	30.2	75

```
    34.7       74     52.4       73     56.5       73     60.7       74       65       75
    69.1       76     77.5       77    123.2       78    169.9       79      180     79.5

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0     .03     24.8     .03     69.1     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
          24.8    69.1                 43       43       63             .1       .3

CROSS SECTION           RIVER: Shelborne Avenue
REACH: RV Park             RS: 525

INPUT
Description:
Station Elevation Data     num=       15
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0       78     22.9     77.3     35.4       77       47    76.33     52.8       76
    56.6       75     60.5       74     64.3       73     91.9       73     95.1       74
    98.4       75    101.7       76    125.6       77    146.3       78    197.7     78.5

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0     .03     52.8     .03    101.7     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
          52.8   101.7                 17       10       18             .1       .3

CROSS SECTION           RIVER: Shelborne Avenue
REACH: RV Park             RS: 514

INPUT
Description:
Station Elevation Data     num=       21
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0       98        0       78    34.59       77     37.3     76.9    40.42     76.8
   45.37     76.7    45.87     76.7    45.87     76.2    47.41     76.3    70.14     75.4
   74.77       75    78.16     75.3    78.16     71.6    91.13     71.8    91.13     74.9
   97.33       74   102.75       75    115.7       76   135.65       77   183.13       78
  203.87    78.15

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0     .03    74.77     .03   102.75     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
         74.77  102.75                 21       21       21             .1       .3

CROSS SECTION           RIVER: Shelborne Avenue
REACH: RV Park             RS: 494

INPUT
Description:
Station Elevation Data     num=       10
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0       77       75    76.68      160       76      190    76.16      220    75.16
     231    75.58      340       76      363     75.8      485       76      568       77

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016        0    .016      568    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
            0     568                 45       38       38             .1       .3
Ineffective Flow     num=       6
   Sta L   Sta R    Elev  Permanent
888        T
888        T
```

```
888       T
888       T
888       T
888       T

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 456

INPUT
Description:
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0       77       66     76.5      155    76.08      255    76.38      305    76.61
     355    76.92

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .016        0     .016      355     .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     355               45      45      45             .1      .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 420

INPUT
Description:
Station Elevation Data    num=      10
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0    77.08   139.96    75.89   139.96    75.39      184    75.24      184    75.74
     206    75.64      266     75.9      316    76.18      366    76.46      426     76.8

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .016        0     .016      426     .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     426               20      20      20             .1      .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 376

INPUT
Description:
Station Elevation Data    num=       7
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0    76.39   148.85    73.79   148.85    73.29    186.3    73.29    186.3    73.79
  295.24     73.5      400       75

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .025   148.85     .016    186.3     .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     400               77      77      71             .1      .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 299

INPUT
Description:
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0     74.4      120     72.5   206.83       75   247.63    76.68   343.36     72.5
     461     74.5

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

```
       0    .016        0    .016     461    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     461               91      93      98            .1       .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 207

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   73.45      120    71.7  219.58   73.45  219.58   73.96  231.28   74.14
  231.28   73.64      270    74.2  327.32    71.7     490    73.5

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016        0    .016     490    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     490               106     107     108            .1       .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 100

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   73.19      160    70.5  297.76   71.67  297.76   72.17  303.71   72.26
  303.71   71.76   339.73    72.3  339.73    72.8  345.72   72.89  345.72   72.39
     395    70.5      520      72

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016        0    .016     520    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     520                55      58      55            .1       .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 90

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    71.9      160      70  291.55   70.64  291.55   71.14  303.54   72.17
  303.54   71.67   339.43   71.35  339.43   71.85  345.43   71.95  345.43   71.45
     400      70      520    71.5

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016        0    .016     520    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     520               120     115     120            .1       .3

CROSS SECTION          RIVER: Shelborne Avenue
REACH: RV Park            RS: 70

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0      71       13    70.6   20.81   70.61   20.81   71.11   26.92   70.97
   26.92   70.67    45.53      70   68.34   69.16   68.34   69.66   73.41   69.46
   73.41   68.96   115.87   68.17  115.87   68.67   119.9   68.54   119.9   68.04
```

163.4	67.49	163.4	67.99	166.39	67.99	166.39	67.49	210.93	67.01
210.93	67.51	212.88	67.51	212.88	67.01	258.46	67.12	258.46	67.62
259.37	67.62	259.37	67.12	304.93	67.82	304.93	68.32	316.93	68.46
316.93	67.96	352.93	68.49	352.93	68.99	358.92	69.09	358.92	68.59
383	69	493	70	583	71				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	583	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	583	45	45	.1	.3

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 60

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	27	70	58	69.5	349.9	66.74	349.9	67.24
361.9	67.2	361.9	66.7	397.9	67.4	397.9	67.9	403.89	68.01
403.89	67.51	473	70	618	70.7				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	618	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	618	50	50	.1	.3

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 50

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	37	69	70	68.5	305.33	65.5	307.87	64.38
408.38	67.7	408.38	67.2	480.41	68.36	480.41	68.86	597.68	70

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	597.68	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	597.68	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Shelborne Avenue

Reach	River Sta.	n1	n2	n3
RV Park	796	.03	.03	.03
RV Park	667	.03	.03	.03
RV Park	567	.03	.03	.03
RV Park	525	.03	.03	.03
RV Park	514	.03	.03	.03
RV Park	494	.016	.016	.016
RV Park	456	.016	.016	.016
RV Park	420	.016	.016	.016
RV Park	376	.025	.016	.025
RV Park	299	.016	.016	.016
RV Park	207	.016	.016	.016
RV Park	100	.016	.016	.016

RV Park	90	.016	.016	.016
RV Park	70	.016	.016	.016
RV Park	60	.016	.016	.016
RV Park	50	.02	.02	.02

SUMMARY OF REACH LENGTHS

River: Shelborne Avenue

Reach	River Sta.	Left	Channel	Right
RV Park	796	133	131	124
RV Park	667	107	101	87
RV Park	567	43	43	63
RV Park	525	17	10	18
RV Park	514	21	21	21
RV Park	494	45	38	38
RV Park	456	45	45	45
RV Park	420	20	20	20
RV Park	376	77	77	71
RV Park	299	91	93	98
RV Park	207	106	107	108
RV Park	100	55	58	55
RV Park	90	120	115	120
RV Park	70	45	45	45
RV Park	60	50	50	50
RV Park	50	0	0	0

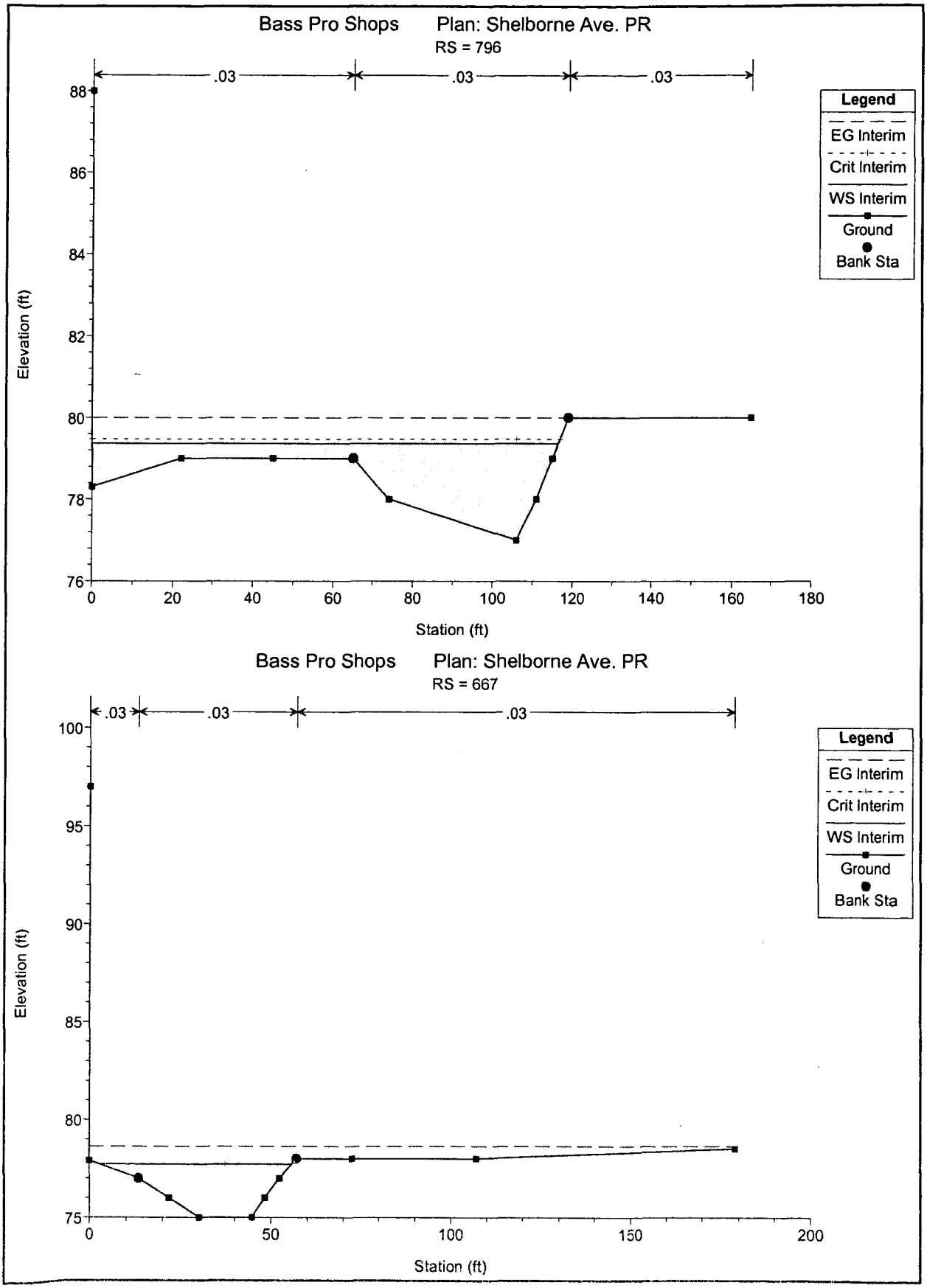
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Shelborne Avenue

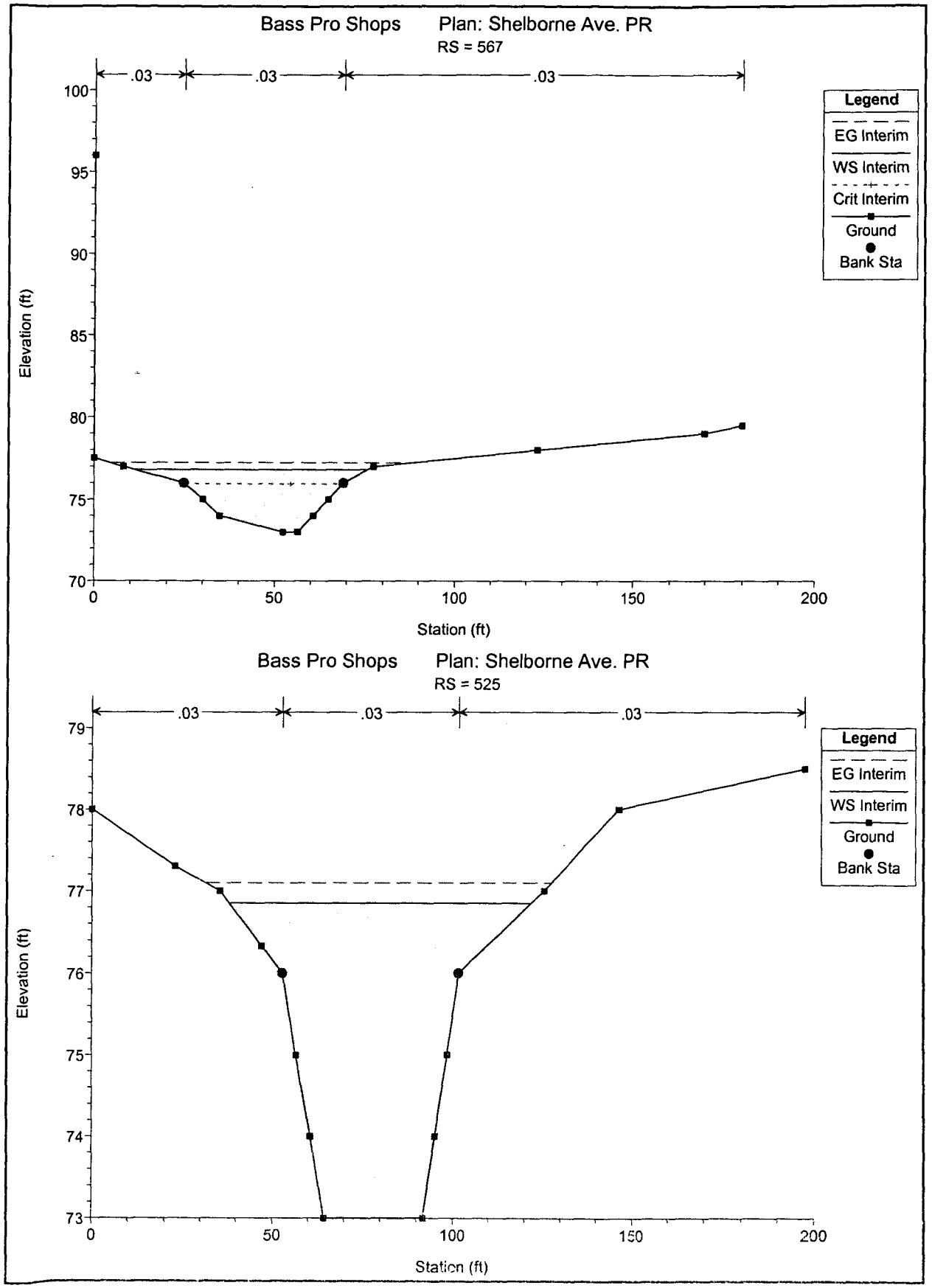
Reach	River Sta.	Contr.	Expan.
RV Park	796	.1	.3
RV Park	667	.1	.3
RV Park	567	.1	.3
RV Park	525	.1	.3
RV Park	514	.1	.3
RV Park	494	.1	.3
RV Park	456	.1	.3
RV Park	420	.1	.3
RV Park	376	.1	.3
RV Park	299	.1	.3
RV Park	207	.1	.3
RV Park	100	.1	.3
RV Park	90	.1	.3
RV Park	70	.1	.3
RV Park	60	.1	.3
RV Park	50	.1	.3

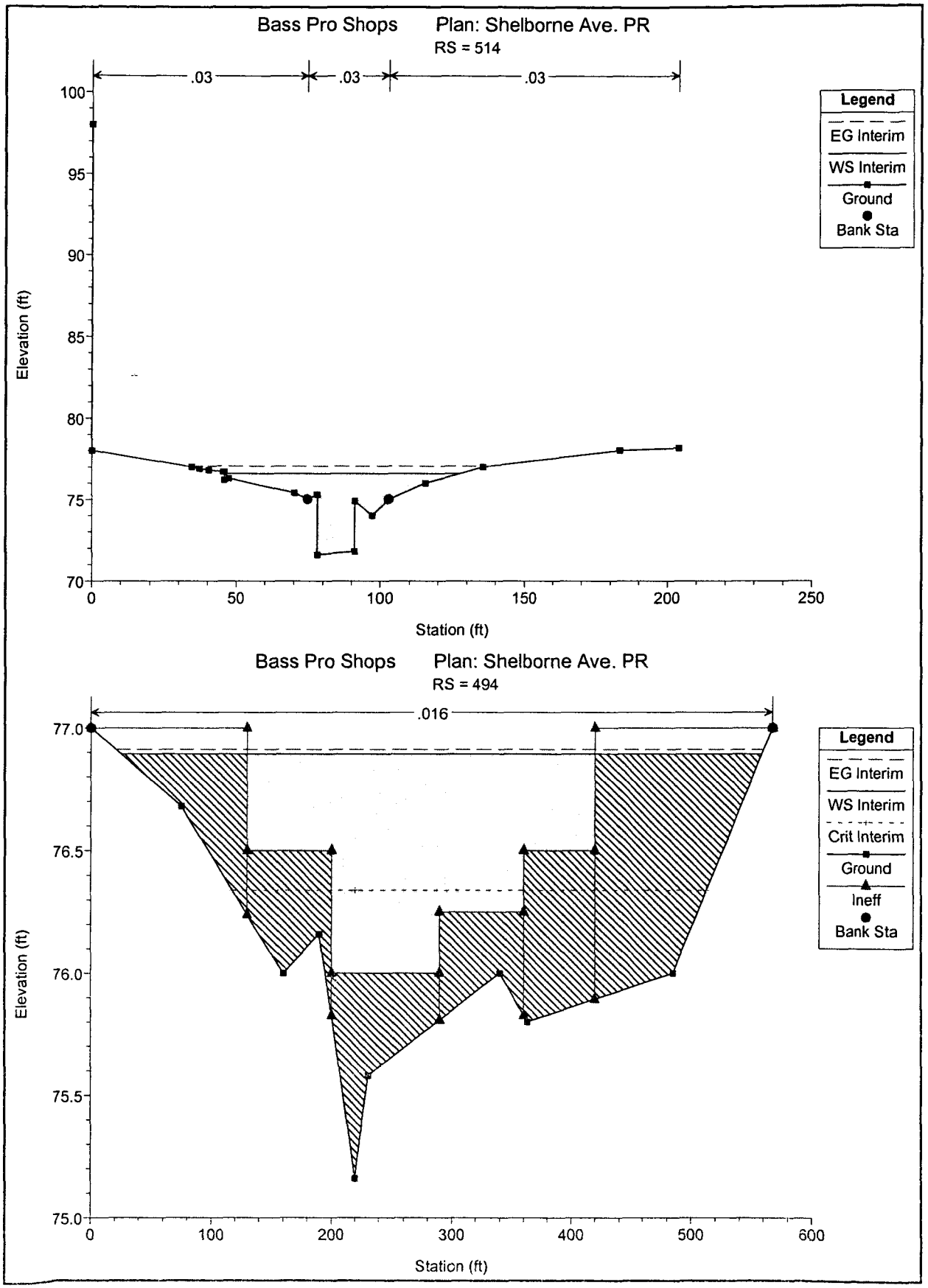
Profile Output Table - Standard Table 1

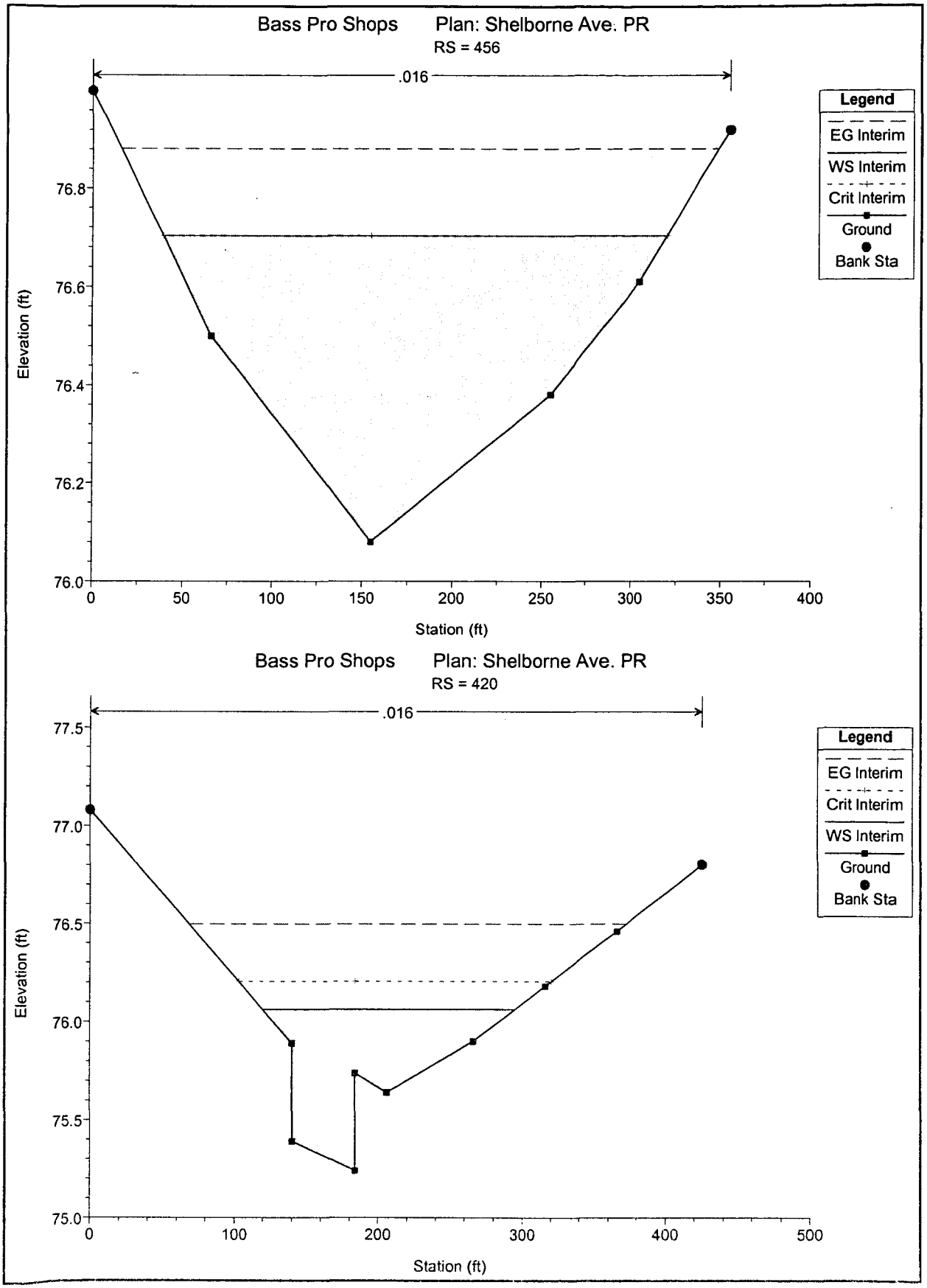
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
RV Park	796	646.00	77.00	79.37	79.48	80.00	0.010309	6.77	112.78	116.49	0.95
RV Park	667	646.00	75.00	77.72	77.75	78.63	0.010130	7.72	86.27	53.01	0.97
RV Park	567	646.00	73.00	76.82	75.95	77.24	0.002955	5.22	129.70	64.86	0.56
RV Park	525	646.00	73.00	76.85		77.10	0.001439	4.03	171.27	84.07	0.40
RV Park	514	646.00	71.60	76.61		77.05	0.003656	5.77	135.72	81.95	0.56
RV Park	494	332.00	75.16	76.89	76.34	76.91	0.000130	1.09	304.24	534.27	0.19
RV Park	456	332.00	76.08	76.70	76.70	76.88	0.005431	3.39	97.92	280.85	1.01
RV Park	420	332.00	75.24	76.06	76.20	76.50	0.012918	5.30	62.65	175.14	1.56

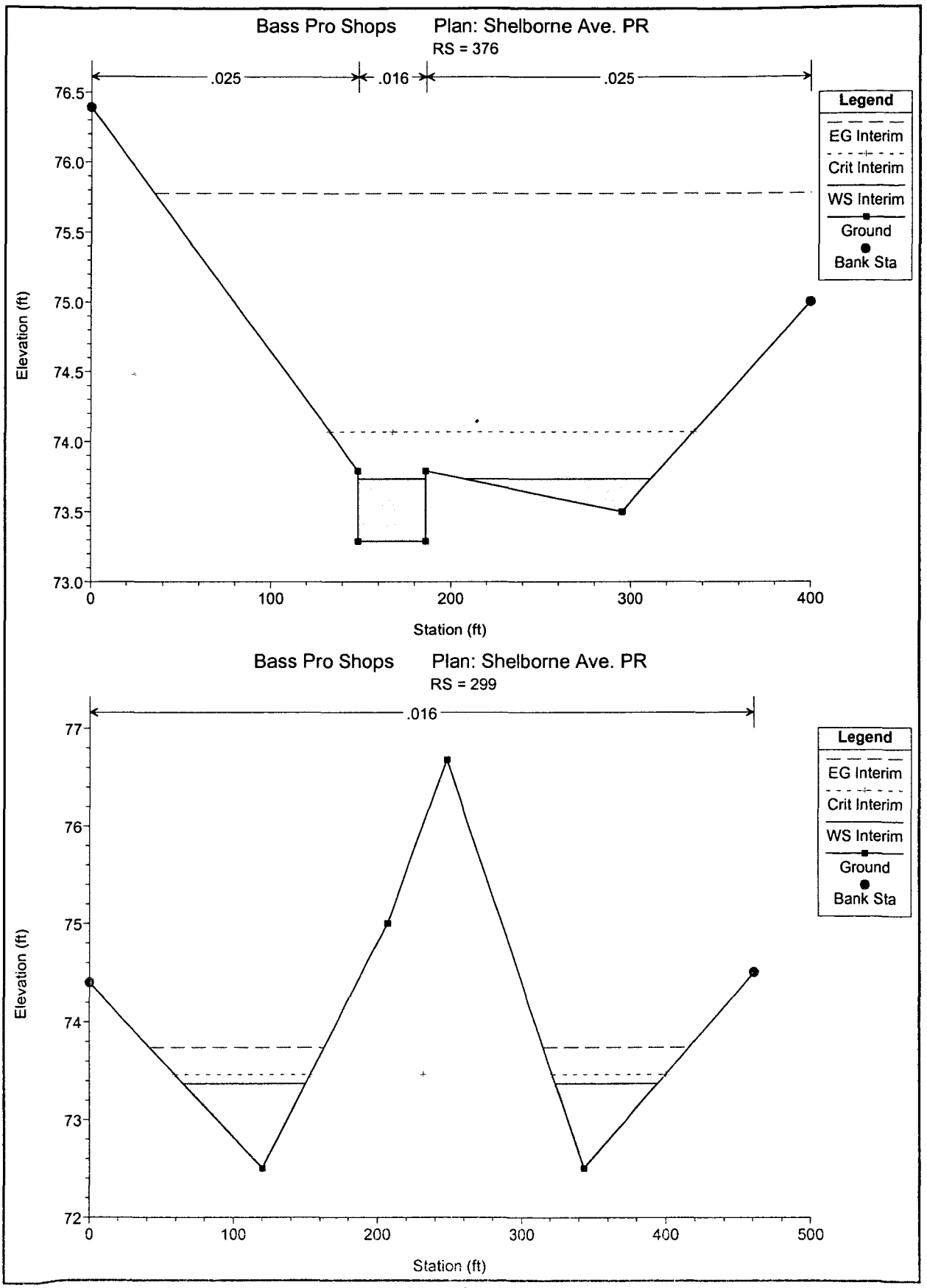
RV Park	376	332.00	73.29	73.73	74.07	75.78	0.097678	11.47	28.93	142.04	4.48
RV Park	299	332.00	72.50	73.37	73.46	73.74	0.008330	4.87	68.17	156.49	1.30
RV Park	207	332.00	71.70	72.44	72.56	72.84	0.011212	5.07	65.48	176.84	1.47
RV Park	100	332.00	70.50	71.18	71.30	71.57	0.012501	5.05	65.80	194.22	1.53
RV Park	90	332.00	70.00	70.62	70.69	70.90	0.009777	4.21	78.78	253.35	1.33
RV Park	70	332.00	67.01	70.75	67.83	70.75	0.000004	0.30	1103.27	546.27	0.04
RV Park	60	332.00	66.70	70.75		70.75	0.000004	0.28	1194.47	611.25	0.04
RV Park	50	332.00	64.38	70.75	66.20	70.75	0.000001	0.18	1833.70	593.06	0.02

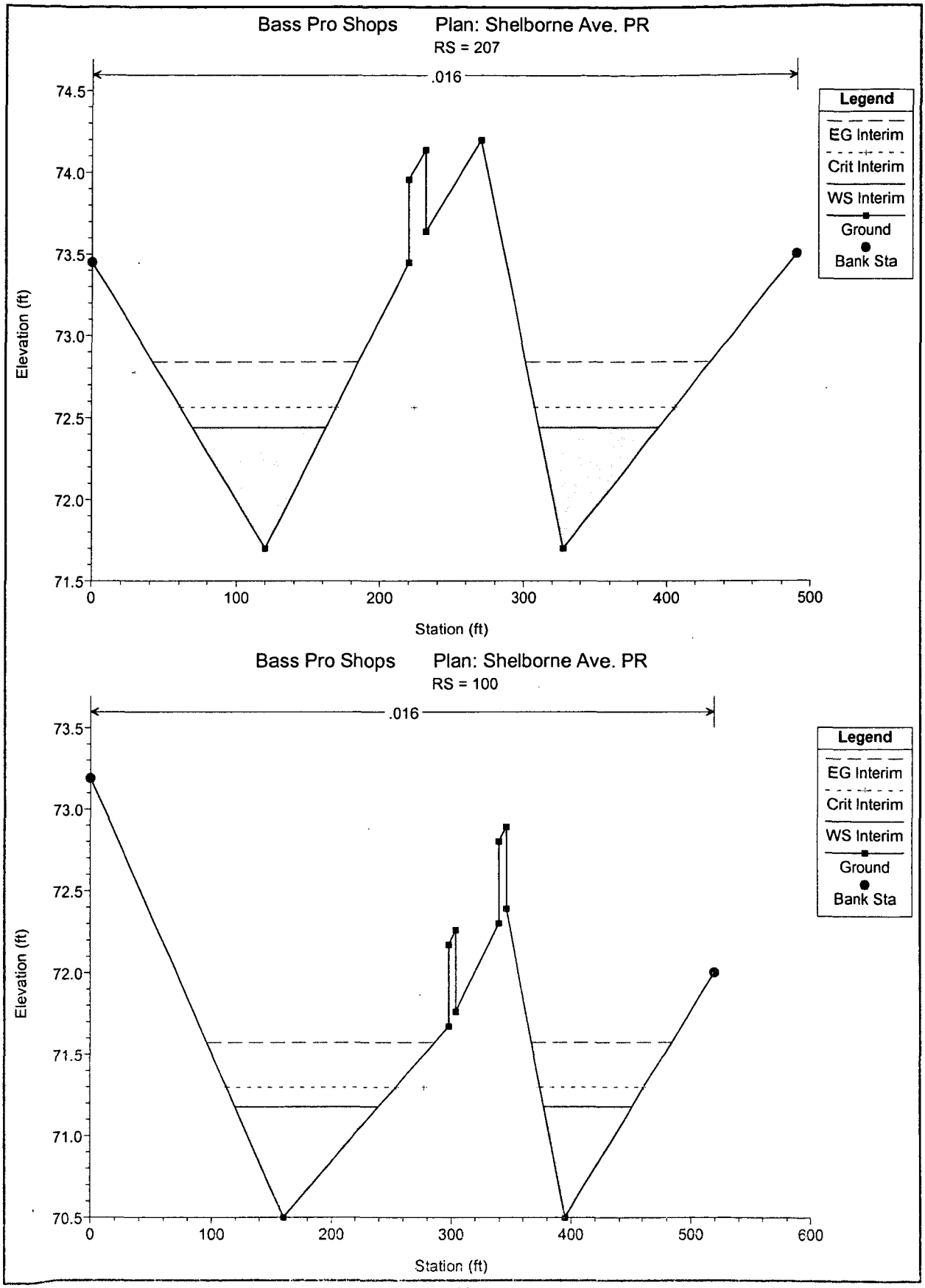

Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 796
.03
.03
.03
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
88
86
84
82
80
78
76
0
20
40
60
80
100
120
140
160
180
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 667
.03
.03
.03
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
0
50
100
150
200
Station (ft)

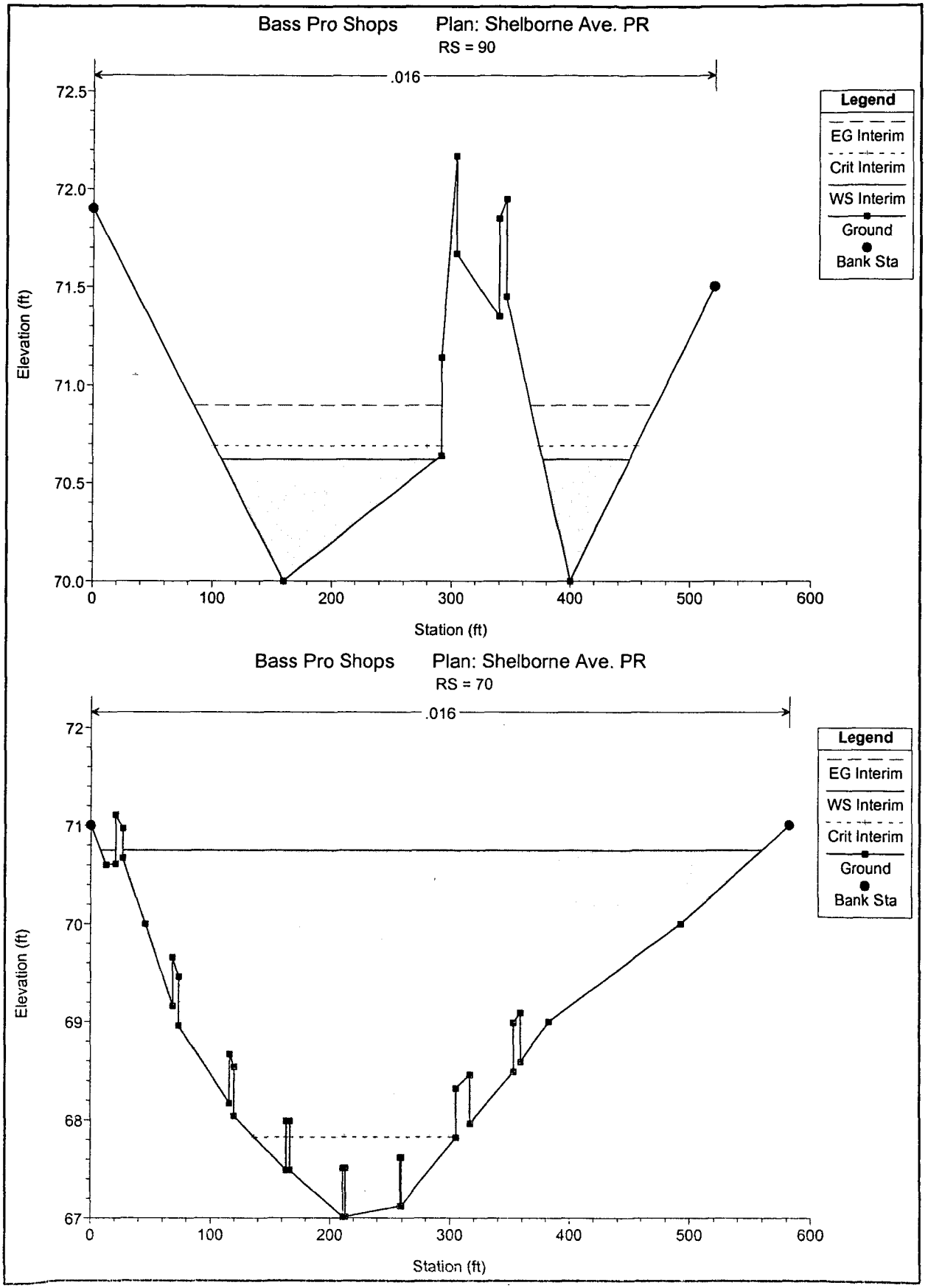

Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 567
.03
.03
.03
Legend
EG Interim
WS Interim
Crit Interim
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
70
0
50
100
150
200
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 525
.03
.03
.03
Legend
EG Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
79
78
77
76
75
74
73
0
50
100
150
200
Station (ft)

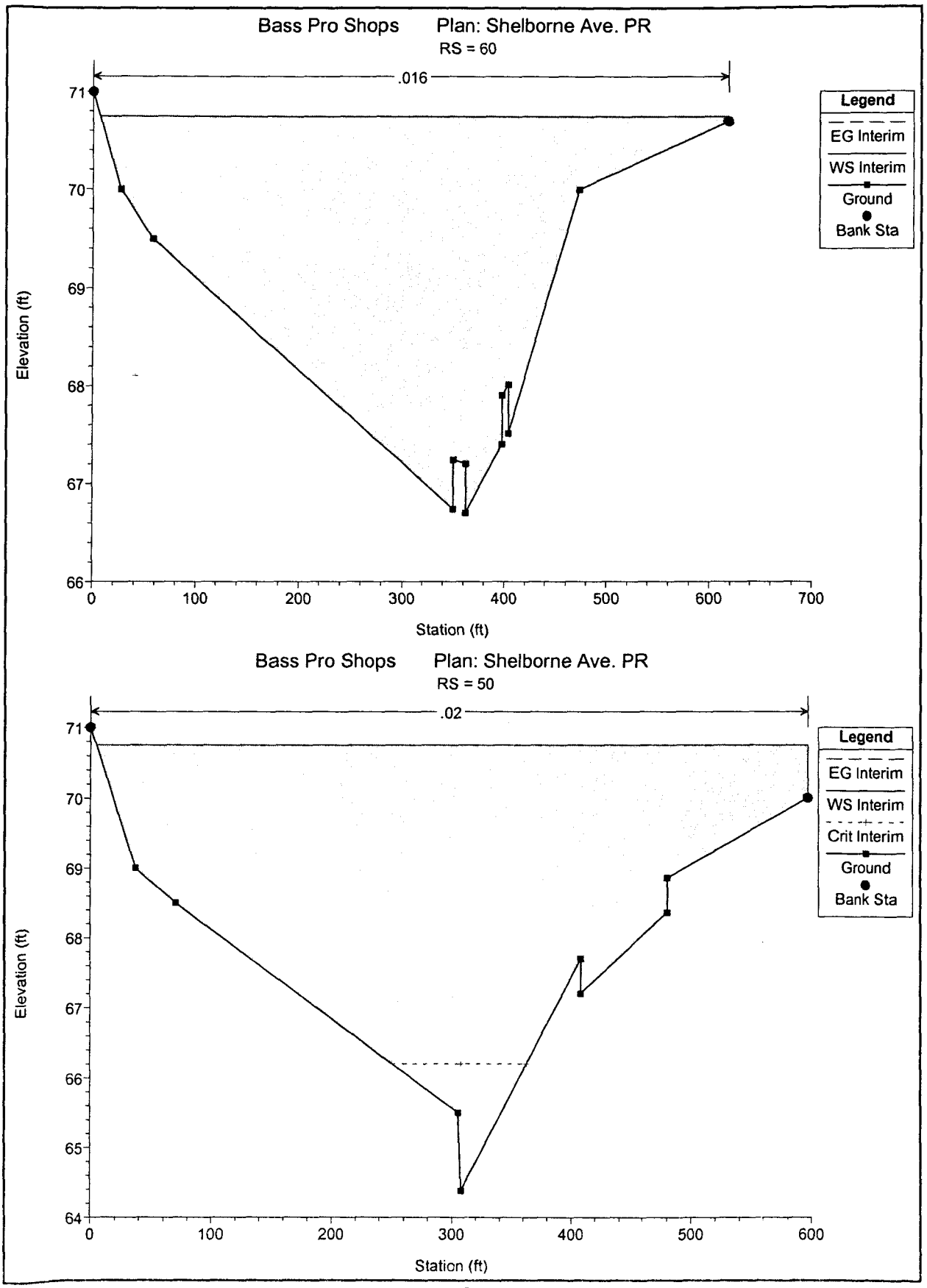

Bass Pro Shops Plan: Shelborne Ave. PR
RS = 514
.03
.03
.03
Legend
EG Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
70
0
50
100
150
200
250
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 494
.016
Legend
EG Interim
WS Interim
Crit Interim
Ground
Ineff
Bank Sta
Elevation (ft)
77.0
76.5
76.0
75.5
75.0
0
100
200
300
400
500
600
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 456
.016
Legend
EG Interim
WS Interim
Crit Interim
Ground
Bank Sta
Elevation (ft)
76.8
76.6
76.4
76.2
76.0
0
50
100
150
200
250
300
350
400
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 420
.016
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
77.5
77.0
76.5
76.0
75.5
75.0
0
100
200
300
400
500
Station (ft)


Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 376
.025
.016
.025
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
76.5
76.0
75.5
75.0
74.5
74.0
73.5
73.0
0
100
200
300
400
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 299
.016
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
77
76
75
74
73
72
0
100
200
300
400
500
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 207
.016
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
74.5
74.0
73.5
73.0
72.5
72.0
71.5
0
100
200
300
400
500
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 100
.016
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
73.5
73.0
72.5
72.0
71.5
71.0
70.5
0
100
200
300
400
500
600
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 90
.016
72.5
72.0
71.5
71.0
70.5
70.0
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG Interim
Crit Interim
WS Interim
Ground
Bank Sta
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 70
.016
72
71
70
69
68
67
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG Interim
WS Interim
Crit Interim
Ground
Bank Sta


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 60
.016
Legend
EG Interim
WS Interim
Ground
Bank Sta
Elevation (ft)
71
70
69
68
67
66
0
100
200
300
400
500
600
700
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 50
.02
Legend
EG Interim
WS Interim
Crit Interim
Ground
Bank Sta
Elevation (ft)
71
70
69
68
67
66
65
64
0
100
200
300
400
500
600
Station (ft)

RESPONSE TO COMMENT #11

REVISED VELOCITY X DEPTH TABLE FOR 100- YEAR SHELBOURNE FLOWS THROUGH PARKING LOT
(INTERIM CONDITION)

Velocity x Depth Table for Shelborne Alignment (Interim Condition)

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	Vel Chnl (ft/s)	Max Chl Dpth (ft)	Froude # Chl	Velocity X Depth	
RV Park	494	332	75.16	76.89	76.34	1.09	1.73	0.19	1.89	*
RV Park	456	332	76.08	76.7	76.7	3.39	0.62	1.01	2.10	*
RV Park	420	332	75.24	76.06	76.2	5.3	0.82	1.56	4.35	*
RV Park	376	332	73.29	73.73	74.07	11.47	0.44	4.48	5.05	
RV Park	299	332	72.5	73.37	73.46	4.87	0.87	1.3	4.24	
RV Park	207	332	71.7	72.44	72.56	5.07	0.74	1.47	3.75	
RV Park	100	332	70.5	71.18	71.3	5.05	0.68	1.53	3.43	
RV Park	90	332	70	70.62	70.69	4.21	0.62	1.33	2.61	
RV Park	70	332	67.01	70.75	67.83	0.3	3.74	0.04	1.12	
RV Park	60	332	66.7	70.75		0.28	4.05	0.04	1.13	
RV Park	50	332	64.38	70.75	66.2	0.18	6.37	0.02	1.15	

* Please note that these sections are within the Industrial Road Right of Way and not within the proposed parking lot

RESPONSE TO COMMENT #10

REVISED HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN - WSPG MODEL FOR LINE-A
100-YEAR STORM EVENT, INTERIM CONDITION

DATE: 9/ 3/2003
TIME: 11:21

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	2	3	0	0.00	5.50	8.00	0.00	0.00	0.00										
CD	3	3	0	0.00	3.00	7.00	0.00	0.00	0.00										
CD	4	4			1.50														
CD	5	4			2.00														
CD	6	3	0	0.00	3.00	7.00	0.00	0.00	0.00										

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

HEADING LINE NO 2 IS -

PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)

HEADING LINE NO 3 IS -

INTERIM CONDITION

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	63.50	1	70.75

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	116.94	63.79	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	173.68	63.93	1	0.013	0.00	36.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	185.16	63.98	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	213.16	63.99	2	3	3	0.013	157.0	157.0	64.00	64.00	40.00	40.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	246.41	64.12	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	247.91	64.12	2	4	0	0.014	5.0	0.0	66.12	0.00	59.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	422.42	64.56	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	424.42	64.56	2	5	0	0.014	5.0	0.0	66.33	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 10 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	439.32	64.60	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 11 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	440.82	64.60	2	4	0	0.014	4.0	0.0	66.63	0.00	55.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 12 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	601.07	65.00	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 13 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	698.15	65.25	2	0.013	0.00	60.00	0.00	0

ELEMENT NO 14 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	738.96	65.35	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 15 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	740.96	65.35	2	5	0	0.014	7.0	0.0	67.15	0.00	53.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 16 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	878.03	65.69	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 17 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	936.91	65.84	2	0.013	0.00	36.00	0.00	0

ELEMENT NO 18 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1054.78	66.14	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 19 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1060.78	66.15	6	0	0	0.013	0.0	0.0	0.00	0.00	0.00	0.00

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 20 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1090.13	66.23	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 21 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1129.90	66.33	6	0.013	0.00	25.00	0.00	0

ELEMENT NO 22 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1148.18	66.37	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 23 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1148.18	66.37	6	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
INTERIM CONDITION

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	63.50	7.250	70.750	520.0	7.25	0.816	71.566	0.00	3.879		6.00	12.00	0.00	0	0.00
116.94	0.00248					.001603	0.19			4.175			0.00		
116.94	63.79	7.147	70.937	520.0	7.25	0.816	71.753	0.00	3.879		6.00	12.00	0.00	0	0.00
56.74	0.00247					.001603	0.09			4.183			0.00		
173.68	63.93	7.202	71.132	520.0	7.25	0.816	71.948	0.00	3.879		6.00	12.00	0.00	0	0.00
11.48	0.00436					.001603	0.02			3.419			0.00		
185.16	63.98	7.170	71.150	520.0	7.25	0.816	71.966	0.00	3.879		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00036					.001247	0.03						0.00		
213.16	63.99	7.721	71.711	206.0	4.71	0.344	72.055	0.00	2.742		5.50	8.00	0.00	0	0.00
33.25	0.00391					.000892	0.03			2.643			0.00		
246.41	64.12	7.621	71.741	206.0	4.71	0.344	72.085	0.00	2.742		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.001009	0.00						0.00		
247.91	64.12	7.650	71.770	201.0	4.59	0.328	72.098	0.00	2.697		5.50	8.00	0.00	0	0.00
174.51	0.00252					.000849	0.15			3.040			0.00		
422.42	64.56	7.358	71.918	201.0	4.59	0.328	72.246	0.00	2.697		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000960	0.00						0.00		
424.42	64.56	7.392	71.952	196.0	4.48	0.312	72.264	0.00	2.652		5.50	8.00	0.00	0	0.00
14.90	0.00268					.000807	0.01			2.918			0.00		
439.32	64.60	7.364	71.964	196.0	4.48	0.312	72.276	0.00	2.652		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000917	0.00						0.00		
440.82	64.60	7.387	71.987	192.0	4.39	0.299	72.286	0.00	2.616		5.50	8.00	0.00	0	0.00
160.25	0.00250					.000774	0.12			2.952			0.00		

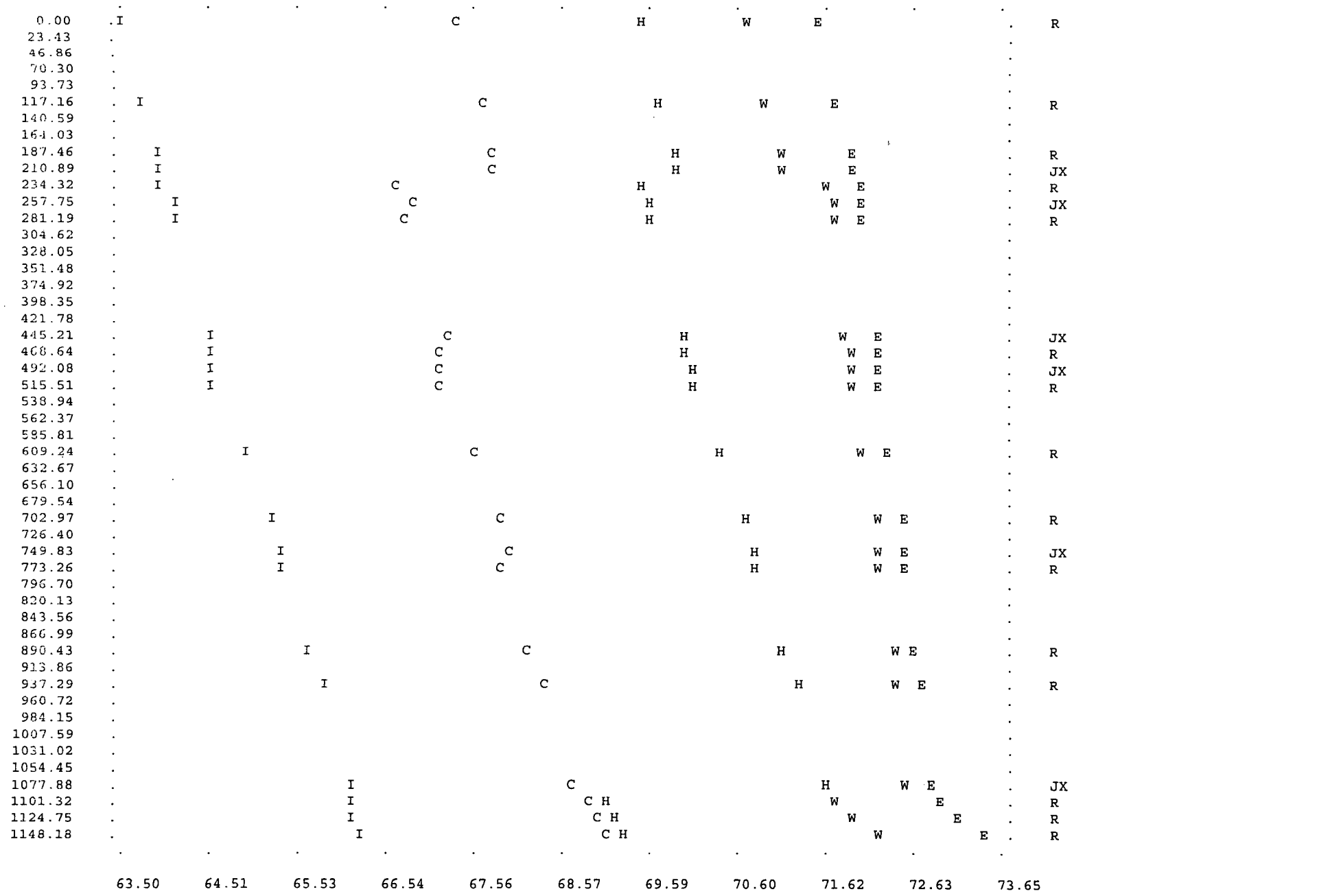
WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
INTERIM CONDITION

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
601.07	65.00	7.126	72.126	192.0	4.39	0.299	72.425	0.00	2.616		5.50	8.00	0.00	0	0.00
97.08	0.00258					.000774	0.08			2.919			0.00		
698.15	65.25	7.000	72.250	192.0	4.39	0.299	72.549	0.00	2.616		5.50	8.00	0.00	0	0.00
40.81	0.00245					.000774	0.03			2.972			0.00		
738.96	65.35	6.932	72.282	192.0	4.39	0.299	72.581	0.00	2.616		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000866	0.00						0.00		
740.96	65.35	6.970	72.320	185.0	4.23	0.278	72.598	0.00	2.552		5.50	8.00	0.00	0	0.00
137.07	0.00248					.000719	0.10			2.880			0.00		
878.03	65.69	6.742	72.432	185.0	4.23	0.278	72.710	0.00	2.552		5.50	8.00	0.00	0	0.00
58.88	0.00255					.000719	0.04			2.853			0.00		
936.91	65.84	6.670	72.510	185.0	4.23	0.278	72.788	0.00	2.552		5.50	8.00	0.00	0	0.00
117.87	0.00254					.000719	0.08			2.854			0.00		
1054.78	66.14	6.455	72.595	185.0	4.23	0.278	72.873	0.00	2.552		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00167					.003256	0.02						0.00		
1060.78	66.15	5.629	71.779	185.0	8.92	1.234	73.013	0.00	2.790		3.00	7.00	0.00	0	0.00
29.35	0.00273					.005792	0.17			3.000			0.00		
1090.13	66.23	5.719	71.949	185.0	8.92	1.234	73.183	0.00	2.790		3.00	7.00	0.00	0	0.00
39.77	0.00251					.005792	0.23			3.000			0.00		
1129.90	66.33	5.980	72.310	185.0	8.92	1.234	73.544	0.00	2.790		3.00	7.00	0.00	0	0.00
18.28	0.00219					.005792	0.11			3.000			0.00		
1148.18	66.37	6.045	72.415	185.0	8.92	1.234	73.649	0.00	2.790		3.00	7.00	0.00	0	0.00

[redacted] [redacted] [redacted] [redacted]GILV[redacted] EXP[redacted]ON P[redacted]1 - [redacted] PRO[redacted]S [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]

PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
INTERIM CONDITION



N O T E S

1. GLOSSARY
   I = INVERT ELEVATION

[redacted] C = [redacted]TICA[redacted]TH [redacted]
W = WATER SURFACE ELEVATION
H = HEIGHT OF CHANNEL
E = ENERGY GRADE LINE
X = CURVES CROSSING OVER
B = BRIDGE ENTRANCE OR EXIT
Y = WALL ENTRANCE OR EXIT

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

RESPONSE TO COMMENT #10

REVISED HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN - WSPG MODEL FOR LINE-A
100-YEAR STORM EVENT, FUTURE CONDITION

DATE: 9/ 3/2003
TIME: 11:18

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	2	3	0	0.00	5.50	8.00	0.00	0.00	0.00										
CD	3	3	0	0.00	3.00	7.00	0.00	0.00	0.00										
CD	4	4			1.50														
CD	5	4			2.00														
CD	6	3	0	0.00	3.00	7.00	0.00	0.00	0.00										

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

HEADING LINE NO 2 IS -

PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)

HEADING LINE NO 3 IS -

FUTURE CONDITION

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	63.50	1	70.75

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	116.94	63.79	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	173.68	63.93	1	0.013	0.00	36.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	185.16	63.98	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	213.16	63.99	2	3	3	0.013	130.0	130.0	64.00	64.00	40.00	40.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	246.41	64.12	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	247.91	64.12	2	4	0	0.014	5.0	0.0	66.12	0.00	59.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	422.42	64.56	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	424.42	64.56	2	5	0	0.014	5.0	0.0	66.33	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 10 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	439.32	64.60	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 11 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	440.82	64.60	2	4	0	0.014	4.0	0.0	66.63	0.00	55.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 12 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	601.07	65.00	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 13 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	698.15	65.25	2	0.013	0.00	60.00	0.00	0

ELEMENT NO 14 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	738.96	65.35	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 15 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	740.96	65.35	2	5	0	0.014	7.0	0.0	67.15	0.00	53.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 16 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	878.03	65.69	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 17 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	936.91	65.84	2	0.013	0.00	36.00	0.00	0

ELEMENT NO 18 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1054.78	66.14	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 19 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1060.78	66.15	6	0	0	0.013	0.0	0.0	0.00	0.00	0.00	0.00

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 20 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1090.13	66.23	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 21 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1129.90	66.33	6	0.013	0.00	25.00	0.00	0

ELEMENT NO 22 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1148.18	66.37	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 23 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1148.18	66.37	6	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
FUTURE CONDITION

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	63.50	7.250	70.750	466.0	6.49	0.655	71.405	0.00	3.606		6.00	12.00	0.00	0	0.00
116.94	0.00248					.001287	0.15			3.860			0.00		
116.94	63.79	7.111	70.901	466.0	6.49	0.655	71.556	0.00	3.606		6.00	12.00	0.00	0	0.00
56.74	0.00247					.001287	0.07			3.867			0.00		
173.68	63.93	7.126	71.056	466.0	6.49	0.655	71.711	0.00	3.606		6.00	12.00	0.00	0	0.00
11.48	0.00436					.001287	0.01			3.166			0.00		
185.16	63.98	7.091	71.071	466.0	6.49	0.655	71.726	0.00	3.606		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00036					.001089	0.03						0.00		
213.16	63.99	7.547	71.537	206.0	4.71	0.344	71.881	0.00	2.742		5.50	8.00	0.00	0	0.00
33.25	0.00391					.000892	0.03			2.643			0.00		
246.41	64.12	7.446	71.566	206.0	4.71	0.344	71.910	0.00	2.742		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.001009	0.00						0.00		
247.91	64.12	7.476	71.596	201.0	4.59	0.328	71.924	0.00	2.697		5.50	8.00	0.00	0	0.00
174.51	0.00252					.000849	0.15			3.040			0.00		
422.42	64.56	7.184	71.744	201.0	4.59	0.328	72.072	0.00	2.697		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000960	0.00						0.00		
424.42	64.56	7.218	71.778	196.0	4.48	0.312	72.090	0.00	2.652		5.50	8.00	0.00	0	0.00
14.90	0.00268					.000807	0.01			2.918			0.00		
439.32	64.60	7.190	71.790	196.0	4.48	0.312	72.102	0.00	2.652		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000917	0.00						0.00		
440.82	64.60	7.213	71.813	192.0	4.39	0.299	72.112	0.00	2.616		5.50	8.00	0.00	0	0.00
160.25	0.00250					.000774	0.12			2.952			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
FUTURE CONDITION

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
661.07	65.00	6.952	71.952	192.0	4.39	0.299	72.251	0.00	2.616		5.50	8.00	0.00	0	0.00
97.08	0.00258					.000774	0.08			2.919			0.00		
698.15	65.25	6.826	72.076	192.0	4.39	0.299	72.375	0.00	2.616		5.50	8.00	0.00	0	0.00
40.81	0.00245					.000774	0.03			2.972			0.00		
738.96	65.35	6.757	72.107	192.0	4.39	0.299	72.406	0.00	2.616		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00000					.000866	0.00						0.00		
740.96	65.35	6.795	72.145	185.0	4.23	0.278	72.423	0.00	2.552		5.50	8.00	0.00	0	0.00
137.07	0.00248					.000719	0.10			2.880			0.00		
878.03	65.69	6.568	72.258	185.0	4.23	0.278	72.536	0.00	2.552		5.50	8.00	0.00	0	0.00
58.88	0.00255					.000719	0.04			2.853			0.00		
936.91	65.84	6.495	72.335	185.0	4.23	0.278	72.613	0.00	2.552		5.50	8.00	0.00	0	0.00
117.87	0.00254					.000719	0.08			2.854			0.00		
1054.78	66.14	6.280	72.420	185.0	4.23	0.278	72.698	0.00	2.552		5.50	8.00	0.00	0	0.00
JUNCT STR	0.00167					.003256	0.02						0.00		
1060.78	66.15	5.455	71.605	185.0	8.92	1.234	72.839	0.00	2.790		3.00	7.00	0.00	0	0.00
29.35	0.00273					.005792	0.17			3.000			0.00		
1090.13	66.23	5.545	71.775	185.0	8.92	1.234	73.009	0.00	2.790		3.00	7.00	0.00	0	0.00
39.77	0.00251					.005792	0.23			3.000			0.00		
1129.90	66.33	5.805	72.135	185.0	8.92	1.234	73.369	0.00	2.790		3.00	7.00	0.00	0	0.00
18.28	0.00219					.005792	0.11			3.000			0.00		
1148.18	66.37	5.871	72.241	185.0	8.92	1.234	73.475	0.00	2.790		3.00	7.00	0.00	0	0.00

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE SD LINE A (7'X3'RCB --> 8'X5.5' RCB --> 12'X6'RCB)
FUTURE CONDITION

N O T E S

1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

RESPONSE TO COMMENT #10

REVISED HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN - WSPG MODEL FOR LINE-B
100-YEAR STORM EVENT, INTERIM CONDITION

DATE: 9/ 3/2003
TIME: 11:32

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	1	1.00	3.00	15.00	0.00	0.00	0.00										
CD	2	3	2	1.00	3.00	18.50	0.00	0.00	0.00										
CD	3	6	0	0.00															
CD	4	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	5	3	0	0.00	5.50	8.00	0.00	0.00	0.00										

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - INTERIM CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	64.00	7.150	71.150	520.0	7.25	0.816	71.966	0.00	3.879		6.00	12.00	0.00	0	0.00
5.00	0.00000					.001603	0.01			0.000			0.00		
5.00	64.00	7.158	71.158	520.0	7.25	0.816	71.974	0.00	3.879		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00200					.002888	0.01						0.00		
10.00	64.01	7.519	71.529	314.0	7.57	0.889	72.418	0.00	2.501		3.00	15.00	0.00	1	1.00
66.34	0.00271					.004172	0.28			2.804			0.00		
76.34	64.19	7.751	71.941	314.0	7.57	0.889	72.830	0.00	2.501		3.00	15.00	0.00	1	1.00
187.19	0.00251					.004172	0.78			2.885			0.00		
263.53	64.66	8.107	72.767	314.0	7.57	0.889	73.656	0.00	2.501		3.00	15.00	0.00	1	1.00
144.37	0.00249					.004172	0.60			2.892			0.00		
407.90	65.02	8.571	73.591	314.0	7.57	0.889	74.480	0.00	2.501		3.00	15.00	0.00	1	1.00
254.67	0.00251					.004172	1.06			2.884			0.00		
662.57	65.66	9.038	74.698	314.0	7.57	0.889	75.587	0.00	2.501		3.00	15.00	0.00	1	1.00
133.83	0.04439					.004172	0.56			1.066			0.00		
796.40	71.60	3.656	75.256	314.0	7.57	0.889	76.145	0.00	2.501		3.00	15.00	0.00	1	1.00
WALL ENTRANCE													0.00		
796.40	71.60	5.377	76.977	314.0	1.08	0.018	76.995		2.064			3		0	0.00
3.67	0.02642					.000197	0.00			1.730					
800.07	71.70	5.279	76.976	314.0	1.14	0.020	76.996		2.064			3		0	0.00
3.59	0.02642					.000220	0.00			1.730					
803.66	71.79	5.183	76.975	314.0	1.19	0.022	76.997		2.064			3		0	0.00
3.51	0.02642					.000247	0.00			1.730					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - INTERIM CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
807.17	71.88	5.089	76.973	314.0	1.25	0.024	76.997		2.064		3		0	0.00
3.50	0.02642					.000276	0.00		1.730					
810.67	71.98	4.995	76.972	314.0	1.31	0.027	76.999		2.064		3		0	0.00
3.43	0.02642					.000309	0.00		1.730					
814.10	72.07	4.903	76.970	314.0	1.37	0.029	76.999		2.064		3		0	0.00
3.37	0.02642					.000345	0.00		1.730					
817.47	72.16	4.812	76.969	314.0	1.44	0.032	77.001		2.064		3		0	0.00
3.34	0.02642					.000385	0.00		1.730					
820.81	72.25	4.722	76.967	314.0	1.51	0.036	77.003		2.064		3		0	0.00
3.29	0.02642					.000429	0.00		1.730					
824.10	72.33	4.633	76.965	314.0	1.59	0.039	77.004		2.064		3		0	0.00
3.24	0.02642					.000478	0.00		1.730					
827.34	72.42	4.545	76.962	314.0	1.66	0.043	77.005		2.064		3		0	0.00
3.23	0.02642					.000528	0.00		1.730					
830.57	72.50	4.457	76.960	314.0	1.74	0.047	77.007		2.064		3		0	0.00
3.26	0.02642					.000576	0.00		1.730					
833.83	72.59	4.368	76.957	314.0	1.83	0.052	77.009		2.064		3		0	0.00
3.25	0.02642					.000624	0.00		1.730					
837.08	72.67	4.279	76.954	314.0	1.92	0.057	77.011		2.064		3		0	0.00
3.31	0.02642					.000672	0.00		1.730					
840.39	72.76	4.188	76.950	314.0	2.01	0.063	77.013		2.064		3		0	0.00
3.38	0.02642					.000718	0.00		1.730					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - INTERIM CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
843.77	72.85	4.095	76.946	314.0	2.11	0.069	77.015		2.064		3		0	0.00
3.47	0.02642					.000760	0.00		1.730					
847.24	72.94	3.999	76.942	314.0	2.21	0.076	77.018		2.064		3		0	0.00
2.16	0.02642					.000808	0.00		1.730					
849.40	73.00	3.939	76.939	314.0	2.28	0.081	77.020		2.064		3		0	0.00
4.61	0.02000					.000885	0.00		1.840					
854.01	73.09	3.843	76.935	314.0	2.39	0.089	77.024		2.064		3		0	0.00
4.53	0.02000					.000989	0.00		1.840					
858.54	73.18	3.748	76.931	314.0	2.51	0.098	77.029		2.064		3		0	0.00
4.46	0.02000					.001103	0.00		1.840					
863.00	73.27	3.654	76.926	314.0	2.63	0.107	77.033		2.064		3		0	0.00
4.43	0.02000					.001228	0.01		1.840					
867.43	73.36	3.560	76.921	314.0	2.76	0.118	77.039		2.064		3		0	0.00
4.30	0.02000					.001365	0.01		1.840					
871.73	73.45	3.468	76.915	314.0	2.89	0.130	77.045		2.064		3		0	0.00
4.28	0.02000					.001514	0.01		1.840					
876.01	73.53	3.376	76.908	314.0	3.04	0.143	77.051		2.064		3		0	0.00
4.24	0.02000					.001677	0.01		1.840					
880.25	73.62	3.284	76.901	314.0	3.18	0.157	77.058		2.064		3		0	0.00
4.14	0.02000					.001852	0.01		1.840					
884.39	73.70	3.193	76.893	314.0	3.34	0.173	77.066		2.064		3		0	0.00
4.11	0.02000					.002042	0.01		1.840					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - INTERIM CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
888.50	73.78	3.102	76.884	314.0	3.50	0.190	77.074		2.064		3		0	0.00
4.05	0.02000					.002244	0.01		1.840					
892.55	73.86	3.011	76.874	314.0	3.67	0.209	77.083		2.064		3		0	0.00
4.01	0.02000					.002508	0.01		1.840					
896.56	73.94	2.920	76.863	314.0	3.85	0.230	77.093		2.064		3		0	0.00
3.78	0.02000					.002856	0.01		1.840					
900.34	74.02	2.832	76.851	314.0	4.04	0.253	77.104		2.064		3		0	0.00
3.57	0.02000					.003262	0.01		1.840					
903.91	74.09	2.747	76.837	314.0	4.24	0.279	77.116		2.064		3		0	0.00
3.39	0.02000					.003727	0.01		1.840					
907.30	74.16	2.664	76.822	314.0	4.44	0.307	77.129		2.064		3		0	0.00
3.19	0.02000					.004259	0.01		1.840					
910.49	74.22	2.583	76.805	314.0	4.66	0.337	77.142		2.064		3		0	0.00
2.99	0.02000					.004867	0.01		1.840					
913.48	74.28	2.504	76.786	314.0	4.89	0.371	77.157		2.064		3		0	0.00
2.70	0.02000					.005564	0.02		1.840					
916.18	74.34	2.428	76.764	314.0	5.13	0.408	77.172		2.064		3		0	0.00
2.43	0.02000					.006363	0.02		1.840					
918.61	74.38	2.354	76.738	314.0	5.38	0.449	77.187		2.064		3		0	0.00
1.49	0.02000					.007124	0.01		1.840					
920.10	74.41	2.304	76.718	314.0	5.56	0.480	77.198		2.064		3		0	0.00

HYDRAULIC JUMP

WATER SURFACE PROFILE LISTING

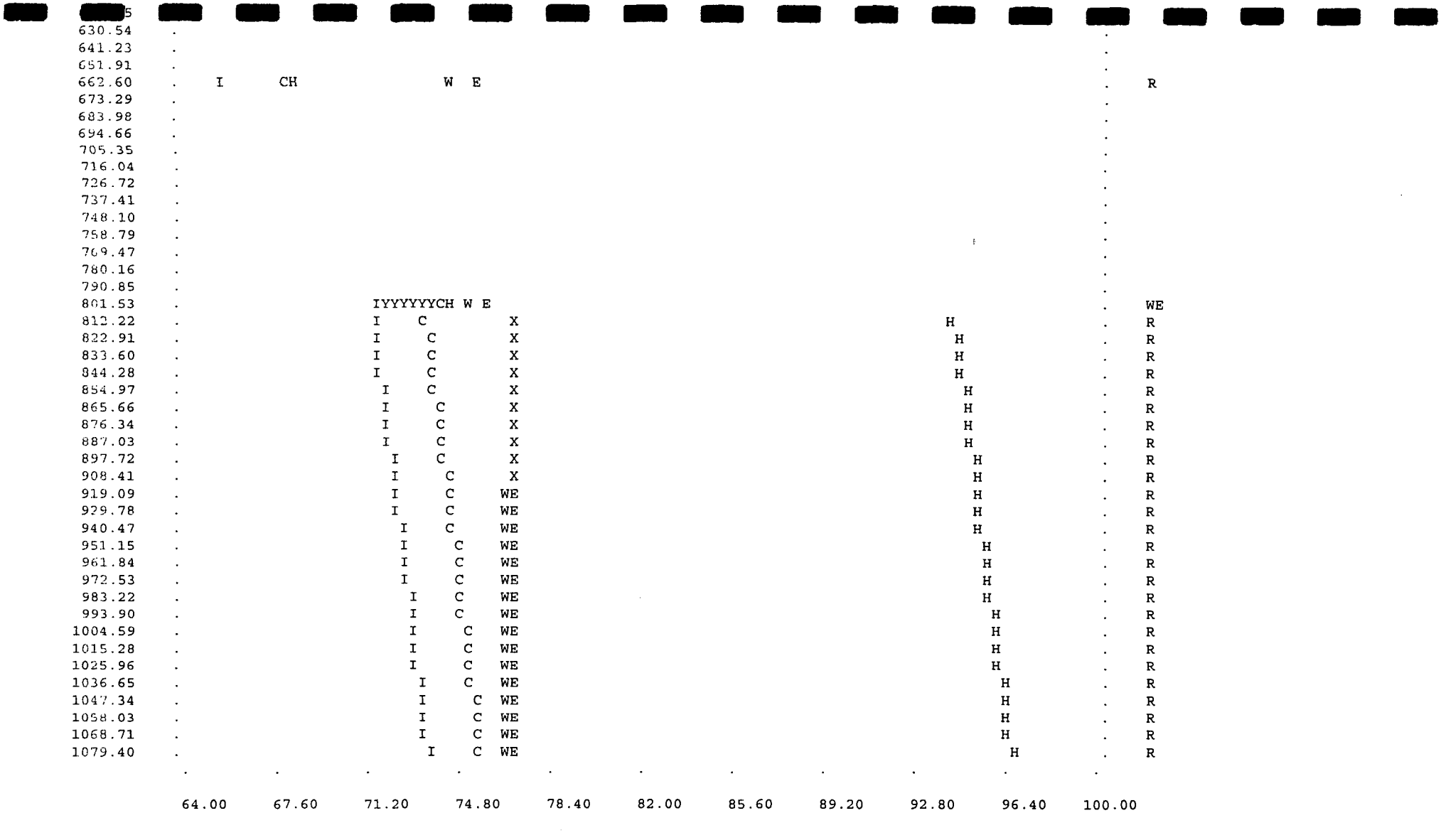
SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - INTERIM CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
920.10	74.41	1.840	76.254	314.0	7.85	0.957	77.211		2.064		3		0	0.00
0.48	0.02000					.020015	0.01		1.840					
920.58	74.42	1.840	76.264	314.0	7.85	0.957	77.221		2.064		3		0	0.00
23.08	0.02000					.018840	0.43		1.840					
943.66	74.89	1.892	76.777	314.0	7.52	0.878	77.655		2.064		3		0	0.00
5.74	0.02000					.016527	0.09		1.840					
949.40	75.00	1.952	76.952	314.0	7.17	0.798	77.750		2.064		3		0	0.00
115.80	0.01538					.015389	1.78		1.952					
1065.20	76.78	1.952	78.734	314.0	7.17	0.798	79.532		2.064		3		0	0.00
12.77	0.01538					.014606	0.19		1.952					
1077.97	76.98	1.999	78.977	314.0	6.91	0.741	79.718		2.064		3		0	0.00
1.43	0.01538					.012934	0.02		1.952					
1079.40	77.00	2.064	79.064	314.0	6.58	0.673	79.737		2.064		3		0	0.00

[redacted] EXP[redacted]N P[redacted]L - [redacted] PRO[redacted]S - [redacted]RIM [redacted]TIO[redacted]

PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

```
                .         .         .         .         .         .         .         .         .         .         .
  0.00          .I        C     H   W   E                                                                .   R
 10.69          .I        C     H   W   E                                                                .   JX
 21.37          .I    C H             W   E                                                              .   R
 32.06          .                                                                                        .
 42.75          .                                                                                        .
 53.44          .                                                                                        .
 64.12          .                                                                                        .
 74.81          .                                                                                        .
 85.50          .I      CH              W E                                                              .   R
 96.18          .                                                                                        .
106.87          .                                                                                        .
117.56          .                                                                                        .
128.25          .                                                                                        .
138.93          .                                                                                        .
149.62          .                                                                                        .
160.31          .                                                                                        .
170.99          .                                                                                        .
181.68          .                                                                                        .
192.37          .                                                                                        .
203.06          .                                                                                        .
213.74          .                                                                                        .
224.43          .                                                                                        .
235.12          .                                                                                        .
245.80          .                                                                                        .
256.49          .                                                                                        .
267.18          . I      C H              W E                                                            .   R
277.87          .                                                                                        .
288.55          .                                                                                        .
299.24          .                                                                                        .
309.93          .                                                                                        .
320.61          .                                                                                        .
331.30          .                                                                                        .
341.99          .                                                                                        .
352.68          .                                                                                        .
363.36          .                                                                                        .
374.05          .                                                                                        .
384.74          .                                                                                        .
395.42          .                                                                                        .
406.11          .                                                                                        .
416.80          .  I      C H              W  E                                                          .   R
427.49          .                                                                                        .
438.17          .                                                                                        .
448.86          .                                                                                        .
459.55          .                                                                                        .
470.23          .                                                                                        .
480.92          .                                                                                        .
491.61          .                                                                                        .
502.30          .                                                                                        .
512.98          .                                                                                        .
523.67          .                                                                                        .
534.36          .                                                                                        .
545.04          .                                                                                        .
555.73          .                                                                                        .
566.42          .                                                                                        .
577.10          .                                                                                        .
587.79          .                                                                                        .
598.48          .                                                                                        .
609.17          .                                                                                        .
```



N O T E S

1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

RESPONSE TO COMMENT #10

REVISED HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN - WSPG MODEL FOR LINE-B
100-YEAR STORM EVENT, FUTURE CONDITION

DATE: 9/ 3/2003
TIME: 11:30

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	1	1.00	3.00	15.00	0.00	0.00	0.00										
CD	2	3	2	1.00	3.00	18.50	0.00	0.00	0.00										
CD	3	6	0	0.00															
CD	4	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	5	3	0	0.00	5.50	8.00	0.00	0.00	0.00										

DATE: 9/ 3/2003
TIME: 11:30

F0515P

WATER SURFACE PROFILE - CROSS SECTION POINT LISTING

CARD CODE	SECT NO	NO OF POINTS	X(1) , Y(1) X(8) , Y(8)		X(2) , Y(2) X(9) , Y(9)		X(3) , Y(3) X(10) ,Y(10)		X(4) , Y(4) X(11) ,Y(11)		X(5) , Y(5) X(N) , Y(N)		X(6) , Y(6) X(N+1),Y(N+1)		X(7) , Y(7) X(99) ,Y(99)	
PTS	3	15	0.00	96.00	0.00	77.52	8.10	77.00	24.80	76.00	30.20	75.00	34.70	74.00	52.40	73.00
PTS			56.50	73.00	60.70	74.00	65.00	75.00	69.10	76.00	77.50	77.00	123.20	78.00	169.90	79.00
PTS			180.00	79.50												

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - FUTURE CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	64.00	7.070	71.070	466.0	6.49	0.655	71.725	0.00	3.606		6.00	12.00	0.00	0	0.00
5.00	0.00000					.001287	0.01			0.000			0.00		
5.00	64.00	7.076	71.076	466.0	6.49	0.655	71.731	0.00	3.606		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00200					.002073	0.01						0.00		
10.00	64.01	7.436	71.446	260.0	6.27	0.609	72.055	0.00	2.205		3.00	15.00	0.00	1	1.00
66.34	0.00271					.002860	0.19			2.446			0.00		
76.34	64.19	7.539	71.729	260.0	6.27	0.609	72.338	0.00	2.205		3.00	15.00	0.00	1	1.00
187.19	0.00251					.002860	0.54			2.515			0.00		
263.53	64.66	7.635	72.295	260.0	6.27	0.609	72.904	0.00	2.205		3.00	15.00	0.00	1	1.00
144.37	0.00249					.002860	0.41			2.521			0.00		
407.90	65.02	7.840	72.860	260.0	6.27	0.609	73.469	0.00	2.205		3.00	15.00	0.00	1	1.00
254.67	0.00251					.002860	0.73			2.514			0.00		
662.57	65.66	7.959	73.619	260.0	6.27	0.609	74.228	0.00	2.205		3.00	15.00	0.00	1	1.00
118.28	0.04439					.002860	0.34			0.941			0.00		
780.85	70.91	3.045	73.955	260.0	6.27	0.609	74.564	0.00	2.205		3.00	15.00	0.00	1	1.00
HYDRAULIC JUMP													0.00		
780.85	70.91	1.499	72.409	260.0	12.39	2.384	74.793	0.00	2.205		3.00	15.00	0.00	1	1.00
0.12	0.04439					.010950	0.00			0.941			0.00		
780.97	70.92	1.505	72.420	260.0	12.34	2.363	74.783	0.00	2.205		3.00	15.00	0.00	1	1.00
4.13	0.04439					.010170	0.04			0.941			0.00		
785.10	71.10	1.579	72.677	260.0	11.76	2.148	74.825	0.00	2.205		3.00	15.00	0.00	1	1.00
3.33	0.04439					.008850	0.03			0.941			0.00		

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - FUTURE CONDITION

PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL

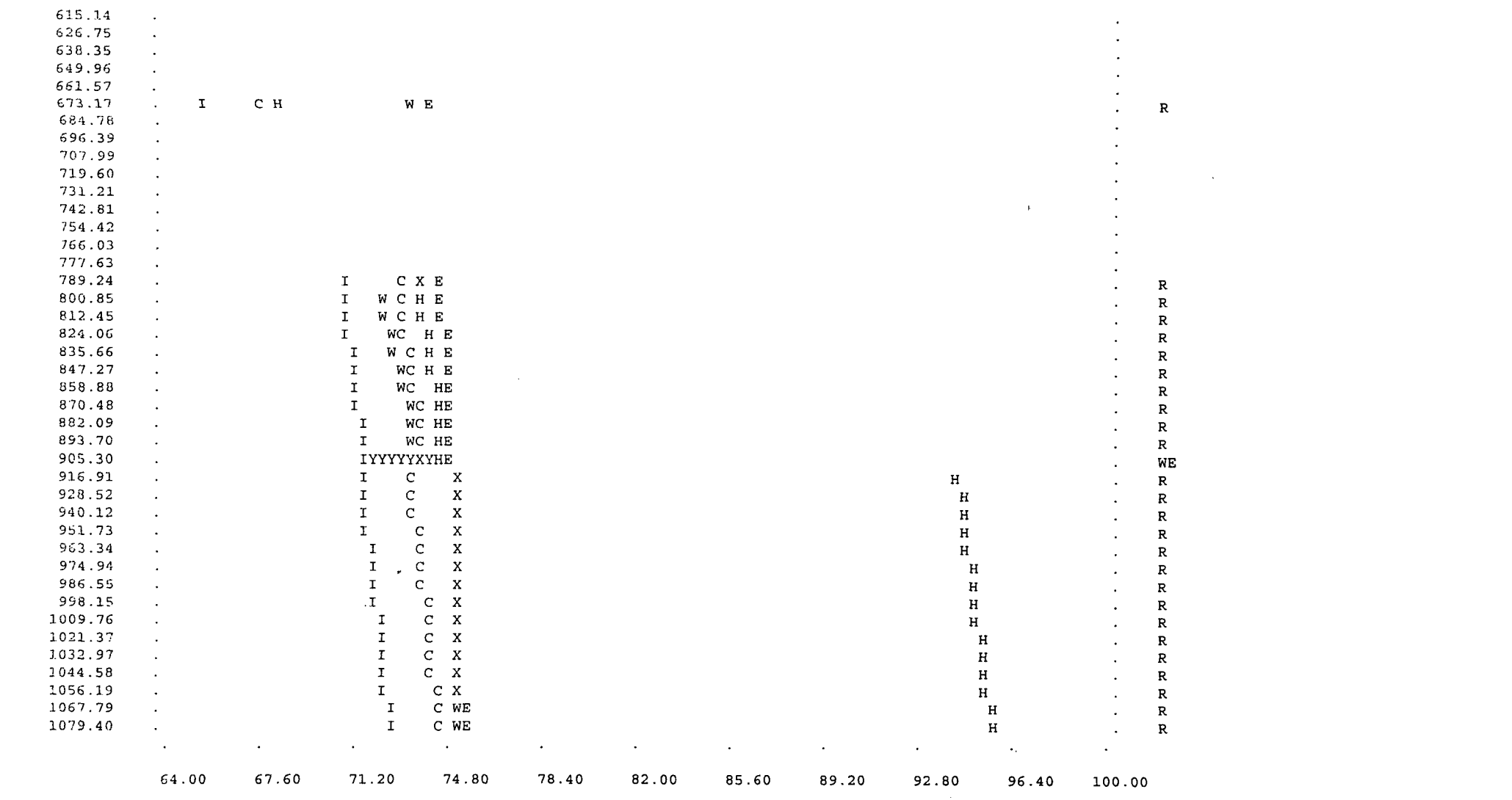
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
788.43	71.25	1.656	72.902	260.0	11.22	1.953	74.855	0.00	2.205		3.00	15.00	0.00	1	1.00
2.63	0.04439					.007705	0.02			0.941			0.00		
791.06	71.36	1.737	73.100	260.0	10.69	1.776	74.876	0.00	2.205		3.00	15.00	0.00	1	1.00
2.04	0.04439					.006713	0.01			0.941			0.00		
793.10	71.45	1.821	73.274	260.0	10.20	1.614	74.888	0.00	2.205		3.00	15.00	0.00	1	1.00
1.50	0.04439					.005853	0.01			0.941			0.00		
794.60	71.52	1.910	73.430	260.0	9.72	1.467	74.897	0.00	2.205		3.00	15.00	0.00	1	1.00
1.02	0.04439					.005107	0.01			0.941			0.00		
795.62	71.56	2.004	73.569	260.0	9.27	1.334	74.903	0.00	2.205		3.00	15.00	0.00	1	1.00
0.59	0.04439					.004459	0.00			0.941			0.00		
796.21	71.59	2.101	73.693	260.0	8.84	1.213	74.906	0.00	2.205		3.00	15.00	0.00	1	1.00
0.19	0.04439					.003893	0.00			0.941			0.00		
796.40	71.60	2.205	73.805	260.0	8.42	1.102	74.907	0.00	2.205		3.00	15.00	0.00	1	1.00
WALL ENTRANCE													0.00		
796.40	71.60	3.805	75.405	260.0	2.02	0.063	75.468		1.882			3		0	0.00
3.45	0.02642					.000709	0.00			1.591					
799.85	71.69	3.710	75.401	260.0	2.12	0.070	75.471		1.882			3		0	0.00
3.39	0.02642					.000790	0.00			1.591					
803.24	71.78	3.616	75.397	260.0	2.22	0.077	75.474		1.882			3		0	0.00
3.34	0.02642					.000878	0.00			1.591					
806.58	71.87	3.523	75.392	260.0	2.33	0.084	75.476		1.882			3		0	0.00
3.29	0.02642					.000976	0.00			1.591					

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS - FUTURE CONDITION
PROPOSED ONSITE DOUBLE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FL
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH				ZR		
809.87	71.96	3.431	75.387	260.0	2.44	0.093	75.480		1.882			3		0	0.00
3.27	0.02642					.001081	0.00			1.591					
813.14	72.04	3.339	75.381	260.0	2.56	0.102	75.483		1.882			3		0	0.00
3.20	0.02642					.001197	0.00			1.591					
816.34	72.13	3.248	75.375	260.0	2.69	0.112	75.487		1.882			3		0	0.00
3.22	0.02642					.001321	0.00			1.591					
819.56	72.21	3.156	75.368	260.0	2.82	0.123	75.491		1.882			3		0	0.00
3.15	0.02642					.001454	0.00			1.591					
822.71	72.30	3.065	75.360	260.0	2.96	0.136	75.496		1.882			3		0	0.00
3.12	0.02642					.001606	0.01			1.591					
825.83	72.38	2.974	75.351	260.0	3.10	0.149	75.500		1.882			3		0	0.00
3.01	0.02642					.001809	0.01			1.591					
828.84	72.46	2.885	75.342	260.0	3.25	0.164	75.506		1.882			3		0	0.00
2.90	0.02642					.002066	0.01			1.591					
831.74	72.53	2.798	75.332	260.0	3.41	0.181	75.513		1.882			3		0	0.00
2.78	0.02642					.002360	0.01			1.591					
834.52	72.61	2.713	75.320	260.0	3.58	0.199	75.519		1.882			3		0	0.00
2.62	0.02642					.002695	0.01			1.591					
837.14	72.68	2.631	75.307	260.0	3.75	0.218	75.525		1.882			3		0	0.00
2.50	0.02642					.003080	0.01			1.591					
839.64	72.74	2.551	75.293	260.0	3.93	0.240	75.533		1.882			3		0	0.00
2.31	0.02642					.003521	0.01			1.591					



N O T E S

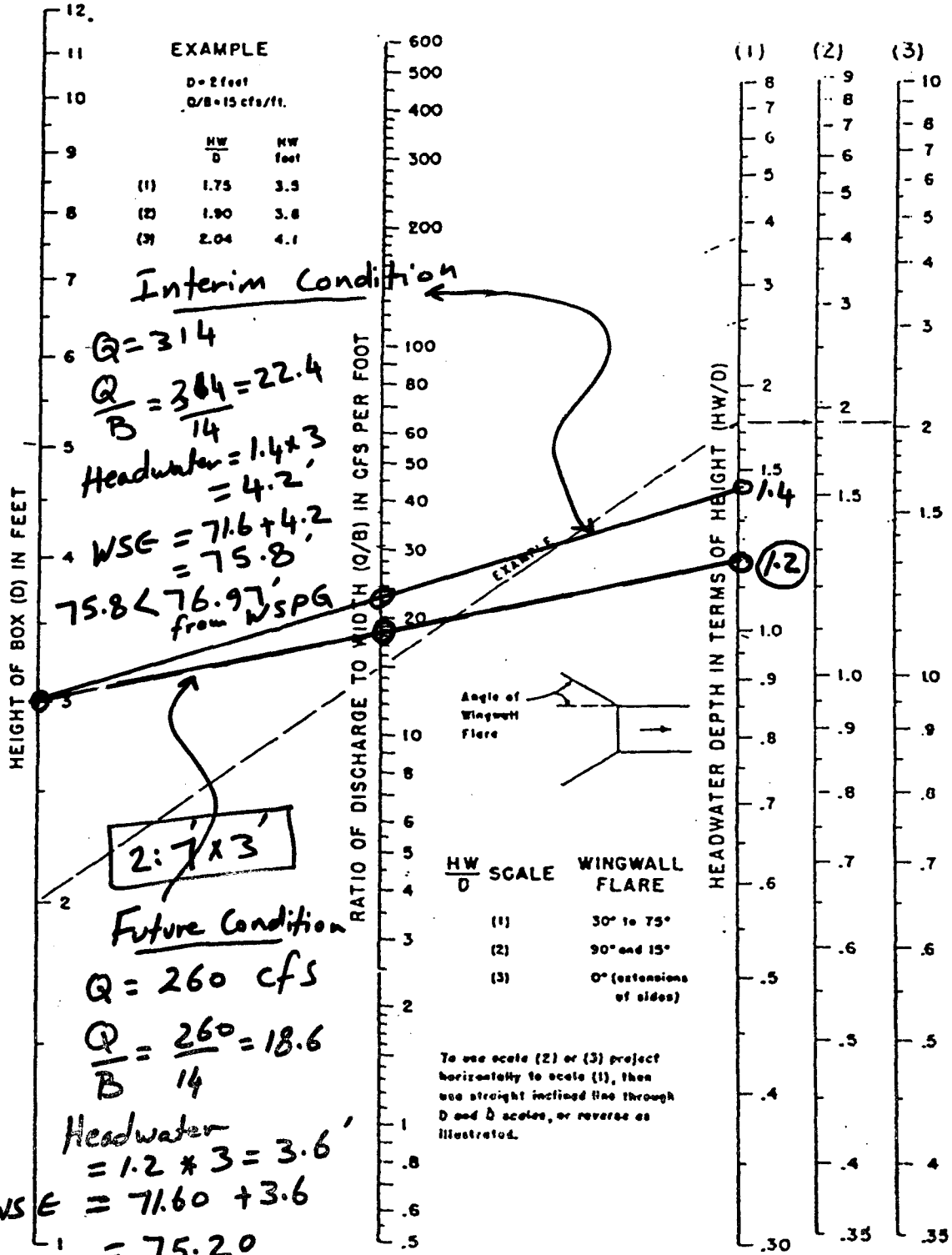
1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

RESPONSE TO COMMENT #11

INLET NOMOGRAPH FOR PROPOSED 2:7'X3' RCB UNDERNEATH INDUSTRIAL ROAD (INTERIM AND FUTURE CONDITIONS)

(NOTE : Provided to illustrate that the flow capacity of the proposed 2:7'x3' isoutlet-controlled, i.e controlled by the RCB hydraulics)

NOMOGRAPH – INLET CONTROL BOX CULVERT



Interim Condition

$Q = 314$

$\frac{Q}{B} = \frac{314}{14} = 22.4$

Headwater $= 1.4 * 3 = 4.2'$

WSE $= 71.6 + 4.2 = 75.8$

$75.8 < 76.97'$ from WSPG

2:1 x 3'

Future Condition

$Q = 260$ cfs

$\frac{Q}{B} = \frac{260}{14} = 18.6$

Headwater $= 1.2 * 3 = 3.6'$

WSE $= 71.60 + 3.6$

$= 75.20$

< WSE from WSPG station 7 + 96.40 (75.40')

Revision	Date

WRC ENGINEERING

REFERENCE: USDOT, FHWA, HDS No.5, 1985

FIGURE 1004

RESPONSE TO COMMENT #18

FLOMASTER CALCULATIONS AT SECTION AA

(NOTE : the analysis is provided to illustrate that the 70.75-ft pond along I-15 is more conservative than adopting the effective FIS analysis along I-15)

Flow at Section AA along I-15 (100-year Storm as determined in FIS)
Worksheet for Irregular Channel

Project Description	
Worksheet	Flow Along I-15 as Determined in FIS
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.005000	ft/ft
Discharge	1,462.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.025	
Water Surface Elevation	67.89	ft
Elevation Range	63.00 to 72.00	
Flow Area	193.1	ft²
Wetted Perimeter	79.82	ft
Top Width	79.08	ft
Actual Depth	4.89	ft
Critical Elevation	67.56	ft
Critical Slope	0.006938	ft/ft
Velocity	7.57	ft/s
Velocity Head	0.89	ft
Specific Energy	68.79	ft
Froude Number	0.85	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.0	1+33.8	0.025

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.0	72.00
0+22.0	71.00
0+40.0	68.00
0+55.0	67.00
0+74.0	63.00
0+78.5	63.00
0+90.0	64.00
1+13.5	67.00
1+21.5	68.00
1+33.8	69.00

Notes:
* Q = Runoff flow along I-15 right-of-way as determined in the effective Duck Creek/Blue Diamond Washes FIS Restudy = 1462 cfs (Referenced Exhibit BD-1)

Flow at Section AA along I-15 (100-year Storm as determined in FIS)
Worksheet for Irregular Channel

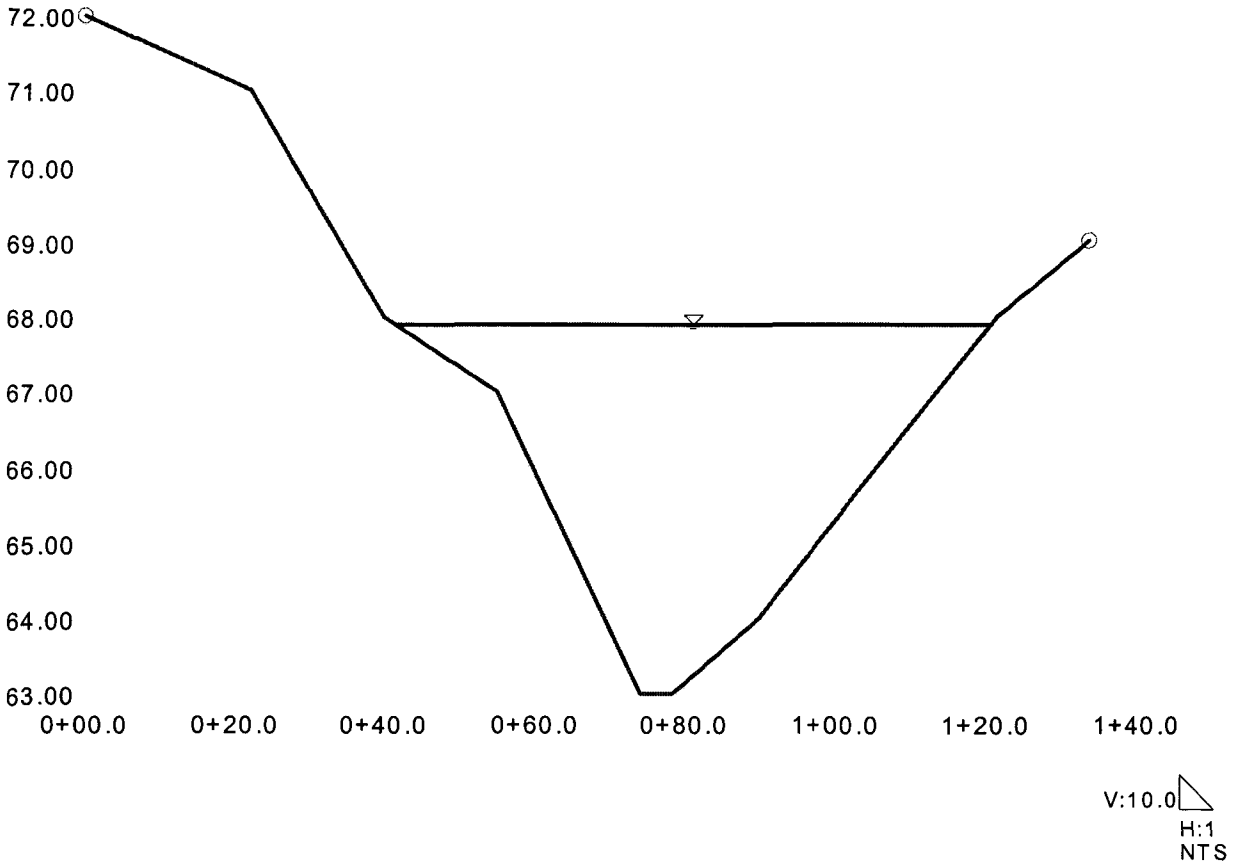
* The section is provided to illustrate that WSE along I-15 as determined by FEMA flows is much less than the conservative WSE value of 2270.75 ft (adopted from the Blue Diamond/I-15 Interchange NDOT Report) used in the subject study and the approved conceptual drainage study.

* For flows along I-15, utilizing the effective FIS flows will indicate that northbound flows are contained within I-15 right-of-way.

Flow at Section AA along I-15 (100-year Storm as determined in FIS)
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Along I-15 as Determined in FIS
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.025	
Slope	0.005000	ft/ft
Water Surface Elevation	67.89	ft
Elevation Range	63.00 to 72.00	
Discharge	1,462.00	cfs



RESPONSE TO COMMENT #10

REVISED HEC-1 MODEL FOR ULTIMATE ANALYSIS TO ACCOUNT FOR THE ENTIRE SHELBOURE FLOWS ROUTED THROUGH LINE B

Peak Flow Summary
Ultimate Condition

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
NX1	11.23	18	33
ND2	7.06	12	22
RTND2	-	12	21
DI-1	0.83	2	3
DI-2	1.06	2	4
LAT-A1	-	4	7
RLATA1	-	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	-	23	41
RT-SD	-	22	41
ND8	5.38	10	18
CMF2	-	51	92
NX3	13.13	18	35
NX4	9.87	14	27
CMF3	-	32	62
OFD2	42.30	55	110
RTOFD2	-	52	105
OFD3	24.03	33	63
RTFD3	-	32	60
ND5	13.13	15	32
CMF4	-	126	258
RLINEB	-	124	255
CMF7	-	168	334
INDUST	4.46	7	12
RTINDU	-	6	12
ND6	3.69	7	13
ND7	4.21	8	15
CMF5	-	21	38
ND9	4.46	13	28
RTND9	-	13	28
ND10	3.69	5	10
OFD4	34.11	42	85
CMF6	-	60	122

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*           MAY  1991                   *
*         VERSION 4.0.1E                *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  09/03/03  TIME  13:57:46   *
*****************************************
```

```
*****************************************
*                                       *
*    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        TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
    2     ID        BASS PRO SHOPS
    3     ID        PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
    4     ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
    5     ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
    6     ID        LOCHSA JOB# 6923.2
    7     ID
    8     ID
    9     ID        INPUT FILE NAME:  6923F.DAT
   10     ID
   11     ID    JULY 2003
   12     ID
   13     ID        **************************************************************************
   14     ID        **************************************************************************
   15     ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
   16     ID
   17     ID             10 & 100 YEAR - 6 HOUR STORM EVENT
   18     ID             PRECIPITATION BASED ON TABLE 505
   19     ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
   20     ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
   21     ID
   22     ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
   23     ID
   24     ID        **************************************************************************
   25     ID
   26     ID        **************************************************************************
          *DIAGRAM
   27     IT       5                    73
   28     IO       5       0
   29     IN       5
   30     JR     PREC    0.57   1.000

   31     KK      NX1
   32     KM    ONSITE BASIN NX1
   33     PB     2.77
   34     PC      0.0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   35     PC      .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
   36     PC      .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
   37     PC     .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
   38     PC     .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
   39     PC      .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
   40     PC     .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
   41     PC     .998    .999     1.0
   42     BA   .01754
   43     LS       0    98.0
   44     UD    .121

   45     KK      ND2
   46     KM    RUNOFF GENERATED THROUGH BASIN ND2
   47     BA   .01104
   48     LS       0    98.0
   49     UD    .096
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  50      KK   RTND2
  51      KM   ROUTE ND2 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  52      RK     950   .0025   0.013       0    CIRC      6.

  53      KK    DI-1
  54      KM   RUNOFF FROM BASIN DI-1 DRAINING INTO THE PROPOSED DROP INLET
  55      BA  .00130
  56      LS       0    98.0
  57      UD    .050

  58      KK    DI-2
  59      KM   RUNOFF FROM BASIN DI-2 DRAINING INTO THE PROPOSED DROP INLET
  60      BA  .00166
  61      LS       0    98.0
  62      UD    .050

  63      KK  LAT-A1
  64      KM   COMBINE DI-1 AND DI-2
  65      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-1"
  66      HC       2

  67      KK  RLATA1
  68      KM   ROUTE LAT-A1 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  69      RK     500   .0025   0.013       0    CIRC      6.

  70      KK    DI-3
  71      KM   RUNOFF FROM BASIN DI-3 DRAINING INTO THE PROPOSED DROP INLET
  72      KM   THE RUNOFF REPRESENTS THE RUNOFF DRAINING INTO THE PROPOSED STORM DRAIN
  73      KM   FROM "LATERAL A-3" AND THE PROPOSED ROOF DRAIN "LATERAL A-5"
  74      BA  .00373
  75      LS       0    98.0
  76      UD    .050

  77      KK    DI-4
  78      KM   RUNOFF FROM BASIN DI-4 DRAINING INTO THE PROPOSED DROP INLET
  79      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-4"
  80      BA  .00206
  81      LS       0    98.0
  82      UD    .050

  83      KK      SD
  84      KM   COMBINE RTND2, RLATA1, DI-3 AND DI-4
  85      KM   TOTAL ONSITE FLOWS DRAINING INTO THE PROPOSED STORM DRAIN
  86      HC       4

  87      KK   RT-SD
  88      KM   ROUTE SD TOWARDS THE 4:12'X4' RCB UNDERNEATH I-15
  89      RK     190   .0025   0.013       0    TRAP     12.     0.0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  90      KK     ND8
  91      KM    RUNOFF GENERATED THROUGH BASIN ND8
  92      BA   .00841
  93      LS        0     98.0
  94      UD     .067

  95      KK     CMF2
  96      KM    COMBINE NX1, ND8 AND RT-SD
  97      KM    TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!FROM THE WEST!!
  98      KM    NOTE: IN FUTURE CONDITIONS THE LOWER BLUE DIAMOND DETENTION BASIN(DCBD 0421)
  99      KM          AND THE PROPOSED REGIONAL 72-INCH RCP WILL INTERCEPT ALL OFFSITE FLOWS
 100      KM          PREVIOUSLY IMPACTING SILVERTON (PER THE 2002 MPU)
 101      HC        3

 102      KK     NX3
 103      KM    ONSITE BASIN NX3 (ALREADY DEVELOPED)
 104      BA   .02052
 105      LS        0     95.0
 106      UD     .149

 107      KK     NX4
 108      KM    ONSITE BASIN NX4 (ALREADY DEVELOPED)
 109      BA   .01543
 110      LS        0     95.0
 111      UD     .133

 112      KK     CMF3
 113      KM    COMBINE NX3 AND NX4
 114      KM    TOTAL RUNOFF DRAINING FROM THE RV PARKING ONTO SHELBORNE CHANNEL
 115      HC        2

 116      KK     OFD2
 117      KM    FUTURE DEVELOPED OFFSITE BASIN OFD2 DRAINING ONTO SHELBORNE CHANNEL
 118      KM    NOTE: IN FUTURE DEVELOPMENT OF THE BLUE DIAMOND ROAD,
 119      KM          RUNOFF FLOWS WEST OF BLUE DIAMOND WILL BE CONVEYED ALONG THE ROAD
 120      KM          TOWARD THE PROPOSED REGIONAL 72-INCH RCP (DCBD 0221)
 121      KM          AS SHOWN IN THE 2002 MPU HYDROLGIC ANALYSIS & FIGURE H-20
 122      KM    THEREFORE, ONLY THE PORTION OF OFX2 EAST OF BLUE DIAMOND DRAINS INTO
 123      KM    SHELBORNE CHANNEL IN THE FUTURE
 124      BA   .06609
 125      LS        0     93.8
 126      UD     .147

 127      KK   RTOFD2
 128      KM    ROUTE OFD2 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
 129      RK     1800     .015    0.030        0     TRAP      20.      3.0

 130      KK     OFD3
 131      KM    FUTURE DEVELOPED OFFSITE BASIN OFD3
 132      BA   .03755
 133      LS        0     95.0
 134      UD     .161
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  135     KK   RTFD3
  136     KM   ROUTE OFD3 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  137     RK    1800    .015   0.030       0    TRAP     20.     3.0

  138     KK     ND5
  139     KM   FUTURE DEVELOPED ONSITE BASIN ND5
  140     BA  .02089
  141     LS       0    91.4
  142     UD    .155

  143     KK    CMF4
  144     KM   COMBINE CMF3, RTFD2,RTFD3 AND ND5
  145     KM   TOTAL RUNOFF REACHING 2:7'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUSTR
  146     HC       4

  147     KK  RLINEB
  148     KM   ROUTE LINE-B TO I-15 R.O.W THROUGH THE PROPOSED 7'X3' RCB
  149     RK     650   .0025   0.013       0    TRAP      7.     0.0

  150     KK    CMF7
  151     KM   COMBINE RLINEB AND CMF2
  152     KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!DIRECTLY FROM THE WE
  153     HC       2

  154     KK  INDUST
  155     KM   PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  156     BA  .00697
  157     LS       0    98.0
  158     UD    .173

  159     KK  RTINDU
  160     KM   RUNOFF IS ROUTED THROUGH THE PARKING LOT TO I-15 R.O.W.
  161     RK     600   .0100   0.016       0    TRAP      0.    50.0

  162     KK     ND6
  163     KM   DEVELOPED ONSITE BASIN ND6
  164     BA  .00576
  165     LS       0    97.0
  166     UD    .063

  167     KK     ND7
  168     KM   RUNOFF GENERATED THROUGH BASIN ND7
  169     BA  .00658
  170     LS       0    98.0
  171     UD    .055

  172     KK    CMF5
  173     KM   COMBINE RTINDU, ND6 AND ND7
  174     KM   TOTAL RUNOFF REACHING I-15 R.O.W FROM SHELBORNE CHANNEL ALIGNMENT
  175     HC       3
```

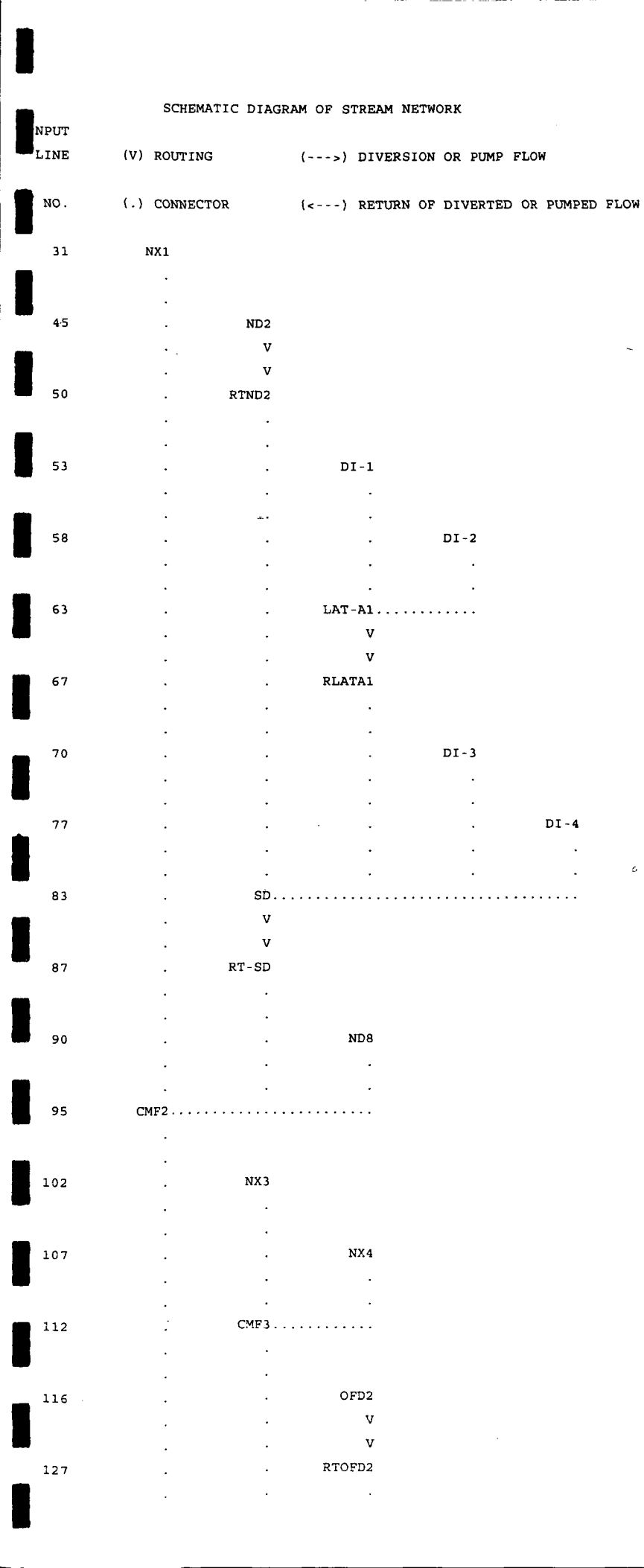
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  176     KK     ND9
  177     KM   FUTURE DEVELOPED ONSITE BASIN ND9
  178     BA  .01758
  179     LS       0    92.0
  180     UD    .127

  181     KK   RTND9
  182     KM   ROUT RUNOFF FROM BASIN ND9 THROUGH BASIN ND10 TO I-15 R.O.W.
  183     RK     650    .015   0.030       0    TRAP     20.   100.0

  184     KK    ND10
  185     KM   FUTURE DEVELOPED ONSITE BASIN ND10
  186     BA  .00590
  187     LS       0    92.0
  188     UD    .094

  189     KK    OFD4
  190     KM   FUTURE DEVELOPED OFFSITE BASIN OFD4
  191     BA  .05329
  192     LS       0    94.1
  193     UD    .175

  194     KK    CMF6
  195     KM   COMBINE RTND9, ND10 AND OFD4
  196     KM   TOTAL RUNOFF REACHING I-15 R.O.W AT CAMERO AVENUE ALIGNMENT
  197     HC       3
  198     ZZ
```

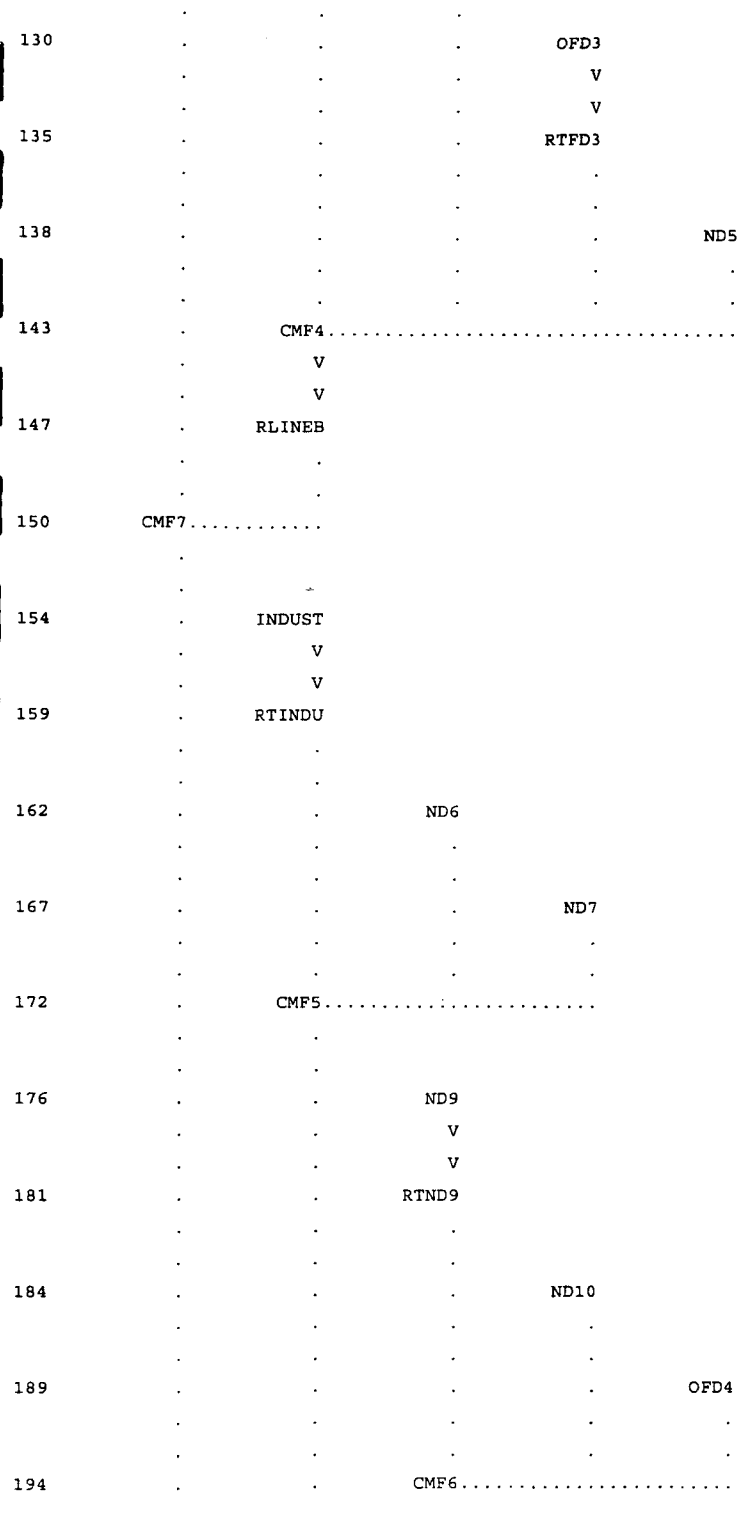
SCHEMATIC DIAGRAM OF STREAM NETWORK

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)    *
*            MAY  1991                  *
*         VERSION 4.0.1E                *
*    Lahey F77L-EM/32 version 5.01      *
*      Dodson & Associates, Inc.        *
* RUN DATE 09/03/03  TIME  13:57:46     *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*         609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 551-1748               *
*                                       *
*****************************************
```

TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6923.2

INPUT FILE NAME: 6923F.DAT

JULY 2003

```
*************************************************************************
*************************************************************************
```

ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

10 & 100 YEAR - 6 HOUR STORM EVENT
PRECIPITATION BASED ON TABLE 505
10-YEAR ADJUSTED RAINFALL DEPTH = 1.58in
100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570

```
*************************************************************************

*************************************************************************
```

28 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		73	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		0600	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 6.00 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

0.57 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

					RATIOS APPLIED TO PRECIPITATION	
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2
					0.57	1.00
HYDROGRAPH AT	NX1	0.02	1	FLOW	18.	33.
				TIME	3.58	3.58
HYDROGRAPH AT	ND2	0.01	1	FLOW	12.	22.
				TIME	3.50	3.50
ROUTED TO	RTND2	0.01	1	FLOW	12.	21.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-1	0.00	1	FLOW	2.	3.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-2	0.00	1	FLOW	2.	4.
				TIME	3.50	3.50
2 COMBINED AT	LAT-A1	0.00	1	FLOW	4.	7.
				TIME	3.50	3.50
ROUTED TO	RLATA1	0.00	1	FLOW	4.	7.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-3	0.00	1	FLOW	5.	9.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-4	0.00	1	FLOW	3.	5.
				TIME	3.50	3.50
4 COMBINED AT	SD	0.02	1	FLOW	23.	41.
				TIME	3.50	3.50
ROUTED TO	RT-SD	0.02	1	FLOW	22.	41.
				TIME	3.50	3.50
HYDROGRAPH AT	ND8	0.01	1	FLOW	10.	18.
				TIME	3.50	3.50
3 COMBINED AT	CMF2	0.05	1	FLOW	51.	92.
				TIME	3.50	3.50
HYDROGRAPH AT	NX3	0.02	1	FLOW	18.	35.
				TIME	3.58	3.58
HYDROGRAPH AT	NX4	0.02	1	FLOW	14.	27.
				TIME	3.58	3.58
COMBINED AT	CMF3	0.04	1	FLOW	33.	62.
				TIME	3.58	3.58
HYDROGRAPH AT	OFD1	0.07	1	FLOW	55.	110.

				TIME	3.58	3.58
OUTED TO	RTOFD2	0.07	1	FLOW	52.	105.
				TIME	3.67	3.58
YDROGRAPH AT	OFD3	0.04	1	FLOW	33.	63.
				TIME	3.58	3.58
OUTED TO	RTFD3	0.04	1	FLOW	32.	60.
				TIME	3.67	3.67
HYDROGRAPH AT	ND5	0.02	1	FLOW	15.	32.
				TIME	3.58	3.58
4 COMBINED AT	CMF4	0.16	1	FLOW	126.	258.
				TIME	3.58	3.58
ROUTED TO	RLINEB	0.16	1	FLOW	124.	255.
				TIME	3.58	3.58
2 COMBINED AT	CMF7	0.21	1	FLOW	168.	334.
				TIME	3.58	3.58
YDROGRAPH AT	INDUST	0.01	1	FLOW	7.	12.
				TIME	3.58	3.58
OUTED TO	RTINDU	0.01	1	FLOW	6.	12.
				TIME	3.58	3.58
YDROGRAPH AT	ND6	0.01	1	FLOW	7.	13.
				TIME	3.50	3.50
YDROGRAPH AT	ND7	0.01	1	FLOW	8.	15.
				TIME	3.50	3.50
3 COMBINED AT	CMF5	0.02	1	FLOW	21.	38.
				TIME	3.50	3.50
HYDROGRAPH AT	ND9	0.02	1	FLOW	13.	28.
				TIME	3.58	3.58
ROUTED TO	RTND9	0.02	1	FLOW	13.	28.
				TIME	3.58	3.58
HYDROGRAPH AT	ND10	0.01	1	FLOW	5.	10.
				TIME	3.50	3.50
HYDROGRAPH AT	OFD4	0.05	1	FLOW	42.	85.
				TIME	3.58	3.58
3 COMBINED AT	CMF6	0.08	1	FLOW	60.	122.
				TIME	3.58	3.58

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= 0.57									
RTND2	MANE	0.94	12.20	211.71	1.36	5.00	11.54	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7981E+00 EXCESS=0.0000E+00 OUTFLOW=0.7980E+00 BASIN STORAGE=0.7517E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00									
RTND2	MANE	0.74	22.10	211.42	2.54	5.00	20.98	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1493E+01 EXCESS=0.0000E+00 OUTFLOW=0.1493E+01 BASIN STORAGE=0.1188E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RLATA1	MANE	0.55	3.78	211.25	1.36	5.00	3.66	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2141E+00 EXCESS=0.0000E+00 OUTFLOW=0.2142E+00 BASIN STORAGE=0.1436E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00									
RLATA1	MANE	0.61	6.74	210.84	2.54	5.00	6.60	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4005E+00 EXCESS=0.0000E+00 OUTFLOW=0.4006E+00 BASIN STORAGE=0.2298E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RT-SD	MANE	0.24	22.58	210.40	1.36	5.00	22.37	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1431E+01 EXCESS=0.0000E+00 OUTFLOW=0.1431E+01 BASIN STORAGE=0.1116E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.00									
RT-SD	MANE	0.30	40.77	210.29	2.54	5.00	40.57	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2678E+01 EXCESS=0.0000E+00 OUTFLOW=0.2677E+01 BASIN STORAGE=0.1539E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57									
RTOFD2	MANE	1.83	53.84	218.21	0.99	5.00	51.83	220.00	0.99

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3483E+01 EXCESS=0.0000E+00 OUTFLOW=0.3483E+01 BASIN STORAGE=0.2036E-01 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 1.00

RTOFD2	MANE	1.37	108.46	216.80	2.10	5.00	105.11	215.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7412E+01 EXCESS=0.0000E+00 OUTFLOW=0.7404E+01 BASIN STORAGE=0.3117E-01 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.57

RTFD3	MANE	2.03	31.82	219.84	1.08	5.00	31.69	220.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2167E+01 EXCESS=0.0000E+00 OUTFLOW=0.2161E+01 BASIN STORAGE=0.1531E-01 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 1.00

RTFD3	MANE	1.60	62.26	217.35	2.21	5.00	60.33	220.00	2.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4442E+01 EXCESS=0.0000E+00 OUTFLOW=0.4431E+01 BASIN STORAGE=0.2330E-01 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.57

RLINEB	MANE	0.26	126.19	215.61	1.01	5.00	123.97	215.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8628E+01 EXCESS=0.0000E+00 OUTFLOW=0.8617E+01 BASIN STORAGE=0.1175E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.00

RLINEB	MANE	0.22	257.51	215.36	2.12	5.00	255.34	215.00	2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1816E+02 EXCESS=0.0000E+00 OUTFLOW=0.1815E+02 BASIN STORAGE=0.1851E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57

RTINDU	MANE	1.21	6.76	217.19	1.35	5.00	6.45	215.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5031E+00 EXCESS=0.0000E+00 OUTFLOW=0.5025E+00 BASIN STORAGE=0.1060E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00

RTINDU	MANE	1.01	12.23	216.96	2.53	5.00	11.74	215.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9410E+00 EXCESS=0.0000E+00 OUTFLOW=0.9403E+00 BASIN STORAGE=0.1615E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57

RTND9	MANE	1.71	13.12	217.31	0.86	5.00	12.69	215.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8111E+00 EXCESS=0.0000E+00 OUTFLOW=0.8104E+00 BASIN STORAGE=0.3183E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.00

RTND9	MANE	1.53	27.92	217.41	1.94	5.00	27.57	215.00	1.93

CONTINUITY SUMMARY (AC-FT - INFLOW=0.1818E-01 EXCESS=0.0000E+00 OUTFLOW=0.1816E+01 BASIN STORAGE=0.5136E-02 PERCENT ERROR= -0.2

*** NORMAL END OF HEC-1 ***

BASS PRO SHOPS
Technical Drainage Study

JOB# 6923.2

AUGUST 2003

Prepared for:

COMMERCE CONSTRUCTION COMPANY

Prepared By:
LOCHSA ENGINEERING
5828 Spring Mountain Road
Suite 308
Las Vegas, Nevada 89146-8896
(702) 365-9312

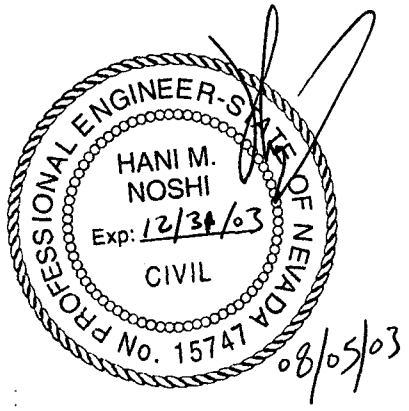
BASS PRO SHOPS
Technical Drainage Study

JOB# 6923.2

AUGUST 2003

Prepared for:

COMMERCE CONSTRUCTION COMPANY



Prepared By:
LOCHSA ENGINEERING
5828 Spring Mountain Road
Suite 308
Las Vegas, Nevada 89146-8896
(702) 365-9312

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Silverton Retail Phase I - Bass Pro Shops Date: August 5, 2003

Location of Development: a) Descriptive (Cross Streets) Southwest Corner of Blue Diamond Road & I-15 Interchange

b) Sect. 17 Twn 22 South Rng. 61 East

Name of Owner: Silverton Hotel and Casino Assessors Parcel No: 177-17-103-002, 177-17-204-007

Telephone No: (702) 263-7770 Facsimile No: (702) 896-4925

Address: 3333 Blue Diamond Road

Las Vegas, Nevada 89139

Contact Person-Name: Hani M. Noshi Telephone No: 702-365-9312

Firm: Lochsa Engineering

Address: 5828 Spring Mountain Road, Suite 308 Las Vegas, Nevada 89146

Type of Land Development\Land Disturbance Process:

☐ Rezoning ☐ Subdivision Map ☐ Clearing and Grading Only

☐ Parcel Map ☐ Planned Unit Development ☐ Other (Please specify below)

☐ Large Parcel Map ■ Building Permit

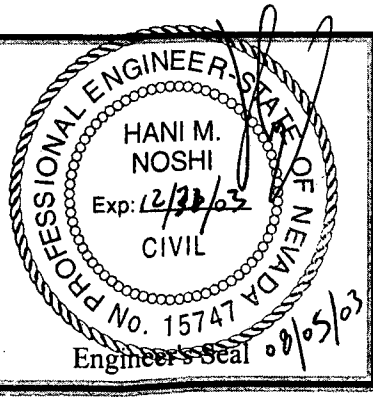
1. Total Owned Land Area: At Site: 93 Acres Being Developed/ Disturbed: 15.85 Acres
2. Is a portion of all of the subject property located in a designated FEMA Flood Hazard Area? ■ Yes ☐ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District 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? 6.5 Square Miles
6. Has the site drainage been evaluated in the past? ■ Yes ☐ No If yes, please identify documentation

Silverton Conceptual Drainage Study for MSM 020-03, HTE 03-8397

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:

East in channel along side I-15

8. Briefly describe your proposed schedule for the subject: Begin construction as soon as possible.



Engineer's Seal 08/05/03

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**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name:	Silverton Retail Phase I		Map ID:
Firm Name:	Lochsa Engineering		Engineer: Mark L. Hedge, P.E.
Address:	5828 Spring Mountain Road Suite 308		
City:	Las Vegas	State: Nevada	Zip: 89146
Phone Number:	(702) 365-9312		Fax Number: (702) 365-9317
Property Owner:	Silverton Hotel and Casnio		
Address:	3333 Blue Diamond Road		
City:	Las Vegas	State: Nevada	Zip: 89139

Reviewed By:	Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

Yes	No	
X	____	Design Manual **Standard Form 1** with the engineer's seal and signature.
X	____	Design Manual **Standard Form 4.**
X	____	2 copies of the 24" x 36" Drainage Plan
____	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

REFERENCE:	**STANDARD FORM 2**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
X	____	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X	____	A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
X	____	Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X	____	On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X	____	Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
X	____	Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X	____	Minimum scale: 1" = 60'.
X	____	Project name.
X	____	Vicinity Map with local and major cross streets.
X	____	Revision box.
X	____	North arrow and bar scale.
X	____	Engineer's/consultant's address and phone number.
X	____	Elevation datum and benchmark.
X	____	Legend for symbols and abbreviations.
X	____	Cut/fill scarps, where applicable.
X	____	Street names, grades, widths.
X	____	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

REFERENCE:	STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X	___	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
X	___	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
___	N/A	Proposed typical street sections.
___	N/A	Streets with off-set crowns.
X	___	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	___	Property lines.
X	___	Right-of-way lines with widths, existing and proposed.
X	___	Existing improvements and their elevations.
X	___	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X	___	Concentration points and drainage flow directions with Q_{100} and V_{100} and D_{100} in streets.
X	___	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	___	Location and cross-section of street capacity calculations.
X	___	Cross-sectional detail for channels, including cutoff wall locations.
X	___	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
X	___	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
___	N/A	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
___	N/A	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:	**STANDARD FORM 2**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X	____	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
X	____	Building and/or lot numbers.
____	N/A	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X	____	Limits of existing floodplain based on current FIRM of best available information; limits of proposed floodplains based on best available information.
X	____	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table.
X	____	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	____	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
X	____	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X	____	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	____	Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	____	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	____	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X	____	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
X	____	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X	____	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
X	____	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	____	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X	____	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
____	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged).
X	____	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
X	____	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow of depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height of flow depth, which ever is greater.
X	____	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data • Input and output information • Plotted cross-sections based on survey with proper encroachments. • A map showing the locations of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
X	____	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X	____	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X	____	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

Technical Drainage Study
for the
Bass Pro Shops

TABLE OF CONTENTS

1. GENERAL LOCATION AND DEVELOPMENT DESCRIPTION 1
1.1 Purpose 1
1.2 Location of Property 1
1.3 Description of Property 2

2 DRAINAGE DESCRIPTION 3
2.1 Existing Drainage Conditions 3
A. Offsite and Onsite Drainage 3
2.2 Interim Drainage Condition 6
A. Offsite and Onsite Drainage 6
2.3 Future Drainage Condition 9
A. Onsite and Offsite Drainage 9
2.4 Master Planning Information 9
2.5 Flood Plain Information 10
2.6 Previous Drainage Studies 10

3. PROPOSED DRAINAGE FACILITIES 12
3.1 General Description 12
3.2 Compliance with Regulations and Adopted Plans 12
3.3 Hydrologic Criteria 12
3.4 Facility Design Calculations 13

4. CONCLUSIONS AND RECOMMENDATIONS 14

5. REFERENCES 15

APPENDICES

A Hydrologic Analysis
B Hydraulic Calculations
C Figures
D Drainage Maps
E References

1. GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1.1 Purpose

Lochsa Engineering has been retained by Commerce Construction Company to provide a technical drainage study for the proposed Bass Pro Shops. The Bass Pro Shops is a proposed retail expansion of the existing Silverton Hotel and Casino. The Silverton Hotel and Casino site is located at the southwest corner of Blue Diamond Road and Interstate-15 Interchange, however the Bass Pro Shops (project site) will be constructed south of the existing hotel building over an existing parking lot. Currently, majority of site is developed into the Silverton Hotel/Casino and Recreational Vehicle Parking (RV park) south of the hotel/casino buildings. The remaining southern portion of the site is undeveloped.

The purpose of this study is to provide a detailed analysis to the existing hydrology of the site and the upstream offsite basins impacting the site and to substantiate the hydraulic design to set finished floor elevations for the proposed Bass Pro Shops. The Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual and CCRFCD 2002 Master Plan Update have been compiled and utilized. This report presents the hydrologic and hydraulic analysis, methodology, and results of the study.

1.2 Location of Property

The project is located at the southwest corner of Blue Diamond Road and Interstate 15 intersection. Industrial Road borders the site from the west, and the alignment of Camero Avenue borders the site from the south. The site is in a portion of the North Half (N1/2) and South Half (S1/2) of the Northwest Quarter (NW1/4) of Section 17, Township 22 South, Range 61 East, of the

M.D.M., in an unincorporated portion of Clark County, Nevada. The project site is within portions of Assessor's Parcel Numbers (APN) 177-17-103-002 and 177-17-204-007. Figure 1 shows the vicinity and area map for the proposed development.

1.3 Description of Property

The Silverton Hotel and Casino site spans over 93.0 acres of land, however, improvements of the proposed Bass Pro Shops and the pertinent parking lot will be constructed on approximately 15.85 acres. Majority of the site is currently developed with existing Silverton Hotel/Casino and RV park. The remaining southern portion of the site is currently undeveloped with sparse vegetation cover. The site generally slopes to the east toward I-15, at approximately 1.0 percent. Review of the 2002 Flood Control Master Plan Update's (Reference 3), Figure H-20, indicates that the site is within the hydrologic soil groups A and B. Soil groups A and B are defined as "High infiltration rate, low runoff potential" and "Moderate infiltration rate, moderately low runoff potential", respectively. The Curve Numbers (CN) for the existing and developed condition has been determined from Table 602 of the CCRFCD Hydrologic Criteria and Drainage Design Manual.

2 DRAINAGE DESCRIPTION

In the 2002 Las Vegas Valley Flood Control Master Plan Update, the valley was hydrologically divided into nine watersheds and each watershed was further divided into subareas. The onsite and offsite basins of the subject project area all falls within the Duck Creek/Blue Diamond Watershed.

2.1 Existing Drainage Conditions

A. Offsite and Onsite Drainage

The most recently approved drainage study for the site is the "*Conceptual Drainage Study for MSM-020-03*" by Lochsa Engineering, approved by in April 2003, (Reference 5). The existing condition offsite runoff impacting the site have already been addressed in Reference 5. Review of Reference 5 indicates that offsite flows impact the subject site from the west and southwest. The offsite flows are concentrated and routed across the site through three routes, namely, the Silverton Hotel/Casino parking lot, Shelborne earth channel, and Camero Avenue alignment. As analyzed in Reference 5, approximately 1945 cfs impacts the existing Silverton Hotel/Casino parking lot from the west and continues eastward within the site to reach the 4:12' x 4' RCB underneath I-15. A portion of this flow (185 cfs) was estimated to be conveyed within the southern parking lot south of the Silverton Hotel/Casino building, while the remainder flow (1760 cfs) is conveyed through the northern portion of the parking lot. In the existing condition, the north and south flows were combined at concentration point CMX2(1943 cfs for the 100-year storm) with onsite runoff generated from basins NX1(18/33 cfs), NX2(21/37 cfs) and NX8(7/13 cfs). The runoff at CMX2 represents the total eastbound flows directly draining to the 4:12'x4' RCBC underneath I-15. However, as determined in Reference 5, the runoff flows impacting the RCBC are not limited to the

eastbound flows conveyed through the Silverton parking lot. Runoff flows generated from a large watershed south of the RCBC drains also eastward towards the west R.O.W of I-15. As discussed in Reference 5, the topographic maps and the field investigation illustrate that the area along the western R.O.W. of I-15 represents a natural detention basin for the eastbound flows, with several flow outlets through culverts underneath I-15. The 4:12'x4' RCBC east of Silverton represents one of these flow outlets for the natural reservoir along I-15. As shown in the referenced material from that was attached in Reference 5, the Blue Diamond Road/I-15 Interchange Report analyzed the WSE and runoff along I-15 taking into consideration the natural reservoir topography, the eastbound flows through Silverton Hotel, and all the flow outlets. The study determined a pond-like condition will occur upstream the 4:12'x4' RCBC and along I-15 with the WSE rising to 2270.75 ft during the 100-year storm events. This conservative WSE is higher than the BFE determined in the current Duck/Creek Flood Insurance Study. However, this higher WSE was adopted in this report for a more conservative approach.

Flows impacting the site through Shelborne earth channel was determined in Reference 5 as concentration point CMX4(274/646 cfs) at Industrial Road. Runoff portion of the runoff flows at CMX4 will be conveyed through the existing dual 5.5'x3' RCB underneath Industrial Road, and the remainder will over top the Road. Other flows in Camero Avenue alignment, approximately Q100=58 cfs at CMX6 will not impact the proposed Bass Pro Shops and therefore is considered of no importance in the design of the project. Offsite and onsite flows within the three routes is provided in this section.

Hydraulic Analysis for Offsite Flows within Silverton Parking Lot

In reference 5, two HEC-RAS models were developed to accurately analyze the runoff flows

conveyed through the Silverton Hotel/Casino parking lot. The first model(labeled Flow Split) determined the hydraulic characteristics and WSE's through the parking lot between the Old Industrial Road and the existing Hotel/Casino building. The model is also used to determine the hydraulic characteristics of flows just upstream the Silverton building (River Station -700) necessary to carry out the split flow analysis. Split flow analysis was carried out using FlowMaster to determine flows north and south of the building. Using this split flow analysis, flows through the north and south parking lots were determined to be 1760 and 185 cfs, respectively.

The second model in reference 5 analyzes runoff flows through the north parking lot. In this report, a HEC-RAS model (labeled Silverton Ex) to determine the characteristics of flows conveyed through the southern parking lot is developed for the existing condition. The 4:12'x4' RCBC's underneath I-15 represents the downstream end of the model. The WSE at the downstream end boundary for the model was therefore set to 2270.75 ft. The existing HEC-RAS is provided to be compared with the WSE determined for the proposed condition (i.e. ponding WSE at the proposed DI as will be described in the following section) to illustrate that development of the site meets Clark County's criteria for developing within flood zone areas.

The HEC-RAS analysis is included in Appendix B. Exhibit HR3 illustrates the WSE within the souther parking lot for existing condition.

Shelborne Earth Channel

HEC-RAS model (labeled Shelborne Ave. Ex) to determine the characteristics of flows conveyed through the Shelborne alignment is developed for the existing condition. As shown in the HEC-RAS model, runoff flows will overtop Industrial Road and continue towards the subject site

due to the limited capacity of the existing 2: 5.5' x 3' RCB underneath Industrial Road. Since the ponding from the 4:12'x4' RCBC's underneath I-15 extends along the west ROW of I-15, the WSE at the downstream end boundary for the model was therefore set to 2270.75 ft. The existing HEC-RAS is provided to be compared with the HEC-RAS model for the proposed condition to illustrate that development of the site meets Clark County's criteria for developing within flood zone areas.

The HEC-RAS analysis is included in Appendix B. Exhibit HR1 illustrates the WSE along Shelborne alignment for the existing condition.

2.2 Interim Drainage Condition

A. Offsite and Onsite Drainage

For interim conditions, the site is assumed to be fully developed while all offsite basins remains in the existing condition. The offsite drainage runoff values for the interim conditions remains the same as described for the existing condition in Reference 5. The proposed Bass Pro development is contained only within a portion of the site analyzed in Reference 5. Using the proposed grading, the proposed development been delineated into 8 drainage basins labeled ND2, ND8, ND6, ND7 and DI-1 through DI-4. The DI basins are the portions of the proposed development that will be intercepted through proposed drop inlets. ND2 represents a portion of the existing onsite basin NX1 from the approved conceptual study . Basins ND8 and DI-1 through DI-4 are portions of the existing basins NX1 and NX8 (from reference 5) and follow the same drainage pattern. Similarly, ND6(7/13 cfs) and ND7(8/15 cfs) represent the developed runoff flows for the existing basins defined in reference 5 as NX6 and NX7. Runoff generated through ND2(12/22 cfs) is intercepted through the proposed onsite 40-ft drop inlet and conveyed through the proposed storm

drain. Runoff from ND2 is therefore combined with runoff from basins DI-1(2/3 cfs), DI-2(2/4 cfs), DI-3(5/9 cfs) and DI-4(3/5 cfs) at concentration point SD(23/41 cfs). Runoff from SD drains towards the RCB underneath I-15. Runoff from basin ND8(10/18 cfs) surface flows towards the RCB underneath I-15. Two storm drain systems are proposed to convey the runoff through the site.

Storm Drain Line A

Line A storm drain is designed to intercept and convey onsite and offsite flows impacting the proposed development through the southern parking and convey it towards the RCB underneath I-15. As shown in the HEC-1 model for the interim condition, a large difference exists between the hydrograph peak time for the offsite flows from DCMX1(-/1945 cfs) and the developed onsite basins. Therefore, adding the onsite flows to the offsite flows does not change the peak flow values for the offsite flows. Therefore, the offsite peak flow was used for the design of the 40-ft Drop Inlet and the proposed Line A storm drain. As shown in the hydraulic calculation for the 40-ft drop inlet, the WSE required to drain the 185 cfs is determined to be 2273.2 ft. The WSE elevation at the DI for the proposed condition is therefore lower than the existing WSE determined at River Station 600 for the existing HEC-RAS. The proposed Line A consists of segments with different sizes. As shown in the grading plan, the line consists of 6'x3 RCB, 72" RCP and 12'x6' RCB. The proposed Line B connects with Line A at a junction box near the downstream end. The hydraulic analysis for Line A is provided in Appendix B to indicate its capability to convey the runoff flows. The sizing of the riprap at the outlet of the storm drain is also provided in Appendix B.

Flows within Shelborne Alignment

Line B storm drain is proposed to convey a portion of the runoff flows within Shelborne

alignment towards the RCB underneath I-15. As described in existing condition, runoff at CMX4(274/646 cfs) flows within Shelborne earth channel as it approaches Industrial Road. A portion of the flows at CMX4 will be conveyed through the existing 2:5.5'x3' RCB underneath Industrial and continuing within the proposed 7'x3' RCB (Line B), and the remaining flows will be overtopping the Road towards the proposed parking lot. A WSPG model was developed for Line B in addition to the HEC-RAS (labeled Shelborne Ave. Pr) for the overtopping flows within the parking lot. Through iterative procedure, the runoff flows intercepted through the 7'x3' RCB (Line B) was determined as the flows in the WSPG that will maintain an EGL matching to the WSE at HEC-RAS River Station 514 just upstream of the existing 2:5.5'x3' RCB underneath Industrial. As shown in the analysis, Line B is determined to convey 170 cfs during 100-year storm events. As shown in the attached HEC-RAS for Selborne alignment, the parking lot has been designed to covey the overtopping flows while maintaining a VxD less than 6 as required by Clack County. The HEC-RAS model also illustrates that the proposed development limits any increase in the WSE at Shelborne alignment within 1 foot from existing WSE.

Industrial Road flow analysis for existing, interim and future conditions remain unchanged. The FlowMaster analysis for the Road is included in Appendix B. The analysis shows that the Road meets the 10- and 100-year VxD requirements set forth by the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual. The analysis also shows that the Industrial Road meets the 12-foot dry lane CCRFCD criteria during the 10-year storm events, except at the low point along Shelborne alignment where the overtopping flows cross the Road.

The finished floor elevation for the proposed building is set to match the finish floor elevations for the existing Silverton Hotel/Casino. The finish floor elevation meets the CCRFCD Hydraulic Design Manual Criteria of 18-inches above the Base Flood Elevation (BFE). The BFE

is determined from the FIRM as the WSE just upstream the proposed building, as shown in Figure 2.

2.3 Future Drainage Condition

A. Onsite and Offsite Drainage

For future conditions, the site and the offsite basins are assumed to be fully developed. The proposed regional flood control facilities are also assumed to be constructed. As shown in the H-20 exhibit and the hydrologic analysis in the 2002 MPU, the development of the Lower Blue Diamond Detention Basin (DCBD 0421) and its outlet facilities will eliminate all the offsite flows impacting the Silverton parking lot. Similarly, the NDOT improvement of the Blue Diamond Road will direct all runoff flows west of the Road towards the regional facilities. Therefore, the offsite basin OFX1 has been eliminated, whereas the basin OFX2 has been limited to only the areas east of Blue Diamond (OFD2). Basins OFD3(33/63 cfs) and OFD4(42/85 cfs) represents the future developments of basins OFX3 and OFX4, respectively. Similarly, basins ND5(15/32 cfs), ND9(13/28 cfs) and ND10(5/10 cfs) represents the development of basins NX5, NX9 and NX10, respectively. Basins NX1, NX3 and NX4 was left as their existing condition since they are already developed. The runoff flow patterns are described in the interim condition. Offsite basins map (OFF2) and onsite basins map (DR3) for the future condition is provided with the study.

2.4 Master Planning Information

"The 2002 Las Vegas Valley Flood Control Master Plan Update", dated September 2002, as prepared by Post Buckley Schuh and Jernigan, Inc. (PBS&J), G.C. Wallace and Louis Berger for the Clark County Regional Flood Control District (CCRFCD) (Reference 3) illustrates the proposed regional master planned facilities in the area as shown on Figure F-20. As indicated from the

attached copy of the Figure, the subject site is bordered by existing and proposed Master Planned Facilities. The facilities are described as:

- DCBD 0218: Existing 4: 12-ft x 5-ft Reinforced Concrete Box Culvert (RCBC) underneath I-15. Please note that the actual size for DCBD 0218 RCBC's is 12-ft x 4-ft.
- DCBD 0221: Proposed 72-inch Reinforced Concrete Pipe (RCP).

2.5 Flood Plain Information

The project site is covered by Flood Insurance Rate Map (FIRM) for the Clark County, Nevada, and unincorporated areas, Community Parcel Numbers: 32003C 2566 E, Effective Date: September 27, 2002 and revised to reflect a Letter of Map Revision (LOMR) dated April 21, 2003 (Reference 4). Figure 2 in Appendix C illustrates the location of the site on a portion of the above referenced FIRM.

The site falls entirely within aSpecial Flood Hazard Area designated as "AE". Zone "AE" is described by the Federal Emergency Management Agency (FEMA) as *"Special flood hazard areas inundated by 100-year flood; Base flood elevations determined."* The Base flood elevation (BFE) for the proposed Bass Pro Shops is interpolated from the BFE's on the FIRM at the upstream end of the building.

2.6 Previous Drainage Studies

The overall area is covered within the CCRFCD *"2002 Las Vegas Valley Flood Control Master Plan Update, Volume I and II"* (Reference 2 and 3). The offsite flows impacting the site was analyzed in the "*Conceptual Drainage Study for MSM-020-03*" by Lochsa Engineering,

approved by in April 2003, (Reference 5). The existing onsite flows was also determined for the sam study. Lochsa Engineering concurs with the information from these referenced studies.

3. PROPOSED DRAINAGE FACILITIES

3.1 General Description

Runoff has been designed to flow away from proposed building pad. The flood control and conveyance system that is proposed for the developed conditions was designed to maintain as much as possible the historic drainage patterns.

3.2 Compliance with Regulations and Adopted Plans

The hydrologic analysis and drainage design of this development is in compliance with local requirements, including the Clark County Regional Flood Control District (CCRFCD) *"Hydrologic Criteria and Drainage Design Manual"* (HCDDM) (Reference 1), and the CCRFCD *"Flood Control Master Plan Update"* (Reference 2). The design of this development is also in compliance with the Federal Emergency Management Agency (FEMA)(Reference 3).

3.3 Hydrologic Criteria

The onsite and offsite basins of the subject project area all falls within the Duck Creek/Blue Diamond Watershed. The hydrologic analysis and drainage of the project site is carried out in accordance with the Hydrologic Criteria and Drainage Design Manual (HCDDM) of the CCRFCD (Reference 3). The rainfall values used for the hydrologic analysis of the existing site represent the 10-year and 100-year storm recurrence events, each with a six-hour duration. The site is within the boundary for using the McCarran Airport Rainfall Data, therefore precipitation data was determined using Table 505 of the HCDDM (Reference 1). The adjusted point rainfall values for the 6-hour, 10- and 100 year storm events are determined from Table 505 as 1.58 and 2.77 inches, respectively. The rainfall losses due to infiltration, interception, etc. are represented using the SCS curve number

(CN) method recommended in the CCRFCD's Manual (Reference 1). The SCS method divides the soils into four hydrological groups as A, B, C and D. Review of the 2002 Flood Control Master Plan Update's (Reference 3), Figure H-20, indicates that the site is within the hydrologic soil groups A and B. Soil groups A and B are defined as "High infiltration rate, low runoff potential" and "Moderate infiltration rate, moderately low runoff potential", respectively. The Curve Numbers (CN) for the existing and developed condition has been determined from Table 602 of the CCRFCD Hydrologic Criteria and Drainage Design Manual. The runoff hydrograph is determined from the design precipitation for each sub-basin using the Soil Conservation Service (SCS) unit hydrograph method.

Calculations used in the hydrologic analysis for the offsite and onsite basins for existing and developed conditions are attached in Appendix A.

3.4 Facility Design Calculations

All drainage facilities within this project have been designed in accordance with the HCDDM (Reference 1). Drainage swale and street flow capacities were calculated based on Manning's equation. The proposed onsite drainage plan has been assumed to closely resemble historic drainage patterns. Street sections have been taken along the adjacent streets to calculate a Velocity x Depth Product. The capacity for drop inlets in a sump condition were calculated using the orifice equation. It is assumed that runoff will pond over the inlet. The curb openings and grates will be completely inundated and act as an orifice. Two lines of storm drain systems are proposed in the study. The storm drain system is modeled using the Water Surface and Pressure Gradient (WSPG) program. HEC-RAS models were developed for the surface runoff flows for existing and proposed condition. A street flow summary table is provided in Appendix C.

4. CONCLUSIONS AND RECOMMENDATIONS

1. This project is in compliance with the applicable drainage laws as recognized by the State of Nevada.

2. This project is in compliance with the CCRFCD "2002 Las Vegas Valley Flood Control Master Plan Update", the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*" (Reference 1).

3. The 100-year storm event runoff flows through Silverton southern parking lot was determined to be 185 cfs in the approved "*Conceptual Study for MSM-020-03*" by Lochsa Engineering. An onsite storm drain system is proposed to intercept and convey these flows towards I-15 maintaining the historical pattern.

4. A 7'x3' RCN storm drain is proposed to convey 170 cfs of the offsite flows within Shelborne alignment (646 cfs) at Industrial Road to drain towards I-15. The remaining overtopping flows within Shelborne is conveyed through the proposed parking lot towards I-15. The parking lot has been designed to maintain V'XD' values lower than 6 as required by Clark County.

5. REFERENCES

1. Clark County Regional Flood Control District, *"Hydrologic Criteria and Drainage Design Manual,"* August 1999.

2. Post, Buckley, Schuh & Jernigan Inc., G.C. Wallace, and Louis Berger, *"2002 Las Vegas Valley Flood Control Master Plan Update, Volume I,"* September 2002.

3. Post, Buckley, Schuh & Jernigan Inc., G.C. Wallace, and Louis Berger, *"2002 Las Vegas Valley Flood Control Master Plan Update, Volume II,"* September 2002.

4. Federal Emergency Management Agency, *"Flood Insurance Rate Map; Community Panel Number 32003C2556 E; Clark County, Nevada and Incorporated Areas,"* Revised on September 27, 2002.

5. Lochsa Engineering, *"Conceptual Study for MSM-020-03,"* approved in April, 2003.

Peak Flow Summary
Interim Condition

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
PT4	-	1,961	1,961
RTPT4	-	1,941	1,941
OFX1	236.00	19	106
CMX1	-	-	2,045
BLUE	-	100	100
DCMX1	-	-	1,945
RTCX1	-	-	1,936
NX1	11.23	18	33
ND2	7.06	12	22
RTND2	-	12	21
DI-1	0.83	2	3
DI-2	1.06	2	4
LAT-AI	-	4	7
RLATA1	-	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	-	23	41
RT-SD	-	22	41
ND8	5.38	10	18
CMD2	-	-	1,943
NX3	13.13	18	35
NX4	9.87	14	27
CMX3	-	32	62
OFX2	270.00	52	189
COMB	-	220	451
SHELB	-	259	609
RSHELB	-	271	642
OFX3	24.03	16	39
RTFX3	-	16	39
NX5	13.37	2	10
CMX4	-	274	646
PARK	-	104	476
LINE-B	-	170	170
CMD7	-	-	2,113
PARK	-	104	476
RPARK	-	103	475
INDUST	4.46	7	12
RTINDU	-	6	12
ND6	3.69	7	13
ND7	4.21	8	15
CMD5	-	107	483
NX9	11.25	3	11
RTNX9	-	3	11
NX10	3.78	1	4
OFX4	34.11	16	44
CMX6	-	19	58

Peak Flow Summary
Future Condition

HEC-1 I.D.	Area (acres)	10-year Flow (cfs)	100-year Flow (cfs)
NX1	11.23	18	33
ND2	7.06	12	22
RTND2	-	12	21
DI-1	0.83	2	3
DI-2	1.06	2	4
LAT-A1	-	4	7
RLATA1	-	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	-	23	41
RT-SD	-	22	41
ND8	5.38	10	18
CMF2	-	51	92
NX3	13.13	18	35
NX4	9.87	14	27
CMF3	-	32	62
OFD2	42.30	55	110
RTOFD2	-	52	105
OFD3	24.03	33	63
RTFD3	-	32	60
ND5	13.13	15	32
CMF4	-	126	258
PARK	-	0	88
LINE-B	-	126	170
RLINEB	-	124	170
CMF7	-	168	260
PARK	-	0	88
INDUST	4.46	7	12
RTINDU	-	6	12
ND6	3.69	7	13
ND7	4.21	8	15
CMF5	-	21	117
ND9	4.46	13	28
RTND9	-	13	28
ND10	3.69	5	10
OFD4	34.11	42	85
CMF6	-	60	122

Existing, Interim and Future Street Flow Summary

10-year, 6-hour Storm

Street	At Section	10-Year Flow [Q10] (cfs)	10-year Velocity [v] (fps)	10-year Flow Depth [d] (ft)	10-year Velocity x Depth Product (v x d)
Industrial Road	AA	7	1.84	0.41	0.8

Existing, Interim and Future Street Flow Summary

100-year, 6-hour Storm

Street	At Section	100-Year Flow [Q100] (cfs)	100-year Velocity [v] (fps)	100-year Flow Depth [d] (ft)	100-year Velocity x Depth Product (v x d)
Industrial Road	AA	12	2.02	0.48	1.0

REGIONAL FLOOD CONTROL DISTRICT

2002 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subarea Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Proposed Facilities

Type Hydrologic Soil Groups

- Low Runoff Potential
- Moderately Low Runoff Potential
- Moderately High Runoff Potential
- High Runoff Potential

Typical Land Use

1. Undeveloped Land, Open Desert
2. Parks, Golf Courses
3. Rural
4. Low Density Residential
5. Medium Density Residential
6. High Density Residential
7. Public Facility, Multi Family
8. Commercial, Office, Retail, Casino
9. Light Industrial
10. Heavy Industrial
11. Schools
12. Lakes

N

0 1,000 2,000 3,000 4,000 5,000

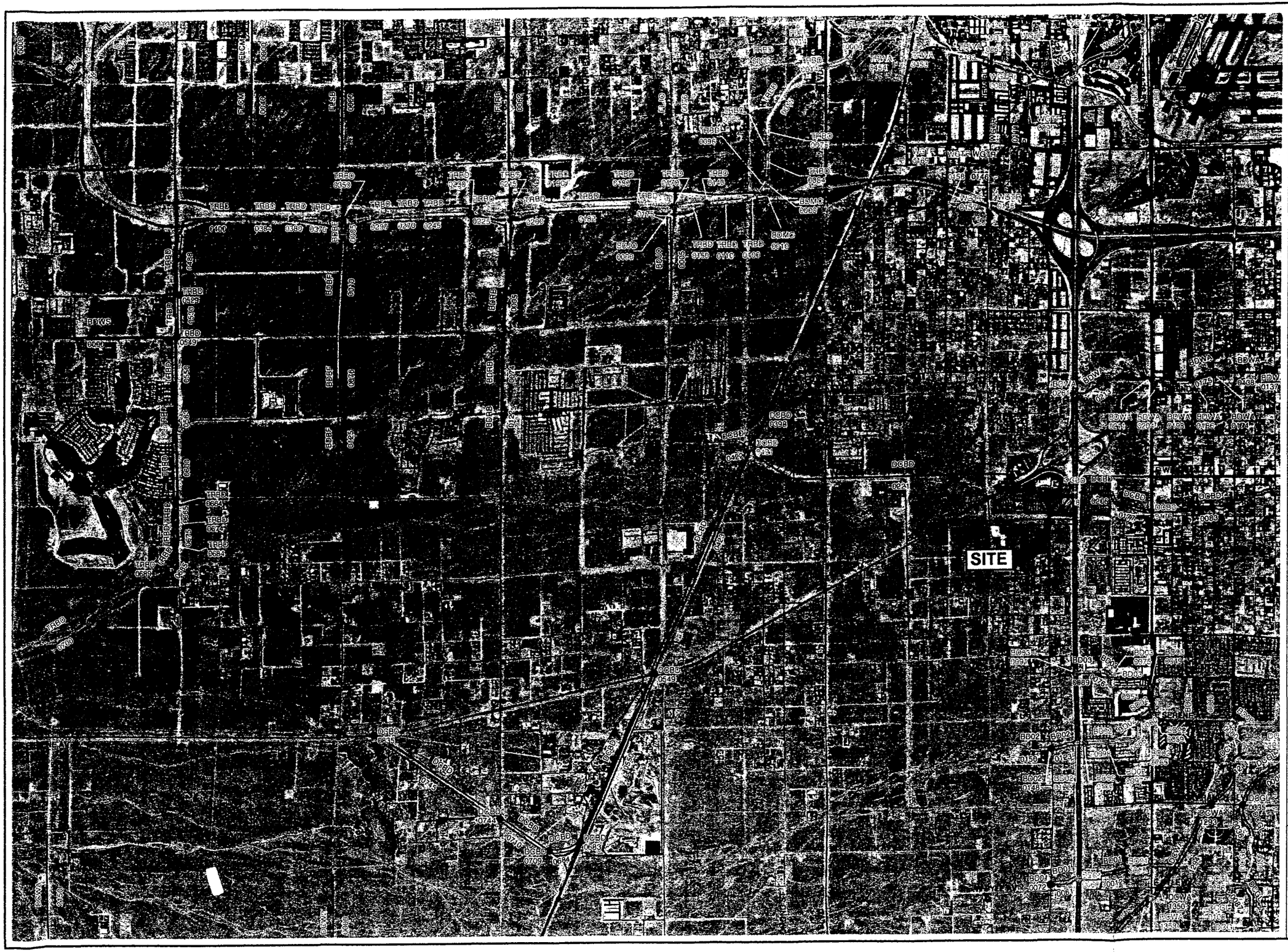
Feet

SCALE: 1 inch = 3000 feet

FIGURE H-20

PBS&J

S:\CAD\6128.2\dwg\Figure H-20.dwg, William 1:3000



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
- XXXX 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

1	2			
3	4	5	6	
7	8	9	10	
11	12	13	14	
15	16	17	18	
19	20	21	22	
23	24	25	26	
27	28	29		

FLOOD CONTROL FACILITIES
FIGURE F-20

PBS&J

G.C. WALLACE, INC.

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BD01		**BLUE DIAMOND CHANNEL 01**						
0000	E	Natural Wash	805	632	CDLD415	DUCK3	2.04	
0000	P1	Gabion Chnl 15'W 5.5'D 2:1 SS	805	632	CDLD415	DUCK3	2.04	0.50
0010	E	3: 10' X 5' RCBC @ Las Vegas Blvd	50	632	CDLD415	DUCK3	2.04	1.60
0012	E	Natural Wash	2400	632	CDLD415	DUCK3	2.04	
0012	P1	Conc Chnl 15'W 4.0'D 2:1 SS	2400	632	CDLD415	DUCK3	2.04	1.30
0060	E	3: 12' X 4' RCBC @ I-15	180	631	CDLD070	DUCK3	1.88	1.30
0061	E	Natural Wash	890	631	CDLD070	DUCK3	1.88	
0061	P1	Conc Chnl 15'W 4.0'D 2:1 SS	890	631	CDLD070	DUCK3	1.88	1.20
0072	P1	2: 6' X 6' RCBC @ Industrial	60	631	CDLD070	DUCK3	1.88	1.80
BD02		**BLUE DIAMOND CHANNEL 02**						
0000	E	3: 8' X 8' RCB	290	1767	CDLD185	DUCK3	4.36	1.10
0008	E	3: 96" CIPCP	1160	1767	CDLD185	DUCK3	4.36	1.10
0026	E	2: 78" CIPCP	1440	784	CDLD180	DUCK3	2.61	1.10
0059	E	2: 10' X 6' RCBC @ Las Vegas Blvd	80	784	CDLD180	DUCK3	2.61	1.10
0060	E	Conc Chnl 20'W 5'D 2:1 SS	375	784	CDLD180	DUCK3	2.61	1.10
0065	E	2: 10' X 6' RCBC @ Serene Ave	50	784	CDLD180	DUCK3	2.61	0.40
0066	E	Conc Chnl 20'W 5'D 2:1 SS	1630	784	CDLD180	DUCK3	2.61	0.45
0097	E	2: 10' X 6' RCBC	70	784	CDLD180	DUCK3	2.61	0.61
0098	E	Conc Chnl 20'W 5'D 2:1 SS	600	784	CDLD180	DUCK3	2.61	0.87
0109	E	2: 10' X 6' RCBC	150	784	CDLD180	DUCK3	2.61	8.09
0111	E	Gabion Chnl 25'W 5'D 2:1 SS	40	688	CDLD130	DUCK3	2.37	4.34
0122	E	2: 12' X 4' RCBC @ I-15	190	688	CDLD130	DUCK3	2.37	0.86
0123	E	Natural Wash	700	688	CDLD130	DUCK3	2.37	
0123	P1	Conc Chnl 20'W 3.5'D 2:1 SS	700	688	CDLD130	DUCK3	2.37	1.30
0148	P1	2: 10' X 5' RCBC @ Industrial	60	688	CDLD130	DUCK3	2.37	1.00
0150	E	Natural Wash	630	688	CDLD130	DUCK3	2.37	
0150	P1	Conc Chnl 20'W 3.5'D 2:1 SS	630	688	CDLD130	DUCK3	2.37	1.30
BD03		**BLUE DIAMOND CHANNEL 03**						
0000	E	2: 84" CIPCP	1070	1158	CDLD185N	DUCK3	1.75	1.20
0020	E	2: 96" CIPCP	880	1158	CDLD185N	DUCK3	1.75	0.60
0037	E	Gabion Chnl 20'W 8'D 2:1 SS	250	1158	CDLD185N	DUCK3	1.75	0.47
0049	E	3: 12' X 7' RCBC @ Las Vegas Blvd	100	1158	CDLD185N	DUCK3	1.75	0.90
0051	E	3: 10' X 5' RCB	1200	1158	CDLD185N	DUCK3	1.75	1.20
0068	E	Conc Chnl 60'W 6'D 2:1 SS	265	1158	CDLD185N	DUCK3	1.75	0.70
0075	E	3: 10' X 5' RCBC @ W Agate Ave	50	1158	CDLD185N	DUCK3	1.75	0.60
0076	E	Natural Wash	420	1158	CDLD185N	DUCK3	1.75	
0076	P1	Gabion Chnl 25'W 6'D 2:1 SS	420	1158	CDLD185N	DUCK3	1.75	0.60
0081	E	2: 109" CMP	700	1158	CDLD185N	DUCK3	1.75	0.60
0089	P1	Gabion Chnl 25'W 6'D 2:1 SS	200	1158	CDLD185N	DUCK3	1.75	0.60
0091	E	3: 12' X 5' RCBC @ I-15	190	1158	CDLD185N	DUCK3	1.75	1.20
BDBF		**BLUE DIAMOND-BUFFALO BRANCH**						
0000	E	Conc Chnl 10'W 10'D 0:1 SS	310	1613	CTBD11S	FLAM3SC	2.06	2.00
0005	E	10' X 10' RCB	480	1613	CTBD11S	FLAM3SC	2.06	2.00
0010	P1	Conc Chnl 10'W 9'D 0:1 SS	3190	1343	CTBD10	FLAM3SC	1.68	0.96
0076	P1	Conc Chnl 10'W 7.5'D 0:1 SS	2660	1002	CTBD9	FLAM3SC	1.29	0.96
0125	P1	90" RCP	1330	556	CTBD8	FLAM3SC	0.78	0.80
BDJO		**BLUE DIAMOND-JONES BRANCH**						
0000	E	12' X 7' RCB	320	768	CTBD19S	FLAM3SC	1.72	0.94
0005	P1	Conc Chnl 12'W 5.5'D 0:1 SS	2690	768	CTBD19S	FLAM3SC	1.72	0.94
BDMO		**BLUE DIAMOND CHANNEL MOHAWK**						
0000	E	Conc Chnl 10'W 6'D 0:1 SS	570	343	CTBD20BS	FLAM3SC	0.73	0.70
0010	E	2: 8' X 6' RCB	410	343	CTBD20BS	FLAM3SC	0.73	0.70
BDRB		**BLUE DIAMOND-RAINBOW BRANCH**						
0000	E	10' X 9' RCB	350	875	CTBD15S	FLAM3SC	1.77	1.09
0005	P2	10' X 6' RCB	3430	875	CTBD15S	FLAM3SC	1.77	1.09
0074	P2	60" RCP	2560	191	CTBD13	FLAM3SC	1.01	0.75
0122	P2	54" RCP	300	36	TBD12	FLAM3SC	0.51	0.60

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BDWA		**BLUE DIAMOND WASH**						
0112	E	Natural Wash	1310	1073	CBUB310	DUCK3	2.12	
0112	P1	10' X 5' RCB	1310	1073	CBUB310	DUCK3	2.12	3.00
0137	E	24", 36", and 54" CMP @ Placid	50	1073	CBUB310	DUCK3	2.12	1.40
0137	P1	Replace with 10' X 6' RCB	50	1073	CBUB310	DUCK3	2.12	1.40
0138	E	Natural Wash	1680	881	CBUB300	DUCK3	1.64	
0138	P1	10' X 5' RCB	1680	881	CBUB300	DUCK3	1.64	2.50
0174	E	48" CMP @ Rancho Destino	50	881	CBUB300	DUCK3	1.64	1.20
0174	P1	Replace with 10' X 6' RCB	50	881	CBUB300	DUCK3	1.64	1.20
0175	E	Natural Wash	630	881	CBUB300	DUCK3	1.64	
0175	P1	9' X 5' RCB	630	881	CBUB300	DUCK3	1.64	3.00
0186	E	3: 15' X 5' RCBC @ Haven St	50	881	CBUB300	DUCK3	1.64	1.00
0187	E	Conc Chnl 15'W 8'D 1:1 SS	585	881	CBUB300	DUCK3	1.64	0.86
0198	E	Single Span Bridge 45'W 10'D @ Giles	45	881	CBUB300	DUCK3	1.64	1.50
0199	E	Conc Chnl 15'W 8'D 1:1 SS	320	881	CBUB300	DUCK3	1.64	1.56
0204	E	Single Span Bridge 15.5'W 7'D	45	881	CBUB300	DUCK3	1.64	1.60
0205	E	Conc Chnl 15'W 8'D 1:1 SS	350	881	CBUB300	DUCK3	1.64	1.56
0211	E	48" CMP @ Las Vegas Blvd	140	578	CBUB290	DUCK3	1.16	1.70
0212	E	5' X 5' RCBC @ Las Vegas Blvd	140	578	CBUB290	DUCK3	1.16	1.70
0213	E	Natural Wash	2510	578	CBUB290	DUCK3	1.16	
0213	P1	7' X 5' RCB	2510	578	CBUB290	DUCK3	1.16	2.00
0261	E	12' X 5' RCBC @ I-15	200	314	CBUB280	DUCK3	0.83	1.30
BDWS		**BLUE DIAMOND-WARM SPRINGS BRANCH**						
0000	P1	84" RCP	2410	428	TBD5	FLAM3SC	0.49	0.80
DCBD		**DUCK CREEK / BLUE DIAMOND**						
0083	E	Natural Wash	4750	1892	CBUB350	DUCK4	10.85	
0083	P1	Conc Chnl 20'W 5.5'D 2:1 SS	4750	1892	CBUB350	DUCK4	10.85	1.10
0176	E	3: 10' X 8' RCBC @ Las Vegas Blvd	80	1747	CBUB340	DUCK4	10.35	0.70
0177	E	Natural Wash	1550	1747	CBUB340	DUCK4	10.35	
0177	P1	Conc Chnl 25'W 5'D 2:1 SS	1550	1747	CBUB340	DUCK4	10.35	1.07
0206	E	2: 60" CMP	1160	1747	CBUB340	DUCK4	10.35	1.20
0206	P1	Replace with 2: 10' X 6' RCB	1160	1747	CBUB340	DUCK4	10.35	1.16
0218	E	4: 12' X 5' RCBC @ I-15	240	1747	CBUB340	DUCK4	10.35	1.16
0221	P1	72" RCP	9930	271	LBDDB	DUCK3	7.67	0.94
0394	P2	48" RCP Outlet	200	271	LBDDB	DUCK3	7.67	
0398	P2	517 acre-ft Lower Blue Diamond Detention Basin		3957	CBLBDDB	DUCK3	7.67	
0421	E	3 Span Bridge 45'W 10'D	25	3921	CBUB205	DUCK3	7.55	1.10
0422	P1	Unlined Levee 3'	600	50	BUB205	DUCK3	0.13	1.20
0423	P1	Conc Chnl 20'W 8'D 2:1 SS	8082	3921	CBUB205	DUCK3	7.55	0.80
0549	P1	2: 12' X 8' RCB @ Blue Diamond	200	2449	CBUB150	DUCK3	3.64	1.00
0550	P1	Gabion Chnl 40'W 7.5'D 2:1 SS	5800	2394	CBUB150	DUCK3	3.64	0.50
0683	P1	2: 12' X 7' RCBC @ UPRR	50	2280	CBUB140	DUCK3	3.35	1.58
0684	P1	Gabion Chnl 30'W 6.5'D 2:1 SS	1050	2280	CBUB140	DUCK3	3.35	1.58
0709	P1	2: 14' X 6' RCBC @ UPRR	50	2280	CBUB140	DUCK3	3.35	1.58
0710	P1	Gabion Chnl 30'W 6.5'D 2:1 SS	1850	2280	CBUB140	DUCK3	3.35	1.58
0744	P1	2: 12' X 6' RCBC @ Rainbow	50	2062	CBUB130	DUCK3	3.01	1.50
0745	P1	Conc Chnl 12'W 6.5'D 2:1 SS	4800	2062	CBUB130	DUCK3	3.01	1.58
0835	P1	2: 12' X 6' RCBC @ Blue Diamond	75	2010	CBUB070	DUCK3	2.77	1.60
DCGL		**DUCK CREEK GILESPIE CHANNEL**						
0000	E	Natural Wash	1900	1811	CDLD460	DUCK3	2.56	
0000	P2	Conc Chnl 32'W 6'D 0:1 SS	1900	1811	CDLD460	DUCK3	2.56	0.80
0035	P2	2: 16' X 4' RCBC @ Silverado Ranch	60	1811	CDLD460	DUCK3	2.56	0.90
0036	E	Natural Wash	1111	1811	CDLD460	DUCK3	2.56	
0036	P1	Conc Chnl 35'W 4'D 0:1 SS	1111	1811	CDLD460	DUCK3	2.56	0.80
0057	E	Conc Chnl 32'W 9.0'D 3:1 SS	1580	841	CDLD460S	DUCK3	1.10	0.20
0066	E	4: 8' X 5' RCBC @ E Pyle Ave	60	841	CDLD460S	DUCK3	1.10	1.20
0087	E	Natural Wash	1080	841	CDLD460S	DUCK3	1.10	
0087	P1	Conc Chnl 32'W 3.5'D 3:1 SS	1080	841	CDLD460S	DUCK3	1.10	0.90
0106	E	3: 8' X 4' RCBC @ La Cienega	80	841	CDLD460S	DUCK3	1.10	0.50
0107	E	Conc Chnl 12'W 7'D 2:1 SS	310	567	CDLD450	DUCK3	0.75	1.30
0112	E	2: 10' X 4' RCBC @ E Frias Ave	60	567	CDLD450	DUCK3	0.75	0.50
0113	E	Conc Chnl 12'W 7'D 2:1 SS	490	567	CDLD450	DUCK3	0.75	2.40
DCW2		**DUCK CREEK - TRIBUTARY 2**						
0000	P0	1: 8' X 5' RCB	3000	547	CDCD150N	DUCK3	1.68	1.10

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
DCWA		**DUCK CREEK WASH**						
1214	E	121,300 cfs PMF Spillway		121300	CDLDCDB	DUCK5SC	16.16	
1215	E	54" RCP Outlet	20	355	LDCDB	DUCK5SC	16.16	
1216	E	1,235 ac-ft Lower Duck Creek Detention Basin		5259	CDLDCDB	DUCK5SC	16.16	
1241	E	Natural Wash	540	4271	CDLD37B*	DUCK3SC	6.41	
1241	P2	2: 20' X 7' RCB	540	4271	CDLD37B*	DUCK3SC	6.41	1.94
1258	E	Natural Wash	1475	4271	CDLD37B*	DUCK3SC	6.41	
1258	P1	Conc Chnl 42'W 7'D 0:1 SS	1475	4271	CDLD37B*	DUCK3SC	6.41	0.70
1293	P2	2: 20' X 7' RCBC @ Silverado	150	4271	CDLD37B*	DUCK3SC	6.41	0.80
1294	E	Natural Wash	2175	4271	CDLD37B*	DUCK3SC	6.41	
1294	P2	Conc Chnl 42'W 7'D 0:1 SS	2175	4271	CDLD37B*	DUCK3SC	6.41	0.80
1338	E	Natural Wash	825	4271	CDLD37B*	DUCK3SC	6.41	
1338	P1	Conc Chnl 40'W 6.5'D 2:1 SS	825	4271	CDLD37B*	DUCK3SC	6.41	0.70
1350	P1	5: 14' X 6' RCBC @ W Pyle Ave	70	4271	CDLD37B	DUCK3SC	6.41	0.70
1351	E	Natural Wash	365	4271	CDLD37B	DUCK3SC	6.41	
1351	P1	Conc Chnl 40'W 6.5'D 2:1 SS	365	4271	CDLD37B	DUCK3SC	6.41	0.70
1358	E	1: 12' X 6' RCBC @ Las Vegas Blvd	120	4271	CDLD37B	DUCK3SC	6.41	0.60
1359	P1	Add 4: 14' X 6' RCBC @ Las Vegas Blvd	120	4271	CDLD37B	DUCK3SC	6.41	0.60
1362	E	Natural Wash	750	3018	CDLD06B	DUCK3SC	5.14	
1362	P1	Conc Chnl 40'W 5.5'D 2:1 SS	750	3018	CDLD06B	DUCK3SC	5.14	0.70
1378	E	Natural Wash	2500	3018	CDLD06B	DUCK3SC	5.14	
1378	P1	Conc Chnl 40'W 5.5'D 2:1 SS	2500	3018	CDLD06B	DUCK3SC	5.14	1.00
2150	P0	72" RCP	3880	299	CDCD010	DUCK3SC	0.45	1.20
2223	P0	66" RCP	5190	299	CDCD010	DUCK3SC	0.45	2.10
FLCM		**FLAMINGO-CIMMARON BRANCH**						
0000	P1	78" RCP	2110	391	UFS27	FLAM3SC	0.38	1.50
0040	P1	72" RCP	2690	391	UFS27	FLAM3SC	0.38	1.50
FLF4		**F4 CHANNEL**						
0014	E	Conc Chnl 10'W 10'D 2:1 SS	2340	5636	CUFS19S	FLAM3SC	6.82	0.90
0050	E	26' X 12' RCB	420	5330	CUFS18	FLAM3SC	6.47	0.94
0058	E	20' X 12' RCB	250	5330	CUFS18	FLAM3SC	6.47	0.94
0091	P1	Conc Chnl 20'W 8.5'D 2:1 SS	640	5330	CUFS18	FLAM3SC	6.47	1.28
0101	P1	Conc Chnl 20'W 8.5'D 2:1 SS	2280	4095	CUFS13	FLAM3SC	4.45	1.28
0155	P1	Conc Chnl 20'W 7.0'D 2:1 SS	10550	3846	CUFS12	FLAM3SC	4.07	1.90
FLJO		**FLAMINGO DIVERSION-JONES BRANCH**						
0000	E	12' X 6' RCB	3310	1179	CTD11S	FLAM3SC	1.46	1.00
0076	E	96" RCP	2640	699	CTD9	FLAM3SC	0.79	1.00
FLOQ		**FLAMINGO OQUENDO**						
0000	P1	Conc Chnl 12'W 7.5'D 0:1 SS	3160	926	CUFS15W	FLAM3SC	0.99	0.50
FLRB		**FLAMINGO DIVERSION-RAINBOW BRANCH**						
0000	P1	Conc Chnl 12'W 5.0'D 2:1 SS	3300	1086	CTD6	FLAM3SC	1.29	1.00
0062	P1	96" RCP	2660	671	CTD5	FLAM3SC	0.78	1.00
FLSB		**FLAMINGO DIVERSION-SOUTH BUFFALO BRANCH**						
0000	P1	9' X 6' RCB	7800	865	CTD3S	FLAM3SC	1.01	1.20
FLTR		**FLAMINGO-TROPICANA DIVERSION CHANNEL**						
0000	E	Conc Chnl 26'W 19.5'D 0:1 SS	1480	3478	CTD13	FLAM3SC	4.86	0.11
0014	E	26' X 18' RCBC	250	3478	CTD13	FLAM3SC	4.86	0.11
0015	E	Conc Chnl 26'W 18'D 0:1 SS	460	3214	CTD13N	FLAM3SC	4.44	0.11
FLWA		**FLAMINGO WASH**						
1439	E	66,000 cfs PMF Spillway		66000	CUFS28	FLAM5SC	30.38	
1440	E	2: 60" RCP Outlet	200	260	UPFLDB	FLAM5SC	30.38	
1443	E	1,100 ac-ft Flamingo Detention Basin		11180	CUFS28	FLAM5SC	30.38	
1444	P3	Upgrade to 1,340 ac-ft Flamingo Detention Basin		11180	CUFS28	FLAM5SC	30.38	
TRBD		**BLUE DIAMOND CHANNEL**						
0000	E	Conc Chnl 10'W 10'D 2:1 SS	1700	4353	CTD15	FLAM4SC	9.49	0.70
0014	E	23' X 10' RCB	130	4353	CTD15	FLAM4SC	9.49	0.70
0015	E	Conc Chnl 10'W 10'D 2:1 SS	3070	4353	CTD15	FLAM4SC	9.49	0.90
0075	E	Conc Chnl 19.5'W 12'D 0:1 SS	400	4233	CTD14	FLAM4SC	9.24	0.48
0083	E	2: 14' X 11' RCBC	120	4233	CTD14	FLAM4SC	9.24	0.48
0084	E	Conc Chnl 19.5'W 12'D 0:1 SS	550	4233	CTD14	FLAM4SC	9.24	0.48
0096	E	Conc Chnl 28'W 9'D 0:1 SS	760	4176	CTBD15*	FLAM3SC	6.47	1.00
0100	E	26' X 10' RCB	560	4176	CTBD15*	FLAM3SC	6.47	1.03
0110	E	Conc Chnl 28'W 9'D 0:1 SS	1040	4176	CTBD15	FLAM3SC	6.47	1.28
0140	E	26' X 10' RCB	380	4176	CTBD15	FLAM3SC	6.47	1.28

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
TRBD		**BLUE DIAMOND CHANNEL – continued**						
0150	E	Conc Chnl 28'W 9'D 0:1 SS	780	4176	CTBD15	FLAM3SC	6.47	1.28
0170	E	26' X 10' RCB	260	4176	CTBD15	FLAM3SC	6.47	1.11
0175	E	Conc Chnl 26'W 9'D 0:1 SS	1000	4176	CTBD15	FLAM3SC	6.47	1.05
0180	E	26' X 10' RCB	370	4176	CTBD15	FLAM3SC	6.47	1.13
0182	E	Conc Chnl 16'W 9'D 2:1 SS	2600	4176	CTBD15	FLAM3SC	6.47	0.64
0190	E	24' X 10' RCB	430	4176	CTBD15	FLAM3SC	6.47	0.92
0200	E	Conc Chnl 24'W 9'D 0:1 SS	750	4176	CTBD15	FLAM3SC	6.47	1.82
0215	E	20' X 10' RCB	260	3508	CTBD11	FLAM3SC	4.70	1.29
0225	E	Conc Chnl 20'W 10'D 0:1 SS	950	3508	CTBD11	FLAM3SC	4.70	1.29
0230	E	20' X 10' RCB	320	3508	CTBD11	FLAM3SC	4.70	2.14
0245	E	Conc Chnl 20'W 8'D 2:1 SS	1300	3508	CTBD11	FLAM3SC	4.70	2.14
0270	E	Conc Chnl 23'W 10'D 0:1 SS	1030	3508	CTBD11	FLAM3SC	4.70	0.84
0290	E	23' X 10' RCB	750	3508	CTBD11	FLAM3SC	4.70	0.84
0300	E	Conc Chnl 23'W 10'D 0:1 SS	450	3508	CTBD11	FLAM3SC	4.70	1.60
0310	E	Conc Chnl 18'W 10.5'D 0:1 SS	310	2023	CTBD6	FLAM3SC	2.64	1.60
0350	E	18' X 10.5' RCB @ Buffalo	260	2023	CTBD6	FLAM3SC	2.64	0.65
0370	E	Conc Chnl 18'W 10'D 0:1 SS	1150	2023	CTBD6	FLAM3SC	2.64	0.65
0380	E	18' X 10' RCB	520	2023	CTBD6	FLAM3SC	2.64	0.98
0384	E	Conc Chnl 18'W 10'D 0:1 SS	1520	2023	CTBD6	FLAM3SC	2.64	0.87
0400	P1	18' X 7' RCB	2370	2023	CTBD6	FLAM3SC	2.64	0.90
0488	P1	Conc Chnl 12'W 6.5'D 2:1 SS	1920	2023	CTBD6	FLAM3SC	2.64	1.67
0529	P1	14' X 8' RCBC	80	2023	CTBD6	FLAM3SC	2.64	1.67
0530	P1	Conc Chnl 12'W 6.5'D 2:1 SS	1270	2023	CTBD6	FLAM3SC	2.64	1.67
0549	P1	14' X 8' RCBC @ Warm Springs	200	1671	CTBD5	FLAM3SC	2.27	1.20
0550	P1	Conc Chnl 12'W 5.5'D 2:1 SS	2130	1350	CTBD4	FLAM3SC	1.78	1.20
0563	P1	14' X 7' RCBC	750	1350	CTBD4	FLAM3SC	1.78	1.50
0600	P1	Conc Chnl 12'W 5.5'D 2:1 SS	2380	1350	CTBD4	FLAM3SC	1.78	1.10
0664	P1	14' X 6' RCBC	80	875	CTBD3	FLAM3SC	1.22	1.00
0665	P1	Conc Chnl 12'W 5'D 2:1 SS	600	875	CTBD3	FLAM3SC	1.22	1.00
0674	P1	14' X 6' RCBC	80	875	CTBD3	FLAM3SC	1.22	1.40
0675	P1	Conc Chnl 12'W 4.5'D 2:1 SS	580	875	CTBD3	FLAM3SC	1.22	1.40
0684	P1	14' X 7' RCBC	80	875	CTBD3	FLAM3SC	1.22	0.62
0685	P1	Conc Chnl 12'W 5'D 2:1 SS Outlet	850	875	CTBD3	FLAM3SC	1.22	0.62
0689	P1	3 ac-ft Blue Diamond Debris Basin		571	CTBD2	FLAM3SC	0.83	
0700	E	Natural Wash	10900	571	CTBD2	FLAM3SC	0.83	1.90
TRMC		**TROPICANA WASH - MCCARRAN AIRPORT**						
0263	E	2: 10' X 6' RCB	1500	1620	CMC8	FLAM3SC	2.42	1.28
0290	E	Rip Rap Chnl 30'W 2'D 4:1 SS	2440	249	MC8	FLAM3SC	0.51	0.79
TRWA		**TROPICANA WASH**						
0441	E	10' X 7' RCB	650	486	TRDB	FLAM5SC	14.79	0.26
0452	E	13,000 cfs PMF Spillway		13000	CTD16	FLAM5SC	14.79	
0453	E	10' X 8.5' RCB Outlet	200	486	TRDB	FLAM5SC	14.79	0.26
0454	E	825 ac-ft Tropicana Detention Basin		5765	CTD16	FLAM5SC	14.79	
WGTR		**WAGON TRAIL CHANNEL**						
0000	E	Grass Chnl 20'W 10'D 4:1 SS	2500	1620	CMC8	FLAM3SC	2.42	0.40
0050	E	2: 12' X 5' RCBC	340	1457	CMC7B	FLAM3SC	1.91	1.30
0051	P3	Conc Chnl 9'W 4.3'D 2:1 SS	500	1457	CMC7B	FLAM3SC	1.91	6.42
0064	E	3: 96" CMP Culvert	50	1457	CMC7B	FLAM3SC	1.91	1.00
0065	E	Rip Rap Chnl 35'W 4'D 2:1 SS	850	1457	CMC7B	FLAM3SC	1.91	1.05
0080	E	Rip Rap Chnl 20'W 6'D 2:1 SS	350	856	CMC7AS	FLAM3SC	1.30	0.36
0088	E	20' X 5' RCAC	50	856	CMC7AS	FLAM3SC	1.30	1.00
0089	E	Rip Rap Chnl 10'W 6.5'D 2:1 SS	470	856	CMC7AS	FLAM3SC	1.30	1.00
0097	E	20' X 7' RCAC	30	856	CMC7AS	FLAM3SC	1.30	1.00
0098	P1	Conc Chnl 30'W 5'D 2:1 SS	700	856	CMC7AS	FLAM3SC	1.30	0.20
0111	P2	10' X 6' RCB	980	856	CMC7AS	FLAM3SC	1.30	1.16
0128	P1	Conc Chnl 30'W 4'D 2:1 SS	860	856	CMC7AS	FLAM3SC	1.30	1.30
0145	E	2: 12' X 4' RCBC	140	694	CMC6B	FLAM3SC	1.12	0.70
0146	E	Rip Rap Chnl 12'W 4.25'D 2:1 SS	550	694	CMC6B	FLAM3SC	1.12	0.57
0146	P1	Conc Chnl 25'W 4'D 0:1 SS	550	694	CMC6B	FLAM3SC	1.12	0.57
0157	E	2: 12' X 4' RCBC	100	694	CMC6B	FLAM3SC	1.12	0.57
0158	E	Conc Chnl 12'W 4'D 2:1 SS	560	694	CMC6B	FLAM3SC	1.12	2.58
0169	E	2: 12' X 4' RCBC	90	694	CMC6B	FLAM3SC	1.12	0.20

**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-20

LEGEND

Street Name Designator AA BB
Parent Stream Name
Stream Name
ID / River Mile CC DD
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
Corrugated Metal Arch Pipe Culvert ..... CMAP
Corrugated Metal Pipe Culvert ..... CMP
High Density Polyethylene ..... HDPE
Helical Elliptical Reinforced Concrete Pipe ..... HERCP
Reinforced Concrete Arch Pipe ..... RCAC
Reinforced Concrete Box ..... RCB
Reinforced Concrete Box Culvert ..... RCBC
Reinforced Concrete Pipe ..... RCP
Reinforced Concrete Pipe Culvert ..... RCPC
Storm Sewer Pipe ..... SSP

PBS&J
G.C. WALLACE, INC.

APPENDIX A

HYDROLOGIC ANALYSIS

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

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.

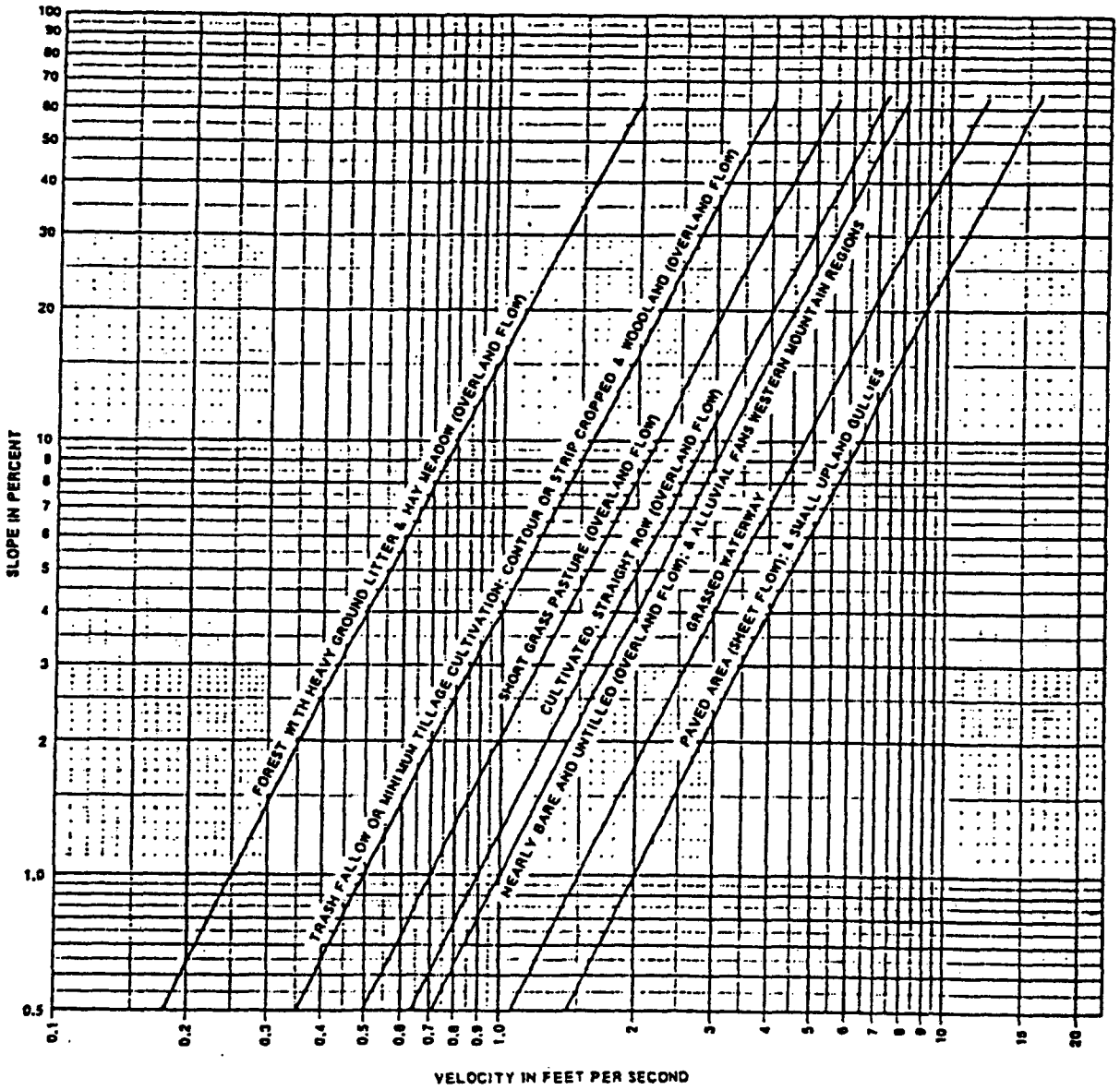
3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

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

TRAVEL TIME VELOCITY



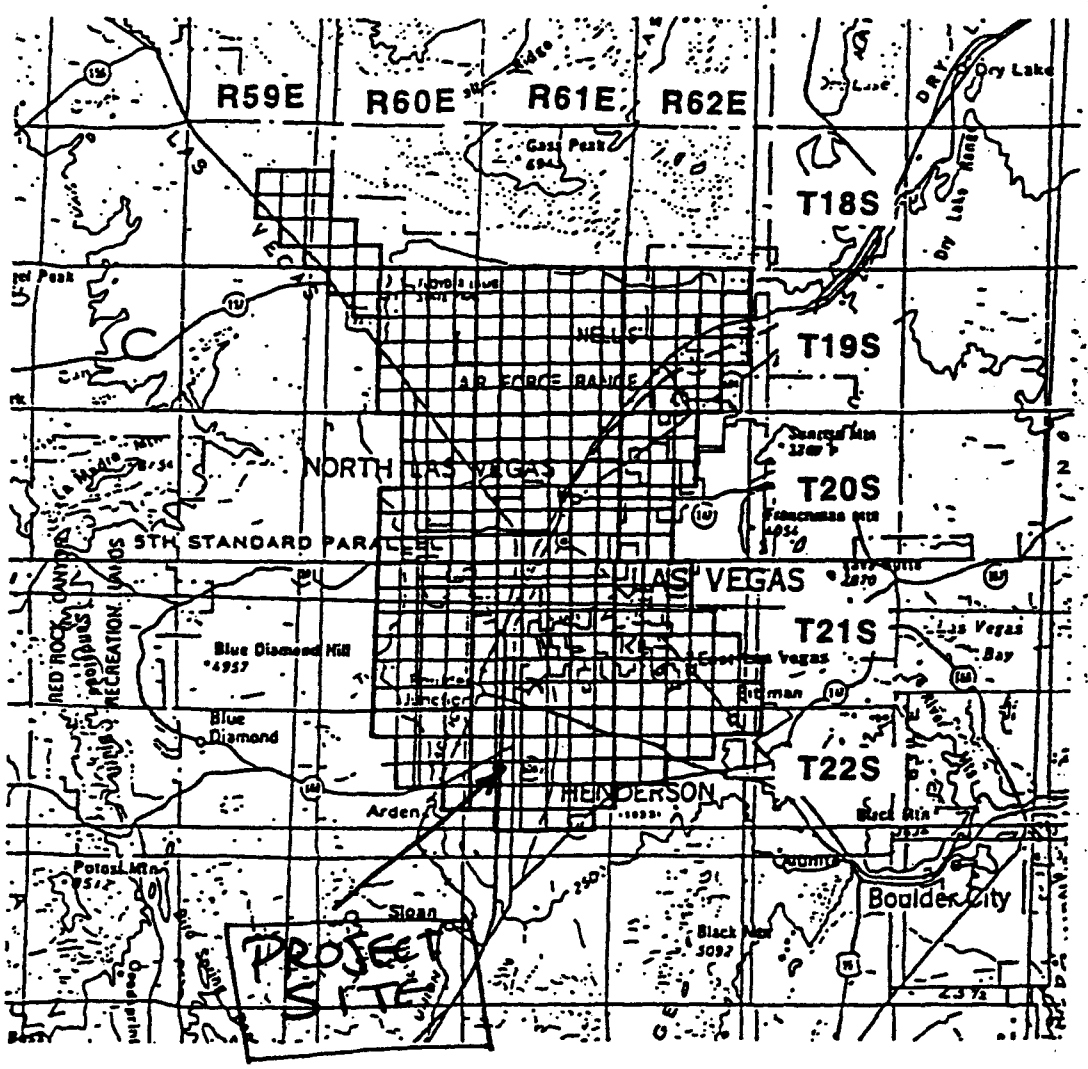
Revision	Date

WRC ENGINEERING

REFERENCE: SCS National Engineering Handbook Section 4, Hydrology, March, 1985

FIGURE 602

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 Sec. 17
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

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

DEVELOPMENT: SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS
CALCULATED BY: HMN
PROJECT NUMBER: 6923.2

DATE: JULY 2003

SUB-BASIN DATA				INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)				tc CHECK (URBANIZED BASINS)		FINAL tc	REMARKS			
DESIGN (1)	K (2)	AREA Ac (3)	AREA Square Miles (4)	LENGTH Ft (5)	SLOPE % (6)	ti Min (7)	LENGTH Ft (8)	SLOPE % (9)	VELOCITY FPS (10)	tt Min (11)	TOTAL LENGTH Ft (12)	tc =(L/180)+10 Min (13)	Min (14)	CN (15)	tL Hrs (16)	Urbanized?	Soil Type
ND2	0.9036	7.06	0.011036	220	2.3	4.0	950	1.3	2.8	5.6	1,170	16.5	9.6	98.0	0.096	YES	A
ND6	0.8897	3.69	0.005760	130	2.7	3.1	500	1.0	2.6	3.2	630	13.5	6.3	97.0	0.063	YES	B
ND7	0.9036	4.21	0.006578	80	2.5	2.3	510	1.0	2.7	3.1	590	13.3	5.5	98.0	0.055	YES	B
ND8	0.9036	5.38	0.008406	110	2.0	2.9	600	0.8	2.7	3.8	710	13.9	6.7	98.0	0.067	YES	A/B
DI-1	0.9036	0.83	0.001299	70	2.0	2.3	150	0.5	1.5	1.6	220	11.2	4.0	98.0	0.050	YES	B
DI-2	0.9036	1.06	0.001656	120	2.0	3.1	140	2.0	2.5	0.9	260	11.4	4.0	98.0	0.050	YES	B
DI-3	0.9036	2.39	0.003729	100	2.0	2.8	300	2.0	2.7	1.8	400	12.2	4.6	98.0	0.050	YES	B
DI-4	0.9036	1.32	0.002055	100	2.0	2.8	300	2.0	2.4	2.1	400	12.2	4.9	98.0	0.050	YES	B
ND5	0.8165	13.37	0.020891	460	1.5	9.5	1,400	1.5	3.9	6.0	1,860	20.3	15.5	91.4	0.155	YES	A/B
ND9	0.8244	11.25	0.017583	280	1.4	7.4	1,080	1.1	3.4	5.4	1,360	17.6	12.7	92.0	0.127	YES	B
ND10	0.8244	3.78	0.005902	185	1.1	6.6	480	1.5	2.9	2.8	665	13.7	9.4	92.0	0.094	YES	B
OFD2	0.8482	42.30	0.066087	300	1.0	7.9	3,200	4.2	7.8	6.8	3,500	29.4	14.7	93.8	0.147	YES	A/D
OFD3	0.8640	24.03	0.037545	500	1.8	7.8	2,130	1.2	4.3	8.3	2,630	24.6	16.1	95.0	0.161	YES	D
OFD4	0.8521	34.11	0.053290	290	2.1	6.0	3,300	1.3	4.8	11.6	3,590	29.9	17.5	94.1	0.175	YES	B/D

ti = 1.8 (1.1 - K) L^(0.5) / S^(1/3)

K = 0.0132*CN - 0.39

tt = L / (60 V)

tc = ti + tt

tL= tLAG = 0.6 tc

LOCATION: Onsite and Offsite

HYDROLOGIC CONDITION: Developed Onsite and Offsite Basins

TRIAL: Final Iteration

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND2**
Total Area: 7.06 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	7.06	A	100%	98	98.0
Total:	7.06	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND6**
Total Area: 3.69 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way) Desert Shrub: Poor Condition	3.50 0.18	B B	95% 5%	98 77	93.1 3.9
Total:	3.69	-------	100%	----------	97.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND7**
Total Area: 4.21 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	4.21	B	100%	98	98.0
Total:	4.21	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND8**
Total Area: 5.38 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	3.77	A	70%	98	68.6
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.61	B	30%	98	29.4
Total:	5.38	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-1**
Total Area: 0.83 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	0.83	B	100%	98	98.0
Total:	0.83	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-2**
Total Area: 1.06 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.06	B	100%	98	98.0
Total:	1.06	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-3**
Total Area: 2.39 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	2.39	B	100%	98	98.0
Total:	2.39	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **DI-4**
Total Area: 1.32 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.32	B	100%	98	98.0
Total:	1.32	------	100%	----------	98.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND5**
Total Area: 13.37 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Commercial and buisness	2.67	A	20%	89	17.8
Commercial and buisness	10.70	B	80%	92	73.6
Total:	13.37	------	100%	----------	91.4

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND9**
Total Area: 11.25 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Commercial and buisness	11.25	B	100%	92	92.0
Total:	11.25	------	100%	----------	92.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **ND10**
Total Area: 3.78 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Commercial and buisness	3.78	B	100%	92	92.0
Total:	3.78	-------	100%	----------	92.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **OFD2**
Total Area: 42.30 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Commercial and buisness	8.46	A	20%	89	17.8
Commercial and buisness	33.84	D	80%	95	76.0
Total:	42.30	-------	100%	----------	93.8

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **OFD3**
Total Area: 24.03 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Commercial and buisness	24.03	D	100%	95	95.0
Total:	24.03	-------	100%	----------	95.0

Curve Number Calculations
SILVERTON EXPANSION PHASE-1 - BASS PRO SHOPS

Sub-Basin: **OFD4**
Total Area: 34.11 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product {CN x P}
Commercial and buisness	10.23	B	30%	92	27.6
Commercial and buisness	23.87	D	70%	95	66.5
Total:	34.11	-------	100%	----------	94.1

AVERAGE VELOCITY

Input Variables	Basin ND2	Basin ND6	Basin ND7	Basin ND8		Basin DI-1	Basin DI-2	Basin DI-3	Basin DI-4	Basin ND5	Basin ND9	Basin ND10	Basin OFD2	Basin OFD3	Basin OFD4	
Bottom Width, B, (ft):	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Right Side Slope, Zr:	50	30	30	0		50	50	50	50	0	0	0	0	0	0	
Left Side Slope, Zl:	50	30	30	50		0	0	50	50	50	50	50	50	50	50	
Manning's n:	0.016	0.016	0.016	0.016		0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	
Geometric Slope, So (ft/ft):	0.013	0.010	0.010	0.008		0.005	0.020	0.020	0.020	0.015	0.011	0.015	0.042	0.012	0.013	
Flowrate, Q (cfs):	11	7	8	9		2	2	5	3	16	14	5	55	32	43	
Output Variables																
Normal Depth, Yn (ft):	0.26	0.27	0.28	0.33		0.19	0.14	0.17	0.14	0.37	0.37	0.23	0.49	0.51	0.56	
Area of Flow, A, (sf):	3.91	2.68	2.96	3.39		1.31	0.78	1.82	1.24	4.12	4.17	1.75	7.06	7.48	9.04	
Velocity, V (fps):	2.81	2.61	2.70	2.65		1.52	2.55	2.74	2.41	3.88	3.35	2.86	7.79	4.28	4.76	
Wetted Perimeter, p (ft):	28.04	18.05	18.97	18.86		11.83	9.22	19.20	15.90	20.77	20.90	13.59	27.14	27.94	30.69	
Hydraulic Radius, Rh (ft):	0.14	0.15	0.16	0.18		0.11	0.09	0.09	0.08	0.20	0.20	0.13	0.26	0.27	0.29	
Free SurfaceTop Width, T (ft):	28.03	18.04	18.96	18.52		11.63	9.08	19.20	15.90	20.40	20.53	13.36	26.64	27.43	30.13	
Centroid, Y*, (ft):	0.09	0.10	0.10	0.12		0.07	0.06	0.06	0.05	0.13	0.13	0.09	0.18	0.18	0.20	

*** NOTE : HALF OF THE 100-YEAR STORM RUNOFF FLOWS IS USED TO DETERMINE THE BASIN TRAVEL VELOCITY REQUIRED FOR THE LAG TIME CALCULATIONS**

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

100-Year Storm Events,
6-Hour Storms
Future Condition

FILE: 6923P100.DAT

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY  1991                  *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*        Dodson & Associates, Inc.      *
*  RUN DATE  08/05/03  TIME  09:21:55   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    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        TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
    2     ID        BASS PRO SHOPS
    3     ID        PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
    4     ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
    5     ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
    6     ID        LOCHSA JOB# 6923.2
    7     ID
    8     ID
    9     ID        INPUT FILE NAME:  6923P100.DAT
   10     ID
   11     ID    JULY 2003
   12     ID
   13     ID        **************************************************************************
   14     ID        **************************************************************************
   15     ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
   16     ID
   17     ID             10 & 100 YEAR - 6 HOUR STORM EVENT
   18     ID             PRECIPITATION BASED ON TABLE 505
   19     ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
   20     ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
   21     ID
   22     ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
   23     ID
   24     ID        **************************************************************************
   25     ID
   26     ID        **************************************************************************
          *DIAGRAM
   27     IT       5                    73
   28     IO       5       0
   29     IN       5
   30     JR     PREC    1.00   0.990   0.980   0.905

   31     KK      PT4
   32     KM    COMBINED RUNOFF AT THE 40'X 7' BRIDGE AT UPRR AS DETERMINED FROM THE
   33     KM    2002 DUCK CREEK/BLUE DIAMOND WASHES FIS RESTUDY, BY G.C.WALLACE
   34     BA      6.4
   35     QI      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
   36     QI      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
   37     QI      0.0     0.0      1.      7.     14.    29.0    45.0    58.0    69.0    76.0
   38     QI     82.0    87.0    91.0    96.0    102.   104.0   106.0   106.    109.    113.
   39     QI     126.    153.    204.    320.    569.    912.   1287.   1623.   1853.   1961.
   40     QI    1958.   1874.   1745.   1596.   1458.   1343.   1259.   1210.   1192.   1196.
   41     QI    1212.   1232.   1243.   1238.   1204.   1137.   1045.   940.0   831.0   725.0
   42     QI     628.    541.    466.

   43     KK    RTPT4
   44     KM    ROUTE PT4 THROUGH BASIN OFX1
   45     RK     9500    .015   0.030       0    TRAP     10.    20.0

   46     KK     OFX1
   47     KM    OFFSITE BASIN OFX1
   48     PB     2.77
   49     PC      0.0     .02    .057     .07    .087    .108    .124    .13     .13     .13
   50     PC      .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
   51     PC      .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  52      PC    .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
  53      PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
  54      PC     .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
  55      PC    .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
  56      PC    .998    .999     1.0
  57      BA  .36875
  58      LS       0    72.9
  59      UD    .651

  60      KK    CMX1
  61      KM   COMBINE RTPT4 AND OFX1 (TOTAL OFFSITE RUNOF IMPACTING SILVERTON)
  62      KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  63      HC       2

  64      KK   DCMX1
  65      DT    BLUE
  66      DI       0     100    1900
  67      DQ       0     100     100

  68      KK   RTCX1
  69      KM   ROUTE CMX1 THROUGH BASIN THROUGH THE PARKING LOT NORTH OF SILVERTON HOTEL/CAS
  70      RK    1700    .008   0.016       0    TRAP      2.    25.0

  71      KK     NX1
  72      KM   ONSITE BASIN NX1
  73      BA  .01754
  74      LS       0    98.0
  75      UD    .121

  76      KK     ND2
  77      KM   RUNOFF GENERATED THROUGH BASIN ND2
  78      BA  .01104
  79      LS       0    98.0
  80      UD    .096

  81      KK   RTND2
  82      KM   ROUTE ND2 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  83      RK     950   .0025   0.013       0    CIRC      6.

  84      KK    DI-1
  85      KM   RUNOFF FROM BASIN DI-1 DRAINING INTO THE PROPOSED DROP INLET
  86      BA  .00130
  87      LS       0    98.0
  88      UD    .050

  89      KK    DI-2
  90      KM   RUNOFF FROM BASIN DI-2 DRAINING INTO THE PROPOSED DROP INLET
  91      BA  .00166
  92      LS       0    98.0
  93      UD    .050
```

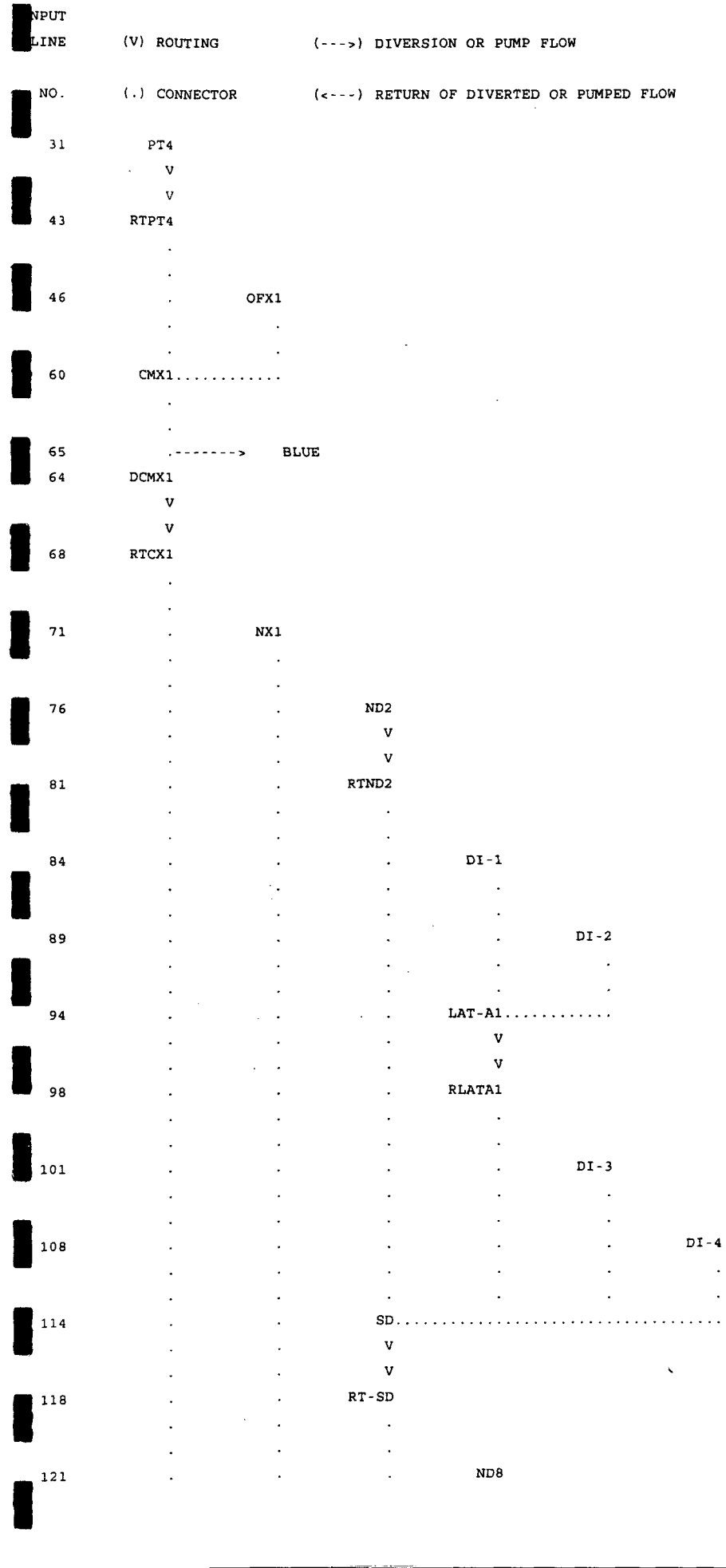
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  94      KK  LAT-A1
  95      KM   COMBINE DI-1 AND DI-2
  96      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-1"
  97      HC       2

  98      KK  RLATA1
  99      KM   ROUTE LAT-A1 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
 100      RK     500   .0025   0.013       0    CIRC      6.

 101      KK    DI-3
 102      KM   RUNOFF FROM BASIN DI-3 DRAINING INTO THE PROPOSED DROP INLET
 103      KM   THE RUNOFF REPRESENTS THE RUNOFF DRAINING INTO THE PROPOSED STORM DRAIN
 104      KM   FROM "LATERAL A-3" AND THE PROPOSED ROOF DRAIN "LATERAL A-5"
 105      BA  .00373
 106      LS       0    98.0
 107      UD    .050

 108      KK    DI-4
 109      KM   RUNOFF FROM BASIN DI-4 DRAINING INTO THE PROPOSED DROP INLET
 110      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-4"
 111      BA  .00206
 112      LS       0    98.0
 113      UD    .050

 114      KK      SD
 115      KM   COMBINE RTND2, RLATA1, DI-3 AND DI-4
 116      KM   TOTAL ONSITE FLOWS DRAINING INTO THE PROPOSED STORM DRAIN
 117      HC       4

 118      KK   RT-SD
 119      KM   ROUTE SD TOWARDS THE 4:12'X4' RCB UNDERNEATH I-15
 120      RK     190   .0025   0.013       0    TRAP     12.     0.0

 121      KK     ND8
 122      KM   RUNOFF GENERATED THROUGH BASIN ND8
 123      BA  .00841
 124      LS       0    98.0
 125      UD    .067

 126      KK    CMD2
 127      KM   COMBINE RTCX1, NX1, ND8 AND RT-SD
 128      KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!FROM THE WEST!!
 129      KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
 130      HC       4

 131      KK     NX3
 132      KM   ONSITE BASIN NX3
 133      BA  .02052
 134      LS       0    95.0
 135      UD    .149
```

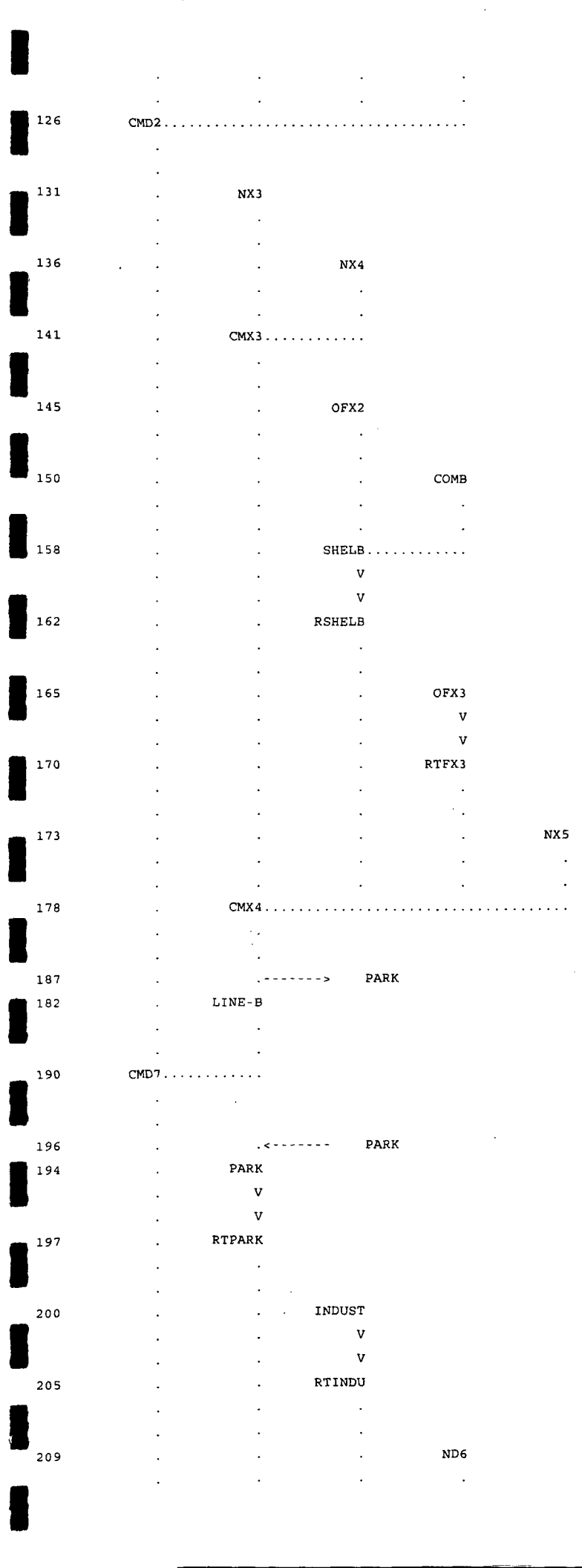
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  136     KK     NX4
  137     KM   ONSITE BASIN NX4
  138     BA  .01543
  139     LS       0    95.0
  140     UD    .133

  141     KK    CMX3
  142     KM   COMBINE NX3 AND NX4
  143     KM   TOTAL RUNOFF DRAINING FROM THE RV PARKING ONTO SHELBORNE CHANNEL
  144     HC       2

  145     KK    OFX2
  146     KM   OFFSITE BASIN OFX2 DRAINING ONTO SHELBORNE CHANNEL
  147     BA  .42188
  148     LS       0    79.0
  149     UD    .596

  150     KK    COMB
  151     KM   COMBINATION POINT COMB AS DETERMINED IN THE BLUE DIAMOND/I-15 NDOT DRAINAGE R
          *
  152     KM   COMB REPRESENTS THE TOTAL RUNOFF GENERATED FROM REFERENCED BASIN A2 AND
  153     KM   FLOWS DIVERTED NORTHEASTERLY ALONG BLUE DIAMOND(I.E, DIVGU2 AND DIVA1)
  154     BA    4.66
  155     KM   BASIN AREA IS [A2(0.32, AT REF.HEC-1 LINE 594)+DUMMY(4.27,AT REF.HEC-1 LINE 2
  156     KM   + A1(0.07, AT REF.HEC-1 LINE 559)]
  157     QI     451     451

  158     KK   SHELB
  159     KM   COMBINE OFX2 AND COMB
  160     KM   TOTAL RUNOFF DRAINING ONTO SHELBORNE CHANNEL AT THE SITE'S WESTERN BOUNDARIES
  161     HC       2

  162     KK  RSHELB
  163     KM   ROUTE SHELB TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  164     RK    1800     .015   0.030        0     TRAP      20.      3.0

  165     KK    OFX3
  166     KM   OFFSITE BASIN OFX3
  167     BA  .03755
  168     LS       0    88.0
  169     UD    .287

  170     KK   RTFX3
  171     KM   ROUTE OFX3 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  172     RK    1800     .015   0.030        0     TRAP      20.      3.0

  173     KK     NX5
  174     KM   ONSITE BASIN NX5
  175     BA  .02089
  176     LS       0    74.2
  177     UD    .311
```

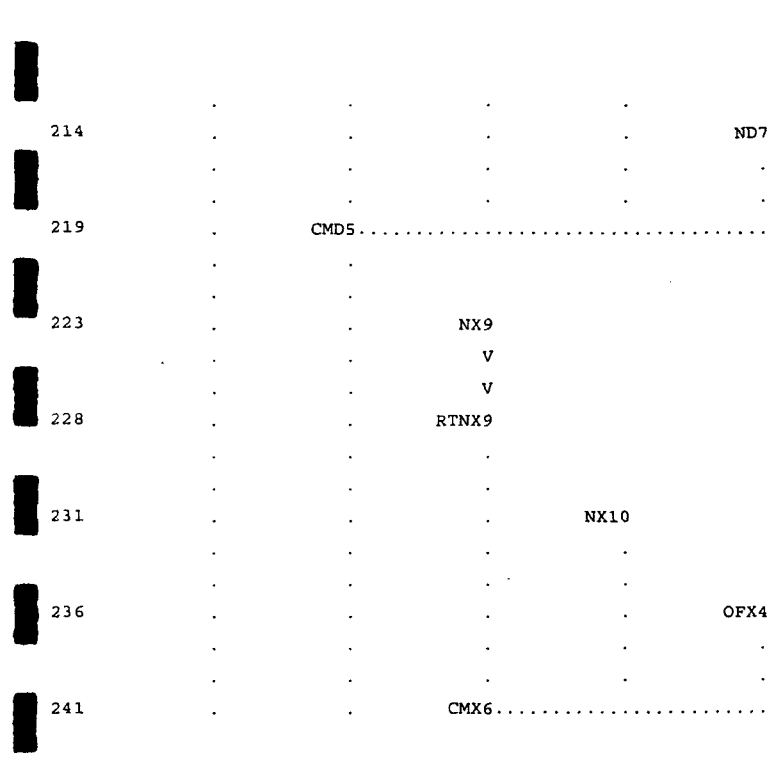
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  178     KK    CMX4
  179     KM   COMBINE CMX3, RSHELB, RTFX3 AND NX5
  180     KM   TOTAL RUNOFF REACHING 2:5.5'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUS
  181     HC       4

  182     KK  LINE-B
  183     KM   DIVERSION FOR FLOWS WITHIN SHELBORN CHANNEL INTO THE 3'X7' RCB (LINE B)
  184     KM   AS DETERMINED FROM THE WSPG ANALYSIS, 170CFS CAN BE CONVEYED WITHIN LINE B
  185     KM   DURING 100-YEAR STORM EVENTS AND THE REMAINING FLOWS WILL OVERTOP INDUSTRIAL
  186     KM   ROAD TOWARDS THE PROPOSED PARKING LOT
  187     DT    PARK
  188     DI       0     126     170     274     646
  189     DQ       0       0       0     104     476

  190     KK    CMD7
  191     KM   COMBINE LINE-B AND CMD2
  192     KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!DIRECTLY FROM THE WE
  193     HC       2

  194     KK    PARK
  195     KM    RECALL  FLOWS OVER-FLOWING INTO THE PARKING LOT
  196     DR    PARK

  197     KK  RTPARK
  198     KM   ROUTE PARK TO I-15 R.O.W THROUGH THE PROPOSED PARKING LOT
  199     RK     600    .010   0.016       0    TRAP      0.    50.0

  200     KK  INDUST
  201     KM   PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  202     BA  .00697
  203     LS       0    98.0
  204     UD    .173

  205     KK  RTINDU
  206     KM   RUNOFF GENERATED THROUGH INDUSTRIAL ROAD WILL WEIR EASTWARD INTO PROPOSED PAR
  207     KM   RUNOFF IS ROUTED THROUGH THE PARKING LOT TO I-15 R.O.W.
  208     RK     600    .010   0.016       0    TRAP      0.    50.0

  209     KK     ND6
  210     KM   DEVELOPED ONSITE BASIN ND6
  211     BA  .00576
  212     LS       0    97.0
  213     UD    .063

  214     KK     ND7
  215     KM   RUNOFF GENERATED THROUGH BASIN ND7
  216     BA  .00658
  217     LS       0    98.0
  218     UD    .055
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 219      KK   CMD5
 220      KM   COMBINE RTPARK, RTINDU, ND6 AND ND7
 221      KM   TOTAL RUNOFF REACHING I-15 R.O.W AT SHELBORNE CHANNEL
 222      HC      4

 223      KK    NX9
 224      KM   ONSITE BASIN NX9
 225      BA  .01758
 226      LS      0    77.0
 227      UD   .255

 228      KK   RTNX9
 229      KM   ROUT RUNOFF FROM BASIN NX9 THROUGH BASIN NX10 TO I-15 R.O.W.
 230      RK    650    .015   0.030       0    TRAP     20.   100.0

 231      KK   NX10
 232      KM   ONSITE BASIN NX10
 233      BA  .00590
 234      LS      0    77.0
 235      UD   .199

 236      KK   OFX4
 237      KM   OFFSITE BASIN OFX4
 238      BA  .05329
 239      LS      0    84.7
 240      UD   .350

 241      KK   CMX6
 242      KM   COMBINE RTNX9, NX10 AND OFX4
 243      KM   TOTAL RUNOFF REACHING I-15 R.O.W AT CAMERO AVENUE ALIGNMENT
 244      HC      3
 245      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK




126
CMD2
131
NX3
136
NX4
141
CMX3
145
OFX2
150
COMB
158
SHELB
162
RSHELB
165
OFX3
170
RTFX3
173
NX5
178
CMX4
187
PARK
182
LINE-B
190
CMD7
196
PARK
194
PARK
197
RTPARK
200
INDUST
205
RTINDU
209
ND6



(***) 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  08/05/03  TIME  09:21:55 *
**************************************
```

```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*          (916) 551-1748            *
*                                    *
**************************************
```

TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6923.2

INPUT FILE NAME: 6923P100.DAT

JULY 2003

```
*************************************************************************
*************************************************************************
     ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

     10 & 100 YEAR - 6 HOUR STORM EVENT
     PRECIPITATION BASED ON TABLE 505
     10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
     100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

     10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570

*************************************************************************

*************************************************************************
```

```
28 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           73  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE       1    0  ENDING DATE
                   NDTIME        0600  ENDING TIME
                   ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL     0.08 HOURS
                      TOTAL TIME BASE     6.00 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 0.99 0.98 0.90

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

					RATIOS APPLIED TO PRECIPITATION			
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4
					1.00	0.99	0.98	0.90
HYDROGRAPH AT	PT4	6.40	1	FLOW	1961.	1961.	1961.	1961.
				TIME	4.08	4.08	4.08	4.08
ROUTED TO	RTPT4	6.40	1	FLOW	1941.	1941.	1941.	1941.
				TIME	4.25	4.25	4.25	4.25
HYDROGRAPH AT	OFX1	0.37	1	FLOW	108.	106.	103.	84.
				TIME	4.17	4.17	4.17	4.17
2 COMBINED AT	CMX1	6.77	1	FLOW	2048.	2045.	2043.	2025.
				TIME	4.25	4.25	4.25	4.25
IVERSION TO	BLUE	6.77	1	FLOW	100.	100.	100.	100.
				TIME	3.17	3.17	3.17	3.17
YDROGRAPH AT	DCMX1	6.77	1	FLOW	1948.	1945.	1943.	1925.
				TIME	4.25	4.25	4.25	4.25
OUTED TO	RTCX1	6.77	1	FLOW	1938.	1936.	1934.	1916.
				TIME	4.33	4.33	4.33	4.33
YDROGRAPH AT	NX1	0.02	1	FLOW	33.	32.	32.	29.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	ND2	0.01	1	FLOW	22.	22.	22.	20.
				TIME	3.50	3.50	3.50	3.50
ROUTED TO	RTND2	0.01	1	FLOW	21.	21.	21.	19.
				TIME	3.50	3.50	3.50	3.50
HYDROGRAPH AT	DI-1	0.00	1	FLOW	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50
HYDROGRAPH AT	DI-2	0.00	1	FLOW	4.	4.	4.	3.
				TIME	3.50	3.50	3.50	3.50
2 COMBINED AT	LAT-A1	0.00	1	FLOW	7.	7.	7.	6.
				TIME	3.50	3.50	3.50	3.50
OUTED TO	RLATA1	0.00	1	FLOW	7.	7.	6.	6.
				TIME	3.50	3.50	3.50	3.50
YDROGRAPH AT	DI-3	0.00	1	FLOW	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50
YDROGRAPH AT	DI-4	0.00	1	FLOW	5.	5.	5.	4.
				TIME	3.50	3.50	3.50	3.50
4 COMBINED AT	SD	0.02	1	FLOW	41.	41.	40.	37.

				TIME	3.50	3.50	3.50	3.50
OUTED TO	RT-SD	0.02	1	FLOW	41.	40.	40.	37.
				TIME	3.50	3.50	3.50	3.50
HYDROGRAPH AT	ND8	0.01	1	FLOW	18.	18.	18.	17.
				TIME	3.50	3.50	3.50	3.50
4 COMBINED AT	CMD2	6.81	1	FLOW	1946.	1943.	1941.	1923.
				TIME	4.33	4.33	4.33	4.33
HYDROGRAPH AT	NX3	0.02	1	FLOW	35.	35.	34.	32.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	NX4	0.02	1	FLOW	27.	27.	26.	24.
				TIME	3.58	3.58	3.58	3.58
2 COMBINED AT	CMX3	0.04	1	FLOW	62.	62.	61.	56.
				TIME	3.58	3.58	3.58	3.58
YDROGRAPH AT	OFX2	0.42	1	FLOW	193.	189.	185.	158.
				TIME	4.08	4.08	4.08	4.08
YDROGRAPH AT	COMB	4.66	1	FLOW	451.	451.	451.	451.
				TIME	0.08	0.08	0.08	0.08
2 COMBINED AT	SHELB	5.08	1	FLOW	644.	640.	636.	609.
				TIME	4.08	4.08	4.08	4.08
OUTED TO	RSHELB	5.08	1	FLOW	642.	639.	635.	608.
				TIME	4.08	4.08	4.08	4.08
HYDROGRAPH AT	OFX3	0.04	1	FLOW	39.	38.	38.	34.
				TIME	3.75	3.75	3.75	3.75
ROUTED TO	RTFX3	0.04	1	FLOW	39.	38.	38.	33.
				TIME	3.75	3.75	3.75	3.75
HYDROGRAPH AT	NX5	0.02	1	FLOW	10.	10.	10.	8.
				TIME	3.75	3.75	3.75	3.83
4 COMBINED AT	CMX4	5.18	1	FLOW	687.	683.	678.	646.
				TIME	4.00	4.00	4.00	4.00
IVERSION TO	PARK	5.18	1	FLOW	517.	513.	508.	476.
				TIME	4.00	4.00	4.00	4.00
YDROGRAPH AT	LINE-B	5.18	1	FLOW	170.	170.	170.	170.
				TIME	0.08	0.08	0.08	0.08
2 COMBINED AT	CMD7	11.99	1	FLOW	2116.	2113.	2111.	2093.
				TIME	4.33	4.33	4.33	4.33
YDROGRAPH AT	PARK	0.00	1	FLOW	517.	513.	508.	476.
				TIME	4.00	4.00	4.00	4.00
OUTED TO	RTPARK	0.00	1	FLOW	516.	512.	508.	475.
				TIME	4.00	4.00	4.00	4.00
HYDROGRAPH AT	INDUST	0.01	1	FLOW	12.	12.	12.	11.

				TIME	3.58	3.58	3.58	3.58
ROUTED TO	RTINDU	0.01	1	FLOW	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	ND6	0.01	1	FLOW	13.	13.	12.	11.
				TIME	3.50	3.50	3.50	3.50
HYDROGRAPH AT	ND7	0.01	1	FLOW	15.	15.	15.	14.
				TIME	3.50	3.50	3.50	3.50
4 COMBINED AT	CMD5	0.02	1	FLOW	524.	520.	516.	483.
				TIME	4.00	4.00	4.00	4.00
HYDROGRAPH AT	NX9	0.02	1	FLOW	11.	11.	11.	9.
				TIME	3.67	3.67	3.67	3.75
OUTED TO	RTNX9	0.02	1	FLOW	11.	11.	11.	9.
				TIME	3.75	3.75	3.75	3.75
YDROGRAPH AT	NX10	0.01	1	FLOW	4.	4.	4.	3.
				TIME	3.67	3.67	3.67	3.67
YDROGRAPH AT	OFX4	0.05	1	FLOW	44.	43.	42.	37.
				TIME	3.75	3.75	3.75	3.83
3 COMBINED AT	CMX6	0.08	1	FLOW	58.	57.	56.	49.
				TIME	3.75	3.75	3.75	3.75

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									
	RTPT4 MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.99									
	RTPT4 MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.98									
	RTPT4 MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.90									
	RTPT4 MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 1.00									
	RTCX1 MANE	0.79	1946.67	256.75	0.63	5.00	1938.38	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2290E+03 EXCESS=0.0000E+00 OUTFLOW=0.2276E+03 BASIN STORAGE=0.1800E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.99									
	RTCX1 MANE	0.79	1944.03	256.82	0.63	5.00	1936.02	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2287E+03 EXCESS=0.0000E+00 OUTFLOW=0.2273E+03 BASIN STORAGE=0.1800E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.98									
	RTCX1 MANE	0.80	1940.89	257.09	0.63	5.00	1933.62	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2284E+03 EXCESS=0.0000E+00 OUTFLOW=0.2270E+03 BASIN STORAGE=0.1799E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.90

```
          RTCX1  MANE         0.81   1923.12    257.06      0.62      5.00   1916.45    260.00        0.62

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2262E+03 EXCESS=0.0000E+00 OUTFLOW=0.2247E+03 BASIN STORAGE=0.1800E+01 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 1.00
          RTND2  MANE         0.74     22.10    211.42      2.54      5.00     20.98    210.00        2.54

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.1493E+01 EXCESS=0.0000E+00 OUTFLOW=0.1493E+01 BASIN STORAGE=0.1188E-02 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.99
          RTND2  MANE         0.74     21.89    211.55      2.51      5.00     20.76    210.00        2.51

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.1476E+01 EXCESS=0.0000E+00 OUTFLOW=0.1476E+01 BASIN STORAGE=0.1174E-02 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.98
          RTND2  MANE         0.78     21.60    211.47      2.48      5.00     20.54    210.00        2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1460E+01 EXCESS=0.0000E+00 OUTFLOW=0.1460E+01 BASIN STORAGE=0.1168E-02 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.90
          RTND2  MANE         0.82     19.83    211.85      2.27      5.00     18.90    210.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1339E+01 EXCESS=0.0000E+00 OUTFLOW=0.1339E+01 BASIN STORAGE=0.1094E-02 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 1.00
          RLATA1 MANE         0.61      6.74    210.84      2.54      5.00      6.60    210.00        2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4005E+00 EXCESS=0.0000E+00 OUTFLOW=0.4006E+00 BASIN STORAGE=0.2298E-03 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.99
          RLATA1 MANE         0.60      6.67    210.98      2.51      5.00      6.53    210.00        2.52

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3961E+00 EXCESS=0.0000E+00 OUTFLOW=0.3962E+00 BASIN STORAGE=0.2260E-03 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.98
          RLATA1 MANE         0.57      6.62    210.76      2.48      5.00      6.47    210.00        2.49

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3918E+00 EXCESS=0.0000E+00 OUTFLOW=0.3918E+00 BASIN STORAGE=0.2235E-03 PERCENT ERROR=   -0.1

        FOR PLAN = 1  RATIO= 0.90
          RLATA1 MANE         0.61      6.09    210.84      2.28      5.00      5.95    210.00        2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3592E+00 EXCESS=0.0000E+00 OUTFLOW=0.3592E+00 BASIN STORAGE=0.2094E-03 PERCENT ERROR=   -0.1
```

FOR PLAN = 1 RATIO= 1.00

RT-SD	MANE	0.30	40.77	210.29	2.54	5.00	40.57	210.00	2.54

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2678E+01 EXCESS=0.0000E+00 OUTFLOW=0.2677E+01 BASIN STORAGE=0.1539E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.99

RT-SD	MANE	0.16	40.53	210.31	2.51	5.00	40.16	210.00	2.51

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2649E+01 EXCESS=0.0000E+00 OUTFLOW=0.2648E+01 BASIN STORAGE=0.1542E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.98

RT-SD	MANE	0.15	40.05	210.21	2.48	5.00	39.74	210.00	2.49

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2620E+01 EXCESS=0.0000E+00 OUTFLOW=0.2619E+01 BASIN STORAGE=0.1511E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.90

RT-SD	MANE	0.14	36.98	210.30	2.28	5.00	36.57	210.00	2.28

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2402E+01 EXCESS=0.0000E+00 OUTFLOW=0.2401E+01 BASIN STORAGE=0.1447E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.00

RSHELB	MANE	0.85	643.21	246.30	0.91	5.00	642.38	245.00	0.91

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2456E+03 EXCESS=0.0000E+00 OUTFLOW=0.2459E+03 BASIN STORAGE=-.7724E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.99

RSHELB	MANE	0.85	639.50	246.30	0.91	5.00	638.66	245.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2452E+03 EXCESS=0.0000E+00 OUTFLOW=0.2455E+03 BASIN STORAGE=-.7731E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.98

RSHELB	MANE	0.85	635.80	246.30	0.90	5.00	634.96	245.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2448E+03 EXCESS=0.0000E+00 OUTFLOW=0.2451E+03 BASIN STORAGE=-.7737E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 0.90

RSHELB	MANE	0.85	608.54	246.30	0.89	5.00	607.65	245.00	0.89

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2417E+03 EXCESS=0.0000E+00 OUTFLOW=0.2420E+03 BASIN STORAGE=-.7786E+00 PERCENT ERROR= 0.2

FOR PLAN = 1 RATIO= 1.00

RTFX3	MANE	1.86	39.03	228.43	1.59	5.00	38.84	225.00	1.59

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.3208E+01 EXCESS=0.0000E+00 OUTFLOW=0.3191E+01 BASIN STORAGE=0.2503E-01 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.99

RTFX3	MANE	1.91	38.39	227.45	1.57	5.00	38.21	225.00	1.56

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.3160E+01 EXCESS=0.0000E+00 OUTFLOW=0.3141E+01 BASIN STORAGE=0.2486E-01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.98

RTFX3	MANE	1.92	37.85	227.90	1.55	5.00	37.71	225.00	1.54

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.3112E+01 EXCESS=0.0000E+00 OUTFLOW=0.3094E+01 BASIN STORAGE=0.2446E-01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.90

RTFX3	MANE	2.11	33.63	227.28	1.37	5.00	33.41	225.00	1.36

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2755E+01 EXCESS=0.0000E+00 OUTFLOW=0.2734E+01 BASIN STORAGE=0.2349E-01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00

RTPARK	MANE	0.43	516.83	241.02	-1.00	5.00	516.30	240.00	-1.00

FOR PLAN = 1 RATIO= 0.99

RTPARK	MANE	0.43	512.46	241.01	-1.00	5.00	511.92	240.00	-1.00

FOR PLAN = 1 RATIO= 0.98

RTPARK	MANE	0.43	508.11	241.01	-1.00	5.00	507.57	240.00	-1.00

FOR PLAN = 1 RATIO= 0.90

RTPARK	MANE	0.43	475.93	241.00	-1.00	5.00	475.41	240.00	-1.00

FOR PLAN = 1 RATIO= 1.00

RTINDU	MANE	1.01	12.23	216.96	2.53	5.00	11.74	215.00	2.53

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.9410E+00 EXCESS=0.0000E+00 OUTFLOW=0.9403E+00 BASIN STORAGE=0.1615E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.99

RTINDU	MANE	1.07	11.99	216.52	2.50	5.00	11.61	215.00	2.50

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.9307E+00 EXCESS=0.0000E+00 OUTFLOW=0.9302E+00 BASIN STORAGE=0.1565E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.98

RTINDU	MANE	1.02	11.97	216.92	2.48	5.00	11.49	215.00	2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9205E+00 EXCESS=0.0000E+00 OUTFLOW=0.9200E+00 BASIN STORAGE=0.1561E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

RTINDU	MANE	1.04	10.97	217.41	2.27	5.00	10.57	215.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8439E+00 EXCESS=0.0000E+00 OUTFLOW=0.8435E+00 BASIN STORAGE=0.1457E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00

RTNX9	MANE	1.88	11.07	223.83	0.90	5.00	11.07	225.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8497E+00 EXCESS=0.0000E+00 OUTFLOW=0.8465E+00 BASIN STORAGE=0.4708E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.99

RTNX9	MANE	1.75	10.84	224.16	0.88	5.00	10.84	225.00	0.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8326E+00 EXCESS=0.0000E+00 OUTFLOW=0.8276E+00 BASIN STORAGE=0.4848E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.98

RTNX9	MANE	1.81	10.61	224.80	0.87	5.00	10.61	225.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8156E+00 EXCESS=0.0000E+00 OUTFLOW=0.8117E+00 BASIN STORAGE=0.4688E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

RTNX9	MANE	1.86	8.96	227.03	0.73	5.00	8.92	225.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6913E+00 EXCESS=0.0000E+00 OUTFLOW=0.6874E+00 BASIN STORAGE=0.4298E-02 PERCENT ERROR= -0.1

*** NORMAL END OF HEC-1 ***

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

10-Year Storm Events,
6-Hour Storms
Future Condition

FILE: 6923P10.DAT

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*           MAY  1991                *
*         VERSION 4.0.1E             *
*    Lahey F77L-EM/32 version 5.01   *
*      Dodson & Associates, Inc.     *
*  RUN DATE 08/05/03  TIME 09:21:39  *
*                                    *
**************************************
```


```
**************************************
*                                    *
*   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        TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
    2     ID        BASS PRO SHOPS
    3     ID        PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
    4     ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
    5     ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
    6     ID        LOCHSA JOB# 6923.2
    7     ID
    8     ID
    9     ID        INPUT FILE NAME:  6923P10.DAT
   10     ID
   11     ID    JULY 2003
   12     ID
   13     ID        **************************************************************************
   14     ID        **************************************************************************
   15     ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
   16     ID
   17     ID             10 & 100 YEAR - 6 HOUR STORM EVENT
   18     ID             PRECIPITATION BASED ON TABLE 505
   19     ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
   20     ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
   21     ID
   22     ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
   23     ID             10-YEAR USING A 0.905 DARF             =.57 * 0.905= 0.520
   24     ID
   25     ID        **************************************************************************
   26     ID
   27     ID        **************************************************************************
          *DIAGRAM
   28     IT       5                    73
   29     IO       5       0
   30     IN       5
   31     JR    PREC    0.57   0.520

   32     KK     PT4
   33     KM   COMBINED RUNOFF AT THE 40'X 7' BRIDGE AT UPRR AS DETERMINED FROM THE
   34     KM   2002 DUCK CREEK/BLUE DIAMOND WASHES FIS RESTUDY, BY G.C.WALLACE
   35     KM   NOTE: THE 100-YEAR HYDROGRAPH IS USED SINCE NO 10-YEAR INFO WAS AVAILABLE
   36     KM         FOR PT4. THEREFORE, CMX1 AND CMX2 DOES NOT REFLECT THE 10-YEAR STORM
   37     KM         AND WERE LEFT IN THIS HEC-1 JUST TO MAINTAIN THE SAME FORMAT THAT WAS
   38     KM         PROVIDED FOR THE 100-YEAR STORM.
   39     BA     6.4
   40     QI     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
   41     QI     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
   42     QI     0.0     0.0      1.      7.     14.    29.0    45.0    58.0    69.0    76.0
   43     QI    82.0    87.0    91.0    96.0    102.   104.0   106.0   106.    109.    113.
   44     QI    126.    153.    204.    320.    569.    912.   1287.   1623.   1853.   1961.
   45     QI   1958.   1874.   1745.   1596.   1458.   1343.   1259.   1210.   1192.   1196.
   46     QI   1212.   1232.   1243.   1238.   1204.   1137.   1045.   940.0   831.0   725.0
   47     QI    628.    541.    466.
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  48      KK   RTPT4
  49      KM   ROUTE PT4 THROUGH BASIN OFX1
  50      RK    9500    .015   0.030       0    TRAP     10.    20.0

  51      KK    OFX1
  52      KM   OFFSITE BASIN OFX1
  53      PB    2.77
  54      PC     0.0     .02    .057     .07    .087    .108    .124     .13     .13     .13
  55      PC     .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
  56      PC     .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
  57      PC    .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
  58      PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
  59      PC     .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
  60      PC    .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
  61      PC    .998    .999     1.0
  62      BA  .36875
  63      LS       0    72.9
  64      UD    .651

  65      KK    CMX1
  66      KM   COMBINE RTPT4 AND OFX1 (TOTAL OFFSITE RUNOF IMPACTING SILVERTON)
  67      KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  68      KM   NOTE :CMX1 DOES NOT REFLECT THE 10-YEAR STORM EVENTS SINCE THE 100-YEAR
  69      KM         HYDROGRAPH WAS USED FOR PT4
  70      HC       2

  71      KK   DCMX1
  72      DT    BLUE
  73      DI       0     100    1900
  74      DQ       0     100     100

  75      KK   RTCX1
  76      KM   ROUTE CMX1 THROUGH BASIN THROUGH THE PARKING LOT NORTH OF SILVERTON HOTEL/CAS
  77      RK    1700    .008   0.016       0    TRAP      2.    25.0

  78      KK     NX1
  79      KM   ONSITE BASIN NX1
  80      BA  .01754
  81      LS       0    98.0
  82      UD    .121

  83      KK     ND2
  84      KM   RUNOFF GENERATED THROUGH BASIN ND2
  85      BA  .01104
  86      LS       0    98.0
  87      UD    .096

  88      KK   RTND2
  89      KM   ROUTE ND2 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  90      RK     950   .0025   0.013       0    CIRC      6.
```

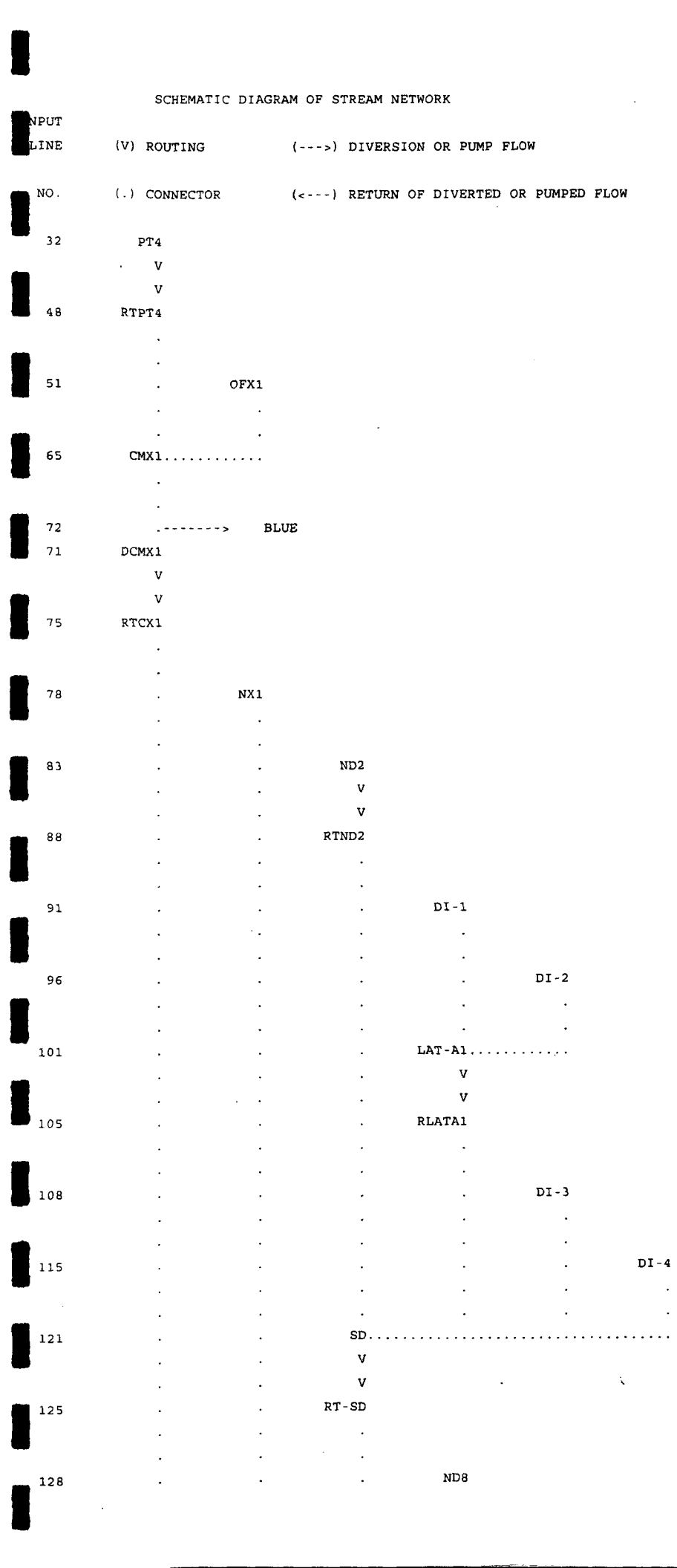
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  91      KK    DI-1
  92      KM   RUNOFF FROM BASIN DI-1 DRAINING INTO THE PROPOSED DROP INLET
  93      BA  .00130
  94      LS       0    98.0
  95      UD    .050

  96      KK    DI-2
  97      KM   RUNOFF FROM BASIN DI-2 DRAINING INTO THE PROPOSED DROP INLET
  98      BA  .00166
  99      LS       0    98.0
 100      UD    .050

 101      KK  LAT-A1
 102      KM   COMBINE DI-1 AND DI-2
 103      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-1"
 104      HC       2

 105      KK  RLATA1
 106      KM   ROUTE LAT-A1 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
 107      RK     500   .0025   0.013       0    CIRC      6.

 108      KK    DI-3
 109      KM   RUNOFF FROM BASIN DI-3 DRAINING INTO THE PROPOSED DROP INLET
 110      KM   THE RUNOFF REPRESENTS THE RUNOFF DRAINING INTO THE PROPOSED STORM DRAIN
 111      KM   FROM "LATERAL A-3" AND THE PROPOSED ROOF DRAIN "LATERAL A-5"
 112      BA  .00373
 113      LS       0    98.0
 114      UD    .050

 115      KK    DI-4
 116      KM   RUNOFF FROM BASIN DI-4 DRAINING INTO THE PROPOSED DROP INLET
 117      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-4"
 118      BA  .00206
 119      LS       0    98.0
 120      UD    .050

 121      KK      SD
 122      KM   COMBINE RTND2, RLATA1, DI-3 AND DI-4
 123      KM   TOTAL ONSITE FLOWS DRAINING INTO THE PROPOSED STORM DRAIN
 124      HC       4

 125      KK   RT-SD
 126      KM   ROUTE SD TOWARDS THE 4:12'X4' RCB UNDERNEATH I-15
 127      RK     190   .0025   0.013       0    TRAP     12.     0.0

 128      KK     ND8
 129      KM   RUNOFF GENERATED THROUGH BASIN ND8
 130      BA  .00841
 131      LS       0    98.0
 132      UD    .067
```

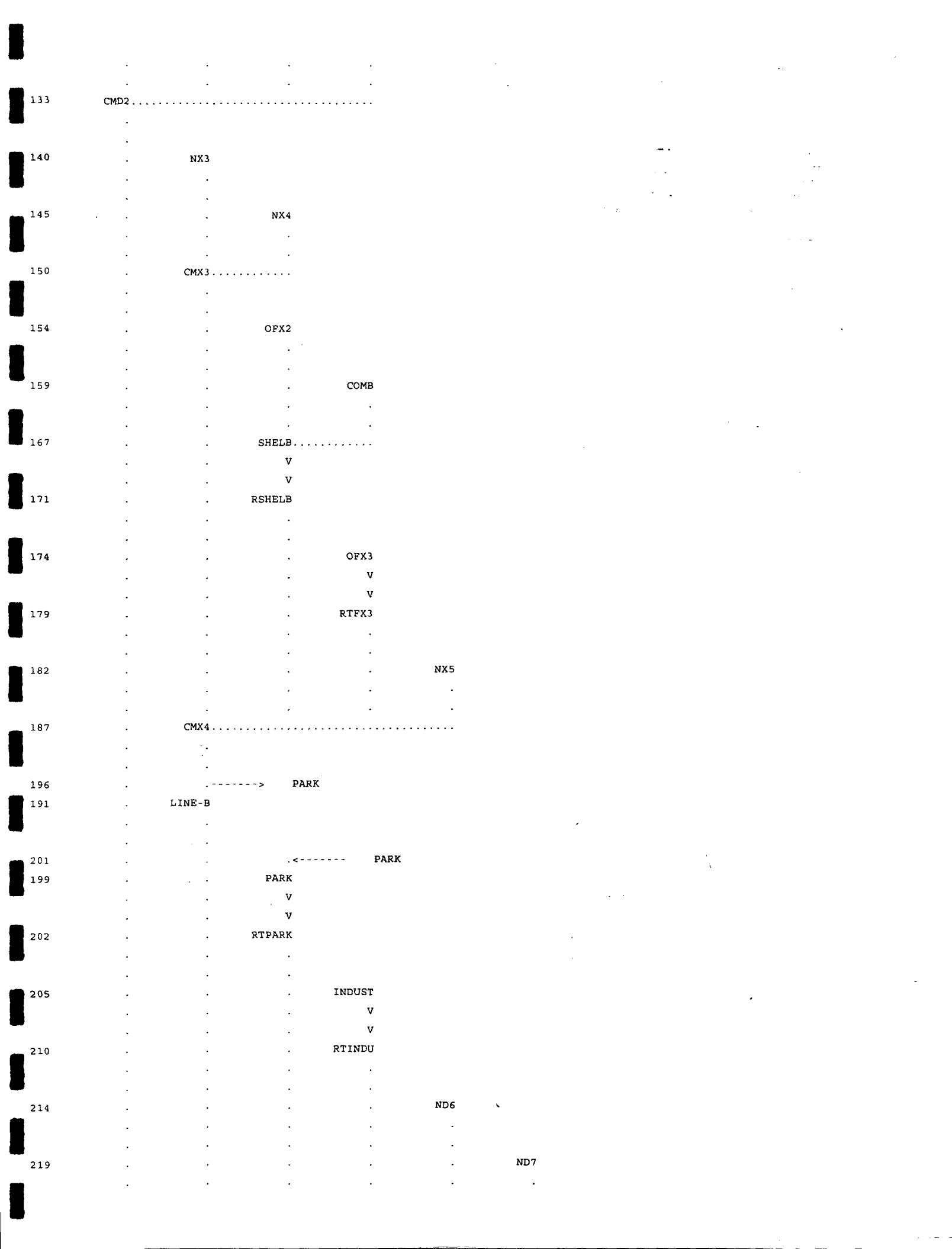
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  133     KK    CMD2
  134     KM   COMBINE RTCX1, NX1, ND8 AND RT-SD
  135     KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15!FROM THE WEST!!
  136     KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  137     KM   NOTE :CMD2 DOES NOT REFLECT THE 10-YEAR STORM EVENTS SINCE THE 100-YEAR
  138     KM         HYDROGRAPH WAS USED FOR PT4
  139     HC       4

  140     KK    NX3
  141     KM   ONSITE BASIN NX3
  142     BA  .02052
  143     LS       0    95.0
  144     UD    .149

  145     KK    NX4
  146     KM   ONSITE BASIN NX4
  147     BA  .01543
  148     LS       0    95.0
  149     UD    .133

  150     KK    CMX3
  151     KM   COMBINE NX3 AND NX4
  152     KM   TOTAL RUNOFF DRAINING FROM THE RV PARKING ONTO SHELBORNE CHANNEL
  153     HC       2

  154     KK    OFX2
  155     KM   OFFSITE BASIN OFX2 DRAINING ONTO SHELBORNE CHANNEL
  156     BA  .42188
  157     LS       0    79.0
  158     UD    .596

  159     KK    COMB
  160     KM   COMBINATION POINT COMB AS DETERMINED IN THE BLUE DIAMOND/I-15 NDOT DRAINAGE R
          *
  161     KM   COMB REPRESENTS THE TOTAL RUNOFF GENERATED FROM REFERENCED BASIN A2 AND
  162     KM   FLOWS DIVERTED NORTHEASTERLY ALONG BLUE DIAMOND(I.E, DIVGU2 AND DIVA1)
  163     BA    4.66
  164     KM   BASIN AREA IS [A2(0.32, AT REF.HEC-1 LINE 594)+DUMMY(4.27,AT REF.HEC-1 LINE 2
  165     KM   + A1(0.07, AT REF.HEC-1 LINE 559)]
  166     QI     220    220

  167     KK   SHELB
  168     KM   COMBINE OFX2 AND COMB
  169     KM   TOTAL RUNOFF DRAINING ONTO SHELBORNE CHANNEL AT THE SITE'S WESTERN BOUNDARIES
  170     HC       2

  171     KK  RSHELB
  172     KM   ROUTE SHELB TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  173     RK    1800     .015   0.030        0    TRAP     20.      3.0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  174     KK    OFX3
  175     KM   OFFSITE BASIN OFX3
  176     BA  .03755
  177     LS       0    88.0
  178     UD    .287

  179     KK   RTFX3
  180     KM   ROUTE OFX3 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  181     RK    1800    .015   0.030       0    TRAP     20.     3.0

  182     KK     NX5
  183     KM   ONSITE BASIN NX5
  184     BA  .02089
  185     LS       0    74.2
  186     UD    .311

  187     KK    CMX4
  188     KM   COMBINE CMX3, RSHELB,RTFX3 AND NX5
  189     KM   TOTAL RUNOFF REACHING 2:5.5'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUS
  190     HC       4

  191     KK  LINE-B
  192     KM   DIVERSION FOR FLOWS WITHIN SHELBORN CHANNEL INTO THE 3'X7' RCB (LINE B)
  193     KM   AS DETERMINED FROM THE WSPG ANALYSIS, 170CFS CAN BE CONVEYED WITHIN LINE B
  194     KM   DURING 100-YEAR STORM EVENTS AND THE REMAINING FLOWS WILL OVERTOP INDUSTRIAL
  195     KM   ROAD TOWARDS THE PROPOSED PARKING LOT
  196     DT    PARK
  197     DI       0     126     170     274     646
  198     DQ       0       0       0     104     476

  199     KK    PARK
  200     KM    RECALL  FLOWS OVER-FLOWING INTO THE PARKING LOT
  201     DR    PARK

  202     KK  RTPARK
  203     KM   ROUTE PARK TO I-15 R.O.W THROUGH THE PROPOSED PARKING LOT
  204     RK     600    .010   0.016       0    TRAP      0.    50.0

  205     KK  INDUST
  206     KM   PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  207     BA  .00697
  208     LS       0    98.0
  209     UD    .173

  210     KK  RTINDU
  211     KM   RUNOFF GENERATED THROUGH INDUSTRIAL ROAD WILL WEIR EASTWARD INTO PROPOSED PAR
  212     KM   RUNOFF IS ROUTED THROUGH THE PARKING LOT TO I-15 R.O.W.
  213     RK     600    .010   0.016       0    TRAP      0.    50.0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  214     KK     ND6
  215     KM   DEVELOPED ONSITE BASIN ND6
  216     BA  .00576
  217     LS       0    97.0
  218     UD    .063

  219     KK     ND7
  220     KM   RUNOFF GENERATED THROUGH BASIN ND7
  221     BA  .00658
  222     LS       0    98.0
  223     UD    .055

  224     KK    CMD5
  225     KM   COMBINE RTPARK, RTINDU, ND6 AND ND7
  226     KM   TOTAL RUNOFF REACHING I-15 R.O.W AT SHELBORNE CHANNEL
  227     HC       4

  228     KK     NX9
  229     KM   ONSITE BASIN NX9
  230     BA  .01758
  231     LS       0    77.0
  232     UD    .255

  233     KK   RTNX9
  234     KM   ROUT RUNOFF FROM BASIN NX9 THROUGH BASIN NX10 TO I-15 R.O.W.
  235     RK     650    .015   0.030       0    TRAP     20.   100.0

  236     KK    NX10
  237     KM   ONSITE BASIN NX10
  238     BA  .00590
  239     LS       0    77.0
  240     UD    .199

  241     KK    OFX4
  242     KM   OFFSITE BASIN OFX4
  243     BA  .05329
  244     LS       0    84.7
  245     UD    .350

  246     KK    CMX6
  247     KM   COMBINE RTNX9, NX10 AND OFX4
  248     KM   TOTAL RUNOFF REACHING I-15 R.O.W AT CAMERO AVENUE ALIGNMENT
  249     HC       3
  250     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK




133
CMD2
140
NX3
145
NX4
150
CMX3
154
OFX2
159
COMB
167
SHELB
171
RSHELB
174
OFX3
179
RTFX3
182
NX5
187
CMX4
196
PARK
191
LINE-B
201
PARK
199
PARK
202
RTPARK
205
INDUST
210
RTINDU
214
ND6
219
ND7

```
                .         .         .         .         .         .
224             .         .      CMD5.....................................
                .         .         .
                .         .         .
228             .         .         .        NX9
                .         .         .         V
                .         .         .         V
233             .         .         .      RTNX9
                .         .         .         .
                .         .         .         .
236             .         .         .         .       NX10
                .         .         .         .         .
                .         .         .         .         .
241             .         .         .         .         .       OFX4
                .         .         .         .         .         .
                .         .         .         .         .         .
246             .         .         .      CMX6.....................
```

(***) 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 08/05/03  TIME 09:21:39   *
**************************************
```

```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*         (916) 551-1748             *
*                                    *
**************************************
```

TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6923.2

INPUT FILE NAME: 6923P10.DAT

JULY 2003

```
**********************************************************************
**********************************************************************
```

ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

10 & 100 YEAR - 6 HOUR STORM EVENT
PRECIPITATION BASED ON TABLE 505
10-YEAR ADJUSTED RAINFALL DEPTH = 1.58in
100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
10-YEAR USING A 0.905 DARF =.57 * 0.905= 0.520

```
**********************************************************************

**********************************************************************
```

29 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		73	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		0600	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 6.00 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

0.57 0.52

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

					RATIOS APPLIED TO PRECIPITATION	
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2
					0.57	0.52
HYDROGRAPH AT	PT4	6.40	1	FLOW	1961.	1961.
				TIME	4.08	4.08
ROUTED TO	RTPT4	6.40	1	FLOW	1941.	1941.
				TIME	4.25	4.25
HYDROGRAPH AT	OFX1	0.37	1	FLOW	19.	13.
				TIME	4.33	4.33
2 COMBINED AT	CMX1	6.77	1	FLOW	1960.	1954.
				TIME	4.25	4.25
IVERSION TO	BLUE	6.77	1	FLOW	100.	100.
				TIME	3.17	3.17
YDROGRAPH AT	DCMX1	6.77	1	FLOW	1860.	1854.
				TIME	4.25	4.25
OUTED TO	RTCX1	6.77	1	FLOW	1855.	1848.
				TIME	4.33	4.33
YDROGRAPH AT	NX1	0.02	1	FLOW	18.	16.
				TIME	3.58	3.58
HYDROGRAPH AT	ND2	0.01	1	FLOW	12.	11.
				TIME	3.50	3.50
ROUTED TO	RTND2	0.01	1	FLOW	12.	10.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-1	0.00	1	FLOW	2.	2.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-2	0.00	1	FLOW	2.	2.
				TIME	3.50	3.50
2 COMBINED AT	LAT-A1	0.00	1	FLOW	4.	3.
				TIME	3.50	3.50
OUTED TO	RLATA1	0.00	1	FLOW	4.	3.
				TIME	3.50	3.50
YDROGRAPH AT	DI-3	0.00	1	FLOW	5.	4.
				TIME	3.50	3.50
YDROGRAPH AT	DI-4	0.00	1	FLOW	3.	2.
				TIME	3.50	3.50
4 COMBINED AT	SD	0.02	1	FLOW	23.	21.

				TIME	3.50	3.50
OUTED TO	RT-SD	0.02	1	FLOW	22.	20.
				TIME	3.50	3.50
YDROGRAPH AT	ND8	0.01	1	FLOW	10.	9.
				TIME	3.50	3.50
4 COMBINED AT	CMD2	6.81	1	FLOW	1859.	1852.
				TIME	4.33	4.33
HYDROGRAPH AT	NX3	0.02	1	FLOW	18.	16.
				TIME	3.58	3.58
HYDROGRAPH AT	NX4	0.02	1	FLOW	14.	12.
				TIME	3.58	3.58
2 COMBINED AT	CMX3	0.04	1	FLOW	32.	28.
				TIME	3.58	3.58
YDROGRAPH AT	OFX2	0.42	1	FLOW	52.	39.
				TIME	4.17	4.17
YDROGRAPH AT	COMB	4.66	1	FLOW	220.	220.
				TIME	0.08	0.08
2 COMBINED AT	SHELB	5.08	1	FLOW	272.	259.
				TIME	4.17	4.17
OUTED TO	RSHELB	5.08	1	FLOW	271.	259.
				TIME	4.17	4.17
YDROGRAPH AT	OFX3	0.04	1	FLOW	16.	13.
				TIME	3.75	3.75
ROUTED TO	RTFX3	0.04	1	FLOW	16.	13.
				TIME	3.83	3.83
HYDROGRAPH AT	NX5	0.02	1	FLOW	2.	1.
				TIME	3.83	3.92
4 COMBINED AT	CMX4	5.18	1	FLOW	289.	274.
				TIME	4.08	4.08
IVERSION TO	PARK	5.18	1	FLOW	119.	104.
				TIME	4.08	4.08
YDROGRAPH AT	LINE-B	5.18	1	FLOW	170.	170.
				TIME	0.08	0.08
YDROGRAPH AT	PARK	0.00	1	FLOW	119.	104.
				TIME	4.08	4.08
OUTED TO	RTPARK	0.00	1	FLOW	118.	103.
				TIME	4.08	4.08
YDROGRAPH AT	INDUST	0.01	1	FLOW	7.	6.
				TIME	3.58	3.58
ROUTED TO	RTINDU	0.01	1	FLOW	6.	6.

				TIME	3.58	3.58
YDROGRAPH AT	ND6	0.01	1	FLOW	7.	6.
				TIME	3.50	3.50
YDROGRAPH AT	ND7	0.01	1	FLOW	8.	8.
				TIME	3.50	3.50
4 COMBINED AT	CMD5	0.02	1	FLOW	122.	107.
				TIME	4.00	4.00
HYDROGRAPH AT	NX9	0.02	1	FLOW	3.	2.
				TIME	3.75	3.75
ROUTED TO	RTNX9	0.02	1	FLOW	3.	2.
				TIME	3.83	3.92
HYDROGRAPH AT	NX10	0.01	1	FLOW	1.	1.
				TIME	3.67	3.75
YDROGRAPH AT	OFX4	0.05	1	FLOW	16.	13.
				TIME	3.83	3.83
3 COMBINED AT	CMX6	0.08	1	FLOW	19.	15.
				TIME	3.83	3.83

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= 0.57									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.52									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.57									
RTCX1	MANE	0.78	1859.31	257.02	0.60	5.00	1854.63	260.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2186E+03 EXCESS=0.0000E+00 OUTFLOW=0.2169E+03 BASIN STORAGE=0.1778E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52									
RTCX1	MANE	0.78	1852.82	257.09	0.60	5.00	1848.32	260.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2178E+03 EXCESS=0.0000E+00 OUTFLOW=0.2163E+03 BASIN STORAGE=0.1770E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RTND2	MANE	0.94	12.20	211.71	1.36	5.00	11.54	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7981E+00 EXCESS=0.0000E+00 OUTFLOW=0.7980E+00 BASIN STORAGE=0.7517E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52									
RTND2	MANE	0.98	10.99	212.37	1.22	5.00	10.44	210.00	1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7179E+00 EXCESS=0.0000E+00 OUTFLOW=0.7179E+00 BASIN STORAGE=0.6977E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RLATA1	MANE	0.55	3.78	211.25	1.36	5.00	3.66	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2141E+00 EXCESS=0.0000E+00 OUTFLOW=0.2142E+00 BASIN STORAGE=0.1436E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RLATA1	MANE	0.56	3.45	210.89	1.22	5.00	3.32	210.00	1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1926E+00 EXCESS=0.0000E+00 OUTFLOW=0.1927E+00 BASIN STORAGE=0.1341E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57

RT-SD	MANE	0.24	22.58	210.40	1.36	5.00	22.37	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1431E+01 EXCESS=0.0000E+00 OUTFLOW=0.1431E+01 BASIN STORAGE=0.1116E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.52

RT-SD	MANE	0.26	20.43	210.50	1.22	5.00	20.24	210.00	1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1288E+01 EXCESS=0.0000E+00 OUTFLOW=0.1287E+01 BASIN STORAGE=0.1041E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57

RSHELB	MANE	1.07	271.62	251.71	0.43	5.00	271.45	250.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1154E+03 EXCESS=0.0000E+00 OUTFLOW=0.1155E+03 BASIN STORAGE=-.4807E+00 PERCENT ERROR= 0.3

FOR PLAN = 1 RATIO= 0.52

RSHELB	MANE	1.07	259.27	251.71	0.42	5.00	259.01	250.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1140E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=-.4843E+00 PERCENT ERROR= 0.3

FOR PLAN = 1 RATIO= 0.57

RTFX3	MANE	2.53	15.86	229.75	0.63	5.00	15.82	230.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1267E+01 EXCESS=0.0000E+00 OUTFLOW=0.1253E+01 BASIN STORAGE=0.1579E-01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTFX3	MANE	2.79	13.32	230.01	0.53	5.00	13.32	230.00	0.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1067E+01 EXCESS=0.0000E+00 OUTFLOW=0.1052E+01 BASIN STORAGE=0.1512E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57

RTPARK	MANE	0.66	118.51	245.81	-1.00	5.00	118.49	245.00	-1.00

FOR PLAN = 1 RATIO= 0.52

RTPARK	MANE	0.66	103.53	245.81	-1.00	5.00	103.49	245.00	-1.00

FOR PLAN = 1 RATIO= 0.57

RTINDU	MANE	1.21	6.76	217.19	1.35	5.00	6.45	215.00	1.35

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.5031E+00 EXCESS=0.0000E+00 OUTFLOW=0.5025E+00 BASIN STORAGE=0.1060E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTINDU	MANE	1.25	6.11	217.22	1.22	5.00	5.83	215.00	1.22

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.4525E+00 EXCESS=0.0000E+00 OUTFLOW=0.4523E+00 BASIN STORAGE=0.9371E-03 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.57

RTNX9	MANE	2.58	2.67	230.93	0.24	5.00	2.65	230.00	0.24

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.2246E+00 EXCESS=0.0000E+00 OUTFLOW=0.2226E+00 BASIN STORAGE=0.2301E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTNX9	MANE	2.73	1.95	232.60	0.18	5.00	1.94	235.00	0.18

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.1715E+00 EXCESS=0.0000E+00 OUTFLOW=0.1695E+00 BASIN STORAGE=0.2042E-02 PERCENT ERROR= 0.0

** NORMAL END OF HEC-1 ***

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

10- &100-Year Storm Events,
6-Hour Storms
Future Condition

FILE: 6923F.DAT

FLOOD HYDROGRAPH PACKAGE (HEC-1)
MAY 1991
VERSION 4.0.1E
Lahey F77L-EM/32 version 5.01
Dodson & Associates, Inc.
RUN DATE 08/04/03 TIME 15:58:38

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        TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
    2     ID        BASS PRO SHOPS
    3     ID        PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
    4     ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
    5     ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
    6     ID        LOCHSA JOB# 6923.2
    7     ID
    8     ID
    9     ID        INPUT FILE NAME:  6923F.DAT
   10     ID
   11     ID    JULY 2003
   12     ID
   13     ID        **************************************************************************
   14     ID        **************************************************************************
   15     ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
   16     ID
   17     ID             10 & 100 YEAR - 6 HOUR STORM EVENT
   18     ID             PRECIPITATION BASED ON TABLE 505
   19     ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
   20     ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
   21     ID
   22     ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
   23     ID
   24     ID        **************************************************************************
   25     ID
   26     ID        **************************************************************************
          *DIAGRAM
   27     IT       5                    73
   28     IO       5       0
   29     IN       5
   30     JR     PREC    0.57   1.000

   31     KK      NX1
   32     KM    ONSITE BASIN NX1
   33     PB     2.77
   34     PC      0.0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   35     PC      .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
   36     PC      .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
   37     PC     .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
   38     PC     .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
   39     PC      .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
   40     PC     .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
   41     PC     .998    .999     1.0
   42     BA   .01754
   43     LS       0    98.0
   44     UD    .121

   45     KK      ND2
   46     KM    RUNOFF GENERATED THROUGH BASIN ND2
   47     BA   .01104
   48     LS       0    98.0
   49     UD    .096
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  50      KK   RTND2
  51      KM   ROUTE ND2 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  52      RK     950    .0025    0.013        0     CIRC       6.

  53      KK    DI-1
  54      KM   RUNOFF FROM BASIN DI-1 DRAINING INTO THE PROPOSED DROP INLET
  55      BA  .00130
  56      LS        0     98.0
  57      UD    .050

  58      KK    DI-2
  59      KM   RUNOFF FROM BASIN DI-2 DRAINING INTO THE PROPOSED DROP INLET
  60      BA  .00166
  61      LS        0     98.0
  62      UD    .050

  63      KK  LAT-A1
  64      KM   COMBINE DI-1 AND DI-2
  65      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-1"
  66      HC        2

  67      KK  RLATA1
  68      KM   ROUTE LAT-A1 TO DI-3 AND DI-4 THROUGH THE PROPOSED STORM DRAIN
  69      RK     500    .0025    0.013        0     CIRC       6.

  70      KK    DI-3
  71      KM   RUNOFF FROM BASIN DI-3 DRAINING INTO THE PROPOSED DROP INLET
  72      KM   THE RUNOFF REPRESENTS THE RUNOFF DRAINING INTO THE PROPOSED STORM DRAIN
  73      KM   FROM "LATERAL A-3" AND THE PROPOSED ROOF DRAIN "LATERAL A-5"
  74      BA  .00373
  75      LS        0     98.0
  76      UD    .050

  77      KK    DI-4
  78      KM   RUNOFF FROM BASIN DI-4 DRAINING INTO THE PROPOSED DROP INLET
  79      KM   FLOW DRAINING INTO THE PROPOSED STORM DRAIN THROUGH "LATERAL A-4"
  80      BA  .00206
  81      LS        0     98.0
  82      UD    .050

  83      KK      SD
  84      KM   COMBINE RTND2, RLATA1, DI-3 AND DI-4
  85      KM   TOTAL ONSITE FLOWS DRAINING INTO THE PROPOSED STORM DRAIN
  86      HC        4

  87      KK   RT-SD
  88      KM   ROUTE SD TOWARDS THE 4:12'X4' RCB UNDERNEATH I-15
  89      RK     190    .0025    0.013        0     TRAP      12.      0.0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  90      KK     ND8
  91      KM   RUNOFF GENERATED THROUGH BASIN ND8
  92      BA  .00841
  93      LS       0    98.0
  94      UD    .067

  95      KK    CMF2
  96      KM   COMBINE NX1, ND8 AND RT-SD
  97      KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!FROM THE WEST!!
  98      KM   NOTE: IN FUTURE CONDITIONS THE LOWER BLUE DIAMOND DETENTION BASIN(DCBD 0421)
  99      KM         AND THE PROPOSED REGIONAL 72-INCH RCP WILL INTERCEPT ALL OFFSITE FLOWS
 100      KM         PREVIOUSLY IMPACTING SILVERTON (PER THE 2002 MPU)
 101      HC       3

 102      KK     NX3
 103      KM   ONSITE BASIN NX3 (ALREADY DEVELOPED)
 104      BA  .02052
 105      LS       0    95.0
 106      UD    .149

 107      KK     NX4
 108      KM   ONSITE BASIN NX4 (ALREADY DEVELOPED)
 109      BA  .01543
 110      LS       0    95.0
 111      UD    .133

 112      KK    CMF3
 113      KM   COMBINE NX3 AND NX4
 114      KM   TOTAL RUNOFF DRAINING FROM THE RV PARKING ONTO SHELBORNE CHANNEL
 115      HC       2

 116      KK    OFD2
 117      KM   FUTURE DEVELOPED OFFSITE BASIN OFD2 DRAINING ONTO SHELBORNE CHANNEL
 118      KM   NOTE: IN FUTURE DEVELOPMENT OF THE BLUE DIAMOND ROAD,
 119      KM         RUNOFF FLOWS WEST OF BLUE DIAMOND WILL BE CONVEYED ALONG THE ROAD
 120      KM         TOWARD THE PROPOSED REGIONAL 72-INCH RCP (DCBD 0221)
 121      KM         AS SHOWN IN THE 2002 MPU HYDROLGIC ANALYSIS & FIGURE H-20
 122      KM   THEREFORE, ONLY THE PORTION OF OFX2 EAST OF BLUE DIAMOND DRAINS INTO
 123      KM   SHELBORNE CHANNEL IN THE FUTURE
 124      BA  .06609
 125      LS       0    93.8
 126      UD    .147

 127      KK  RTOFD2
 128      KM   ROUTE OFD2 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
 129      RK    1800    .015   0.030       0    TRAP     20.     3.0

 130      KK    OFD3
 131      KM   FUTURE DEVELOPED OFFSITE BASIN OFD3
 132      BA  .03755
 133      LS       0    95.0
 134      UD    .161
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  135     KK   RTFD3
  136     KM   ROUTE OFD3 TO INDUSTRIAL ROAD THROUGH THE SHELBORNE CHANNEL
  137     RK    1800    .015   0.030       0    TRAP     20.      3.0

  138     KK    ND5
  139     KM   FUTURE DEVELOPED ONSITE BASIN ND5
  140     BA  .02089
  141     LS       0    91.4
  142     UD    .155

  143     KK    CMF4
  144     KM   COMBINE CMF3, RTFD2,RTFD3 AND ND5
  145     KM   TOTAL RUNOFF REACHING 2:5.5'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUS
  146     HC       4

  147     KK  LINE-B
  148     KM   DIVERSION FOR FLOWS WITHIN SHELBORN CHANNEL INTO THE 3'X7' RCB (LINE B)
  149     KM   AS DETERMINED FROM THE WSPG ANALYSIS, 170CFS CAN BE CONVEYED WITHIN LINE B
  150     KM   DURING 100-YEAR STORM EVENTS AND THE REMAINING FLOWS WILL OVERTOP INDUSTRIAL
  151     KM   ROAD TOWARDS THE PROPOSED PARKING LOT
  152     DT    PARK
  153     DI       0     126     170     258
  154     DQ       0       0       0      88

  155     KK  RLINEB
  156     KM   ROUTE LINE-B TO I-15 R.O.W THROUGH THE PROPOSED 7'X3' RCB
  157     RK     650   .0025   0.013       0    TRAP      7.     0.0

  158     KK    CMF7
  159     KM   COMBINE RLINEB AND CMF2
  160     KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!DIRECTLY FROM THE WE
  161     HC       2

  162     KK    PARK
  163     KM    RECALL  FLOWS OVER-FLOWING INTO THE PARKING LOT
  164     DR    PARK

  165     KK  INDUST
  166     KM   PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  167     BA  .00697
  168     LS       0    98.0
  169     UD    .173

  170     KK  RTINDU
  171     KM   RUNOFF IS ROUTED THROUGH THE PARKING LOT TO I-15 R.O.W.
  172     RK     600   .0100   0.016       0    TRAP      0.    50.0

  173     KK    ND6
  174     KM   DEVELOPED ONSITE BASIN ND6
  175     BA  .00576
  176     LS       0    97.0
  177     UD    .063
```

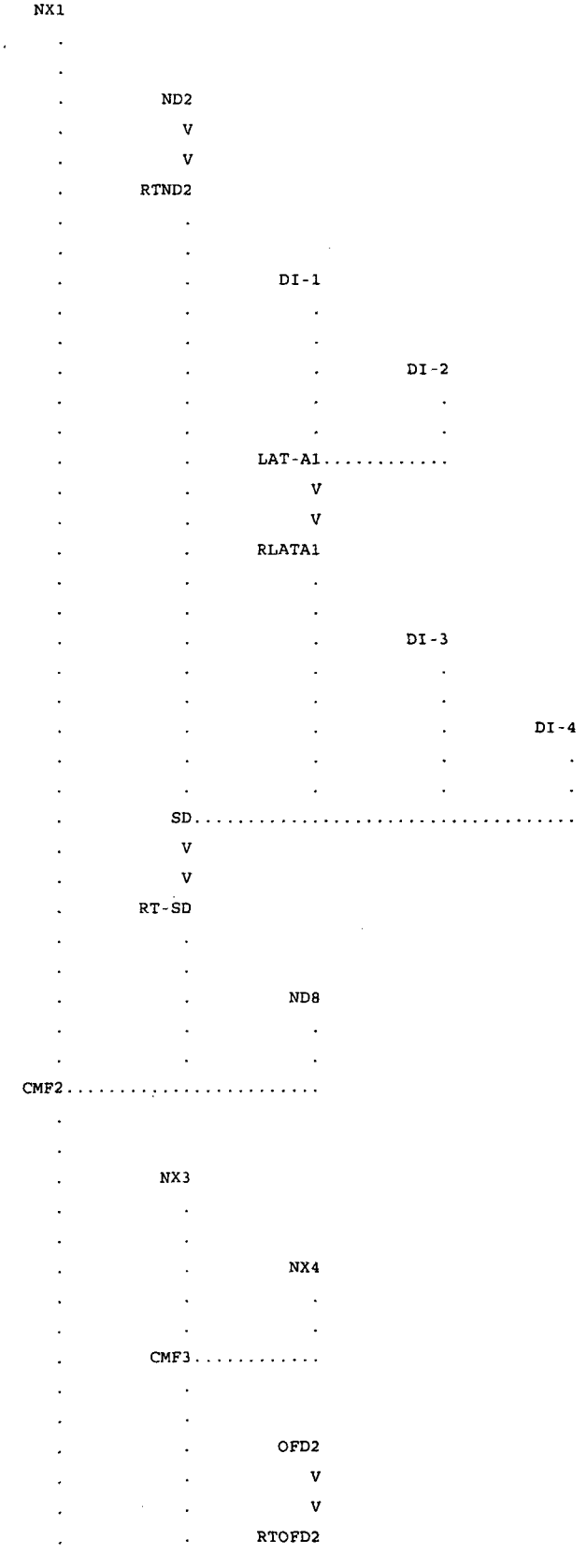
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  178     KK     ND7
  179     KM   RUNOFF GENERATED THROUGH BASIN ND7
  180     BA  .00658
  181     LS        0     98.0
  182     UD     .055

  183     KK     CMF5
  184     KM   COMBINE PARK, RTINDU, ND6 AND ND7
  185     KM   TOTAL RUNOFF REACHING I-15 R.O.W FROM SHELBORNE CHANNEL ALIGNMENT
  186     HC        4

  187     KK     ND9
  188     KM   FUTURE DEVELOPED ONSITE BASIN ND9
  189     BA  .01758
  190     LS        0     92.0
  191     UD     .127

  192     KK   RTND9
  193     KM   ROUT RUNOFF FROM BASIN ND9 THROUGH BASIN ND10 TO I-15 R.O.W.
  194     RK      650     .015   0.030        0     TRAP      20.    100.0

  195     KK     ND10
  196     KM   FUTURE DEVELOPED ONSITE BASIN ND10
  197     BA  .00590
  198     LS        0     92.0
  199     UD     .094

  200     KK     OFD4
  201     KM   FUTURE DEVELOPED OFFSITE BASIN OFD4
  202     BA  .05329
  203     LS        0     94.1
  204     UD     .175

  205     KK     CMF6
  206     KM   COMBINE RTND9, ND10 AND OFD4
  207     KM   TOTAL RUNOFF REACHING I-15 R.O.W AT CAMERO AVENUE ALIGNMENT
  208     HC        3
  209     ZZ
```

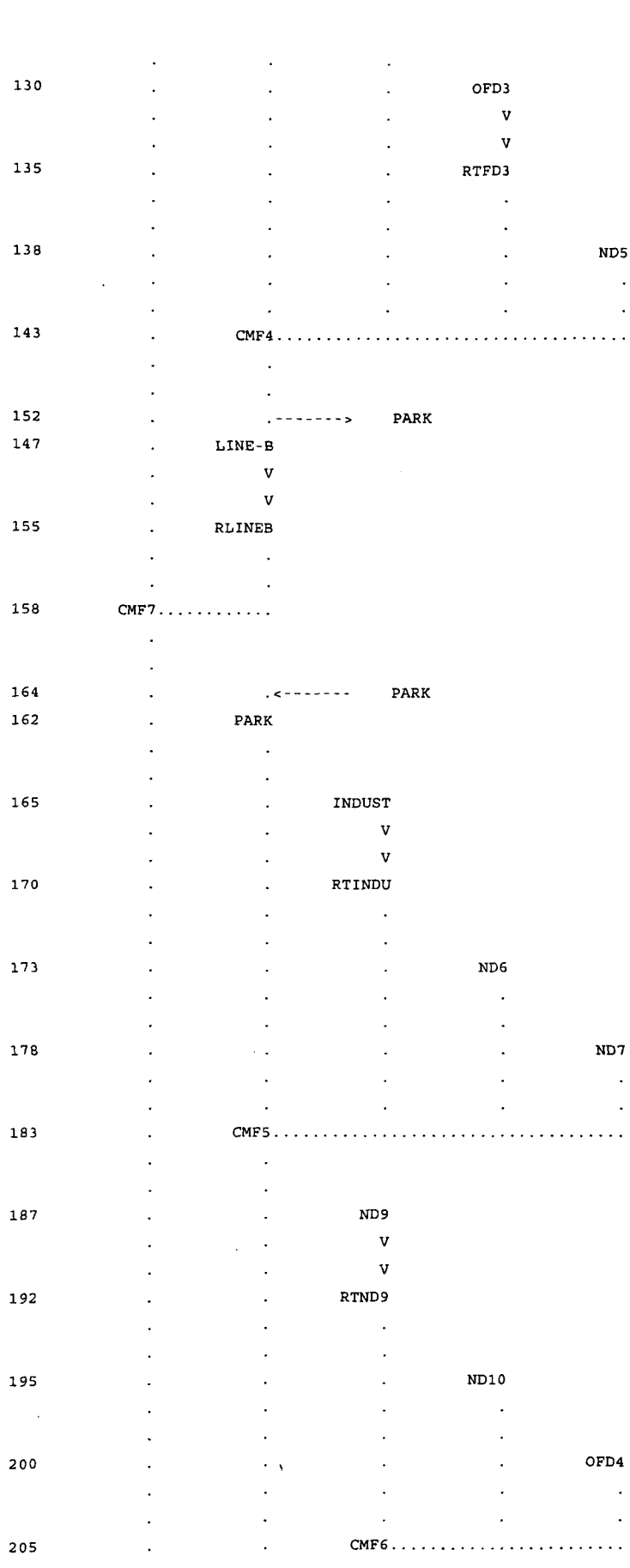
SCHEMATIC DIAGRAM OF STREAM NETWORK

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)    *
*            MAY   1991                 *
*          VERSION 4.0.1E               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  08/04/03  TIME  15:58:38   *
*****************************************
```


```
*****************************************
*                                       *
*     U.S. ARMY CORPS OF ENGINEERS      *
*     HYDROLOGIC ENGINEERING CENTER     *
*           609 SECOND STREET           *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748              *
*                                       *
*****************************************
```


TECHNICAL DRAINAGE STUDY FOR SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PROPOSED CONDITION - PROPOSED DEVELOPMENT & EXISTING OFFSITES
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6923.2

INPUT FILE NAME: 6923F.DAT

JULY 2003

****
****
ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

10 & 100 YEAR - 6 HOUR STORM EVENT
PRECIPITATION BASED ON TABLE 505
10-YEAR ADJUSTED RAINFALL DEPTH = 1.58in
100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570

****

****

28 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		73	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		0600	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 6.00 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

0.57 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	RATIO 2
					0.57	1.00
HYDROGRAPH AT	NX1	0.02	1	FLOW	18.	33.
				TIME	3.58	3.58
HYDROGRAPH AT	ND2	0.01	1	FLOW	12.	22.
				TIME	3.50	3.50
ROUTED TO	RTND2	0.01	1	FLOW	12.	21.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-1	0.00	1	FLOW	2.	3.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-2	0.00	1	FLOW	2.	4.
				TIME	3.50	3.50
2 COMBINED AT	LAT-A1	0.00	1	FLOW	4.	7.
				TIME	3.50	3.50
ROUTED TO	RLATA1	0.00	1	FLOW	4.	7.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-3	0.00	1	FLOW	5.	9.
				TIME	3.50	3.50
HYDROGRAPH AT	DI-4	0.00	1	FLOW	3.	5.
				TIME	3.50	3.50
4 COMBINED AT	SD	0.02	1	FLOW	23.	41.
				TIME	3.50	3.50
ROUTED TO	RT-SD	0.02	1	FLOW	22.	41.
				TIME	3.50	3.50
HYDROGRAPH AT	ND8	0.01	1	FLOW	10.	18.
				TIME	3.50	3.50
3 COMBINED AT	CMF2	0.05	1	FLOW	51.	92.
				TIME	3.50	3.50
HYDROGRAPH AT	NX3	0.02	1	FLOW	18.	35.
				TIME	3.58	3.58
HYDROGRAPH AT	NX4	0.02	1	FLOW	14.	27.
				TIME	3.58	3.58
2 COMBINED AT	CMF3	0.04	1	FLOW	32.	62.
				TIME	3.58	3.58
HYDROGRAPH AT	OFD2	0.07	1	FLOW	55.	110.

				TIME	3.58	3.58
OUTED TO	RTOFD2	0.07	1	FLOW	52.	105.
				TIME	3.67	3.58
HYDROGRAPH AT	OFD3	0.04	1	FLOW	33.	63.
				TIME	3.58	3.58
ROUTED TO	RTFD3	0.04	1	FLOW	32.	60.
				TIME	3.67	3.67
HYDROGRAPH AT	ND5	0.02	1	FLOW	15.	32.
				TIME	3.58	3.58
4 COMBINED AT	CMF4	0.16	1	FLOW	126.	258.
				TIME	3.58	3.58
IVERSION TO	PARK	0.16	1	FLOW	0.	88.
				TIME	0.08	3.58
YDROGRAPH AT	LINE-B	0.16	1	FLOW	126.	170.
				TIME	3.58	3.50
OUTED TO	RLINEB	0.16	1	FLOW	124.	170.
				TIME	3.58	3.58
2 COMBINED AT	CMF7	0.21	1	FLOW	168.	260.
				TIME	3.58	3.50
YDROGRAPH AT	PARK	0.00	1	FLOW	0.	88.
				TIME	0.08	3.58
HYDROGRAPH AT	INDUST	0.01	1	FLOW	7.	12.
				TIME	3.58	3.58
ROUTED TO	RTINDU	0.01	1	FLOW	6.	12.
				TIME	3.58	3.58
HYDROGRAPH AT	ND6	0.01	1	FLOW	7.	13.
				TIME	3.50	3.50
HYDROGRAPH AT	ND7	0.01	1	FLOW	8.	15.
				TIME	3.50	3.50
4 COMBINED AT	CMF5	0.02	1	FLOW	21.	117.
				TIME	3.50	3.58
YDROGRAPH AT	ND9	0.02	1	FLOW	13.	28.
				TIME	3.58	3.58
OUTED TO	RTND9	0.02	1	FLOW	13.	28.
				TIME	3.58	3.58
YDROGRAPH AT	ND10	0.01	1	FLOW	5.	10.
				TIME	3.50	3.50
YDROGRAPH AT	OFD4	0.05	1	FLOW	42.	85.
				TIME	3.58	3.58
3 COMBINED AT	CMF6	0.08	1	FLOW	60.	122.

TIME	3.58	3.58

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= 0.57									
	RTND2 MANE	0.94	12.20	211.71	1.36	5.00	11.54	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7981E+00 EXCESS=0.0000E+00 OUTFLOW=0.7980E+00 BASIN STORAGE=0.7517E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00									
	RTND2 MANE	0.74	22.10	211.42	2.54	5.00	20.98	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1493E+01 EXCESS=0.0000E+00 OUTFLOW=0.1493E+01 BASIN STORAGE=0.1188E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
	RLATA1 MANE	0.55	3.78	211.25	1.36	5.00	3.66	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2141E+00 EXCESS=0.0000E+00 OUTFLOW=0.2142E+00 BASIN STORAGE=0.1436E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00									
	RLATA1 MANE	0.61	6.74	210.84	2.54	5.00	6.60	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4005E+00 EXCESS=0.0000E+00 OUTFLOW=0.4006E+00 BASIN STORAGE=0.2298E-03 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
	RT-SD MANE	0.24	22.58	210.40	1.36	5.00	22.37	210.00	1.36

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1431E+01 EXCESS=0.0000E+00 OUTFLOW=0.1431E+01 BASIN STORAGE=0.1116E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.00									
	RT-SD MANE	0.30	40.77	210.29	2.54	5.00	40.57	210.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2678E+01 EXCESS=0.0000E+00 OUTFLOW=0.2677E+01 BASIN STORAGE=0.1539E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57									
	RTOFD2 MANE	1.83	53.84	218.21	0.99	5.00	51.83	220.00	0.99

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3488E+01 EXCESS=0.0000E+00 OUTFLOW=0.3483E+01 BASIN STORAGE=0.2036E-01 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 1.00

RTOFD2	MANE	1.37	108.46	216.80	2.10	5.00	105.11	215.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7412E+01 EXCESS=0.0000E+00 OUTFLOW=0.7404E+01 BASIN STORAGE=0.3117E-01 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.57

RTFD3	MANE	2.03	31.82	219.84	1.08	5.00	31.69	220.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2167E+01 EXCESS=0.0000E+00 OUTFLOW=0.2161E+01 BASIN STORAGE=0.1531E-01 PERCENT ERROR= -0.5

FOR PLAN = 1 RATIO= 1.00

RTFD3	MANE	1.60	62.26	217.35	2.21	5.00	60.33	220.00	2.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4442E+01 EXCESS=0.0000E+00 OUTFLOW=0.4431E+01 BASIN STORAGE=0.2330E-01 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 0.57

RLINEB	MANE	0.26	126.19	215.61	1.01	5.00	123.97	215.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8628E+01 EXCESS=0.0000E+00 OUTFLOW=0.8617E+01 BASIN STORAGE=0.1175E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 1.00

RLINEB	MANE	0.22	170.00	210.45	1.94	5.00	170.00	215.00	1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1659E+02 EXCESS=0.0000E+00 OUTFLOW=0.1658E+02 BASIN STORAGE=0.1850E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57

RTINDU	MANE	1.21	6.76	217.19	1.35	5.00	6.45	215.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5031E+00 EXCESS=0.0000E+00 OUTFLOW=0.5025E+00 BASIN STORAGE=0.1060E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00

RTINDU	MANE	1.01	12.23	216.96	2.53	5.00	11.74	215.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9410E+00 EXCESS=0.0000E+00 OUTFLOW=0.9403E+00 BASIN STORAGE=0.1615E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57

RTND9	MANE	1.71	13.12	217.31	0.86	5.00	12.69	215.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8111E+00 EXCESS=0.0000E+00 OUTFLOW=0.8104E+00 BASIN STORAGE=0.3183E-02 PERCENT ERROR= -0.3

FOR PLAN = 1 RATIO= 1.00

RTND9	MANE	1.53	27.92	217.44	1.94	5.00	27.57	215.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1818E+01 EXCESS=0.0000E+00 OUTFLOW=0.1816E+01 BASIN STORAGE=0.5138E-02 PERCENT ERROR= -0.2

*** NORMAL END OF HEC-1 ***

APPENDIX B

HYDRAULIC ANALYSIS

HEC-RAS MODEL FOR FLOWS WITHIN SILVERTON HOTEL/CASINO SOUTHERN PARKING LOT (EXISTING CONDITION)

HEC-RAS Plan: SILVEX River: Silverton Reach: South of Casino Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Max Chl Dpth	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)	(sq ft)	(ft)	
South of Casino	820	185.00	73.80	74.72	74.81	75.09	0.010014	4.88	0.92	37.94	98.40	1.38
South of Casino	700	185.00	73.29	74.45	74.30	74.59	0.002239	3.05	1.16	60.68	103.96	0.70
South of Casino	600	185.00	73.00	74.02	74.02	74.26	0.004796	3.98	1.02	46.43	94.34	1.00
South of Casino	500	185.00	71.85	72.88	72.95	73.22	0.006912	4.67	1.03	39.59	84.04	1.20
South of Casino	400	185.00	70.50	71.08	71.19	71.47	0.017985	5.06	0.58	36.56	141.13	1.75
South of Casino	300	185.00	70.00	70.66	70.66	70.84	0.005475	3.43	0.66	53.94	152.79	1.02
South of Casino	200	185.00	69.00	70.75	69.69	70.76	0.000066	0.81	1.75	228.16	203.69	0.14
South of Casino	100	185.00	68.61	70.75		70.75	0.000010	0.39	2.14	493.07	347.51	0.06
South of Casino	25	185.00	68.00	70.75	68.60	70.75	0.000004	0.32	2.75	571.38	240.00	0.04

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X     X
X     X  X             X      X   X     X   X    X
XXXXXXX  XXXX         X   XXX  XXXX     XXXXXX    XXXX
X     X  X            X       X  X      X    X        X
X     X  X        X   X       X   X      X   X        X
X     X  XXXXXX    XXXX       X    X     X    X   XXXXX
```

PROJECT DATA
Project Title: Bass Pro Shops
Project File : 6923.prj
Run Date and Time: 8/5/03 2:07:18 PM

Project in English units

FLOW DATA

Flow Title: Silverton EX
Flow File : G:\DRAINAGE\6923.2\HEC-RAS\6923.f03

Flow Data (cfs)

River	Reach	RS	PF 1
Silverton	South of Casino	820	185

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	South of Casino	PF 1	Normal S = .01	Known WS = 70.75

GEOMETRY DATA

Geometry Title: Silverton EX
Geometry File : G:\DRAINAGE\6923.2\HEC-RAS\6923.g03

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 820

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75	9.8	74.92	9.8	74.42	45.8	74.18	45.8	74.68
84.2	74.3	84.2	73.8	94.9	74	108.2	74.63	108.2	75.13
148.5	76.23	148.5	75.73	158	76	173.2	76.6	173.2	77.1
210.4	78.23	210.4	77.73	221.4	78	241	78.86	241	79.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	241	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	241	120	120	120	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	75.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.72	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	74.81	Flow Area (sq ft)		37.94	
E.G. Slope (ft/ft)	0.010014	Area (sq ft)		37.94	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	98.40	Top Width (ft)		98.40	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	0.92	Hydr. Depth (ft)		0.39	
Conv. Total (cfs)	1848.7	Conv. (cfs)		1848.7	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		99.81	
Min Ch El (ft)	73.80	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		1.16	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.11	2.78	
C & E Loss (ft)		Cum SA (acres)	0.13	3.22	

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 700

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	9	75.12	18.13	74.95	21.12	74.45
49	74	73	73.66	73	74.16	78	74.07	78	73.57
98	73.37	99.5	73.29	101	73.37	119	74	133	75
183	76	215	77	252	78	267.85	78.6	267.85	79.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	267.85	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	267.85	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	74.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.45	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	74.30	Flow Area (sq ft)		60.68	
E.G. Slope (ft/ft)	0.002239	Area (sq ft)		60.68	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	103.96	Top Width (ft)		103.96	
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)		3.05	
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	3909.5	Conv. (cfs)		3909.5	

Length Wtd. (ft)	100.00	Wetted Per. (ft)			105.00
Min Ch El (ft)	73.29	Shear (lb/sq ft)			-0.08
Alpha	1.00	Stream Power (lb/ft s)			0.25
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		0.11	2.64
C & E Loss (ft)	0.01	Cum SA (acres)		0.13	2.94

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 600

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	18.13	74.94	21.12	74.31	47.75	74
72.5	73.67	72.5	74.17	78.11	73.78	78.11	73.28	96.49	73.08
97.99	73	99.49	73.08	101.94	73	141.9	74	184.61	75
221.37	76	265.79	76.3	266.29	76.8	267.89	77		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	267.89	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	267.89	271	182	71	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	74.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.02	Reach Len. (ft)	271.00	182.00	71.00
Crit W.S. (ft)	74.02	Flow Area (sq ft)		46.43	
E.G. Slope (ft/ft)	0.004796	Area (sq ft)		46.43	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	94.34	Top Width (ft)		94.34	
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	1.02	Hydr. Depth (ft)		0.49	
Conv. Total (cfs)	2671.5	Conv. (cfs)		2671.5	
Length Wtd. (ft)	182.00	Wetted Per. (ft)		95.22	
Min Ch El (ft)	73.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.58	
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	0.11	2.52	
C & E Loss (ft)	0.00	Cum SA (acres)	0.13	2.72	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated water surface came back below critical depth. This indicates
that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 500

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	55.43	74.84	55.93	74.34	71.91	74
100.4	73	152.21	72.07	157.71	71.85	163.21	72.07	195.51	73
224.24	74	254.76	75	284.1	76	317.75	77	354.53	78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	354.53	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	354.53	46	165	277	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.22	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.88	Reach Len. (ft)	46.00	165.00	277.00
Crit W.S. (ft)	72.95	Flow Area (sq ft)		39.59	
E.G. Slope (ft/ft)	0.006912	Area (sq ft)		39.59	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	84.04	Top Width (ft)		84.04	
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)		4.67	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	2225.2	Conv. (cfs)		2225.2	
Length Wtd. (ft)	165.00	Wetted Per. (ft)		84.07	
Min Ch El (ft)	71.85	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.95	
Frctn Loss (ft)	1.04	Cum Volume (acre-ft)	0.11	2.34	
C & E Loss (ft)	0.01	Cum SA (acres)	0.13	2.34	

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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 400

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	38.44	75.54	38.94	75.04	66.09	73

121.29	72	161.23	71	174.91	71.03	177.91	70.95	180.91	71.03
191.02	71	206.84	72	226.36	71	245.18	70.5	332.01	71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	332.01	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	332.01	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	71.47	Element			
Vel Head (ft)	0.40	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.08	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	71.19	Flow Area (sq ft)		36.56	
E.G. Slope (ft/ft)	0.017985	Area (sq ft)		36.56	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	141.13	Top Width (ft)		141.13	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.26	
Conv. Total (cfs)	1379.5	Conv. (cfs)		1379.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		141.22	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.47	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	0.11	2.19	
C & E Loss (ft)	0.01	Cum SA (acres)	0.13	1.92	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Silverton
REACH: South of Casino RS: 300

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.12	0	75.12	38.4	74.05	38.9	74.05	38.9	73.55
59.81	73	70.25	72.87	70.25	73.37	75.25	73.2	75.25	72.7
97.36	72	142.4	71	178.41	70	214.73	71	218.97	70
233.2	70.1	321.24	70.57						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	321.24	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	321.24	145	140	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.66	Reach Len. (ft)	145.00	140.00	140.00
Crit W.S. (ft)	70.66	Flow Area (sq ft)		53.94	
E.G. Slope (ft/ft)	0.005475	Area (sq ft)		53.94	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	152.79	Top Width (ft)		152.79	
Vel Total (ft/s)	3.43	Avg. Vel. (ft/s)		3.43	
Max Chl Dpth (ft)	0.66	Hydr. Depth (ft)		0.35	
Conv. Total (cfs)	2500.3	Conv. (cfs)		2500.3	
Length Wtd. (ft)	140.00	Wetted Per. (ft)		152.98	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.41	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.11	2.09	
C & E Loss (ft)	0.05	Cum SA (acres)	0.13	1.58	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Silverton
REACH: South of Casino RS: 200

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.59	0	72.09	32.19	71.62	32.19	72.12	37.33	72.02
37.33	71.52	58.84	71	107.43	70	140.41	69.35	169.13	70
185.2	70	208.16	69.3	232	69	267.75	69	274.8	69.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	274.8	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	274.8	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	69.69	Flow Area (sq ft)		228.16	
E.G. Slope (ft/ft)	0.000066	Area (sq ft)		228.16	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	203.69	Top Width (ft)		203.69	
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)		0.81	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		1.12	

Conv. Total (cfs)	22755.0	Conv. (cfs)		22755.0
Length Wtd. (ft)	100.00	Wetted Per. (ft)		205.01
Min Ch El (ft)	69.00	Shear (lb/sq ft)		0.00
Alpha	1.00	Stream Power (lb/ft s)		0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.11	1.64
C & E Loss (ft)	0.00	Cum SA (acres)	0.13	1.01

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: South of Casino RS: 100

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-65	70.5	-65	70	0	69.84	121.62	69	138.45	68.61
148.45	69	211.18	69	235.38	69	282.51	69.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-65	.016	0	.016	282.51	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	282.51	75	75	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.016	0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	75.00	75.00	75.00
Crit W.S. (ft)		Flow Area (sq ft)	53.95	439.12	
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	53.95	439.12	
Q Total (cfs)	185.00	Flow (cfs)	13.78	171.22	
Top Width (ft)	347.51	Top Width (ft)	65.00	282.51	
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.26	0.39	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)	0.83	1.55	
Conv. Total (cfs)	58936.7	Conv. (cfs)	4391.3	54545.3	
Length Wtd. (ft)	75.00	Wetted Per. (ft)	65.75	283.88	
Min Ch El (ft)	68.61	Shear (lb/sq ft)	0.00	0.00	
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	0.87	
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	0.45	

Warning: The cross-section end points had to be extended vertically for the computed water

surface.
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: Silverton
REACH: South of Casino RS: 25

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	68.88	.5	68.88	.5	68.38	202.63	68.28	205.26	68
209.07	68	211.17	68.42	239.32	69	240	69	240	69.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	240	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	240	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.75	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)			
Crit W.S. (ft)	68.60	Flow Area (sq ft)		571.38	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		571.38	
Q Total (cfs)	185.00	Flow (cfs)		185.00	
Top Width (ft)	240.00	Top Width (ft)		240.00	
Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)		0.32	
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	93528.3	Conv. (cfs)		93528.3	
Length Wtd. (ft)		Wetted Per. (ft)		244.18	
Min Ch El (ft)	68.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

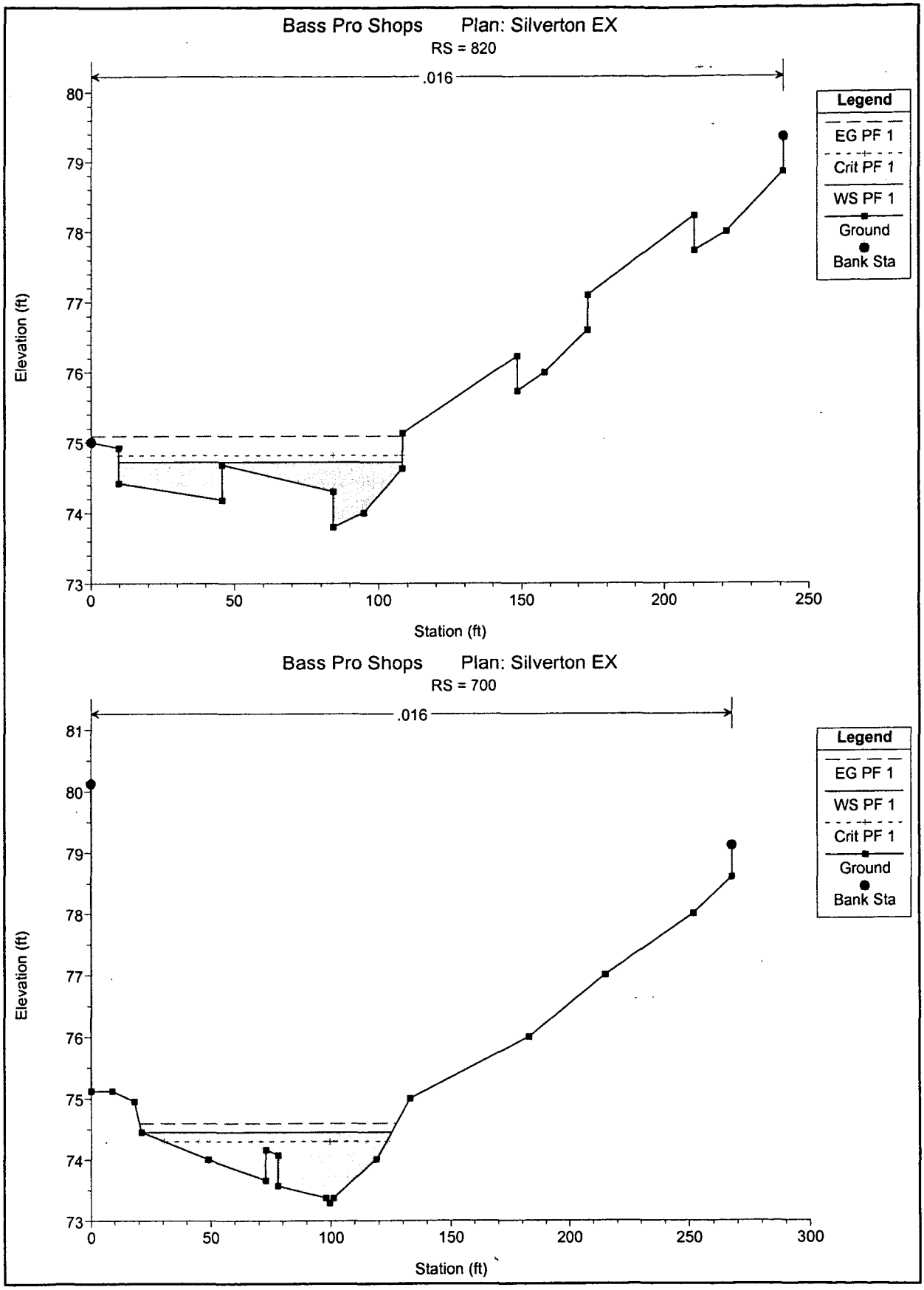
SUMMARY OF REACH LENGTHS

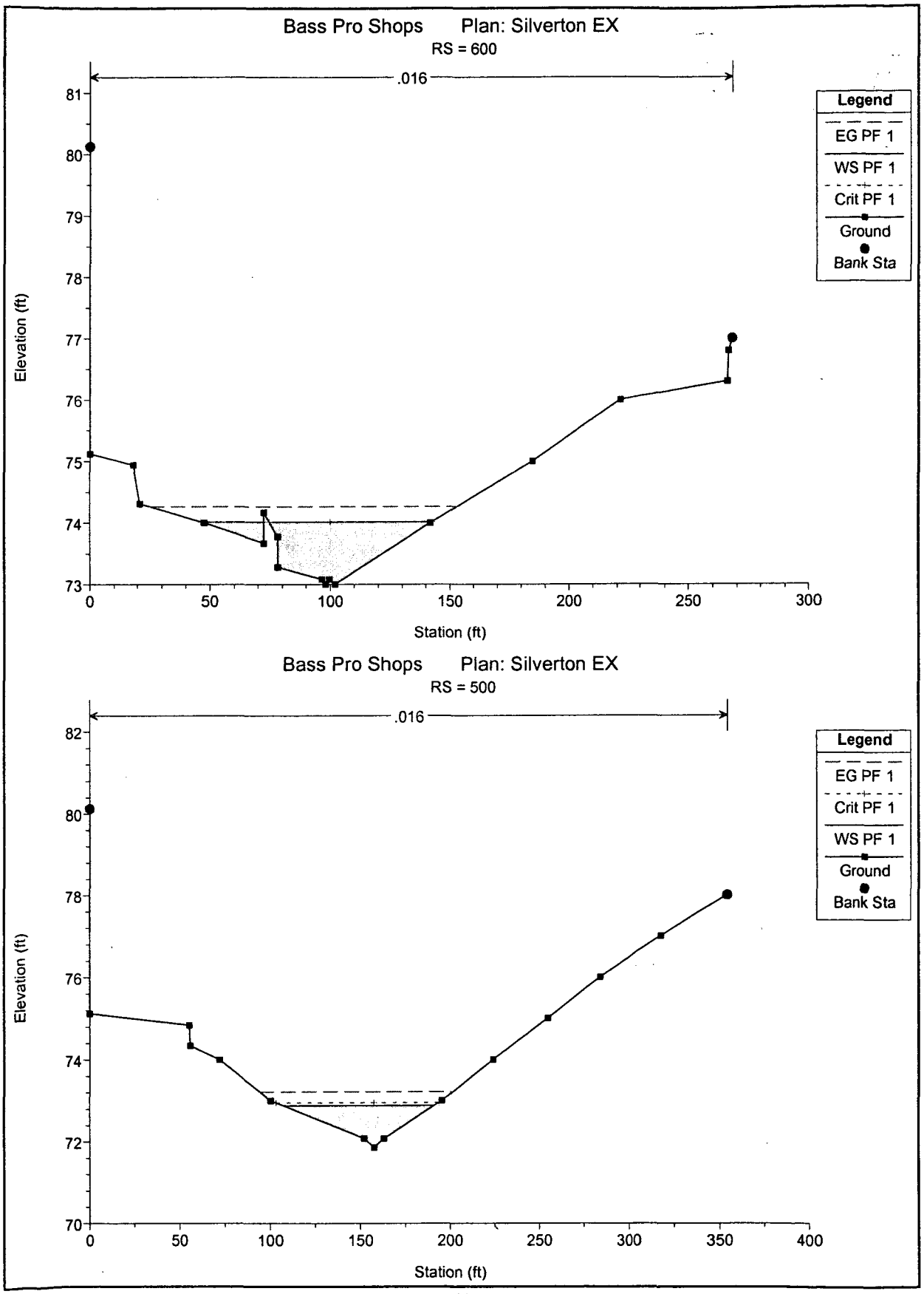
River: Silverton

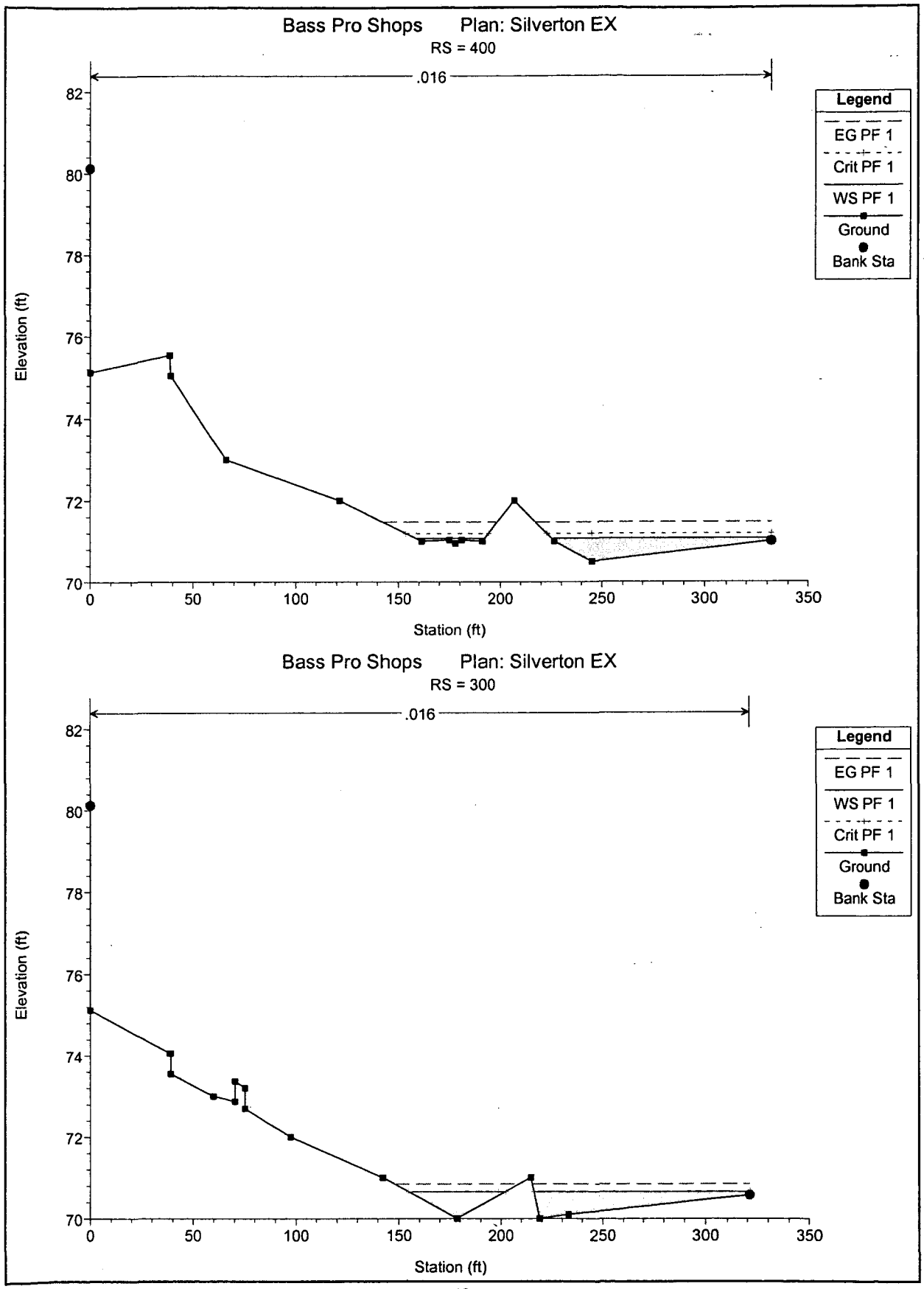
Reach	River Sta.	Left	Channel	Right
South of Casino	820	120	120	120
South of Casino	700	100	100	100
South of Casino	600	271	182	71
South of Casino	500	46	165	277
South of Casino	400	100	100	100
South of Casino	300	145	140	140
South of Casino	200	100	100	100
South of Casino	100	75	75	75
South of Casino	25	0	0	0

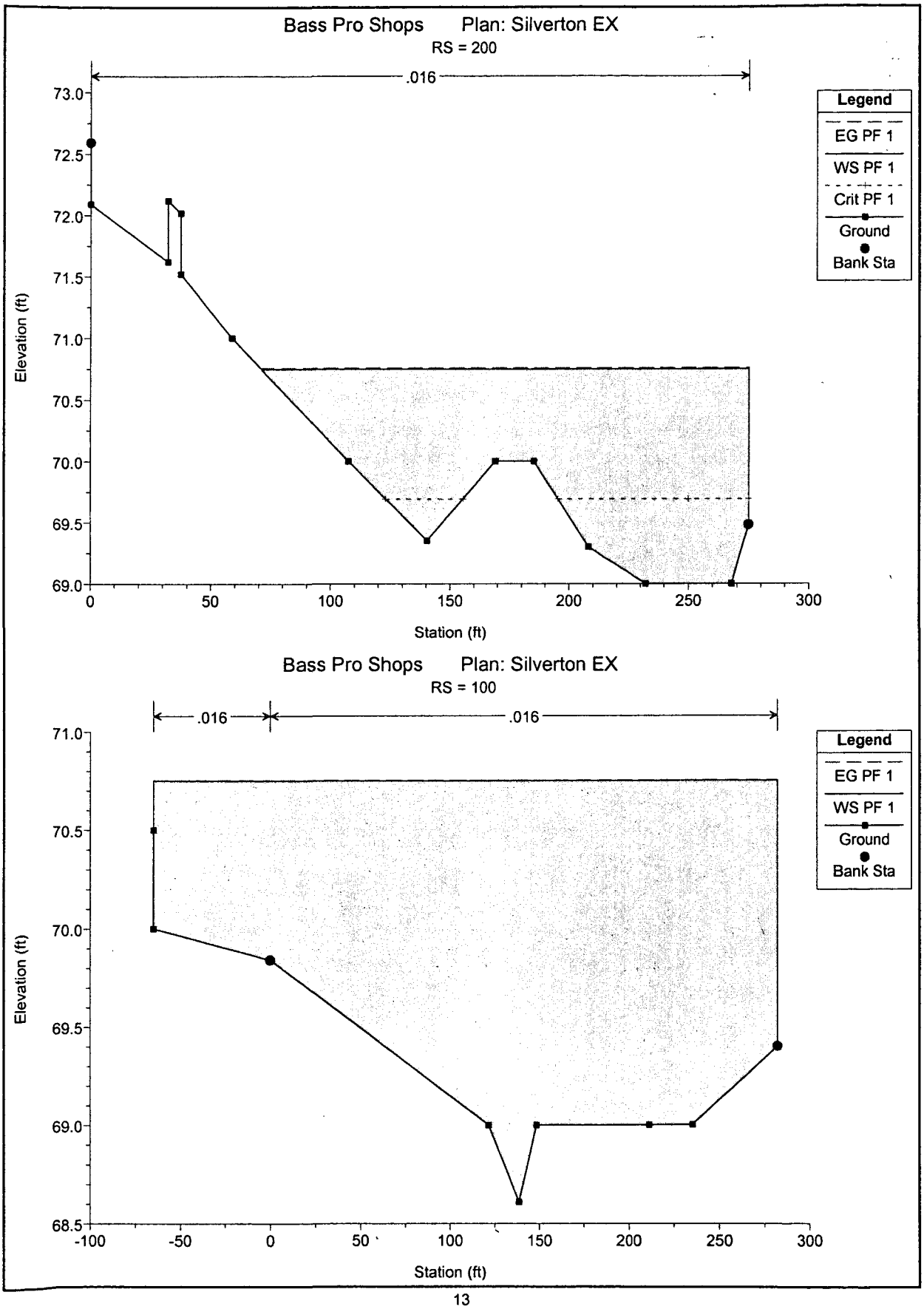
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

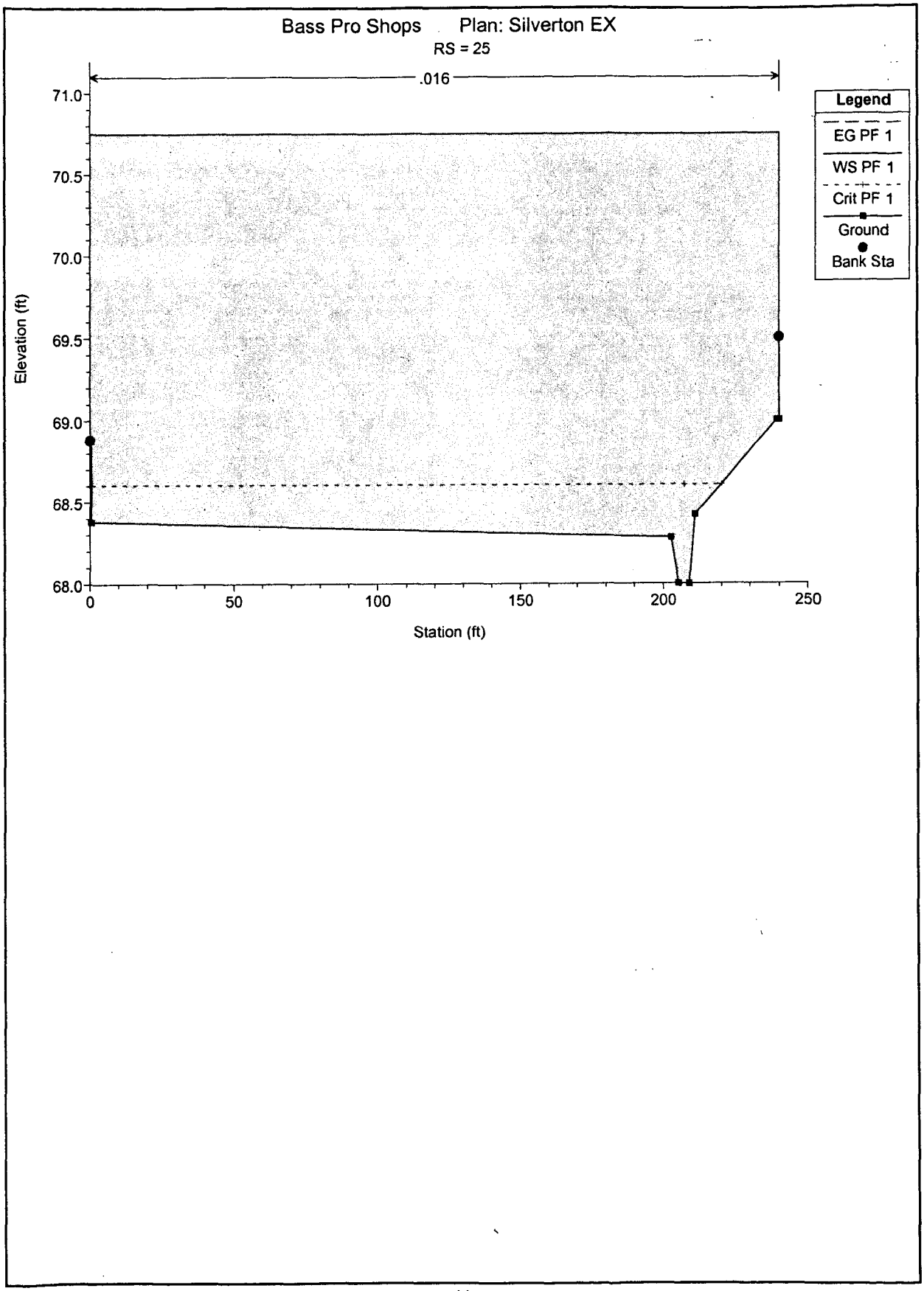
Reach	River Sta.	Contr.	Expan.
South of Casino	820	.1	.3
South of Casino	700	.1	.3
South of Casino	600	.1	.3
South of Casino	500	.1	.3
South of Casino	400	.1	.3
South of Casino	300	.1	.3
South of Casino	200	.1	.3
South of Casino	100	.1	.3
South of Casino	25	.1	.3


Bass Pro Shops Plan: Silverton EX
RS = 820
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
80
79
78
77
76
75
74
73
0
50
100
150
200
250
Bass Pro Shops Plan: Silverton EX
RS = 700
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
81
80
79
78
77
76
75
74
73
0
50
100
150
200
250
300


Bass Pro Shops Plan: Silverton EX
RS = 600
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
81
80
79
78
77
76
75
74
73
0
50
100
150
200
250
300
Bass Pro Shops Plan: Silverton EX
RS = 500
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
82
80
78
76
74
72
70
0
50
100
150
200
250
300
350
400


Bass Pro Shops Plan: Silverton EX
RS = 400
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Bass Pro Shops Plan: Silverton EX
RS = 300
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bass Pro Shops Plan: Silverton EX
RS = 200
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
73.0
72.5
72.0
71.5
71.0
70.5
70.0
69.5
69.0
0
50
100
150
200
250
300
Station (ft)
Bass Pro Shops Plan: Silverton EX
RS = 100
.016
.016
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
71.0
70.5
70.0
69.5
69.0
68.5
-100
-50
0
50
100
150
200
250
300
Station (ft)


Bass Pro Shops Plan: Silverton EX
RS = 25
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
71.0
70.5
70.0
69.5
69.0
68.5
68.0
0
50
100
150
200
250
Station (ft)

HEC-RAS MODEL FOR FLOWS ALONG SHELBORN ALIGNMENT (EXISTING CONDITION)

HEC-RAS Plan: SHELBEX River: Shelborne Avenue Reach: RV Park Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Max Chl Dpth	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)	(sq ft)	(ft)	
RV Park	796	646.00	77.00	79.37	79.48	80.00	0.010309	6.77	2.37	112.78	116.49	0.95
RV Park	667	646.00	75.00	77.72	77.75	78.63	0.010130	7.72	2.72	86.27	53.01	0.97
RV Park	567	646.00	73.00	77.16	75.95	77.47	0.001928	4.56	4.16	153.65	79.14	0.46
RV Park	525	646.00	73.00	77.19		77.38	0.000983	3.56	4.19	202.21	101.88	0.33
RV Park	514	646.00	71.60	77.08	76.01	77.35	0.001978	4.63	5.48	179.87	107.73	0.42
RV Park	462	Culvert										
RV Park	412	646.00	71.00	74.52	74.52	75.35	0.006208	7.81	3.52	101.17	73.56	0.81
RV Park	376	646.00	71.18	73.30	73.81	74.90	0.022263	10.23	2.12	65.84	59.89	1.40
RV Park	299	646.00	70.00	72.86	72.63	73.43	0.006187	6.41	2.86	109.89	60.87	0.77
RV Park	207	646.00	69.00	71.95	71.95	72.73	0.008740	7.28	2.95	94.96	59.78	0.91
RV Park	100	646.00	68.79	71.18	71.33	71.76	0.008079	6.93	2.39	135.38	208.81	0.87
RV Park	90	646.00	69.00	70.46	70.63	71.05	0.016921	7.78	1.46	125.40	214.46	1.19
RV Park	70	646.00	68.00	70.75	69.57	70.77	0.000334	1.63	2.75	521.38	331.59	0.18
RV Park	60	646.00	67.00	70.75		70.76	0.000133	1.14	3.75	707.90	363.43	0.11
RV Park	50	646.00	65.00	70.75	67.34	70.75	0.000016	0.45	5.75	1444.90	430.00	0.04

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X       X
X     X  X        X    X       X   X    X    X       X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Bass Pro Shops
Project File : 6923.prj
Run Date and Time: 8/5/03 2:27:20 PM

Project in English units

FLOW DATA

Flow Title: Shelborne Ave. EX
Flow File : G:\DRAINAGE\6923.2\HEC-RAS\6923.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Shelborne Avenue	RV Park	796	646

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Shelborne Avenue	RV Park	PF 1	Normal S = .0103	Known WS = 70.75

GEOMETRY DATA

Geometry Title: Shelborne Ave. EX
Geometry File : G:\DRAINAGE\6923.2\HEC-RAS\6923.g01

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 796

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88	0	78.3	22	79	45	79	65	79
74	78	106	77	111	78	115	79	119	80
165	80								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	65	.03	119	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65	119	133	131	124	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	80.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	79.37	Reach Len. (ft)	133.00	131.00	124.00
Crit W.S. (ft)	79.48	Flow Area (sq ft)	31.89	80.89	
E.G. Slope (ft/ft)	0.010309	Area (sq ft)	31.89	80.89	
Q Total (cfs)	646.00	Flow (cfs)	98.68	547.32	
Top Width (ft)	116.49	Top Width (ft)	65.00	51.49	
Vel Total (ft/s)	5.73	Avg. Vel. (ft/s)	3.09	6.77	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.49	1.57	
Conv. Total (cfs)	6362.4	Conv. (cfs)	971.9	5390.5	
Length Wtd. (ft)	131.17	Wetted Per. (ft)	66.08	51.83	
Min Ch El (ft)	77.00	Shear (lb/sq ft)	0.31	1.00	
Alpha	1.23	Stream Power (lb/ft s)	0.96	6.80	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.39	2.74	1.99
C & E Loss (ft)		Cum SA (acres)	0.50	1.08	1.88

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 667

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97	0	77.9	13.4	77	21.7	76	30.2	75
44.8	75	48.3	76	52.3	77	57.1	78	72.5	78
107.2	78	178.9	78.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	13.4	.03	57.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.4	57.1	107	101	87	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	78.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	77.72	Reach Len. (ft)	107.00	101.00	87.00
Crit W.S. (ft)	77.75	Flow Area (sq ft)	3.82	82.45	
E.G. Slope (ft/ft)	0.010130	Area (sq ft)	3.82	82.45	
Q Total (cfs)	646.00	Flow (cfs)	9.59	636.41	
Top Width (ft)	53.01	Top Width (ft)	10.67	42.34	
Vel Total (ft/s)	7.49	Avg. Vel. (ft/s)	2.51	7.72	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	0.36	1.95	
Conv. Total (cfs)	6418.5	Conv. (cfs)	95.3	6323.2	
Length Wtd. (ft)	101.05	Wetted Per. (ft)	10.69	42.79	

Min Ch El (ft)	75.00	Shear (lb/sq ft)	0.23	1.22	
Alpha	1.05	Stream Power (lb/ft s)	0.57	9.40	
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	0.33	2.49	1.99
C & E Loss (ft)	0.03	Cum SA (acres)	0.38	0.94	1.88

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: Shelborne Avenue
REACH: RV Park RS: 567

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	96	0	77.52	8.1	77	24.8	76	30.2	75
34.7	74	52.4	73	56.5	73	60.7	74	65	75
69.1	76	77.5	77	123.2	78	169.9	79	180	79.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.8	.03	69.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.8	69.1	43	43	63	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	77.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	77.16	Reach Len. (ft)	43.00	43.00	63.00
Crit W.S. (ft)	75.95	Flow Area (sq ft)	11.20	136.34	6.11
E.G. Slope (ft/ft)	0.001928	Area (sq ft)	11.20	136.34	6.11
Q Total (cfs)	646.00	Flow (cfs)	17.00	621.92	7.08
Top Width (ft)	79.14	Top Width (ft)	19.17	44.30	15.66
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)	1.52	4.56	1.16
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)	0.58	3.08	0.39
Conv. Total (cfs)	14712.4	Conv. (cfs)	387.1	14164.0	161.2
Length Wtd. (ft)	43.40	Wetted Per. (ft)	19.21	44.88	15.72
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.07	0.37	0.05
Alpha	1.14	Stream Power (lb/ft s)	0.11	1.67	0.05
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.31	2.24	1.98
C & E Loss (ft)	0.04	Cum SA (acres)	0.35	0.84	1.87

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 525

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78	22.9	77.3	35.4	77	47	76.33	52.8	76
56.6	75	60.5	74	64.3	73	91.9	73	95.1	74
98.4	75	101.7	76	125.6	77	146.3	78	197.7	78.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	52.8	.03	101.7	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.8	101.7	17	10	18	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.38	Element			
Vel Head (ft)	0.19	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	77.19	Reach Len. (ft)	17.00	10.00	18.00
Crit W.S. (ft)		Flow Area (sq ft)	12.72	172.71	16.79
E.G. Slope (ft/ft)	0.000983	Area (sq ft)	12.72	172.71	16.79
Q Total (cfs)	646.00	Flow (cfs)	12.50	614.87	18.62
Top Width (ft)	101.88	Top Width (ft)	25.20	48.90	27.78
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)	0.98	3.56	1.11
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)	0.50	3.53	0.60
Conv. Total (cfs)	20609.4	Conv. (cfs)	398.9	19616.4	594.1
Length Wtd. (ft)	11.06	Wetted Per. (ft)	25.23	49.73	27.80
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.03	0.21	0.04
Alpha	1.19	Stream Power (lb/ft s)	0.03	0.76	0.04
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.30	2.09	1.97
C & E Loss (ft)	0.01	Cum SA (acres)	0.32	0.79	1.84

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: Shelborne Avenue
REACH: RV Park RS: 514

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74.77	102.75	106	104	101	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.35	Element			
Vel Head (ft)	0.27	Wt. n-Val.	0.030	0.030	0.030

W.S. Elev (ft)	77.08	Reach Len. (ft)	106.00	104.00	101.00
Crit W.S. (ft)	76.01	Flow Area (sq ft)	41.00	106.65	32.23
E.G. Slope (ft/ft)	0.001978	Area (sq ft)	41.00	106.65	32.23
Q Total (cfs)	646.00	Flow (cfs)	86.78	494.25	64.97
Top Width (ft)	107.73	Top Width (ft)	42.99	27.98	36.76
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)	2.12	4.63	2.02
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)	0.95	3.81	0.88
Conv. Total (cfs)	14524.0	Conv. (cfs)	1951.0	11112.3	1460.7
Length Wtd. (ft)	104.00	Wetted Per. (ft)	43.53	34.95	36.82
Min Ch El (ft)	71.60	Shear (lb/sq ft)	0.12	0.38	0.11
Alpha	1.35	Stream Power (lb/ft s)	0.25	1.75	0.22
Frctn Loss (ft)		Cum Volume (acre-ft)	0.29	2.06	1.96
C & E Loss (ft)		Cum SA (acres)	0.31	0.78	1.82

CULVERT RIVER: Shelborne Avenue
REACH: RV Park RS: 462

INPUT
Description:
Distance from Upstream XS = 1
Deck/Roadway Width = 100
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	76	195	76
	71		71

Upstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
74.77	102.75	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	75	180	75
	70		70

Downstream Bridge Cross Section Data
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85	0	75	24.25	75.4	34.79	74.4	35.4	74.4
35.4	73.9	56	73	60	72	63	71	73	71
76	72	80	73	83	74	129	75	185	75.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	56	.03	80	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
56	80	.3	.5

Upstream Embankment side slope = 3 horiz. to 1.0 vertical
Downstream Embankment side slope = 3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 76
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	3	5.5

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
	1	100	.013	.5	1

Number of Barrels = 2
Upstream Elevation = 71.6
Centerline Stations

Sta.	Sta.
82	88.5

Downstream Elevation = 70.5
Centerline Stations

Sta.	Sta.
64.5	70.5

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 412

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85	0	75	24.25	75.4	34.79	74.4	35.4	74.4
35.4	73.9	56	73	60	72	63	71	73	71
76	72	80	73	83	74	129	75	185	75.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	56	.03	80	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
56	80	20	20	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	75.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	74.52	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	74.52	Flow Area (sq ft)	22.26	69.55	9.36
E.G. Slope (ft/ft)	0.006208	Area (sq ft)	22.26	69.55	9.36
Q Total (cfs)	646.00	Flow (cfs)	84.91	543.16	17.93
Top Width (ft)	73.56	Top Width (ft)	22.51	24.00	27.06
Vel Total (ft/s)	6.39	Avg. Vel. (ft/s)	3.81	7.81	1.92
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)	0.99	2.90	0.35
Conv. Total (cfs)	8198.8	Conv. (cfs)	1077.7	6893.6	227.5
Length Wtd. (ft)	20.00	Wetted Per. (ft)	23.03	24.57	27.23
Min Ch El (ft)	71.00	Shear (lb/sq ft)	0.37	1.10	0.13
Alpha	1.31	Stream Power (lb/ft s)	1.43	8.57	0.26
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.21	1.85	1.91
C & E Loss (ft)	0.03	Cum SA (acres)	0.23	0.72	1.75

Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated water surface came back below critical depth. This indicates
that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 376

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.28	0	73.28	22	73	27	72	30	71.18
48	71.18	55	72	59	73	62	74	135	75
158	75								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	22	.03	62	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
22	62	77	77	71	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.90	Element			
Vel Head (ft)	1.61	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	73.30	Reach Len. (ft)	77.00	77.00	71.00
Crit W.S. (ft)	73.81	Flow Area (sq ft)	3.42	62.42	
E.G. Slope (ft/ft)	0.022263	Area (sq ft)	3.42	62.42	
Q Total (cfs)	646.00	Flow (cfs)	7.30	638.70	
Top Width (ft)	59.89	Top Width (ft)	22.00	37.89	
Vel Total (ft/s)	9.81	Avg. Vel. (ft/s)	2.13	10.23	
Max Chl Dpth (ft)	2.12	Hydr. Depth (ft)	0.16	1.65	
Conv. Total (cfs)	4329.5	Conv. (cfs)	48.9	4280.6	
Length Wtd. (ft)	77.00	Wetted Per. (ft)	22.02	38.31	
Min Ch El (ft)	71.18	Shear (lb/sq ft)	0.22	2.26	
Alpha	1.08	Stream Power (lb/ft s)	0.46	23.17	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.21	1.82	1.90
C & E Loss (ft)	0.23	Cum SA (acres)	0.22	0.71	1.74

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 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: Shelborne Avenue
REACH: RV Park RS: 299

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.11	0	72.11	24	71	29.26	70.59	50	70
53.4	71	57	72	61.51	73	106	74	159.49	74.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24	.03	61.51	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24	61.51	91	93	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	73.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	72.86	Reach Len. (ft)	91.00	93.00	98.00
Crit W.S. (ft)	72.63	Flow Area (sq ft)	31.29	78.60	
E.G. Slope (ft/ft)	0.006187	Area (sq ft)	31.29	78.60	
Q Total (cfs)	646.00	Flow (cfs)	142.42	503.58	
Top Width (ft)	60.87	Top Width (ft)	24.00	36.87	
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)	4.55	6.41	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)	1.30	2.13	
Conv. Total (cfs)	8212.5	Conv. (cfs)	1810.6	6401.9	
Length Wtd. (ft)	92.72	Wetted Per. (ft)	24.77	37.27	
Min Ch El (ft)	70.00	Shear (lb/sq ft)	0.49	0.81	
Alpha	1.06	Stream Power (lb/ft s)	2.22	5.22	
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	0.18	1.69	1.90
C & E Loss (ft)	0.02	Cum SA (acres)	0.18	0.64	1.74

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 207

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.59	0	71.59	18	71	26	70	30	69
52.5	70	56	71	60	72	163	72.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	18	.03	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18	60	106	107	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	72.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	71.95	Reach Len. (ft)	106.00	107.00	125.00

Crit W.S. (ft)	71.95	Flow Area (sq ft)	11.72	83.24	
E.G. Slope (ft/ft)	0.008740	Area (sq ft)	11.72	83.24	
Q Total (cfs)	646.00	Flow (cfs)	40.22	605.78	
Top Width (ft)	59.78	Top Width (ft)	18.00	41.78	
Vel Total (ft/s)	6.80	Avg. Vel. (ft/s)	3.43	7.28	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)	0.65	1.99	
Conv. Total (cfs)	6910.0	Conv. (cfs)	430.2	6479.7	
Length Wtd. (ft)	108.29	Wetted Per. (ft)	18.37	42.25	
Min Ch El (ft)	69.00	Shear (lb/sq ft)	0.35	1.08	
Alpha	1.09	Stream Power (lb/ft s)	1.19	7.82	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.13	1.52	1.90
C & E Loss (ft)	0.13	Cum SA (acres)	0.14	0.56	1.74

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 100

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.62	0	70.62	25.65	70.28	30.73	68.79	51.84	68.88
60.92	70.9	107.16	70.85	142.48	70.72	156.18	70.8	206	71
222	72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	25.65	.03	60.92	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
25.65	60.92	55	58	75	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	71.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	71.18	Reach Len. (ft)	55.00	58.00	75.00
Crit W.S. (ft)	71.33	Flow Area (sq ft)	18.61	69.41	47.35
E.G. Slope (ft/ft)	0.008079	Area (sq ft)	18.61	69.41	47.35
Q Total (cfs)	646.00	Flow (cfs)	65.94	481.38	98.67
Top Width (ft)	208.81	Top Width (ft)	25.65	35.27	147.89
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)	3.54	6.93	2.08

Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	0.73	1.97	0.32
Conv. Total (cfs)	7186.9	Conv. (cfs)	733.6	5355.5	1097.8
Length Wtd. (ft)	62.73	Wetted Per. (ft)	26.21	35.71	147.89
Min Ch El (ft)	68.79	Shear (lb/sq ft)	0.36	0.98	0.16
Alpha	1.66	Stream Power (lb/ft s)	1.27	6.80	0.34
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.10	1.33	1.84
C & E Loss (ft)	0.06	Cum SA (acres)	0.08	0.46	1.53

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 90

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80	0	70	2	70	20	70	24	69
48	69	52	70	90	70	208	70	222	71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	20	.03	52	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
20	52	120	115	129	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	71.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	70.46	Reach Len. (ft)	120.00	115.00	129.00
Crit W.S. (ft)	70.63	Flow Area (sq ft)	9.22	42.76	73.42
E.G. Slope (ft/ft)	0.016921	Area (sq ft)	9.22	42.76	73.42
Q Total (cfs)	646.00	Flow (cfs)	34.93	332.48	278.59
Top Width (ft)	214.46	Top Width (ft)	20.00	32.00	162.46
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)	3.79	7.78	3.79
Max Chl Dpth (ft)	1.46	Hydr. Depth (ft)	0.46	1.34	0.45
Conv. Total (cfs)	4966.1	Conv. (cfs)	268.5	2555.9	2141.6
Length Wtd. (ft)	124.40	Wetted Per. (ft)	20.46	32.25	162.47
Min Ch El (ft)	69.00	Shear (lb/sq ft)	0.48	1.40	0.48
Alpha	1.44	Stream Power (lb/ft s)	1.80	10.89	1.81
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.08	1.26	1.73
C & E Loss (ft)	0.00	Cum SA (acres)	0.05	0.42	1.26

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: Shelborne Avenue
REACH: RV Park RS: 70

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.5	0	68.5	14	68	30	68	32	69
35	69	38.5	69	83	69	230	69	292	70
345	71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	14	.03	38.5	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14	38.5	45	45	56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	70.75	Reach Len. (ft)	45.00	45.00	56.00
Crit W.S. (ft)	69.57	Flow Area (sq ft)	34.96	59.80	426.62
E.G. Slope (ft/ft)	0.000334	Area (sq ft)	34.96	59.80	426.62
Q Total (cfs)	646.00	Flow (cfs)	52.70	97.47	495.83
Top Width (ft)	331.59	Top Width (ft)	14.00	24.50	293.09
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)	1.51	1.63	1.16
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)	2.50	2.44	1.46
Conv. Total (cfs)	35359.3	Conv. (cfs)	2884.6	5335.1	27139.6
Length Wtd. (ft)	53.37	Wetted Per. (ft)	16.26	24.74	293.10
Min Ch El (ft)	68.00	Shear (lb/sq ft)	0.04	0.05	0.03
Alpha	1.06	Stream Power (lb/ft s)	0.07	0.08	0.04
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02	1.12	0.99
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.34	0.59

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 60

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77	0	67	27	67	31	68	35	69
42	69	45	70	63	70	70	71	81	70
85	69	100	68	218	68	264	69	315	70
368	70.71								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	0	.03	45	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	45	66	56	54	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	70.75	Reach Len. (ft)	66.00	56.00	54.00
Crit W.S. (ft)		Flow Area (sq ft)		139.08	568.82
E.G. Slope (ft/ft)	0.000133	Area (sq ft)		139.08	568.82
Q Total (cfs)	646.00	Flow (cfs)		158.94	487.06
Top Width (ft)	363.43	Top Width (ft)		45.00	318.43
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		1.14	0.86
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		3.09	1.79
Conv. Total (cfs)	56012.7	Conv. (cfs)		13781.2	42231.4
Length Wtd. (ft)	55.25	Wetted Per. (ft)		49.15	318.74
Min Ch El (ft)	67.00	Shear (lb/sq ft)		0.02	0.01
Alpha	1.05	Stream Power (lb/ft s)		0.03	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.02	0.35
C & E Loss (ft)	0.00	Cum SA (acres)		0.31	0.20

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Shelborne Avenue
REACH: RV Park RS: 50

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.4	0	66.4	4	66	9	65	24	65
30	66	50	67	112	67	137	67	224	67
261	67	334	68	358	69	430	69.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	0	.03	430	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	430	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	70.75	Reach Len. (ft)			
Crit W.S. (ft)	67.34	Flow Area (sq ft)		1444.90	
E.G. Slope (ft/ft)	0.000016	Area (sq ft)		1444.90	
Q Total (cfs)	646.00	Flow (cfs)		646.00	
Top Width (ft)	430.00	Top Width (ft)		430.00	
Vel Total (ft/s)	0.45	Avg. Vel. (ft/s)		0.45	

Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)	3.36
Conv. Total (cfs)	159065.5	Conv. (cfs)	159065.5
Length Wtd. (ft)		Wetted Per. (ft)	436.06
Min Ch El (ft)	65.00	Shear (lb/sq ft)	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

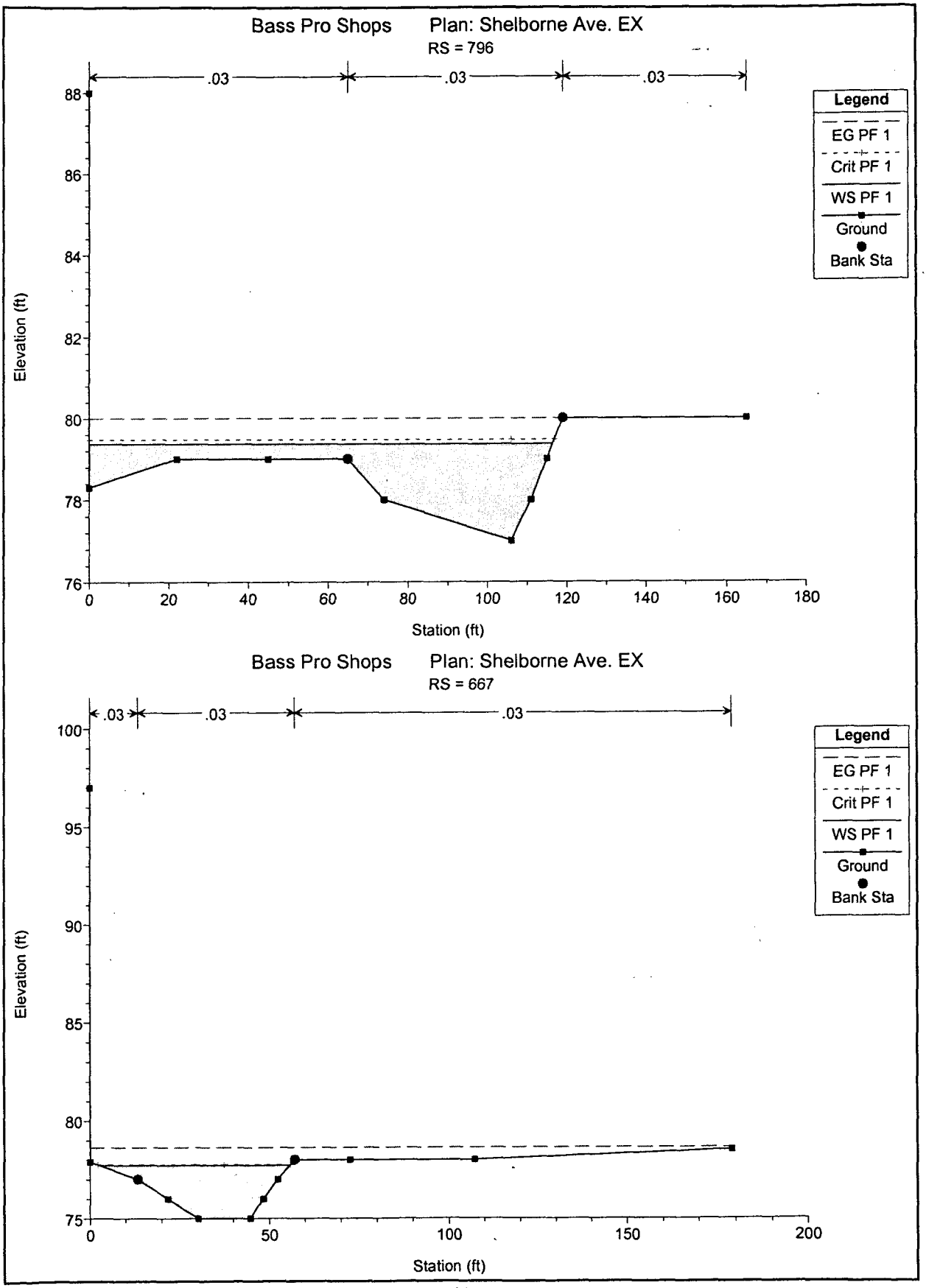
SUMMARY OF REACH LENGTHS

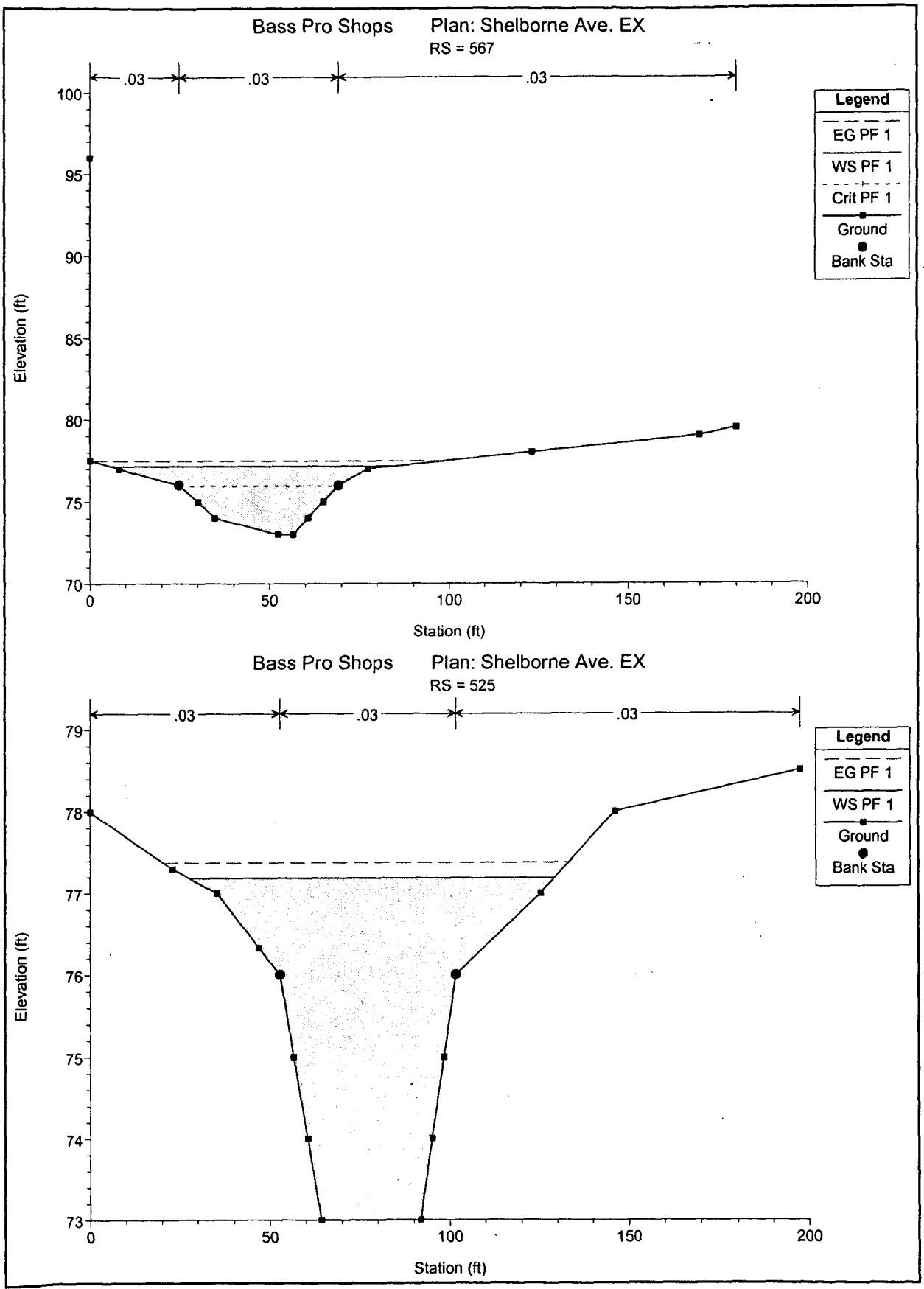
River: Shelborne Avenue

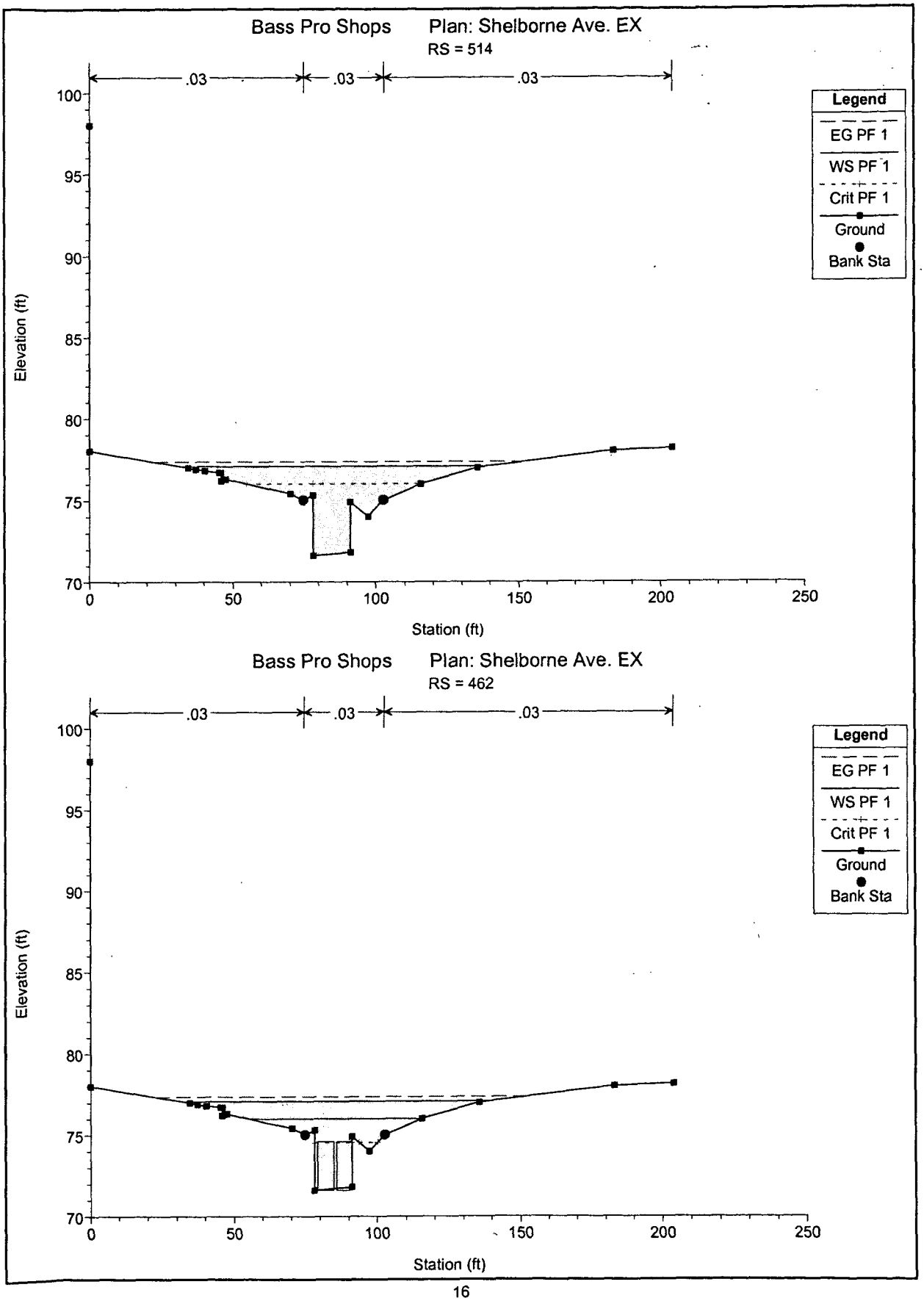
Reach	River Sta.	Left	Channel	Right
RV Park	796	133	131	124
RV Park	667	107	101	87
RV Park	567	43	43	63
RV Park	525	17	10	18
RV Park	514	106	104	101
RV Park	462	Culvert		
RV Park	412	20	20	20
RV Park	376	77	77	71
RV Park	299	91	93	98
RV Park	207	106	107	125
RV Park	100	55	58	75
RV Park	90	120	115	129
RV Park	70	45	45	56
RV Park	60	66	56	54
RV Park	50	0	0	0

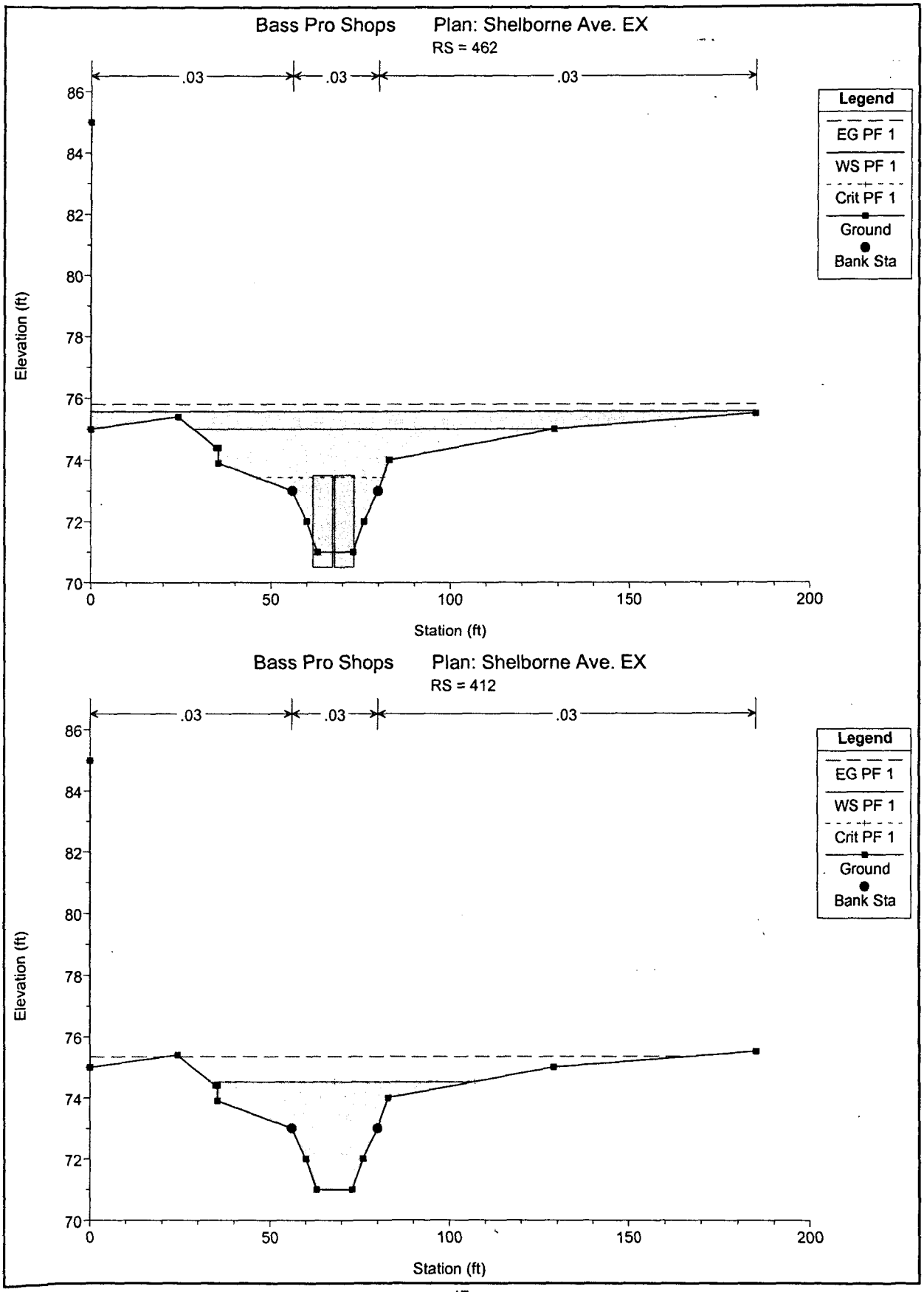
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Shelborne Avenue

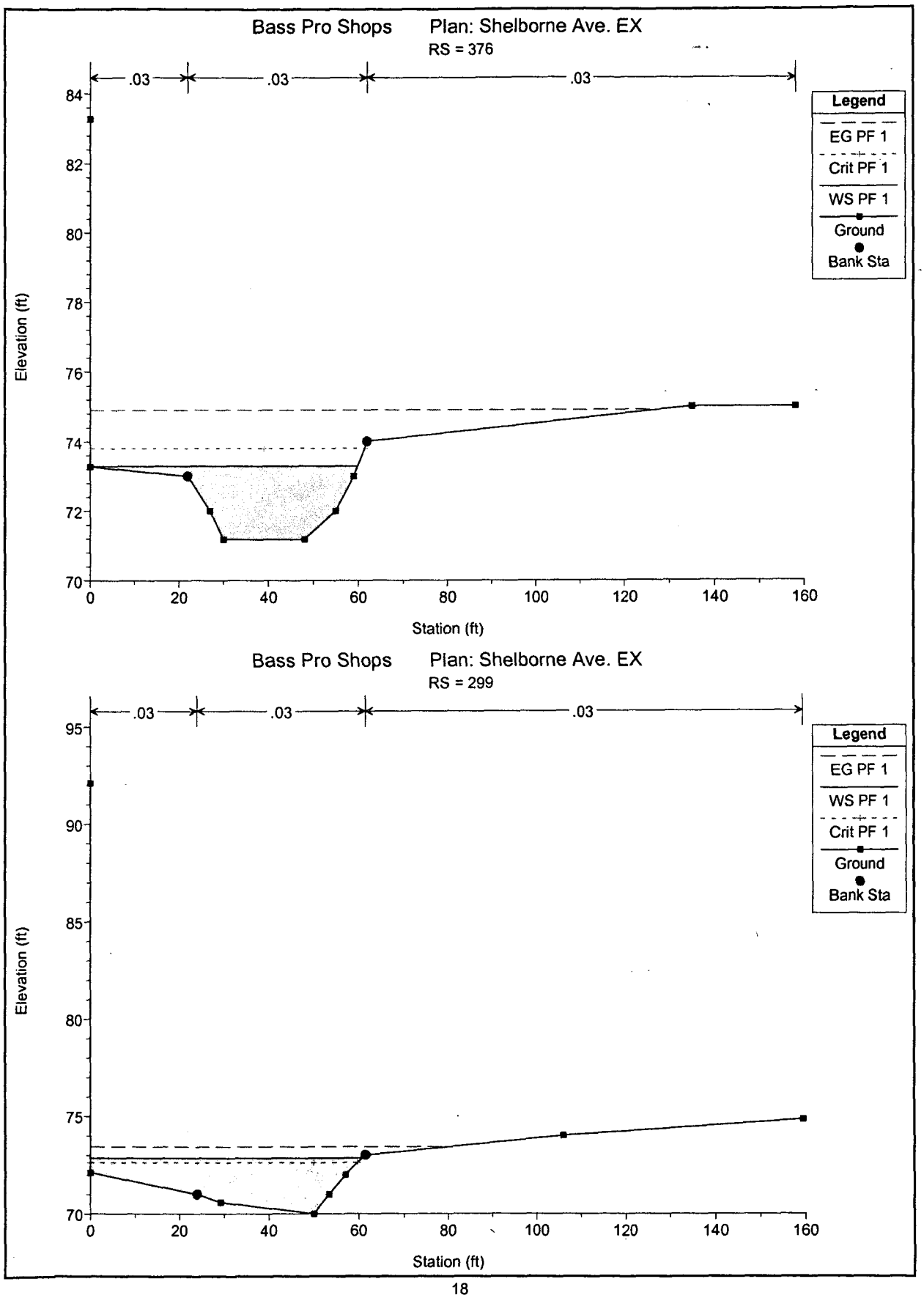
Reach	River Sta.	Contr.	Expan.
RV Park	796	.1	.3
RV Park	667	.1	.3
RV Park	567	.1	.3
RV Park	525	.1	.3
RV Park	514	.3	.5
RV Park	462	Culvert	
RV Park	412	.3	.5
RV Park	376	.1	.3
RV Park	299	.1	.3
RV Park	207	.1	.3
RV Park	100	.1	.3
RV Park	90	.1	.3
RV Park	70	.1	.3
RV Park	60	.1	.3
RV Park	50	.1	.3

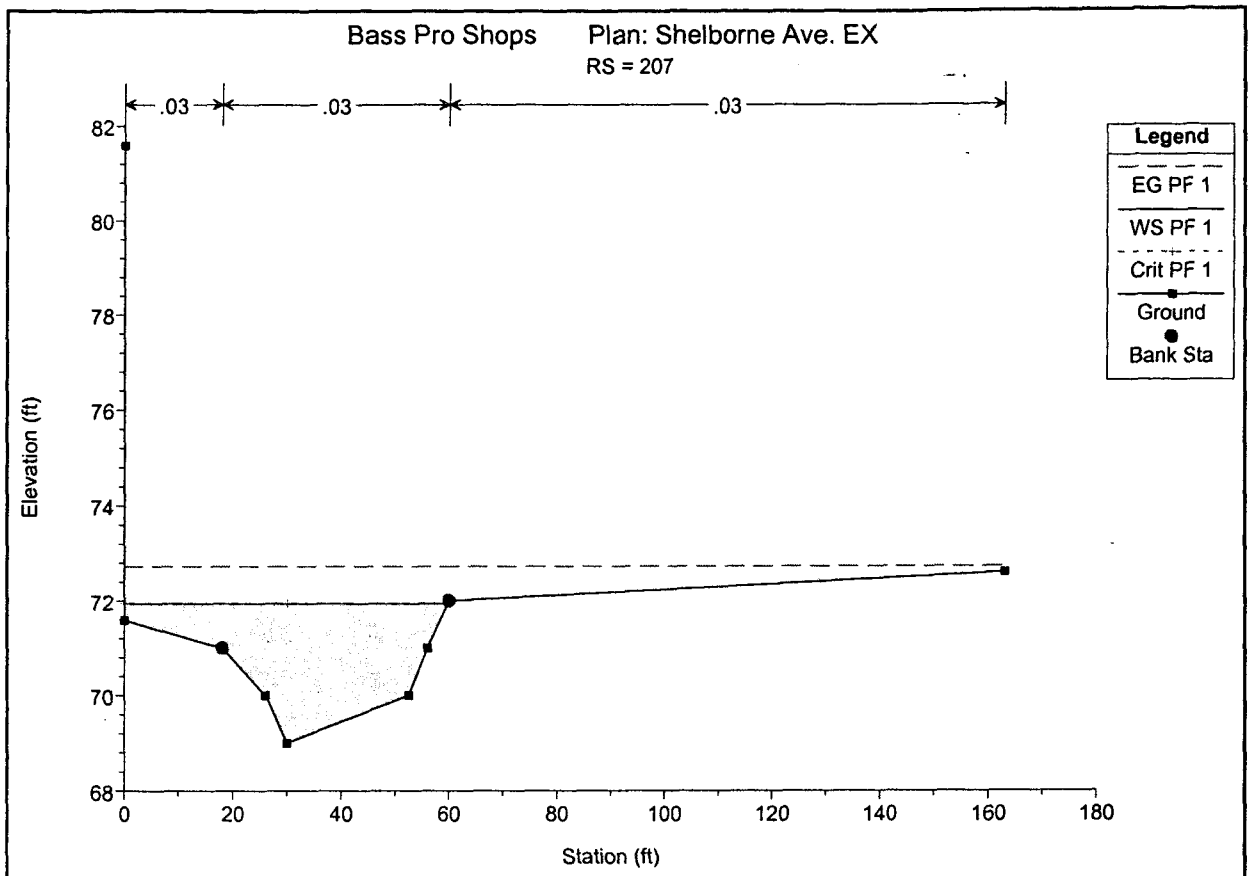

Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 796
.03
.03
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
88
86
84
82
80
78
76
0
20
40
60
80
100
120
140
160
180
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 667
.03
.03
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
0
50
100
150
200
Station (ft)

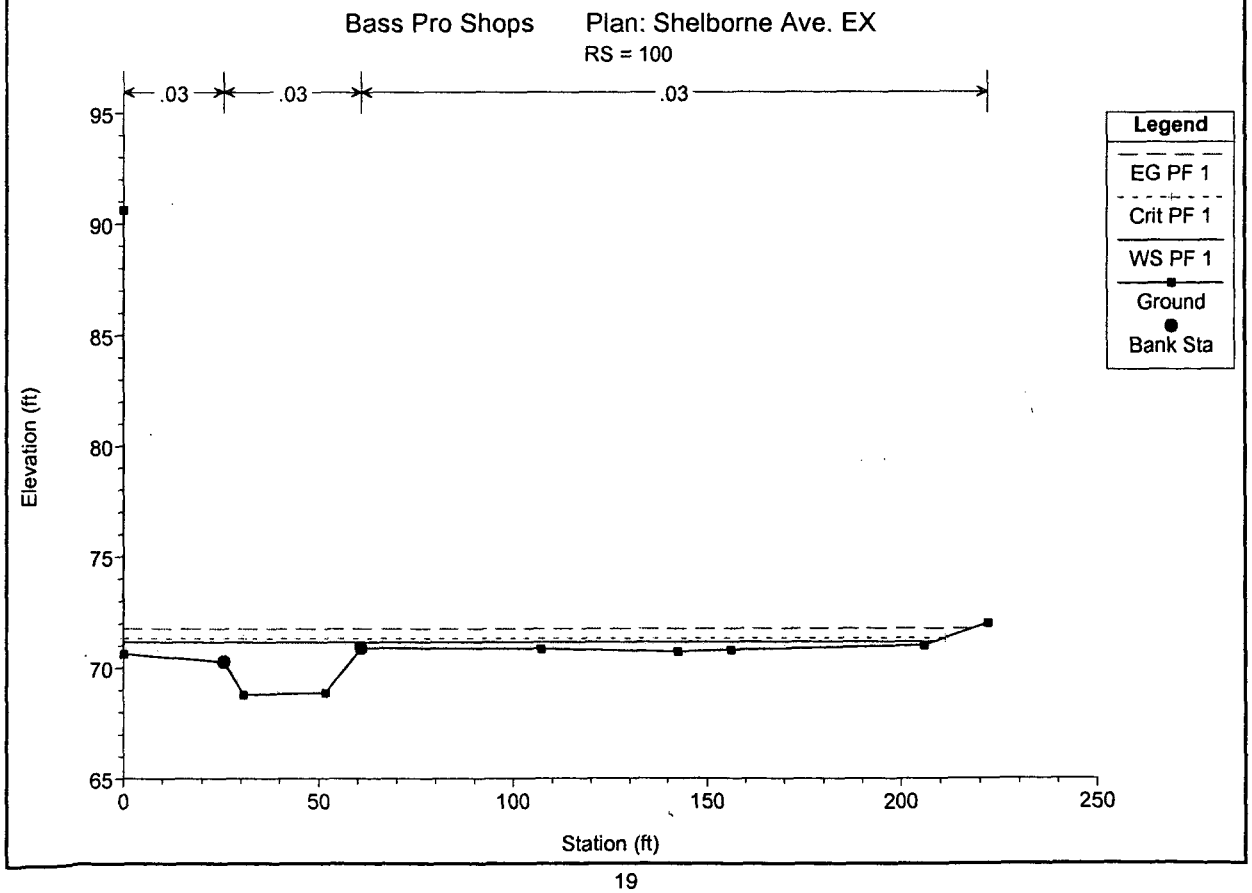

Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 567
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 525
.03
.03
.03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

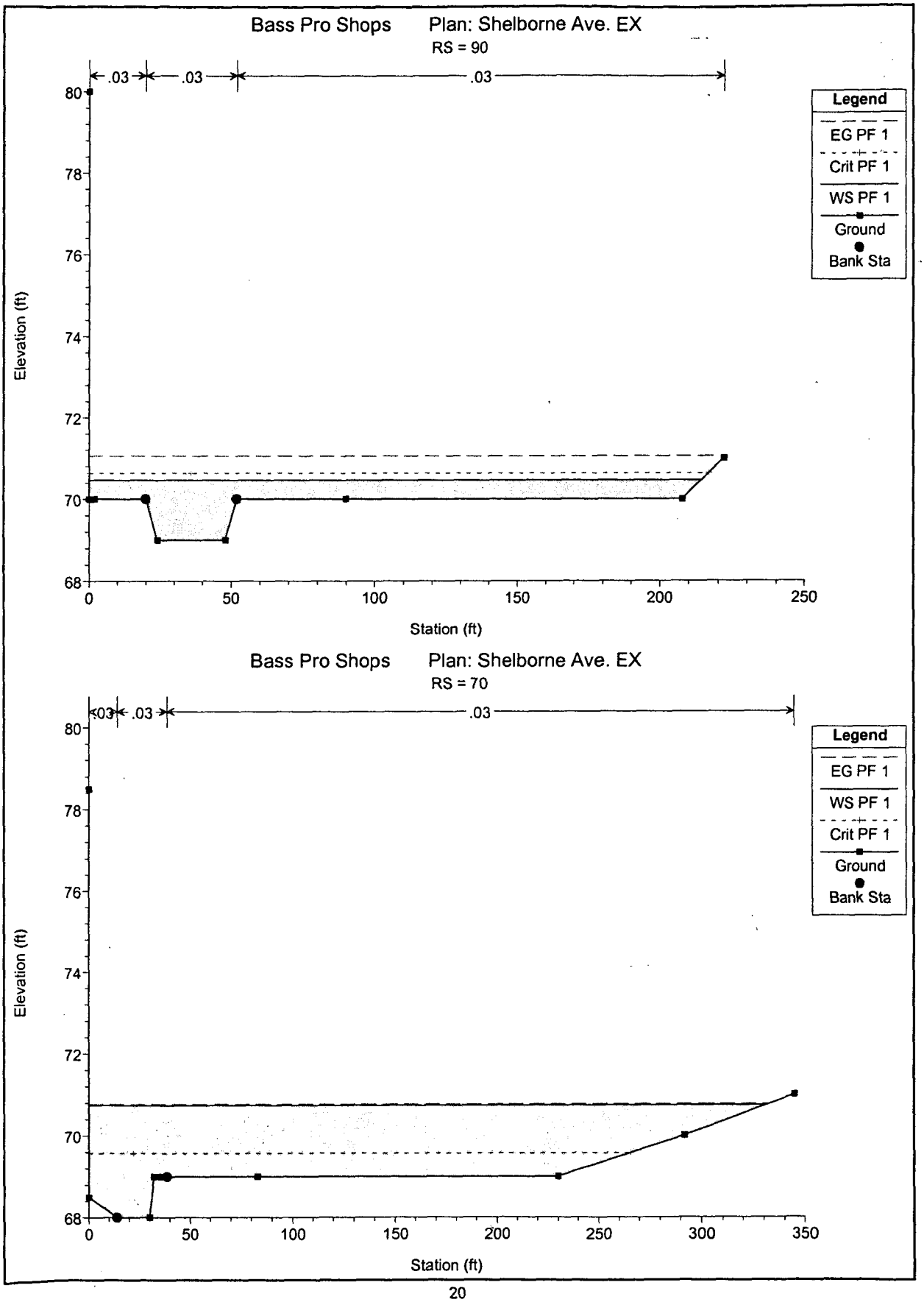

Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 514
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 462
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

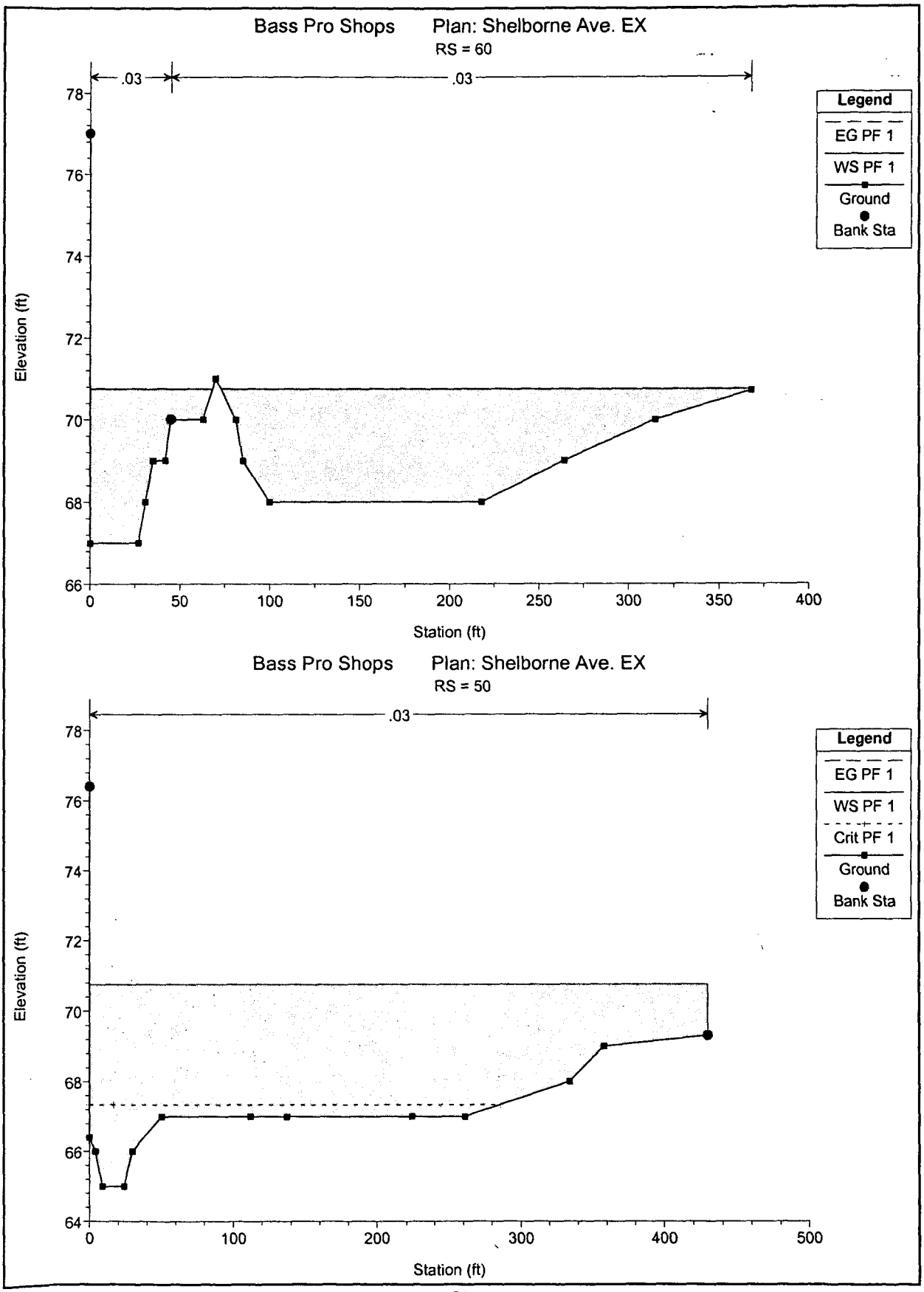

Bass Pro Shops Plan: Shelborne Ave. EX
RS = 462
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
86
84
82
80
78
76
74
72
70
0
50
100
150
200
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. EX
RS = 412
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
86
84
82
80
78
76
74
72
70
0
50
100
150
200
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. EX
RS = 376
.03
.03
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
84
82
80
78
76
74
72
70
0
20
40
60
80
100
120
140
160
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. EX
RS = 299
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
95
90
85
80
75
70
0
20
40
60
80
100
120
140
160
Station (ft)


Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 207
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
82
80
78
76
74
72
70
68
0
20
40
60
80
100
120
140
160
180


Bass Pro Shops
Plan: Shelborne Ave. EX
RS = 100
.03
.03
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
95
90
85
80
75
70
65
0
50
100
150
200
250


Bass Pro Shops Plan: Shelborne Ave. EX
RS = 90
.03
.03
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
80
78
76
74
72
70
68
0
50
100
150
200
250
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. EX
RS = 70
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
80
78
76
74
72
70
68
0
50
100
150
200
250
300
350
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. EX
RS = 60
.03
.03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
78
76
74
72
70
68
66
0
50
100
150
200
250
300
350
400
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. EX
RS = 50
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
78
76
74
72
70
68
66
64
0
100
200
300
400
500
Station (ft)

HEC-RAS MODEL FOR FLOWS ALONG SHELBORN ALIGNMENT (INTERIM AND FUTURE CONDITIONS)

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Max Chl Dpth	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)	(sq ft)	(ft)	
RV Park	796	646.00	77.00	79.37	79.48	80.00	0.010309	6.77	2.37	112.78	116.49	0.95
RV Park	796	258.00	77.00	78.68	78.68	79.13	0.011836	5.44	1.68	49.00	57.83	0.95
RV Park	667	646.00	75.00	77.72	77.75	78.63	0.010130	7.72	2.72	86.27	53.01	0.97
RV Park	667	258.00	75.00	76.57	76.68	77.29	0.016381	6.82	1.57	37.85	33.64	1.13
RV Park	567	646.00	73.00	76.71	75.95	77.17	0.003439	5.48	3.71	122.52	62.02	0.60
RV Park	567	258.00	73.00	76.04	74.87	76.18	0.001492	2.97	3.04	86.86	45.34	0.37
RV Park	525	646.00	73.00	76.74		77.01	0.001644	4.21	3.74	162.09	79.44	0.42
RV Park	525	258.00	73.00	76.04		76.12	0.000637	2.21	3.04	116.85	50.73	0.25
RV Park	514	646.00	71.60	76.12	76.01	76.92	0.007578	7.47	4.52	98.54	66.01	0.78
RV Park	514	258.00	71.60	75.95	74.04	76.10	0.001562	3.25	4.35	87.89	58.65	0.35
RV Park	494	476.00	75.16	76.35	76.35	76.64	0.004788	4.29	1.19	111.07	203.00	1.02
RV Park	494	88.00	75.16	75.93	75.93	76.05	0.006353	2.76	0.77	31.87	139.74	1.02
RV Park	412	476.00	73.87	74.63	75.04	75.84	0.020717	8.83	0.76	53.90	99.37	2.11
RV Park	412	88.00	73.87	74.12	74.32	74.87	0.046766	6.96	0.25	12.64	61.46	2.71
RV Park	376	476.00	73.29	73.87	74.19	75.20	0.055229	9.24	0.58	51.53	177.05	3.02
RV Park	376	88.00	73.29	73.62	73.76	74.14	0.024873	5.78	0.33	15.22	89.18	2.47
RV Park	299	476.00	72.50	73.57	73.62	73.90	0.005639	4.60	1.07	103.40	192.72	1.11
RV Park	299	88.00	72.50	73.07	73.07	73.21	0.005840	3.06	0.57	28.77	101.66	1.01
RV Park	207	476.00	71.70	72.51	72.70	73.08	0.014352	6.09	0.81	78.21	193.26	1.69
RV Park	207	88.00	71.70	72.13	72.20	72.38	0.014792	4.04	0.43	21.80	102.04	1.54
RV Park	100	476.00	70.50	71.30	71.43	71.72	0.010684	5.21	0.80	91.44	228.95	1.45
RV Park	100	88.00	70.50	70.93	70.97	71.10	0.009528	3.27	0.43	26.91	124.21	1.24
RV Park	90	476.00	70.00	70.69	70.79	71.07	0.011344	4.96	0.69	95.98	270.27	1.47
RV Park	90	88.00	70.00	70.75	70.41	70.76	0.000245	0.79	0.75	112.07	282.03	0.22
RV Park	70	476.00	67.01	70.75	67.98	70.75	0.000009	0.43	3.74	1102.90	541.39	0.05
RV Park	70	88.00	67.01	70.75		70.75	0.000000	0.08	3.74	1102.90	541.39	0.01
RV Park	60	476.00	66.70	70.75		70.75	0.000008	0.41	4.05	1155.87	560.00	0.05

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Max Chl Dpth	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)	(sq ft)	(ft)	
RV Park	60	88.00	66.70	70.75		70.75	0.000000	0.08	4.05	1155.87	560.00	0.01
RV Park	50	476.00	64.38	70.75	66.40	70.75	0.000003	0.27	6.37	1739.37	527.68	0.03
RV Park	50	88.00	64.38	70.75	65.51	70.75	0.000000	0.05	6.37	1739.37	527.68	0.00

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Bass Pro Shops
Project File : 6923.prj
Run Date and Time: 8/5/03 12:24:22 PM

Project in English units

FLOW DATA

Flow Title: Shelborne Ave. PR
Flow File : G:\DRAINAGE\6923.2\HEC-RAS\6923.f02

Flow Data (cfs)

River	Reach	RS	Interim	Future
Shelborne Avenue	RV Park	796	646	258
Shelborne Avenue	RV Park	494	476	88

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Shelborne Avenue	RV Park	Interim	Normal S = .0103	Known WS = 70.75

GEOMETRY DATA

Geometry Title: Shelborne Ave. PR
Geometry File : G:\DRAINAGE\6923.2\HEC-RAS\6923.g02

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 796

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88	0	78.3	22	79	45	79	65	79
74	78	106	77	111	78	115	79	119	80
165	80								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.03	65	.03	119	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65	119	133	131	124	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	80.00	Element			
Vel Head (ft)	0.63	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	79.37	Reach Len. (ft)	133.00	131.00	124.00
Crit W.S. (ft)	79.48	Flow Area (sq ft)	31.89	80.89	
E.G. Slope (ft/ft)	0.010309	Area (sq ft)	31.89	80.89	
Q Total (cfs)	646.00	Flow (cfs)	98.68	547.32	
Top Width (ft)	116.49	Top Width (ft)	65.00	51.49	
Vel Total (ft/s)	5.73	Avg. Vel. (ft/s)	3.09	6.77	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.49	1.57	
Conv. Total (cfs)	6362.4	Conv. (cfs)	971.9	5390.5	
Length Wtd. (ft)	131.17	Wetted Per. (ft)	66.08	51.83	
Min Ch El (ft)	77.00	Shear (lb/sq ft)	0.31	1.00	
Alpha	1.23	Stream Power (lb/ft s)	0.96	6.80	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.07	5.93	0.01
C & E Loss (ft)		Cum SA (acres)	0.17	4.55	0.03

CROSS SECTION OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	79.13	Element			
Vel Head (ft)	0.45	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	78.68	Reach Len. (ft)	133.00	131.00	124.00
Crit W.S. (ft)	78.68	Flow Area (sq ft)	2.28	46.72	
E.G. Slope (ft/ft)	0.011836	Area (sq ft)	2.28	46.72	
Q Total (cfs)	258.00	Flow (cfs)	3.99	254.01	
Top Width (ft)	57.83	Top Width (ft)	11.98	45.85	
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	1.75	5.44	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)	0.19	1.02	
Conv. Total (cfs)	2371.5	Conv. (cfs)	36.7	2334.8	
Length Wtd. (ft)	131.02	Wetted Per. (ft)	12.37	46.09	
Min Ch El (ft)	77.00	Shear (lb/sq ft)	0.14	0.75	
Alpha	1.05	Stream Power (lb/ft s)	0.24	4.07	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	5.15	0.00
C & E Loss (ft)		Cum SA (acres)	0.03	3.74	0.01

Warning: Divided flow computed for this cross-section.
Warning: Slope too shallow for slope area to converge during supercritical flow calculations (normal depth is above critical depth). Water surface set to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 667

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97	0	77.9	13.4	77	21.7	76	30.2	75
44.8	75	48.3	76	52.3	77	57.1	78	72.5	78
107.2	78	178.9	78.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	13.4	.03	57.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.4	57.1	107	101	87	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	78.63	Element			

Vel Head (ft)	0.91	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	77.72	Reach Len. (ft)	107.00	101.00	87.00
Crit W.S. (ft)	77.75	Flow Area (sq ft)	3.82	82.45	
E.G. Slope (ft/ft)	0.010130	Area (sq ft)	3.82	82.45	
Q Total (cfs)	646.00	Flow (cfs)	9.59	636.41	
Top Width (ft)	53.01	Top Width (ft)	10.67	42.34	
Vel Total (ft/s)	7.49	Avg. Vel. (ft/s)	2.51	7.72	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	0.36	1.95	
Conv. Total (cfs)	6418.5	Conv. (cfs)	95.3	6323.2	
Length Wtd. (ft)	101.04	Wetted Per. (ft)	10.69	42.79	
Min Ch El (ft)	75.00	Shear (lb/sq ft)	0.23	1.22	
Alpha	1.05	Stream Power (lb/ft s)	0.57	9.40	
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	0.02	5.69	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	4.41	0.03

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 OUTPUT Profile #Future

E.G. Elev (ft)	77.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.030	
W.S. Elev (ft)	76.57	Reach Len. (ft)	107.00	101.00	87.00
Crit W.S. (ft)	76.68	Flow Area (sq ft)		37.85	
E.G. Slope (ft/ft)	0.016381	Area (sq ft)		37.85	
Q Total (cfs)	258.00	Flow (cfs)		258.00	
Top Width (ft)	33.64	Top Width (ft)		33.64	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.13	
Conv. Total (cfs)	2015.8	Conv. (cfs)		2015.8	
Length Wtd. (ft)	101.00	Wetted Per. (ft)		33.95	
Min Ch El (ft)	75.00	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)		7.77	
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)	0.00	5.02	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	3.62	0.01

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: Shelborne Avenue
REACH: RV Park RS: 567

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	96	0	77.52	8.1	77	24.8	76	30.2	75
34.7	74	52.4	73	56.5	73	60.7	74	65	75
69.1	76	77.5	77	123.2	78	169.9	79	180	79.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.8	.03	69.1	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.8	69.1	43	43	63	.1 .3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	77.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.71	Reach Len. (ft)	43.00	43.00	63.00
Crit W.S. (ft)	75.95	Flow Area (sq ft)	4.16	116.27	2.09
E.G. Slope (ft/ft)	0.003439	Area (sq ft)	4.16	116.27	2.09
Q Total (cfs)	646.00	Flow (cfs)	6.03	636.95	3.02
Top Width (ft)	62.02	Top Width (ft)	11.79	44.30	5.93

Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	1.45	5.48	1.44
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)	0.35	2.62	0.35
Conv. Total (cfs)	11016.4	Conv. (cfs)	102.8	10862.1	51.5
Length Wtd. (ft)	43.15	Wetted Per. (ft)	11.81	44.88	5.97
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.08	0.56	0.08
Alpha	1.07	Stream Power (lb/ft s)	0.11	3.05	0.11
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.01	5.46	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.02	4.31	0.03

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #Future

E.G. Elev (ft)	76.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.04	Reach Len. (ft)	43.00	43.00	63.00
Crit W.S. (ft)	74.87	Flow Area (sq ft)	0.01	86.84	0.01
E.G. Slope (ft/ft)	0.001492	Area (sq ft)	0.01	86.84	0.01
Q Total (cfs)	258.00	Flow (cfs)	0.00	258.00	0.00
Top Width (ft)	45.34	Top Width (ft)	0.69	44.30	0.35
Vel Total (ft/s)	2.97	Avg. Vel. (ft/s)	0.14	2.97	0.14
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.02	1.96	0.02
Conv. Total (cfs)	6679.1	Conv. (cfs)	0.1	6679.0	0.0
Length Wtd. (ft)	43.00	Wetted Per. (ft)	0.70	44.88	0.35
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.00	0.18	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.54	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00	4.87	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	3.53	0.01

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 525

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78	22.9	77.3	35.4	77	47	76.33	52.8	76
56.6	75	60.5	74	64.3	73	91.9	73	95.1	74
98.4	75	101.7	76	125.6	77	146.3	78	197.7	78.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	52.8	.03	101.7	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
52.8	101.7	17	10	18	.1	.3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	77.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.74	Reach Len. (ft)	17.00	10.00	18.00
Crit W.S. (ft)		Flow Area (sq ft)	4.78	150.79	6.53
E.G. Slope (ft/ft)	0.001644	Area (sq ft)	4.78	150.79	6.53
Q Total (cfs)	646.00	Flow (cfs)	4.95	634.31	6.74
Top Width (ft)	79.44	Top Width (ft)	12.88	48.90	17.66
Vel Total (ft/s)	3.99	Avg. Vel. (ft/s)	1.04	4.21	1.03
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)	0.37	3.08	0.37
Conv. Total (cfs)	15933.3	Conv. (cfs)	122.0	15644.9	166.3
Length Wtd. (ft)	10.36	Wetted Per. (ft)	12.90	49.73	17.68

Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.04	0.31	0.04
Alpha	1.10	Stream Power (lb/ft s)	0.04	1.31	0.04
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01	5.33	0.00
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	4.27	0.01

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 OUTPUT Profile #Future

E.G. Elev (ft)	76.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.04	Reach Len. (ft)	17.00	10.00	18.00
Crit W.S. (ft)		Flow Area (sq ft)	0.02	116.81	0.02
E.G. Slope (ft/ft)	0.000637	Area (sq ft)	0.02	116.81	0.02
Q Total (cfs)	258.00	Flow (cfs)	0.00	258.00	0.00
Top Width (ft)	50.73	Top Width (ft)	0.78	48.90	1.06
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	0.10	2.21	0.10
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.02	2.39	0.02
Conv. Total (cfs)	10223.5	Conv. (cfs)	0.1	10223.3	0.1
Length Wtd. (ft)	10.21	Wetted Per. (ft)	0.78	49.73	1.06
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.00	0.09	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.21	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	4.77	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	3.49	0.01

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: Shelborne Avenue
REACH: RV Park RS: 514

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	98	0	78	34.59	77	37.3	76.9	40.42	76.8
45.37	76.7	45.87	76.7	45.87	76.2	47.41	76.3	70.14	75.4
74.77	75	78.16	75.3	78.16	71.6	91.13	71.8	91.13	74.9
97.33	74	102.75	75	115.7	76	135.65	77	183.13	78
203.87	78.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.77	.03	102.75	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74.77	102.75	21	21	.1	.3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	76.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	76.12	Reach Len. (ft)	21.00	21.00	21.00
Crit W.S. (ft)	76.01	Flow Area (sq ft)	10.74	79.67	8.13
E.G. Slope (ft/ft)	0.007578	Area (sq ft)	10.74	79.67	8.13
Q Total (cfs)	646.00	Flow (cfs)	28.06	594.98	22.96
Top Width (ft)	66.01	Top Width (ft)	22.74	27.98	15.29
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)	2.61	7.47	2.82
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)	0.47	2.85	0.53
Conv. Total (cfs)	7420.7	Conv. (cfs)	322.3	6834.6	263.8
Length Wtd. (ft)	21.00	Wetted Per. (ft)	22.77	34.95	15.33
Min Ch El (ft)	71.60	Shear (lb/sq ft)	0.22	1.08	0.25
Alpha	1.21	Stream Power (lb/ft s)	0.58	8.05	0.71

Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.00	5.30	0.00
C & E Loss (ft)	0.16	Cum SA (acres)	0.01	4.26	0.00

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 OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.10	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	75.95	Reach Len. (ft)	21.00	21.00	21.00
Crit W.S. (ft)	74.04	Flow Area (sq ft)	7.22	74.88	5.79
E.G. Slope (ft/ft)	0.001562	Area (sq ft)	7.22	74.88	5.79
Q Total (cfs)	258.00	Flow (cfs)	7.56	243.57	6.87
Top Width (ft)	58.65	Top Width (ft)	18.42	27.98	12.25
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)	1.05	3.25	1.19
Max Chl Dpth (ft)	4.35	Hydr. Depth (ft)	0.39	2.68	0.47
Conv. Total (cfs)	6528.7	Conv. (cfs)	191.2	6163.6	173.9
Length Wtd. (ft)	21.00	Wetted Per. (ft)	18.45	34.95	12.29
Min Ch El (ft)	71.60	Shear (lb/sq ft)	0.04	0.21	0.05
Alpha	1.17	Stream Power (lb/ft s)	0.04	0.68	0.05
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00	4.75	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	3.48	0.00

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: Shelborne Avenue
REACH: RV Park RS: 494

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76	30	76.16	60	75.16	71	75.58	180	76
203	75.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	203	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	203	83	82	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.64	Element			
Vel Head (ft)	0.29	Wt. n-Val.		0.016	
W.S. Elev (ft)	76.35	Reach Len. (ft)	83.00	82.00	82.00
Crit W.S. (ft)	76.35	Flow Area (sq ft)		111.07	
E.G. Slope (ft/ft)	0.004788	Area (sq ft)		111.07	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	203.00	Top Width (ft)		203.00	
Vel Total (ft/s)	4.29	Avg. Vel. (ft/s)		4.29	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)		0.55	
Conv. Total (cfs)	6879.1	Conv. (cfs)		6879.1	
Length Wtd. (ft)	82.00	Wetted Per. (ft)		203.93	
Min Ch El (ft)	75.16	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		5.25	
C & E Loss (ft)	0.01	Cum SA (acres)		4.20	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.05	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.016	
W.S. Elev (ft)	75.93	Reach Len. (ft)	83.00	82.00	82.00
Crit W.S. (ft)	75.93	Flow Area (sq ft)		31.87	
E.G. Slope (ft/ft)	0.006353	Area (sq ft)		31.87	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	139.74	Top Width (ft)		139.74	
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)		2.76	
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)		0.23	
Conv. Total (cfs)	1104.0	Conv. (cfs)		1104.0	
Length Wtd. (ft)	82.00	Wetted Per. (ft)		139.89	
Min Ch El (ft)	75.16	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.25	
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		4.73	
C & E Loss (ft)	0.01	Cum SA (acres)		3.44	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 412

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.08	123.81	73.87	139.96	74.38	139.96	73.88	184	73.88
184	74.38	220	75.32	344.56	75				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	344.56	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	344.56	20	20	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	75.84	Element			
Vel Head (ft)	1.21	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.63	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	75.04	Flow Area (sq ft)		53.90	
E.G. Slope (ft/ft)	0.020717	Area (sq ft)		53.90	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	99.37	Top Width (ft)		99.37	
Vel Total (ft/s)	8.83	Avg. Vel. (ft/s)		8.83	
Max Chl Dpth (ft)	0.76	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	3307.0	Conv. (cfs)		3307.0	
Length Wtd. (ft)	20.00	Wetted Per. (ft)		100.40	
Min Ch El (ft)	73.87	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)		6.13	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		5.10	

C & E Loss (ft)	0.09	Cum SA (acres)	3.92

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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.87	Element			
Vel Head (ft)	0.75	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.12	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	74.32	Flow Area (sq ft)		12.64	
E.G. Slope (ft/ft)	0.046766	Area (sq ft)		12.64	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	61.46	Top Width (ft)		61.46	
Vel Total (ft/s)	6.96	Avg. Vel. (ft/s)		6.96	
Max Chl Dpth (ft)	0.25	Hydr. Depth (ft)		0.21	
Conv. Total (cfs)	406.9	Conv. (cfs)		406.9	
Length Wtd. (ft)	20.00	Wetted Per. (ft)		61.94	
Min Ch El (ft)	73.87	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		4.15	
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)		4.68	
C & E Loss (ft)	0.06	Cum SA (acres)		3.25	

Warning: Divided flow computed for this cross-section.
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.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 376

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.39	148.85	73.79	148.85	73.29	186.3	73.29	186.3	73.79
295.24	73.5	400	75						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	148.85	.016	186.3	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	400	77	71	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	75.20	Element			
Vel Head (ft)	1.32	Wt. n-Val.		0.019	
W.S. Elev (ft)	73.87	Reach Len. (ft)	77.00	77.00	71.00
Crit W.S. (ft)	74.19	Flow Area (sq ft)		51.53	
E.G. Slope (ft/ft)	0.055229	Area (sq ft)		51.53	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	177.05	Top Width (ft)		177.05	
Vel Total (ft/s)	9.24	Avg. Vel. (ft/s)		9.24	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	2025.5	Conv. (cfs)		2025.5	
Length Wtd. (ft)	77.00	Wetted Per. (ft)		178.06	
Min Ch El (ft)	73.29	Shear (lb/sq ft)		1.00	

Alpha	1.00	Stream Power (lb/ft s)	9.22
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	5.07
C & E Loss (ft)	0.01	Cum SA (acres)	3.85

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 OUTPUT Profile #Future

E.G. Elev (ft)	74.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.62	Reach Len. (ft)	77.00	77.00	71.00
Crit W.S. (ft)	73.76	Flow Area (sq ft)		15.22	
E.G. Slope (ft/ft)	0.024873	Area (sq ft)		15.22	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	89.18	Top Width (ft)		89.18	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	0.33	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	558.0	Conv. (cfs)		558.0	
Length Wtd. (ft)	77.00	Wetted Per. (ft)		89.83	
Min Ch El (ft)	73.29	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.52	
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		4.68	
C & E Loss (ft)	0.07	Cum SA (acres)		3.21	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 299

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.4	120	72.5	206.83	75	247.63	76.68	343.36	72.5
461	74.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	461	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	461	91	93	98	.1 .3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	73.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.57	Reach Len. (ft)	91.00	93.00	98.00
Crit W.S. (ft)	73.62	Flow Area (sq ft)		103.40	
E.G. Slope (ft/ft)	0.005639	Area (sq ft)		103.40	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	192.72	Top Width (ft)		192.72	
Vel Total (ft/s)	4.60	Avg. Vel. (ft/s)		4.60	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	6338.9	Conv. (cfs)		6338.9	
Length Wtd. (ft)	93.00	Wetted Per. (ft)		192.78	
Min Ch El (ft)	72.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.87	
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)		4.94	
C & E Loss (ft)	0.30	Cum SA (acres)		3.53	

Warning: Divided flow computed for this cross-section.
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 OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.21	Element			
Vel Head (ft)	0.15	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.07	Reach Len. (ft)	91.00	93.00	98.00
Crit W.S. (ft)	73.07	Flow Area (sq ft)		28.77	
E.G. Slope (ft/ft)	0.005840	Area (sq ft)		28.77	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	101.66	Top Width (ft)		101.66	
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)		3.06	
Max Chl Dpth (ft)	0.57	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	1151.5	Conv. (cfs)		1151.5	
Length Wtd. (ft)	93.00	Wetted Per. (ft)		101.69	
Min Ch El (ft)	72.50	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)		0.32	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		4.64	
C & E Loss (ft)	0.00	Cum SA (acres)		3.05	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 207

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.45	120	71.7	219.58	73.45	219.58	73.96	231.28	74.14
231.28	73.64	270	74.2	327.32	71.7	490	73.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	490	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	490	106	107	108	.1 .3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.08	Element			
Vel Head (ft)	0.58	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.51	Reach Len. (ft)	106.00	107.00	108.00
Crit W.S. (ft)	72.70	Flow Area (sq ft)		78.21	
E.G. Slope (ft/ft)	0.014352	Area (sq ft)		78.21	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	193.26	Top Width (ft)		193.26	
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)		6.09	
Max Chl Dpth (ft)	0.81	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	3973.2	Conv. (cfs)		3973.2	
Length Wtd. (ft)	107.00	Wetted Per. (ft)		193.29	
Min Ch El (ft)	71.70	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		2.21	
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)		4.74	
C & E Loss (ft)	0.02	Cum SA (acres)		3.12	

Warning: Divided flow computed for this cross-section.

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 OUTPUT Profile #Future

E.G. Elev (ft)	72.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.016	
W.S. Elev (ft)	72.13	Reach Len. (ft)	106.00	107.00	108.00
Crit W.S. (ft)	72.20	Flow Area (sq ft)		21.80	
E.G. Slope (ft/ft)	0.014792	Area (sq ft)		21.80	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	102.04	Top Width (ft)		102.04	
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)		4.04	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.21	
Conv. Total (cfs)	723.6	Conv. (cfs)		723.6	
Length Wtd. (ft)	107.00	Wetted Per. (ft)		102.06	
Min Ch El (ft)	71.70	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.80	
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)		4.58	
C & E Loss (ft)	0.01	Cum SA (acres)		2.83	

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 100

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.19	160	70.5	297.76	71.67	297.76	72.17	303.71	72.26
303.71	71.76	339.73	72.3	339.73	72.8	345.72	72.89	345.72	72.39
395	70.5	520	72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	520	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	520	55	58	55	.1

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	71.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.30	Reach Len. (ft)	55.00	58.00	55.00
Crit W.S. (ft)	71.43	Flow Area (sq ft)		91.44	
E.G. Slope (ft/ft)	0.010684	Area (sq ft)		91.44	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	228.95	Top Width (ft)		228.95	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	0.80	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	4605.0	Conv. (cfs)		4605.0	
Length Wtd. (ft)	58.00	Wetted Per. (ft)		228.98	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)		4.54	
C & E Loss (ft)	0.05	Cum SA (acres)		2.60	

Warning: Divided flow computed for this cross-section.
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 OUTPUT Profile #Future

E.G. Elev (ft)	71.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.93	Reach Len. (ft)	55.00	58.00	55.00
Crit W.S. (ft)	70.97	Flow Area (sq ft)		26.91	
E.G. Slope (ft/ft)	0.009528	Area (sq ft)		26.91	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	124.21	Top Width (ft)		124.21	
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)		3.27	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.22	
Conv. Total (cfs)	901.6	Conv. (cfs)		901.6	
Length Wtd. (ft)	58.00	Wetted Per. (ft)		124.23	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	1.25	Cum Volume (acre-ft)		4.52	
C & E Loss (ft)	0.03	Cum SA (acres)		2.55	

Warning: Divided flow computed for this cross-section.
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: Shelborne Avenue
REACH: RV Park RS: 90

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.9	160	70	291.55	70.64	291.55	71.14	303.54	72.17
303.54	71.67	339.43	71.35	339.43	71.85	345.43	71.95	345.43	71.45
400	70	520	71.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	520	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	520	120	115	120	.1	.3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	71.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.69	Reach Len. (ft)	120.00	115.00	120.00
Crit W.S. (ft)	70.79	Flow Area (sq ft)		95.98	
E.G. Slope (ft/ft)	0.011344	Area (sq ft)		95.98	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	270.27	Top Width (ft)		270.27	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.36	
Conv. Total (cfs)	4469.2	Conv. (cfs)		4469.2	
Length Wtd. (ft)	115.00	Wetted Per. (ft)		270.33	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		1.25	
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)		4.41	
C & E Loss (ft)	0.01	Cum SA (acres)		2.26	

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #Future

E.G. Elev (ft)	70.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	120.00	115.00	120.00
Crit W.S. (ft)	70.41	Flow Area (sq ft)		112.07	
E.G. Slope (ft/ft)	0.000245	Area (sq ft)		112.07	

Q Total (cfs)	88.00	Flow (cfs)	88.00
Top Width (ft)	282.03	Top Width (ft)	282.03
Vel Total (ft/s)	0.79	Avg. Vel. (ft/s)	0.79
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.40
Conv. Total (cfs)	5624.0	Conv. (cfs)	5624.0
Length Wtd. (ft)	115.00	Wetted Per. (ft)	282.16
Min Ch El (ft)	70.00	Shear (lb/sq ft)	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	4.43
C & E Loss (ft)	0.00	Cum SA (acres)	2.28

Warning: Divided flow computed for this cross-section.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 70

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70.6	7.81	70.61	7.81	71.11	13.92	70.97	13.92	70.67
32.53	70	55.34	69.16	55.34	69.66	60.41	69.46	60.41	68.96
102.87	68.17	102.87	68.67	106.9	68.54	106.9	68.04	150.4	67.49
150.4	67.99	153.39	67.99	153.39	67.49	197.93	67.01	197.93	67.51
199.88	67.51	199.88	67.01	245.46	67.12	245.46	67.62	246.37	67.62
246.37	67.12	291.93	67.82	291.93	68.32	303.93	68.46	303.93	67.96
339.93	68.49	339.93	68.99	345.92	69.09	345.92	68.59	370	69
480	70	570	71						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	570	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	570	45	45	.1	.3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	67.98	Flow Area (sq ft)		1102.90	
E.G. Slope (ft/ft)	0.000009	Area (sq ft)		1102.90	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	541.39	Top Width (ft)		541.39	
Vel Total (ft/s)	0.43	Avg. Vel. (ft/s)		0.43	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	163109.3	Conv. (cfs)		163109.3	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		548.83	
Min Ch El (ft)	67.01	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.83	
C & E Loss (ft)	0.00	Cum SA (acres)		1.19	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #Future

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	45.00	45.00	45.00

Crit W.S. (ft)		Flow Area (sq ft)	1102.90
E.G. Slope (ft/ft)	0.000000	Area (sq ft)	1102.90
Q Total (cfs)	88.00	Flow (cfs)	88.00
Top Width (ft)	541.39	Top Width (ft)	541.39
Vel Total (ft/s)	0.08	Avg. Vel. (ft/s)	0.08
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)	2.04
Conv. Total (cfs)	163107.5	Conv. (cfs)	163107.5
Length Wtd. (ft)	45.00	Wetted Per. (ft)	548.83
Min Ch El (ft)	67.01	Shear (lb/sq ft)	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	2.83
C & E Loss (ft)	0.00	Cum SA (acres)	1.19

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Shelborne Avenue
REACH: RV Park RS: 60

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	291.9	66.74	291.9	67.24	303.9	67.2	303.9	66.7
339.9	67.4	339.9	67.9	345.89	68.01	345.89	67.51	415	70
560	70.7								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	0	.016	560	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	560	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Interim

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		1155.87	
E.G. Slope (ft/ft)	0.000008	Area (sq ft)		1155.87	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	560.00	Top Width (ft)		560.00	
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)		0.41	
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	173326.4	Conv. (cfs)		173326.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		563.37	
Min Ch El (ft)	66.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.66	
C & E Loss (ft)	0.00	Cum SA (acres)		0.62	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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 OUTPUT Profile #Future

E.G. Elev (ft)	70.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.016	
W.S. Elev (ft)	70.75	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		1155.87	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		1155.87	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	560.00	Top Width (ft)		560.00	
Vel Total (ft/s)	0.08	Avg. Vel. (ft/s)		0.08	

Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)	2.06
Conv. Total (cfs)	173325.4	Conv. (cfs)	173325.4
Length Wtd. (ft)	50.00	Wetted Per. (ft)	563.37
Min Ch El (ft)	66.70	Shear (lb/sq ft)	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.66
C & E Loss (ft)	0.00	Cum SA (acres)	0.62

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Shelborne Avenue
REACH: RV Park RS: 50

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	68.5	235.33	65.5	237.87	64.38	338.38	67.7	338.38	67.2
410.41	68.36	410.41	68.86	527.68	70				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	527.68	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	527.68	0	0	.1	.3

CROSS SECTION OUTPUT Profile #Interim

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.75	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.020	
W.S. Elev (ft)	70.75	Reach Len. (ft)			
Crit W.S. (ft)	66.40	Flow Area (sq ft)		1739.37	
E.G. Slope (ft/ft)	0.000003	Area (sq ft)		1739.37	
Q Total (cfs)	476.00	Flow (cfs)		476.00	
Top Width (ft)	527.68	Top Width (ft)		527.68	
Vel Total (ft/s)	0.27	Avg. Vel. (ft/s)		0.27	
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	284670.6	Conv. (cfs)		284670.6	
Length Wtd. (ft)		Wetted Per. (ft)		532.00	
Min Ch El (ft)	64.38	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #Future

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.75	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.020	
W.S. Elev (ft)	70.75	Reach Len. (ft)			
Crit W.S. (ft)	65.51	Flow Area (sq ft)		1739.37	
E.G. Slope (ft/ft)	0.000000	Area (sq ft)		1739.37	
Q Total (cfs)	88.00	Flow (cfs)		88.00	
Top Width (ft)	527.68	Top Width (ft)		527.68	
Vel Total (ft/s)	0.05	Avg. Vel. (ft/s)		0.05	
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	284670.6	Conv. (cfs)		284670.6	
Length Wtd. (ft)		Wetted Per. (ft)		532.00	
Min Ch El (ft)	64.38	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)		0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

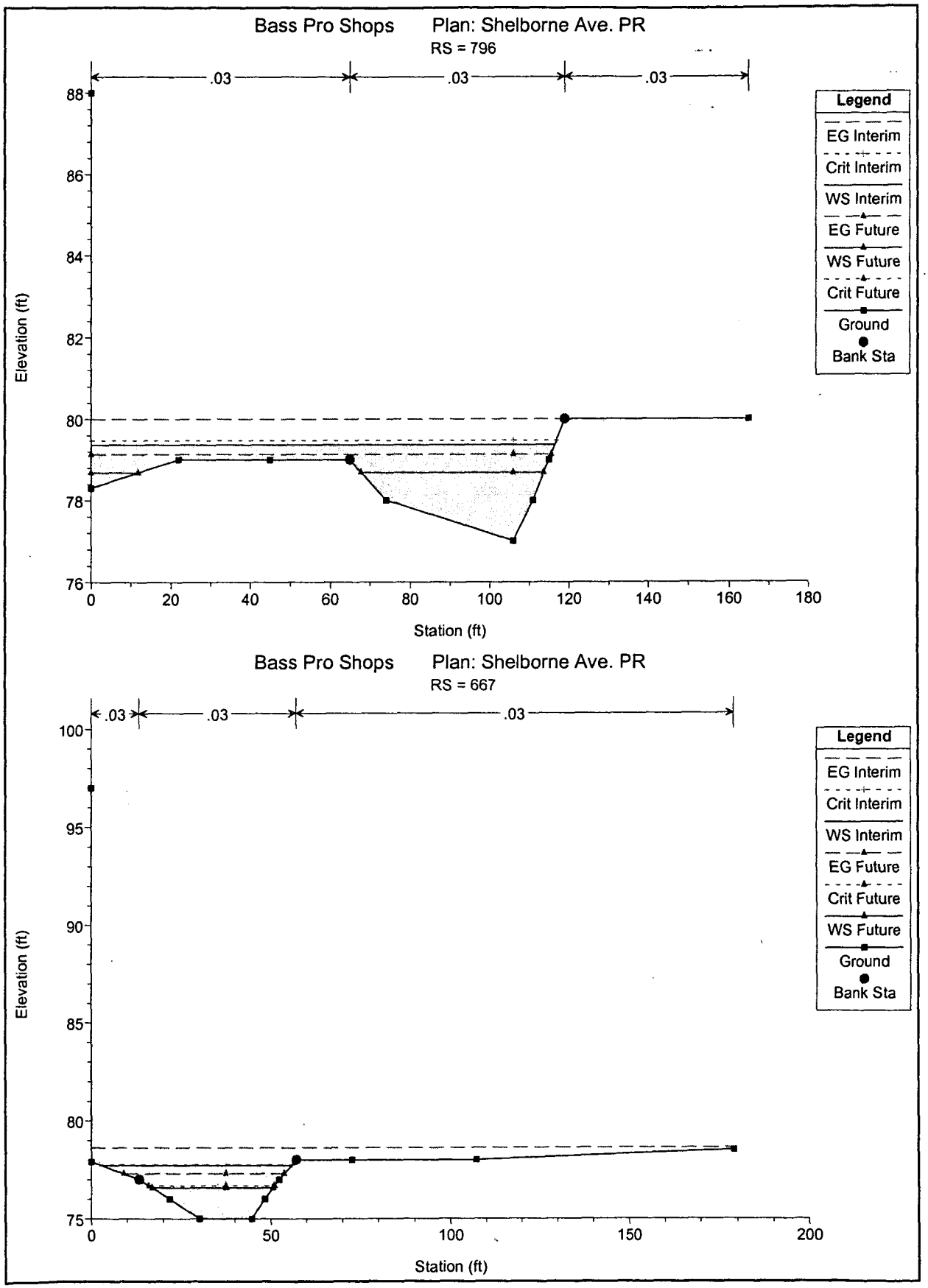
SUMMARY OF REACH LENGTHS

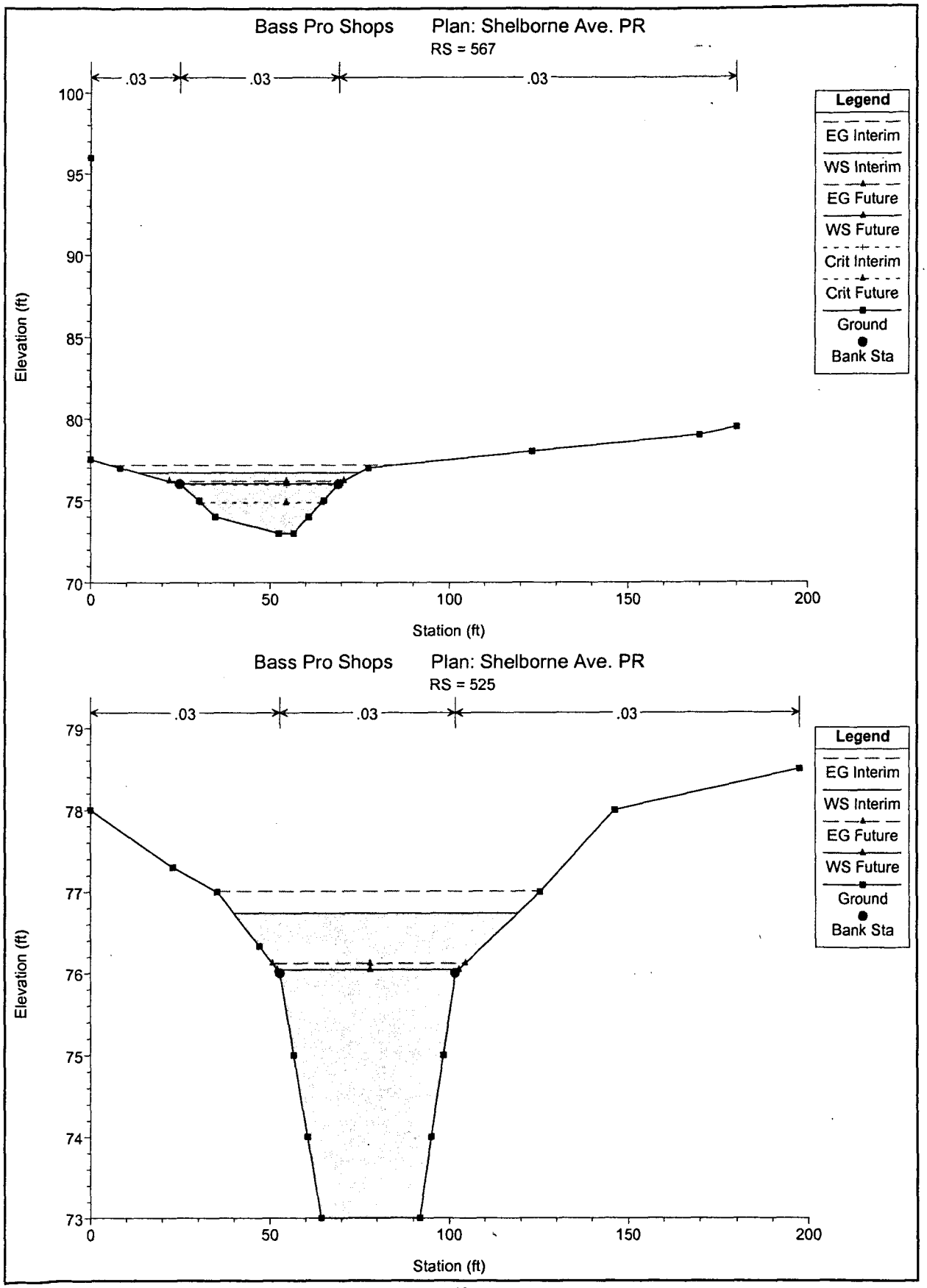
River: Shelborne Avenue

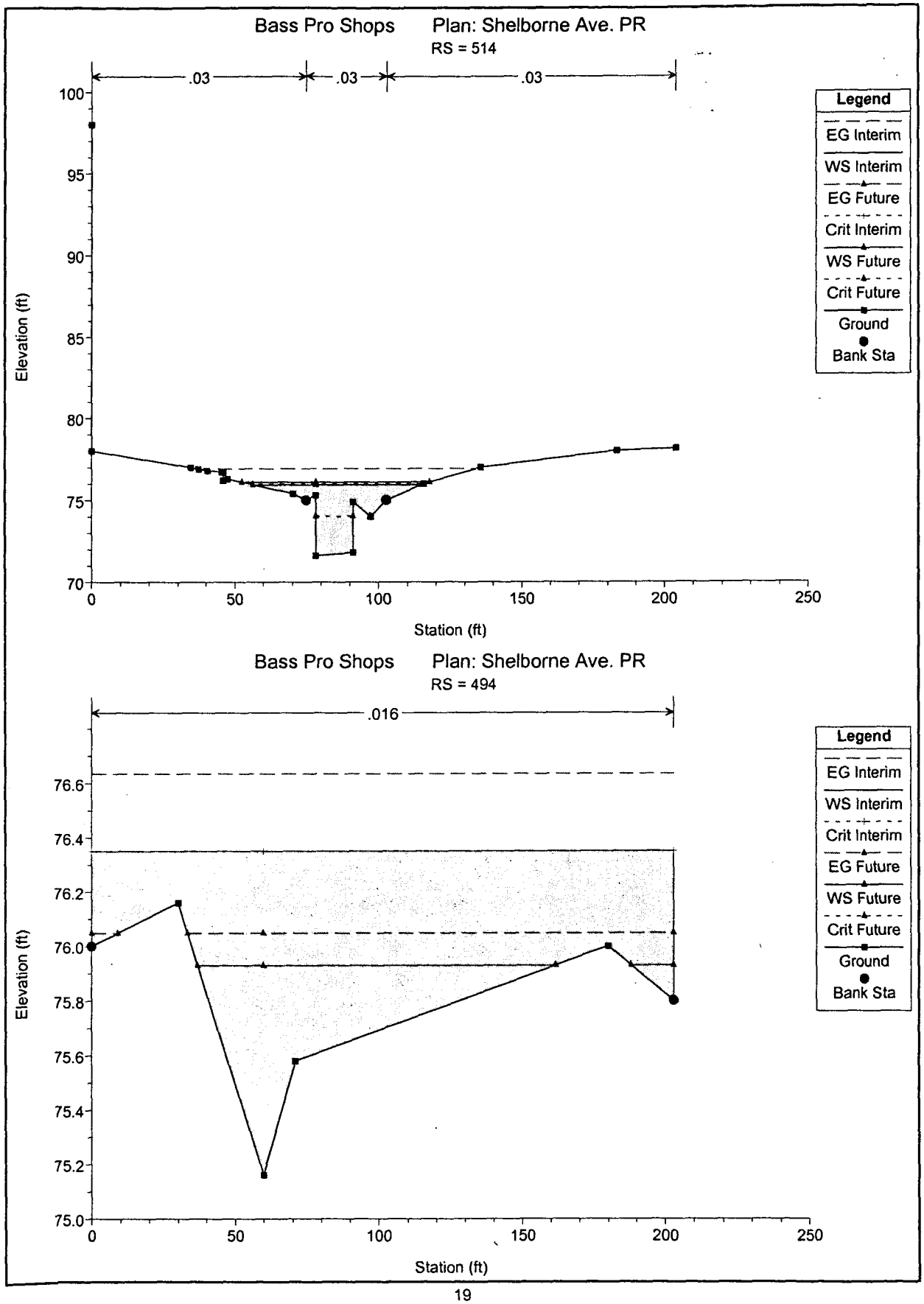
Reach	River Sta.	Left	Channel	Right
RV Park	796	133	131	124
RV Park	667	107	101	87
RV Park	567	43	43	63
RV Park	525	17	10	18
RV Park	514	21	21	21
RV Park	494	83	82	82
RV Park	412	20	20	20
RV Park	376	77	77	71
RV Park	299	91	93	98
RV Park	207	106	107	108
RV Park	100	55	58	55
RV Park	90	120	115	120
RV Park	70	45	45	45
RV Park	60	50	50	50
RV Park	50	0	0	0

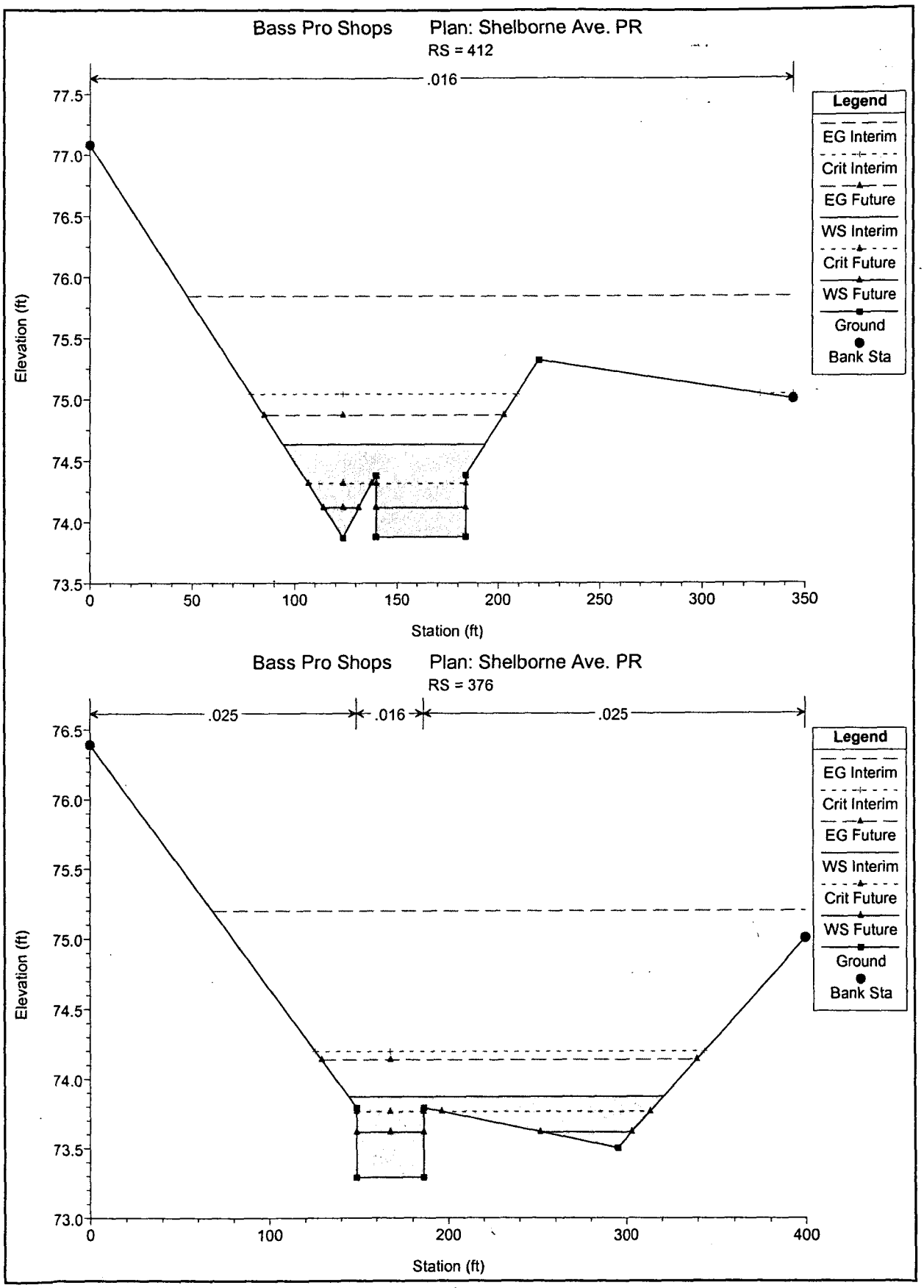
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Shelborne Avenue

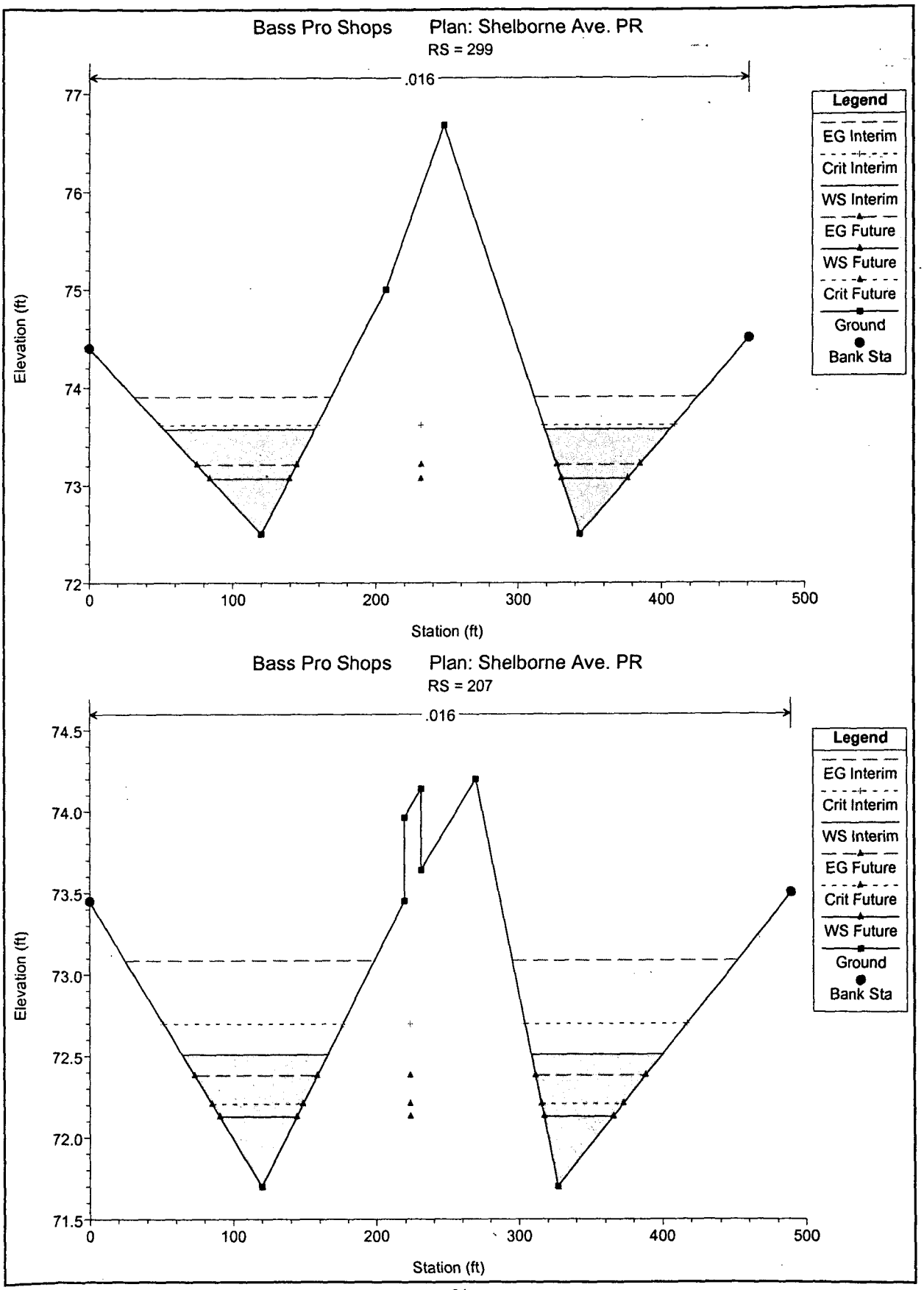
Reach	River Sta.	Contr.	Expan.
RV Park	796	.1	.3
RV Park	667	.1	.3
RV Park	567	.1	.3
RV Park	525	.1	.3
RV Park	514	.1	.3
RV Park	494	.1	.3
RV Park	412	.1	.3
RV Park	376	.1	.3
RV Park	299	.1	.3
RV Park	207	.1	.3
RV Park	100	.1	.3
RV Park	90	.1	.3
RV Park	70	.1	.3
RV Park	60	.1	.3
RV Park	50	.1	.3

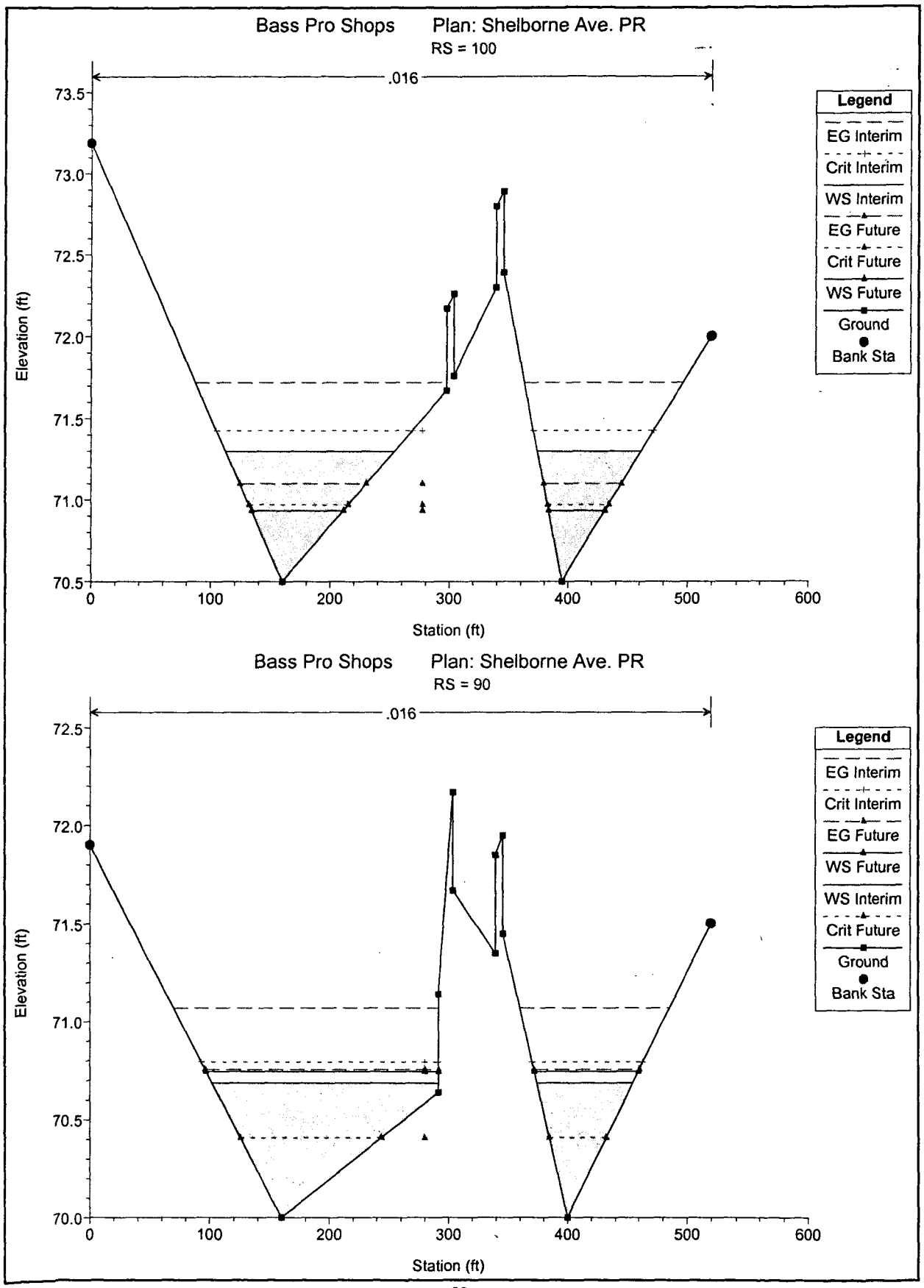

Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 796
.03
.03
.03
Legend
EG Interim
Crit Interim
WS Interim
EG Future
WS Future
Crit Future
Ground
Bank Sta
Elevation (ft)
88
86
84
82
80
78
76
0
20
40
60
80
100
120
140
160
180
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 667
.03
.03
.03
Legend
EG Interim
Crit Interim
WS Interim
EG Future
Crit Future
WS Future
Ground
Bank Sta
Elevation (ft)
100
95
90
85
80
75
0
50
100
150
200
Station (ft)

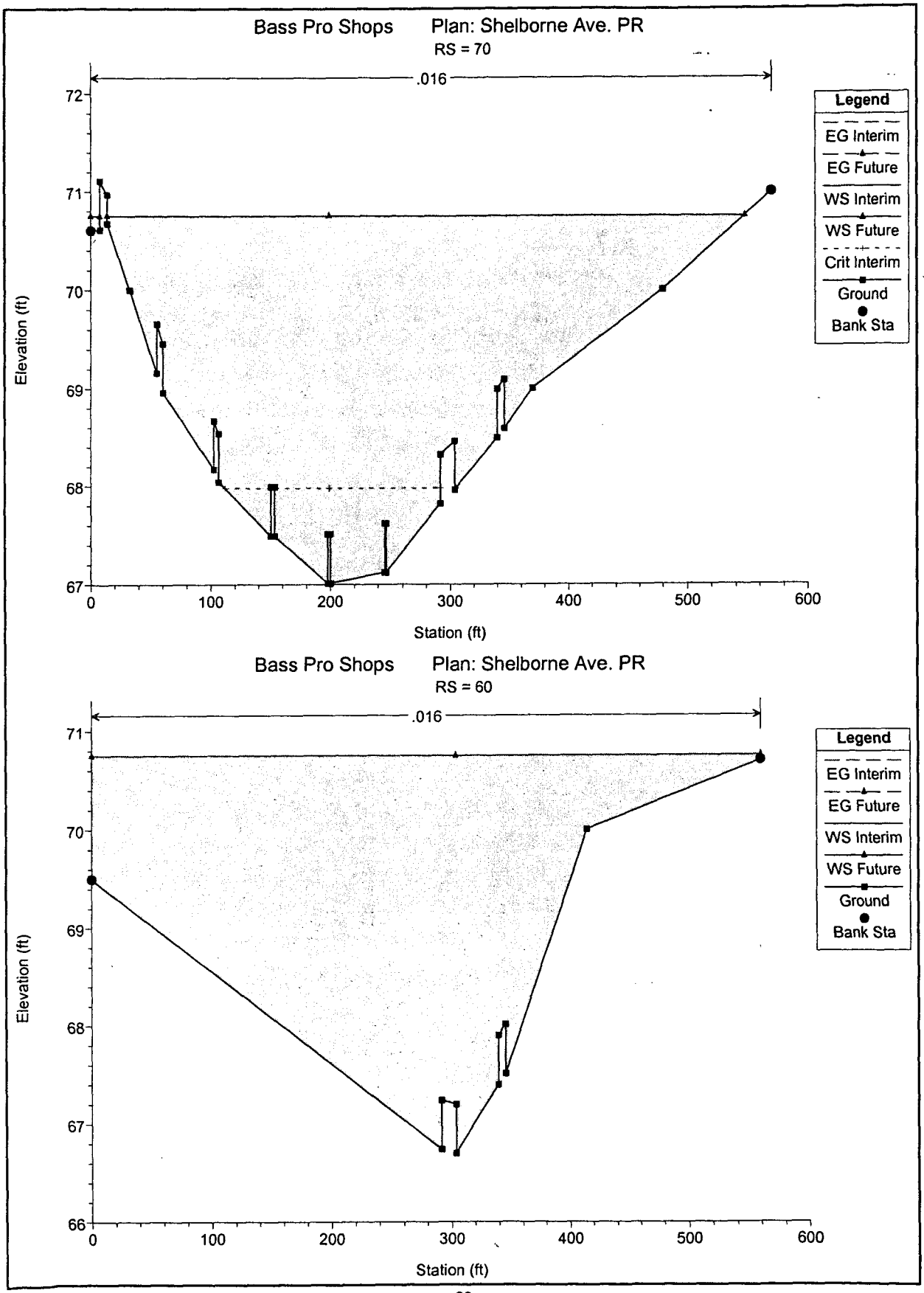

Bass Pro Shops Plan: Shelborne Ave. PR
RS = 567
.03
.03
.03
Legend
EG Interim
WS Interim
EG Future
WS Future
Crit Interim
Crit Future
Ground
Bank Sta
Elevation (ft)
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 525
.03
.03
.03
Legend
EG Interim
WS Interim
EG Future
WS Future
Ground
Bank Sta
Elevation (ft)
Station (ft)

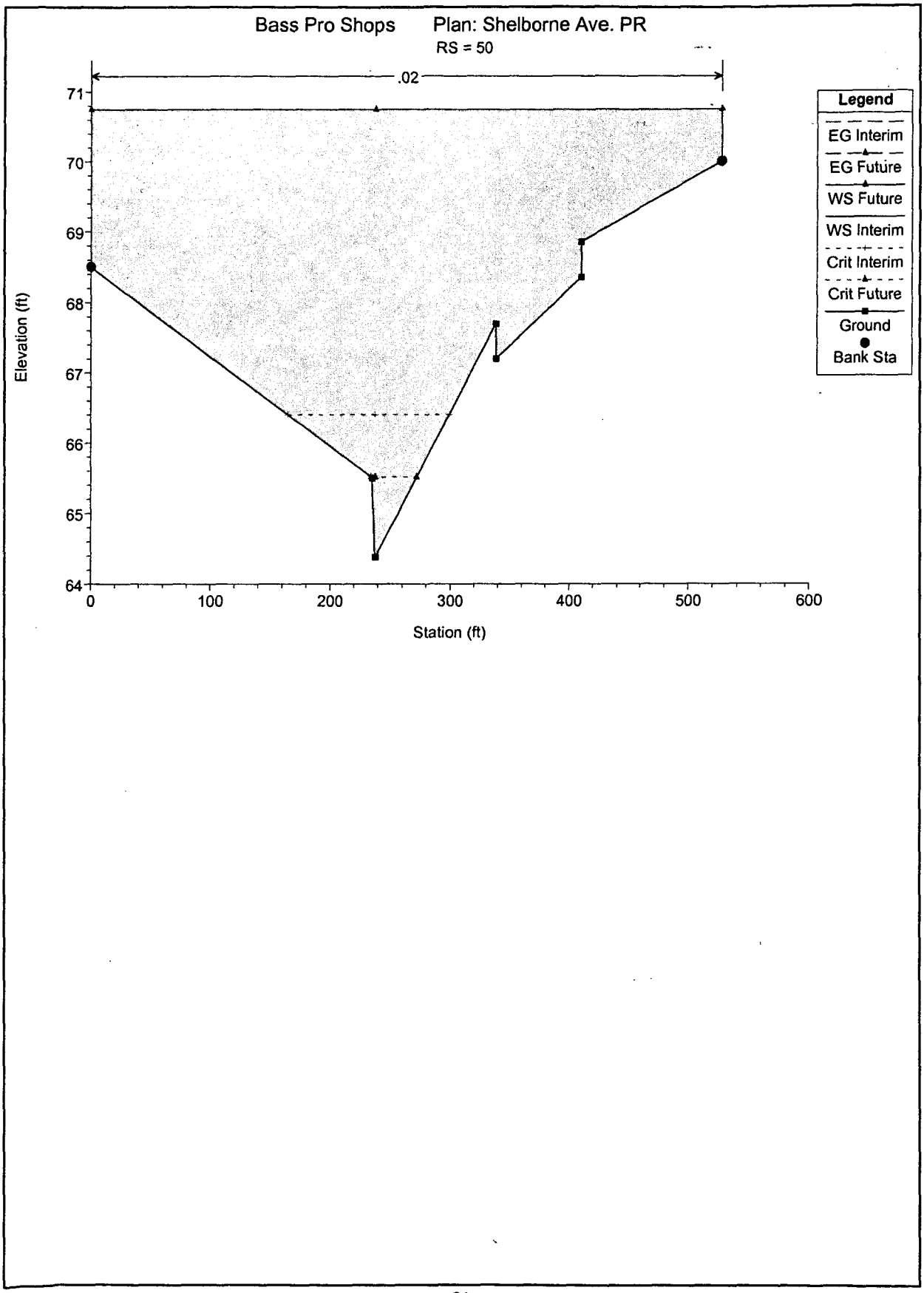

Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 514
.03
.03
.03
Legend
EG Interim
WS Interim
EG Future
Crit Interim
WS Future
Crit Future
Ground
Bank Sta
Elevation (ft)
Station (ft)
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 494
.016
Legend
EG Interim
WS Interim
Crit Interim
EG Future
WS Future
Crit Future
Ground
Bank Sta
Elevation (ft)
Station (ft)


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 412
.016
Legend
EG Interim
Crit Interim
EG Future
WS Interim
Crit Future
WS Future
Ground
Bank Sta
Elevation (ft)
77.5
77.0
76.5
76.0
75.5
75.0
74.5
74.0
73.5
0
50
100
150
200
250
300
350
Station (ft)
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 376
.025
.016
.025
Legend
EG Interim
Crit Interim
EG Future
WS Interim
Crit Future
WS Future
Ground
Bank Sta
Elevation (ft)
76.5
76.0
75.5
75.0
74.5
74.0
73.5
73.0
0
100
200
300
400
Station (ft)


Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 299
.016
Elevation (ft)
77
76
75
74
73
72
0
100
200
300
400
500
Station (ft)
Legend
EG Interim
Crit Interim
WS Interim
EG Future
WS Future
Crit Future
Ground
Bank Sta
Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 207
.016
Elevation (ft)
74.5
74.0
73.5
73.0
72.5
72.0
71.5
0
100
200
300
400
500
Station (ft)
Legend
EG Interim
Crit Interim
WS Interim
EG Future
Crit Future
WS Future
Ground
Bank Sta


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 100
.016
Elevation (ft)
73.5
73.0
72.5
72.0
71.5
71.0
70.5
0
100
200
300
400
500
600
Station (ft)
Legend
EG Interim
Crit Interim
WS Interim
EG Future
Crit Future
WS Future
Ground
Bank Sta
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 90
.016
Elevation (ft)
72.5
72.0
71.5
71.0
70.5
70.0
0
100
200
300
400
500
600
Station (ft)
Legend
EG Interim
Crit Interim
EG Future
WS Future
WS Interim
Crit Future
Ground
Bank Sta


Bass Pro Shops Plan: Shelborne Ave. PR
RS = 70
.016
Legend
EG Interim
EG Future
WS Interim
WS Future
Crit Interim
Ground
Bank Sta
Elevation (ft)
Station (ft)
72
71
70
69
68
67
0
100
200
300
400
500
600
Bass Pro Shops Plan: Shelborne Ave. PR
RS = 60
.016
Legend
EG Interim
EG Future
WS Interim
WS Future
Ground
Bank Sta
Elevation (ft)
Station (ft)
71
70
69
68
67
66
0
100
200
300
400
500
600


Bass Pro Shops
Plan: Shelborne Ave. PR
RS = 50
.02
Legend
EG Interim
EG Future
WS Future
WS Interim
Crit Interim
Crit Future
Ground
Bank Sta
Elevation (ft)
Station (ft)
71
70
69
68
67
66
65
64
0
100
200
300
400
500
600

VELOCITY X DEPTH TABLE FOR FLOWS WITHIN THE PROPOSED PARKING LOT
(INTERIM AND FUTURE CONDITIONS)

Velocity x Depth Table for Shelborne Alignment (Proposed and Future Flows)

HEC-RAS Plan: SHELBPR River: Shelborne Avenue Reach: RV Park

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Max Chl Dpth (ft)	Froude # Chl	Velocity X Depth
RV Park	*494	476	75.16	76.35	76.35	76.64	0.004788	4.29	1.19	1.02	*5.11
RV Park	*494	88	75.16	75.93	75.93	76.05	0.006353	2.76	0.77	1.02	*2.13
RV Park	*412	476	73.87	74.63	75.04	75.84	0.020717	8.83	0.76	2.11	*6.71
RV Park	*412	88	73.87	74.12	74.32	74.87	0.046766	6.96	0.25	2.71	*1.74
RV Park	376	476	73.29	73.87	74.19	75.2	0.055229	9.24	0.58	3.02	5.36
RV Park	376	88	73.29	73.62	73.76	74.14	0.024873	5.78	0.33	2.47	1.91
RV Park	299	476	72.5	73.57	73.62	73.9	0.005639	4.6	1.07	1.11	4.92
RV Park	299	88	72.5	73.07	73.07	73.21	0.00584	3.06	0.57	1.01	1.74
RV Park	207	476	71.7	72.51	72.7	73.08	0.014352	6.09	0.81	1.69	4.93
RV Park	207	88	71.7	72.13	72.2	72.38	0.014792	4.04	0.43	1.54	1.74
RV Park	100	476	70.5	71.3	71.43	71.72	0.010684	5.21	0.8	1.45	4.17
RV Park	100	88	70.5	70.93	70.97	71.1	0.009528	3.27	0.43	1.24	1.41
RV Park	90	476	70	70.69	70.79	71.07	0.011344	4.96	0.69	1.47	3.42
RV Park	90	88	70	70.75	70.41	70.76	0.000245	0.79	0.75	0.22	0.59
RV Park	70	476	67.01	70.75	67.98	70.75	0.000009	0.43	3.74	0.05	1.61
RV Park	70	88	67.01	70.75		70.75	0	0.08	3.74	0.01	0.30
RV Park	60	476	66.7	70.75		70.75	0.000008	0.41	4.05	0.05	1.66
RV Park	60	88	66.7	70.75		70.75	0	0.08	4.05	0.01	0.32
RV Park	50	476	64.38	70.75	66.4	70.75	0.000003	0.27	6.37	0.03	1.72
RV Park	50	88	64.38	70.75	65.51	70.75	0	0.05	6.37	0	0.32

* Please note that these sections are within the Industrial Road Right of Way and not within the proposed parking lot

HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN
WSPG MODEL FOR LINE-A
100-YEAR STORM EVENT, INTERIM CONDITION

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	2	4			6.00														
CD	3	3	0	0.00	3.00	7.00	0.00	0.00	0.00										
CD	4	4			1.50														
CD	5	4			2.00														
CD	6	3	0	0.00	3.00	6.00	0.00	0.00	0.00										

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

HEADING LINE NO 2 IS -

PROPOSED ONSITE SD LINE A (6'x3'RCB --> 72" RCP --> 12'x6')

HEADING LINE NO 3 IS -

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	63.50	1	70.75

ELEMENT NO 2 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	116.94	63.79	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	173.68	63.93	1	0.013	0.00	36.00	0.00	0

ELEMENT NO 4 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	190.98	63.98	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 5 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	204.48	64.01	2	3	0	0.013	170.0	0.0	64.00	0.00	40.00	0.00

ELEMENT NO 6 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	246.04	64.12	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	247.16	64.12	2	4	0	0.014	5.0	0.0	66.12	0.00	59.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 8 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	422.42	64.56	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	424.42	64.56	2	5	0	0.014	5.0	0.0	66.33	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 10 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	440.07	64.60	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 11 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	441.57	64.60	2	4	0	0.014	4.0	0.0	66.63	0.00	55.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 12 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	601.07	65.00	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 13 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	699.65	65.25	2	0.013	0.00	60.00	0.00	0

ELEMENT NO 14 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	740.46	65.35	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 15 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	742.46	65.35	2	5	0	0.014	7.0	0.0	67.15	0.00	53.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 16 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	876.03	65.69	2	0.013	0.00	0.00	0.00	1

ELEMENT NO 17 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	938.41	65.84	2	0.013	0.00	36.00	0.00	0

ELEMENT NO 18 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1056.28	66.14	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 19 IS A TRANSITION

U/S DATA	STATION	INVERT	SECT	N
	1062.28	66.15	6	0.013

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 20 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1091.63	66.23	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 21 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1131.40	66.33	6	0.013	0.00	25.00	0.00	0

ELEMENT NO 22 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1148.68	66.37	6	0.013	0.00	0.00	0.00	0

ELEMENT NO 23 IS A SYSTEM HEADWORKS

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1148.68	66.37	6	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

PROPOSED ONSITE SD LINE A (6'x3'RCB --> 72" RCP --> 12'x6')

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	63.50	7.250	70.750	376.0	5.24	0.426	71.176	0.00	3.125		6.00	12.00	0.00	0	0.00
116.94	0.00248					.000838	0.10			3.318			0.00		
116.94	63.79	7.058	70.848	376.0	5.24	0.426	71.274	0.00	3.125		6.00	12.00	0.00	0	0.00
56.74	0.00247					.000838	0.05			3.324			0.00		
173.68	63.93	7.019	70.949	376.0	5.24	0.426	71.375	0.00	3.125		6.00	12.00	0.00	0	0.00
17.30	0.00289					.000838	0.01			3.146			0.00		
190.98	63.98	6.984	70.964	376.0	5.24	0.426	71.390	0.00	3.125		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00222					.001602	0.02						0.00		
204.48	64.01	6.605	70.615	206.0	7.29	0.824	71.439	0.00	3.925		6.00	0.00	0.00	0	0.00
41.56	0.00265					.002366	0.10			4.647			0.00		
246.04	64.12	6.593	70.713	206.0	7.29	0.824	71.537	0.00	3.925		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.002678	0.00						0.00		
247.16	64.12	6.667	70.787	201.0	7.11	0.785	71.572	0.00	3.876		6.00	0.00	0.00	0	0.00
175.26	0.00251					.002253	0.39			4.655			0.00		
422.42	64.56	6.622	71.182	201.0	7.11	0.785	71.967	0.00	3.876		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.002548	0.01						0.00		
424.42	64.56	6.704	71.264	196.0	6.93	0.746	72.010	0.00	3.825		6.00	0.00	0.00	0	0.00
15.65	0.00256					.002142	0.03			4.515			0.00		
440.07	64.60	6.698	71.298	196.0	6.93	0.746	72.044	0.00	3.825		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.002434	0.00						0.00		
441.57	64.60	6.756	71.356	192.0	6.79	0.716	72.072	0.00	3.785		6.00	0.00	0.00	0	0.00
159.50	0.00251					.002055	0.33			4.472			0.00		

WATER SURFACE PROFILE LISTING

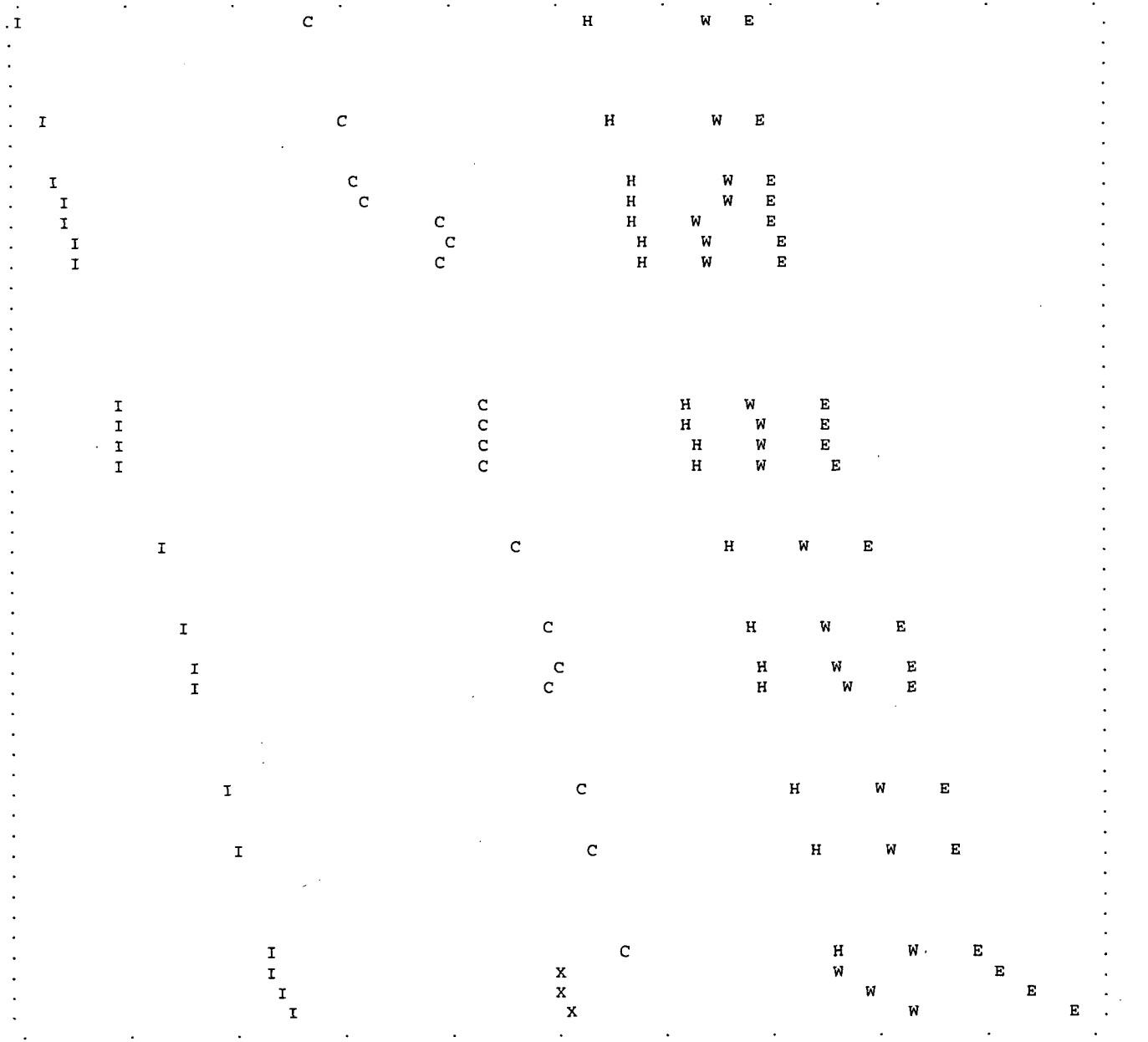
SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

PROPOSED ONSITE SD LINE A (6'x3'RCB --> 72" RCP --> 12'x6')

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
601.07	65.00	6.719	71.719	192.0	6.79	0.716	72.435	0.00	3.785		6.00	0.00	0.00	0	0.00
98.58	0.00254					.002055	0.20			4.451			0.00		
699.65	65.25	6.789	72.039	192.0	6.79	0.716	72.755	0.00	3.785		6.00	0.00	0.00	0	0.00
40.81	0.00245					.002055	0.08			4.517			0.00		
740.46	65.35	6.773	72.123	192.0	6.79	0.716	72.839	0.00	3.785		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.002299	0.00						0.00		
742.46	65.35	6.870	72.220	185.0	6.54	0.665	72.885	0.00	3.712		6.00	0.00	0.00	0	0.00
133.57	0.00254					.001908	0.25			4.311			0.00		
876.03	65.69	6.818	72.508	185.0	6.54	0.665	73.173	0.00	3.712		6.00	0.00	0.00	0	0.00
62.38	0.00241					.001908	0.12			4.412			0.00		
938.41	65.84	6.871	72.711	185.0	6.54	0.665	73.376	0.00	3.712		6.00	0.00	0.00	0	0.00
117.87	0.00254					.001908	0.22			4.312			0.00		
1056.28	66.14	6.796	72.936	185.0	6.54	0.665	73.601	0.00	3.712		6.00	0.00	0.00	0	0.00
TRANS STR	0.00167					.005189	0.03						0.00		
1062.28	66.15	5.999	72.149	185.0	10.42	1.687	73.836	0.00	3.000		3.00	6.00	0.00	0	0.00
29.35	0.00273					.008470	0.25			3.000			0.00		
1091.63	66.23	6.168	72.398	185.0	10.42	1.687	74.085	0.00	3.000		3.00	6.00	0.00	0	0.00
39.77	0.00251					.008470	0.34			3.000			0.00		
1131.40	66.33	6.583	72.913	185.0	10.42	1.687	74.600	0.00	3.000		3.00	6.00	0.00	0	0.00
17.28	0.00231					.008470	0.15			3.000			0.00		
1148.68	66.37	6.689	73.059	185.0	10.42	1.687	74.746	0.00	3.000		3.00	6.00	0.00	0	0.00

[redacted] SIL[redacted]ON E[redacted]ION [redacted]E 1 [redacted]S PR[redacted]OPS [redacted] [redacted]

PROPOSED ONSITE SD LINE A (6'x3'RCB --> 72" RCP --> 12'x6')



N O T E S

1. GLOSSARY

   I = INVERT ELEVATION

C [redacted]TIC[redacted]PTH [redacted]

W = WATER SURFACE ELEVATION
H = HEIGHT OF CHANNEL
E = ENERGY GRADE LINE
X = CURVES CROSSING OVER
B = BRIDGE ENTRANCE OR EXIT
Y = WALL ENTRANCE OR EXIT

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

HYDRAULIC ANALYSIS FOR PROPOSED ONSITE STORM DRAIN
WSPG MODEL FOR LINE-B
100-YEAR STORM EVENT, INTERIM CONDITION

DATE: 8/ 1/2003
TIME: 20:37

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	3.00	7.00	0.00	0.00	0.00										
CD	2	3	1	0.60	3.00	11.60	0.00	0.00	0.00										
CD	3	1	0	0.00	3.00	30.00	3.00	4.00	0.00										
CD	4	3	0	0.00	6.00	12.00	0.00	0.00	0.00										
CD	5	4			6.00														

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS

HEADING LINE NO 2 IS -

PROPOSED ONSITE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FLOWS

HEADING LINE NO 3 IS -

STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	64.00	4	70.97

ELEMENT NO 2 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5.00	64.00	4	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	10.00	64.01	1	5	0	0.013	206.0	0.0	64.00	0.00	40.00	0.00

ELEMENT NO 4 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	76.34	64.19	1	0.013	0.00	52.50	0.00	0

ELEMENT NO 5 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	263.53	64.66	1	0.013	0.00	0.00	0.00	1

ELEMENT NO 6 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	407.90	65.02	1	0.013	0.00	90.00	0.00	1

ELEMENT NO 7 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	662.57	65.66	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 8 IS A TRANSITION

U/S DATA	STATION	INVERT	SECT	N
	696.40	70.50	2	0.013

ELEMENT NO 9 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	796.40	71.60	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 10 IS A WALL ENTRANCE

U/S DATA	STATION	INVERT	SECT	FP
	796.40	71.60	3	0.500

ELEMENT NO 11 IS A SYSTEM HEADWORKS

U/S DATA	STATION	INVERT	SECT	W S ELEV
	796.40	71.60	3	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

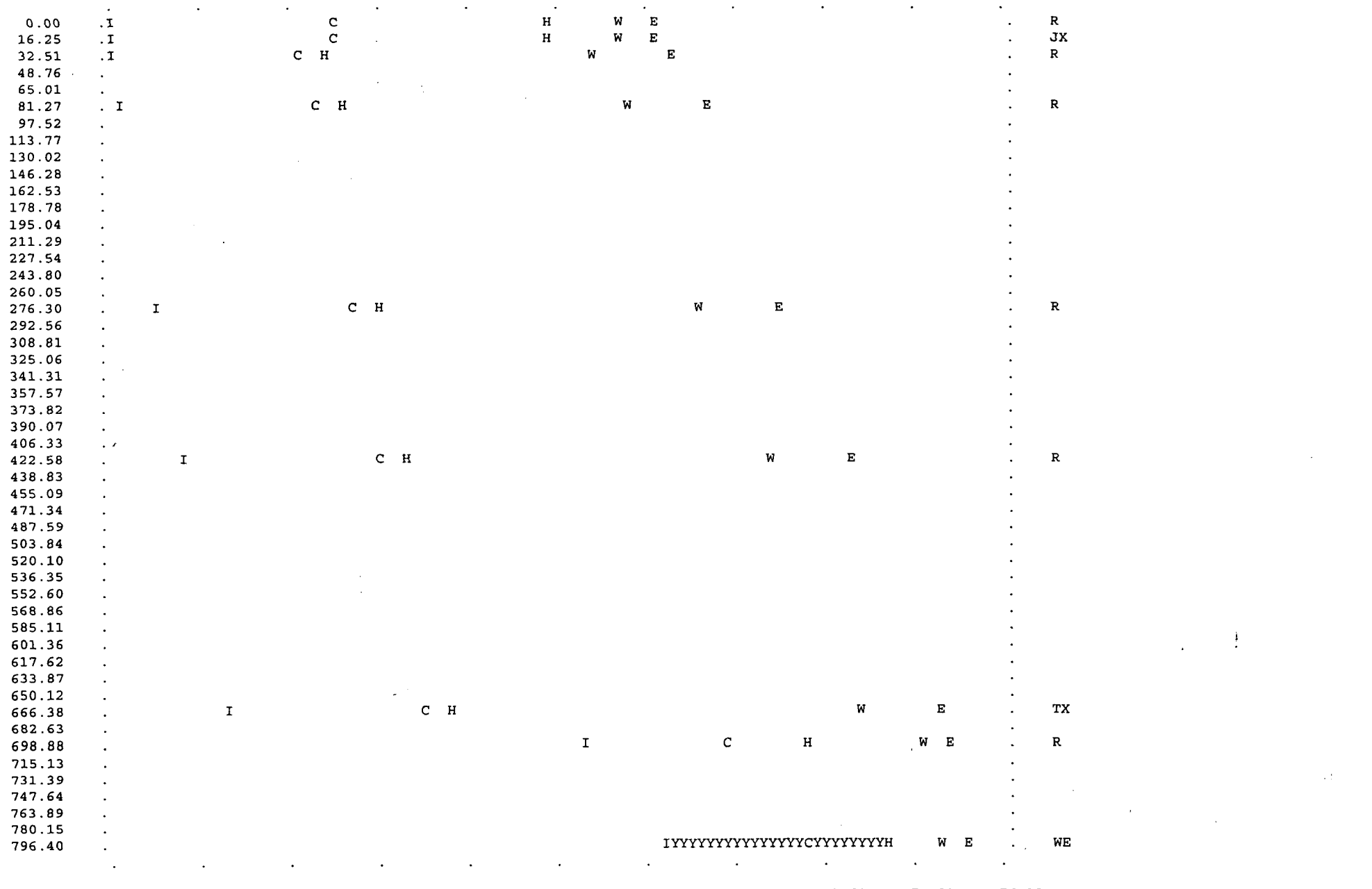
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

WATER SURFACE PROFILE LISTING

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FLOWS
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	64.00	6.970	70.970	376.0	5.24	0.426	71.396	0.00	3.125		6.00	12.00	0.00	0	0.00
5.00	0.00000					.000838	0.00			0.000			0.00		
5.00	64.00	6.974	70.974	376.0	5.24	0.426	71.400	0.00	3.125		6.00	12.00	0.00	0	0.00
JUNCT STR	0.00200					.002865	0.01						0.00		
10.00	64.01	6.594	70.604	170.0	8.19	1.042	71.646	0.00	2.637		3.00	7.00	0.00	0	0.00
66.34	0.00271					.004891	0.32			2.972			0.00		
76.34	64.19	6.898	71.088	170.0	8.19	1.042	72.130	0.00	2.637		3.00	7.00	0.00	0	0.00
187.19	0.00251					.004891	0.92			3.000			0.00		
263.53	64.66	7.396	72.056	170.0	8.19	1.042	73.098	0.00	2.637		3.00	7.00	0.00	0	0.00
144.37	0.00249					.004891	0.71			3.000			0.00		
407.90	65.02	8.002	73.022	170.0	8.19	1.042	74.064	0.00	2.637		3.00	7.00	0.00	0	0.00
254.67	0.00251					.004891	1.25			3.000			0.00		
662.57	65.66	8.608	74.268	170.0	8.19	1.042	75.310	0.00	2.637		3.00	7.00	0.00	0	0.00
TRANS STR	0.14307					.003557	0.12						0.00		
696.40	70.50	4.567	75.067	170.0	5.23	0.425	75.492	0.00	1.951		3.00	11.60	0.00	1	0.60
100.00	0.01100					.002224	0.22			1.369			0.00		
796.40	71.60	3.690	75.290	170.0	5.23	0.425	75.715	0.00	1.951		3.00	11.60	0.00	1	0.60
WALL ENTRANCE													0.00		
796.40	71.60	4.507	76.107	170.0	0.82	0.011	76.118	0.00	0.961		3.00	30.00	3.00	0	0.00

SILVERTON EXPANSION PHASE 1 - BASS PRO SHOPS
PROPOSED ONSITE 7'X3' STORM DRAIN TO CONVEY PORTION OF SHELBORNE FLOWS
STORM DRAIN LINE B CONNECTS TO JUNCTION STRUCTURE AT STATION 19+51.80



N O T E S

1. GLOSSARY
   - I = INVERT ELEVATION
   - C = CRITICAL DEPTH
   - W = WATER SURFACE ELEVATION
   - H = HEIGHT OF CHANNEL
   - E = ENERGY GRADE LINE
   - X = CURVES CROSSING OVER
   - B = BRIDGE ENTRANCE OR EXIT
   - Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

HYDRAULIC ANALYSIS AT PROPOSED DROP INLETS

Project: Silverton Expansion Phase 1-Bass Pro Shop

Project Number: 6923.2 **Date:** July 2003

Drop Inlet Capacity for the D.I. intercepting the 100-year Offsite Flow

Orifice Equation: Q=KCA(2gh)^0.5

D.I Flowline = 2272 ft

Side Opening		Grate	
Length of Opening (Ls)(ft):	40.0	Length of Opening (Lg)(ft):	39.0
Orifice Coefficient (Cs):	0.67	Orifice Coefficient (Cg):	0.70
Clogging Factor (Ks):	0.50	Clogging Factor (Kg):	0.50
		Effective Area Coeficient =	0.75
		* As = 0.75 x Lg x grate width (1.5 ft)	

WSE (ft)	Depth of Flow (ft)	Head Above Side Opening (Hs) (ft)	Area of Side Opening (As) (sf)	Flow into Side Opening (Qs) (cfs)	Head Above Grate (Hg) (ft)	Area of Grate (As) (sf)	Flow into Grate (Qs) (cfs)	Total Flow (Qt) (cfs)	
2272.5	0.50	0.3	20.0	27	0.5	43.9	87	114	
2272.6	0.60	0.4	20.0	32	0.6	43.9	95	127	
2272.7	0.70	0.5	20.0	36	0.7	43.9	103	139	
2272.8	0.80	0.6	20.0	40	0.8	43.9	110	150	
2272.9	0.90	0.7	20.0	43	0.9	43.9	117	160	
2273	1.00	0.7	20.0	47	1.0	43.9	123	170	
2273.1	1.10	0.8	20.0	50	1.1	43.9	129	179	
2273.2	**1.20**	**1.0**	**20.0**	**52**	**1.2**	**43.9**	**135**	**187**	<---WSE at D.I U/S the Proposed Expansion
2273.3	1.30	1.1	20.0	55	1.3	43.9	141	196	
2273.4	1.40	1.2	20.0	58	1.4	43.9	146	203	
2273.5	1.50	1.3	20.0	60	1.5	43.9	151	211	
2273.6	1.60	1.4	20.0	62	1.6	43.9	156	218	

Project: Silverton Expansion Phase 1-Bass Pro Shop
Project Number: 6923.2
Date: July 2003

Drop Inlet Capacity To Drain Basins DI-1, DI-2, DI-3 and DI-4

Orifice Equation: Q=KCA(2gh)^0.5

Side Opening		**Grate**	
Length of Opening (Ls)(ft):	4.0	Length of Opening (Lg)(ft):	3.0
Orifice Coefficient (Cs):	0.67	Orifice Coefficient (Cg):	0.70
Clogging Factor (Ks):	0.50	Clogging Factor (Kg):	0.50
		Effective Area Coeficient =	0.75
		*** As = 0.75 x Lg x 1.5 ft (grate width)**	

Depth of Flow (ft)	Head Above Side Opening (Hs) (ft)	Area of Side Opening (As) (sf)	Flow into Side Opening (Qs) (cfs)	Head Above Grate (Hg) (ft)	Area of Grate (As) (sf)	Flow into Grate (Qs) (cfs)	Total Flow (Qt) (cfs)	
0.10	0.1	0.4	0	0.1	3.4	3	3	**<---DI-1**
0.20	0.1	0.8	1	0.2	3.4	4	5	**<---DI-2, DI-4**
0.30	0.2	1.2	1	0.3	3.4	5	6	
0.40	0.2	1.6	2	0.4	3.4	6	8	
0.50	0.3	2.0	3	0.5	3.4	7	9	**<---DI-3**
0.60	0.4	2.0	3	0.6	3.4	7	11	
0.70	0.5	2.0	4	0.7	3.4	8	12	
0.80	0.6	2.0	4	0.8	3.4	8	12	
0.90	0.7	2.0	4	0.9	3.4	9	13	
1.00	0.7	2.0	5	1.0	3.4	9	14	
1.10	0.8	2.0	5	1.1	3.4	10	15	
1.20	1.0	2.0	5	1.2	3.4	10	16	

SIZING OF THE RIPRAP AT THE OUTLET OF
THE PROPOSED ONSITE 12'X6' RCB

OUTLET PROTECTION FOR 12-ft x6-ft RCB STORM DRAIN

Project: Silverton Expansion Phase 1 - Bass Pro Shops Date: July 2003
(Outlet for the 12-ft x 6-ft Box Culvert)
Job No: 6923.2

Calculated by: Hani Noshi

Section 707.4 of Hydrologic Criteria and Drainage Design Manual (HCDDM)
Equation 761a:

$(d_{50}/H)\ (Y_t/H) / (Q/WH^{1.5}) = 0.014$ For $Q/WH^{\wedge 1.5} < 4$

$(d50/H)\ (Yt/H)^{\wedge 2} / (Q/WH^{1.5})^{2.5} = 0.0019$ For $Q/WH^{\wedge 1.5} > 4$

d_{50} = Rock size in feet for which 50 percent of the riprap by weight is smaller

H = Height of a rectangular culvert in feet

H_a = Average height used for computation if culvert is not flowing full $\{D_a=1/2(H+Y_n)\}$

Y_n = Normal depth of supercritical flow in culvert

Y_t = Tailwater depth in feet

Q = Design discharge in cubic feet per second (cfs)

Solving equation 733 for d_{50}:

$$d_{50} = \frac{[0.014\ (Q/WH^{1.5})]\ H}{(Y_t/H)}$$

Computed results
Entered values

Check Figure 713 for Riprap Type: $Q/WH^{0.5}$ = 13.61
Y_t/Ha = 1.21 Loose Riprap is Required

W=	12.00	ft.
Y_n =	6.00	ft.
H=	6.00	ft.
H_a =	6	ft.
known Y_t=	7.25	
Y_t =	7.25	ft.
Q =	400	cfs
$Q/WH^{1.5}$=	2.268046	
d_{50} =	0.16	ft.
	1.89	in.
Use d_{50}=	6.00	in.
Thickness =	12.00	in.

*As determined from the attached FlowMaster for the 6-ft wide concrete box section

* Yt = 70.75 (Ponding WSE along I-15) - 63.50 (the 12' x 6' Box invert)
* If Yt is not determined, use (Yt = 0.4 x Ha)

EXTENT OF PROTECTION:

Per Section 707.4.4 of HCDDM

Froude Parameter $Q/WH^{1.5}$ = 2.27

$Q/WH^{1.5} < 8$ Therefore Length of Protection shall be between 3H and 10H

From Equation 764: Length of Protection $L = (1/(2\tan\theta))(A^t/Y^t - W)$

W = Width of the Conduit, in ft (Use Diameter for Circular Conduits)

θ = The Expansion Angle of Culvert Flow

A_t = Required Area of Flow at Allowable Velocity in sq. ft. ($A_t = Q/V$)

V = Allowable Non-Eroding Velocity in the Downstream Channel in fps

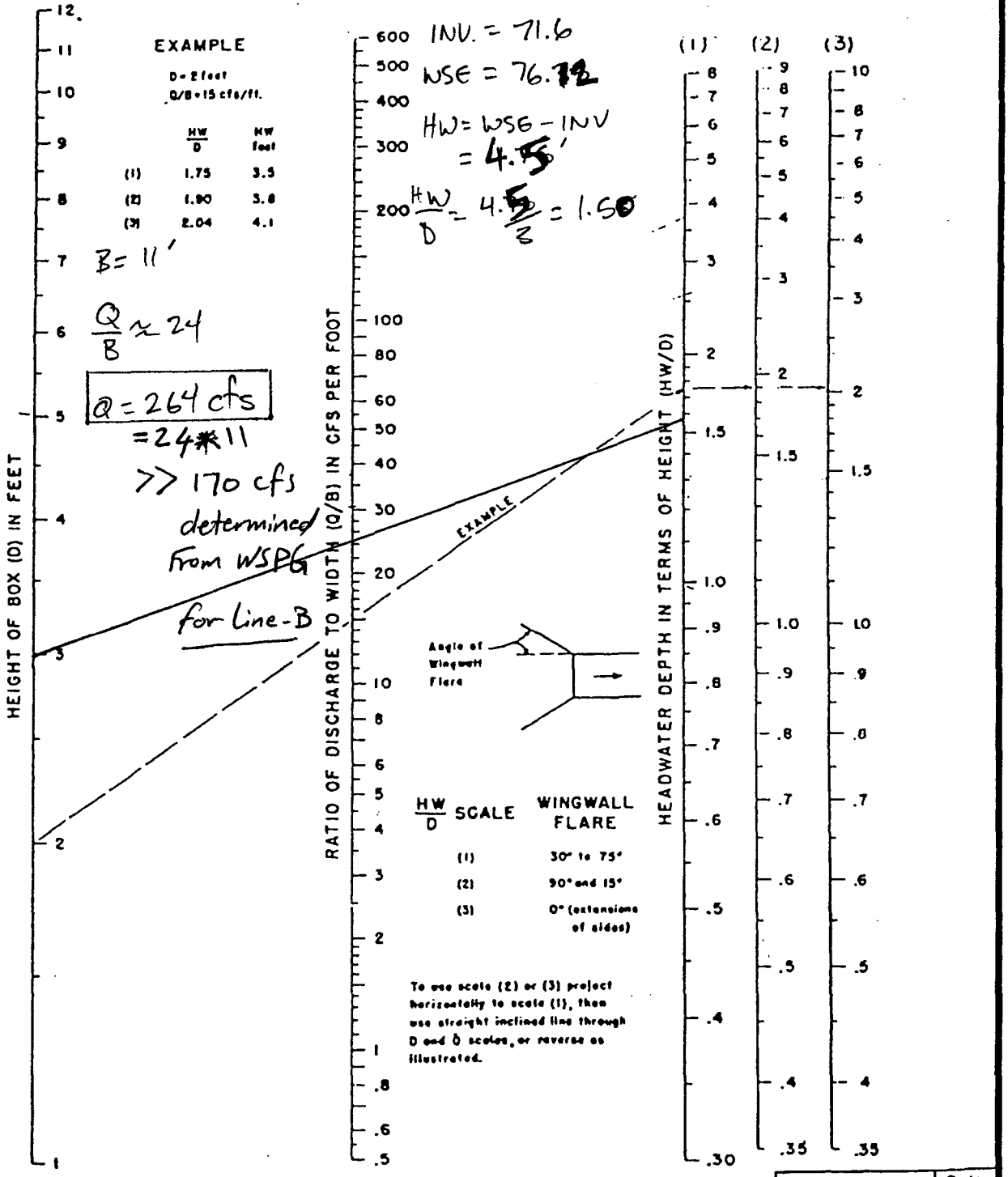
1/(2tan0) =	6.3	(From Figure 715)
W =	12	
A_t =	80	
V =	5	
Y_t =	7.25	
Q =	400	
L =	-6.08	

Provide a Protection Downstream With Minimum Length of 4 x Box Height (per Figure 713) = 4 * 6 = 25-feet.

DETERMINING THE INLET-CONTROL FLOW CAPACITY FOR THE EXISTING 2: 5.5'X3' RCB

NOTE: The inlet control capacity determined 264-cfs can be conveyed into the existing 2:5.5'x3' RCB at WSE of 76.35ft(from proposed HEC-RAS model). However, the WSPG for Line B, indicated only 170cfs can be conveyed through the box to maintain the 76.35ft WSE upstream the 2:5.5'x3' RCB

NOMOGRAPH – INLET CONTROL BOX CULVERT



Revision	Date

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS No.5, 1985

FIGURE 1004

STREET FLOW ANALYSIS

Industrial Road at Section A-A (10-year storm event)
Worksheet for Irregular Channel

Project Description	
Worksheet	Industrial Road Near Section A-A (10-year storm event)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.004000	ft/ft
Discharge	7.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.014	
Water Surface Elevation	0.41	ft
Elevation Range	0.00 to 0.83	
Flow Area	3.8	ft²
Wetted Perimeter	27.51	ft
Top Width	26.61	ft
Actual Depth	0.41	ft
Critical Elevation	0.39	ft
Critical Slope	0.005571	ft/ft
Velocity	1.84	ft/s
Velocity Head	0.05	ft
Specific Energy	0.46	ft
Froude Number	0.86	
Flow Type	Subcritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.013
0+07.00	0+73.00	0.016
0+73.00	0+80.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17

Industrial Road at Section A-A (10-year storm event)
Worksheet for Irregular Channel

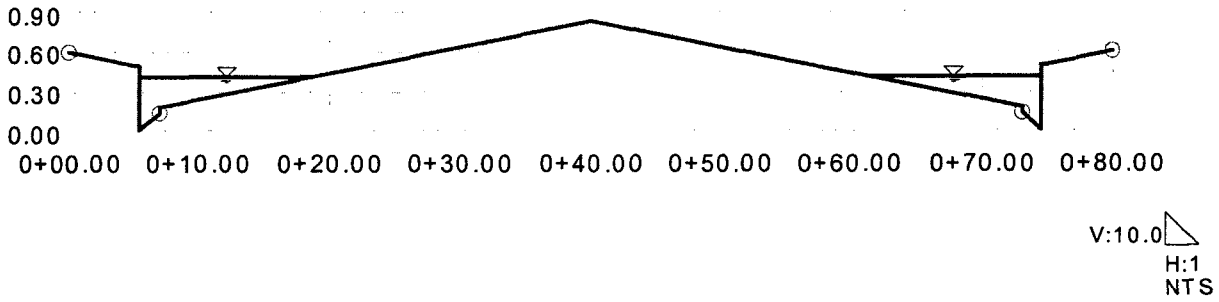
Natural Channel Points	
Station (ft)	Elevation (ft)
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Notes:
* Q = Runoff generated from Basin INDUST(7/12 cfs)

Industrial Road at Section A-A (10-year storm event)
Cross Section for Irregular Channel

Project Description	
Worksheet	Industrial Road Near Section A-A (10-year storm event)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Slope	0.004000	ft/ft
Water Surface Elevation	0.41	ft
Elevation Range	0.00 to 0.83	
Discharge	7.00	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666
Project Engineer: Hani M. Noshi

Industrial Road at Section A-A (100-year storm event)
Worksheet for Irregular Channel

Project Description	
Worksheet	Industrial Road Near Section A-11 (100-year storm event
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.004000	ft/ft
Discharge	12.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.014	
Water Surface Elevation	0.48	ft
Elevation Range	0.00 to 0.83	
Flow Area	5.9	ft²
Wetted Perimeter	34.72	ft
Top Width	33.67	ft
Actual Depth	0.48	ft
Critical Elevation	0.45	ft
Critical Slope	0.005679	ft/ft
Velocity	2.02	ft/s
Velocity Head	0.06	ft
Specific Energy	0.54	ft
Froude Number	0.85	
Flow Type	Subcritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.013
0+07.00	0+73.00	0.016
0+73.00	0+80.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17

Industrial Road at Section A-A (100-year storm event)
Worksheet for Irregular Channel

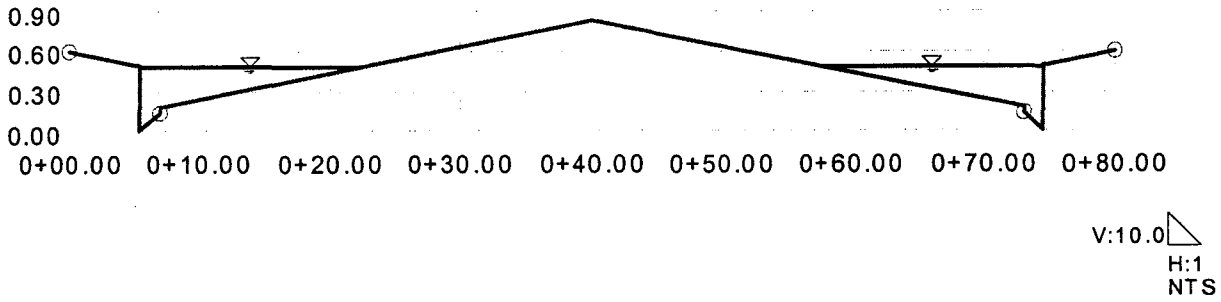
Natural Channel Points	
Station (ft)	Elevation (ft)
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Notes:
* Q = Runoff generated from Basin INDUST(7/12 cfs)

Industrial Road at Section A-A (100-year storm event)
Cross Section for Irregular Channel

Project Description	
Worksheet	Industrial Road Near Section A-11 (100-year storm event
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

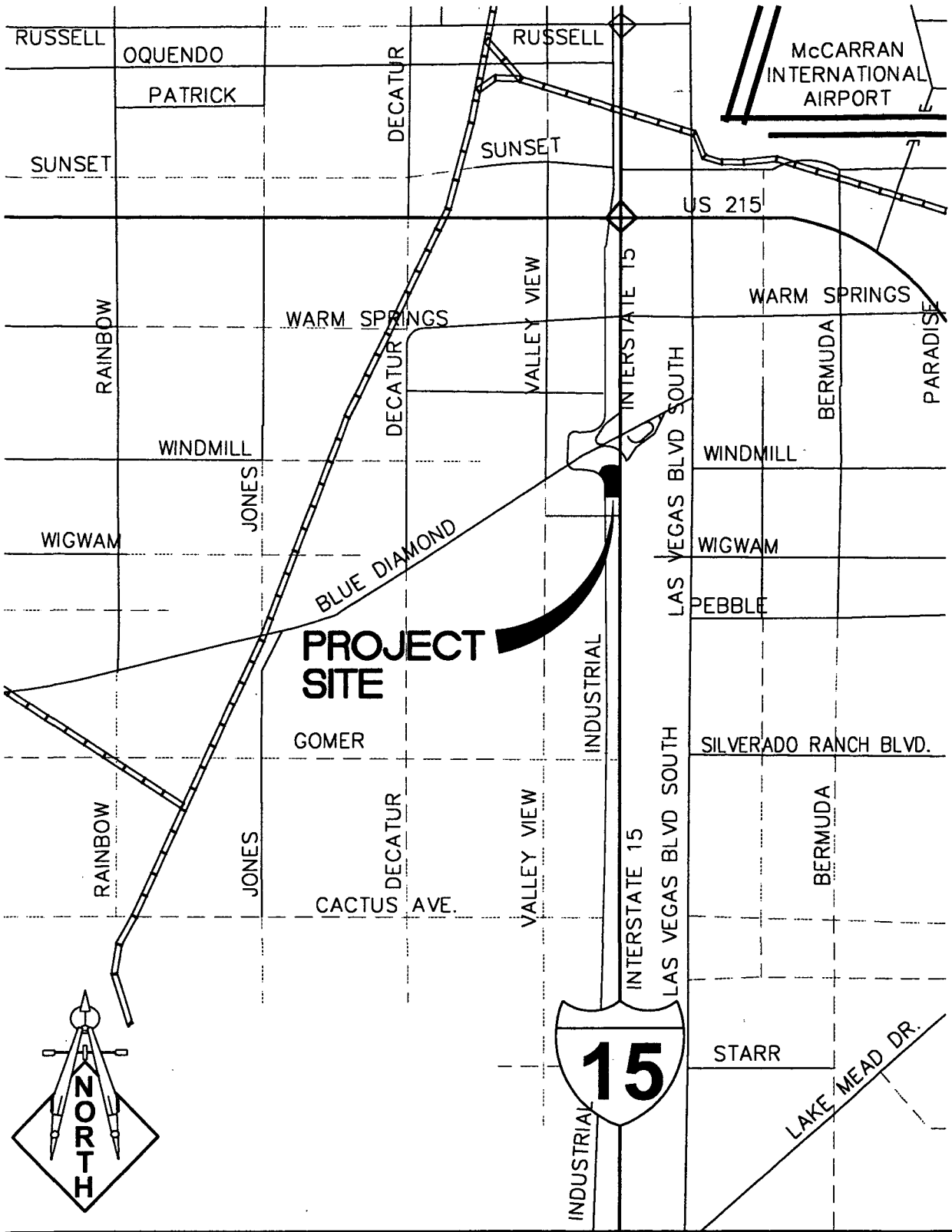
Section Data		
Mannings Coefficient	0.014	
Slope	0.004000	ft/ft
Water Surface Elevation	0.48	ft
Elevation Range	0.00 to 0.83	
Discharge	12.00	cfs



© Haestad Methods, Inc.

APPENDIX C

FIGURES



DRAWN BY: WSB	SCALE: N.T.S	**VICINITY MAP (FIGURE 1)**	PROJECT No.: 6923.2
CHECKED BY: HMN	DATE: 8-1-03		SHEET No. 1

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
P: 702 365-9312, F: 702 365-9317

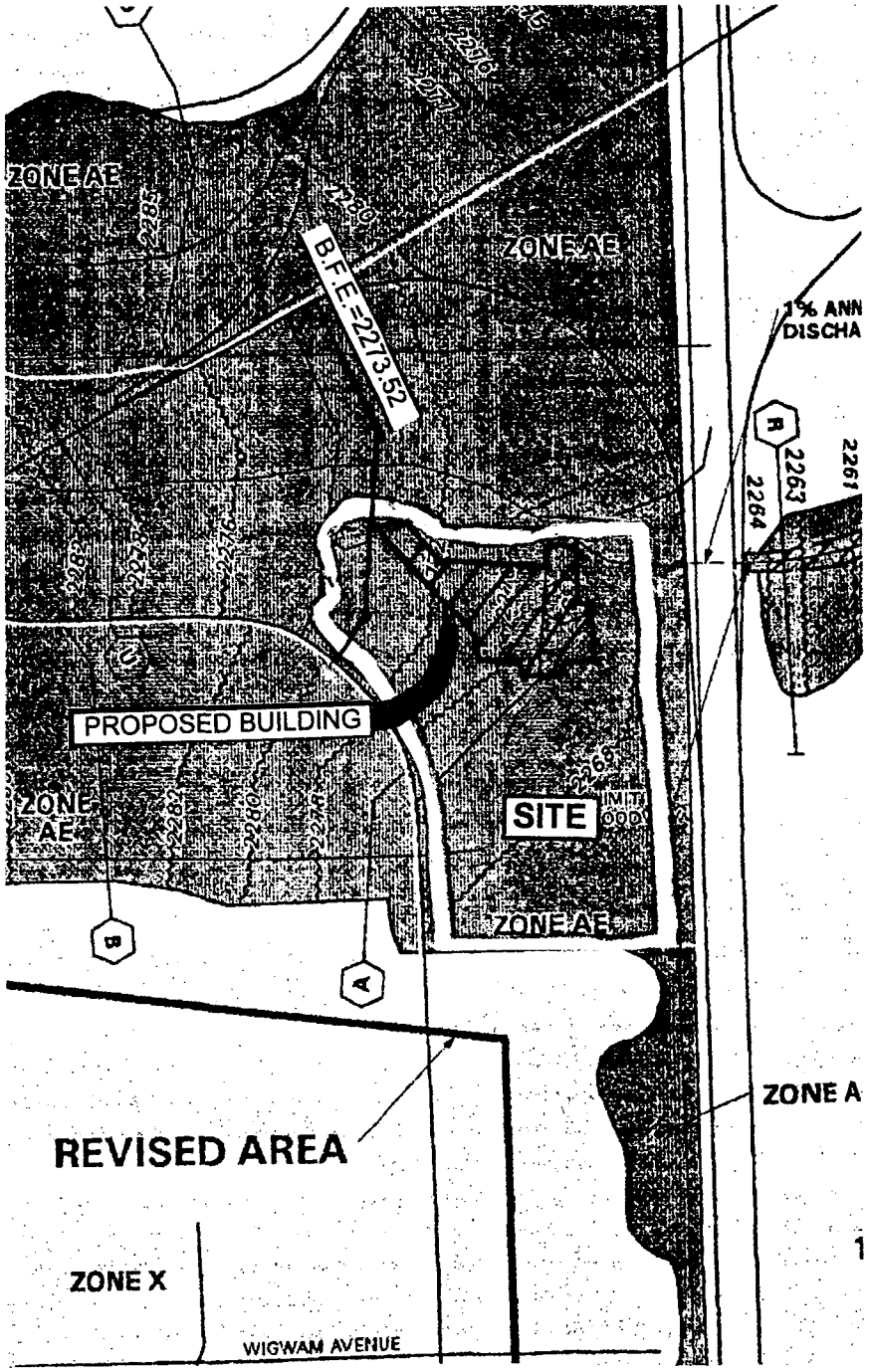
SILVERTON EXPANSION PH1, BASS PRO SHOPS

SHEET 1 OF 1

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2566E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA
AND INCORPORATED AREAS

PANEL 2566 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2566	E

REVISED TO REFLECT LOMR DATED APR 2 1 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
32003C2566E

MAP REVISED
SEPTEMBER 27, 2002

Federal Emergency Management Agency

DRAWN BY:	WSB	SCALE:	1"=500'
CHECKED BY:	HMN	DATE:	7-23-03

FLOOD INSURANCE RATE MAP (FIGURE 2)

PROJECT No.: 6923.2

SHEET No. **2**

SHEET 1 OF 1

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
P: 702 365-9312, F: 702 365-9317

BASS PRO SHOPS

APPENDIX D

REFERENCES

APPENDIX E

DRAINAGE MAPS

REFERENCE MATERIAL FROM THE APPROVED SILVERTON CONCEPTUAL DRAINAGE STUDY

Department of Development Services
Civil Engineering Division

500 S Grand Central Pky 1st Fl • PO Box 551842 • Las Vegas NV 89155-1842
(702) 455-4600 • Fax (702) 388-2550

Phil Rosenquist, Director • Carla J. Pearson, Assistant Director

April 11, 2003

RETURN DRAINAGE STUDY REDLINES AND APPROVAL LETTER WITH *ALL* FUTURE SUBMITTALS FOR THIS PROJECT.

Lochsa Engineering
5828 Spring Mountain Road, Suite 308
Las Vegas, NV 89102

SUBJECT: WILLDAN / Clark County Development Services Dept. Plan Review Contract
Conceptual Drainage Study for MSM 020-03 (formerly Silverton) **(4187)**
Study Dated: January 29, 2003
Addendum Dated: March 7, 2003
Supplemental Dated: March 18, 2003
Location: Southwest corner of Blue Diamond Road and Interstate 15
(Sec. 17, T. 22 S., R. 61 E.)
HTE #03-8397

The referenced **Technical Drainage Study** has been reviewed and is accepted as complying with minimum improvement standards. As set forth in the subject drainage study, the following measures will be taken to mitigate flood hazards.

1. The onsite and offsite flows are as developed in the Conceptual Drainage Study for Parcel Map MSM 020-03, signed and sealed by Hani M. Noshi, P.E., on January 29, 2003 and last revised on March 18, 2003;

2. This approval does not allow any construction activity, grading, placement of fill, or excavation of any kind;

3. An New Technical Drainage study shall be required prior to any construction activity;

4. Future technical drainage studies must provide more detailed hydraulic analyses of the runoff along I-15 and also address any required drainage easements;

5. As a condition of approval the Engineer must provide the FIRM Panels Revised April 7, 2003 with the site depicted on them.

6. The subject site is located within Zone AE and Zone X, as shown on FIRM Community Panel Numbers 32003C2562E and 32003C2566E, revised April 7, 2003. Zone AE is subject to inundation by the 1% annual chance flood event. Base flood elevations have been determined by FEMA. Zone X is determined to be outside the 0.2% annual chance flood plain;

BOARD OF COUNTY COMMISSIONERS
MARY KINCAID-CHAUNCEY, Chair • CHIP MAXFIELD, Vice-Chairman
YVONNE ATKINSON GATES • MARK A. JAMES • RORY REID • MYRNA WILLIAMS • BRUCE L. WOODBURY
THOM REILLY, County Manager

7. Clark County Regional Flood Control District (CCRFCD) concurrence is required since the site is located within a FEMA designated flood hazard area and is impacting an existing regional Master Plan Facility. As a condition of final approval, the applicant must submit a copy of the drainage study and any addenda to the CCRFCD. The parcel map will not be accepted for submittal until concurrence is obtained from the CCRFCD;

No liability is assumed by the County for information, data, and conclusions of the consulting engineer.

DEPARTMENT OF DEVELOPMENT SERVICES

BY: Robert J Hauf

Dave Betley, P.E.
Principal Engineer
Civil Engineering Division

DB/IP/bk

cc: Silverton Hotel and Casino
Development File

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Silverton Conceptual Drainage Study Date: January 28, 2003

Location of Development: a) Descriptive (Cross Streets) Southwest corner of Blue Diamond and I-15 interchange

b) Sect. 17 Twn 22 S Rng. 61 E

Name of Owner: Silverton Hotel and Casino Assessors Parcel No: see attached sheet

Telephone No: 702-263-7777 Facsimile No: 702-896-4925

Address: 3333 Blue Diamond Road

Las Vegas, Nevada 89139

Contact Person-Name: Hani Noshi, Ph.D., P.E. Telephone No: 702-365-9312

Firm: Lochsa Engineering

Address: 5828 Spring Mountain Road, Suite 308 Las Vegas, Nevada 89146

Type of Land Development\Land Disturbance Process:

☐ Rezoning ☐ Subdivision Map ☐ Clearing and Grading Only

■ Parcel Map ☐ Planned Unit Development ☐ Other (Please specify below)

☐ Large Parcel Map ☐ Building Permit

1. Total Owned Land Area: At Site: 93 Acres ± Being Developed/ Disturbed:

2. Is a portion of 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.)? N/A

5. Approximate upstream land area which drains to the subject site? 6.5 Square Miles ±

6. Has the site drainage been evaluated in the past? ■ Yes ☐ No If yes, please identify documentation

Portion of the site has been evaluated in Boomtown Hotel and Casino drainage study

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: East towards RCBC's underneath I-15 south of Blue Diamond interchange

8. Briefly describe your proposed schedule for the subject: ASAP

PROFESSIONAL ENGINEER-STATE OF NEVADA
HANI M. NOSHI
Exp: 06/30/03
CIVIL
No. 15747

Engineer's Seal

01/29/03

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

LOCHSA ENGINEERING

JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

March 18, 2003

Ms. Isabel Pennington
Willdan
2725 East Desert Inn Road, Suite 100
Las Vegas, Nevada 89121

RE: Supplement #1 to the Conceptual Drainage Study for MSM-020-03
HTE #03-8397.
Lochsa Job #6904

Dear Ms. Pennington:

The following are responses to comment regarding the Conceptual Drainage Study listed above.

Comment #1: The addendum indicates that based on Exhibit OFF1 and the FIS Figure 6B, the runoff from the basins and culverts south of Wigwam Avenue will flow eastward and will not directly impact the subject site. Note that the Duck Creek/Blue Diamond Washes FIS Restudy provides an overall analysis to determine flows at major concentration point and size drainage facilities. Also, the Blue Diamond Road/I-15 Interchange NDOT Drainage Report provides an analysis to determine the flows impacting the NDOT right-of-way. Neither report is specific to the subject site to address if the flows south of Wigwam Avenue will be conveyed towards the site. Note that the Southwest Las Vegas Valley Development Guidelines Area II shows flows from the area and culverts south of Wigwam Avenue conveyed northeasterly along Blue Diamond Road towards the subject site. This must be addressed and the impacts to the site from the area and culverts south of Wigwam Avenue must be included in the hydrologic analysis;

Response#1: For the determination of the offsite flows impacting the site at Shelborne Avenue alignment, the offsite basin delineation was adopted from the Hydrology Study for Industrial Road Realignment by the Keith Companies (Approved in July 31, 2000). The approved study determined the total runoff impacting Shelborne Channel and the proposed box culverts underneath Industrial Road to be 26cfs and 195 cfs for the 10- and 100-year storm events, respectively. Field investigation of the Blue Diamond Road and its culverts crossings (between Wigwam Avenue and UPRR) indicates that flows exceeding culverts capacity may overtop Blue Diamond Road. A portion of these overtopping flows will flow eastward towards I-15 and does not directly impact the subject site. However, for a conservative approach, it will be assumed that the entire flow exceeding the capacity of the Blue Diamond culverts will be conveyed northeasterly along Blue Diamond to directly impact the subject site. By making this assumption, facilities previously designed and constructed under Industrial Road at Shelborne Avenue alignment will then be undersized.

The Blue Diamond Road/I-15 Interchange NDOT Drainage Report (by PBS&J, Reference 5) analyzed the Blue Diamond northeasterly diverted runoff flows. Lochsa Engineering has concurs with the referenced hydrologic analysis. As shown in the referenced HEC-1 and referenced basins map (Figure 3) previously submitted, the total runoff conveyed northeasterly along Blue Diamond is determined as combination point COMB(220/451 cfs). Concentration point COMB(line 604 in the referenced HEC-1) includes the runoff from generated from basins A1 and A2 (south of Wigwam Avenue, between UPRR and Blue Diamond). COMB also includes the flows from the 8'x5' RCB (Card DIVGU1) and 2:36-inch RCP (Card DIVGU2) underneath UPRR. The HEC-1 has been revised to include the combined runoff at COMB. Runoff from COMB will combine with offsite basin basin OFX2(52/189 cfs) to drain into the Shelborne Channel. The revised total offsite flows draining onto the Shelborne Channel at the site's western boundary is determined as concentration piont SHELB(259/609 cfs). The revised HEC-1 and Offsite basin map are provided with this submittal.

Thank you for your cooperation. Please contact our office if you have any further questions.

Sincerely,

LOCHSA ENGINEERING

PROFESSIONAL ENGINEER, STATE OF NEVADA
HANI M. NOSHI
Exp: 06/30/03
CIVIL
No. 15747
03/18/03

Hani M. Noshi, Ph.D., P.E.
Director of Flood Control and Drainage

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  1       ID        CONCEPTUAL DRAINAGE STUDY FOR SILVERTON PARCEL MAP
  2       ID        EXISTING CONDITION -
  3       ID        USING SCS METHODS AND KINEMATIC WAVE ROUTING
  4       ID        MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
  5       ID        LOCHSA JOB# 6904
  6       ID
  7       ID
  8       ID        INPUT FILE NAME:  6904X100.DAT
  9       ID
 10       ID    REVISED ON MARCH 2003 TO INCLUDE NORTHEASTERLY FLOWS DIVERTED TO THE SITE
 11       ID    THROUGH BLUE DIAMOND ROAD
 12       ID
 13       ID        **********************************************************************
 14       ID        **********************************************************************
 15       ID             ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA
 16       ID
 17       ID             10 & 100 YEAR - 6 HOUR STORM EVENT
 18       ID             PRECIPITATION BASED ON TABLE 505
 19       ID             10-YEAR ADJUSTED RAINFALL DEPTH  = 1.58in
 20       ID             100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in
 21       ID
 22       ID             10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
 23       ID
 24       ID        **********************************************************************
 25       ID
 26       ID        **********************************************************************
          *DIAGRAM
 27       IT       5                    73
 28       IO       5       0
 29       IN       5
 30       JR     PREC    1.00   0.990   0.980   0.905

 31       KK      PT4
 32       KM    COMBINED RUNOFF AT THE 40'X 7' BRIDGE AT UPRR AS DETERMINED FROM THE
 33       KM    2002 DUCK CREEK/BLUE DIAMOND WASHES FIS RESTUDY, BY G.C.WALLACE
 34       BA      6.4
 35       QI      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
 36       QI      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
 37       QI      0.0     0.0      1.      7.     14.    29.0    45.0    58.0    69.0    76.0
 38       QI     82.0    87.0    91.0    96.0    102.   104.0   106.0    106.    109.    113.
 39       QI     126.    153.    204.    320.    569.    912.   1287.   1623.   1853.   1961.
 40       QI    1958.   1874.   1745.   1596.   1458.   1343.   1259.   1210.   1192.   1196.
 41       QI    1212.   1232.   1243.   1238.   1204.   1137.   1045.   940.0   831.0   725.0
 42       QI     628.    541.    466.

 43       KK    RTPT4
 44       KM    ROUTE PT4 THROUGH BASIN OFX1
 45       RK     9500    .015   0.030       0    TRAP     10.    20.0

 46       KK     OFX1
 47       KM    OFFSITE BASIN OFX1
 48       PB     2.77
 49       PC      0.0     .02    .057     .07    .087    .108    .124     .13     .13     .13
 50       PC      .13     .13     .13    .133     .14    .142    .148    .158    .172    .181
 51       PC      .19    .197    .199      .2    .201    .204    .214    .229    .241    .249
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  52      PC    .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
  53      PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
  54      PC     .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
  55      PC    .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
  56      PC    .998    .999     1.0
  57      BA  .36875
  58      LS       0   72.9
  59      UD    .651

  60      KK    CMX1
  61      KM   COMBINE RTPT4 AND OFX1 (TOTAL OFFSITE RUNOF IMPACTING SILVERTON)
  62      KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  63      HC       2

  64      KK   DCMX1
  65      DT    BLUE
  66      DI       0     100    1900
  67      DQ       0     100     100

  68      KK   RTCX1
  69      KM   ROUTE CMX1 THROUGH BASIN THROUGH THE PARKING LOT NORTH OF SILVERTON HOTEL/CAS
  70      RK    1700    .008   0.016       0    TRAP      2.    25.0

  71      KK     NX1
  72      KM   ONSITE BASIN NX1
  73      BA  .01754
  74      LS       0    98.0
  75      UD    .121

  76      KK     NX2
  77      KM   ONSITE BASIN NX2
  78      BA  .02017
  79      LS       0    98.0
  80      UD    .137

  81      KK     NX8
  82      KM   ONSITE BASIN NX8
  83      BA  .00657
  84      LS       0    96.1
  85      UD    .081

  86      KK    CMX2
  87      KM   COMBINE RTCX1, NX1, NX2 AND NX8
  88      KM   TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!FROM THE WEST!!
  89      KM   IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  90      HC       4

  91      KK     NX3
  92      KM   ONSITE BASIN NX3
  93      BA  .02052
  94      LS       0    95.0
  95      UD    .149
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  138     KK    CMX4
  139     KM    COMBINE CMX3, RTFX2,RTFX3 AND NX5
  140     KM    TOTAL RUNOFF REACHING 2:5.5'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUS
  141     HC       4

  142     KK    RTCX4
  143     KM    ROUTE CMX4 TO I-15 R.O.W THROUGH SHELBORNE CHANNEL
  144     RK     600     .013    0.030        0     TRAP      20.      3.0

  145     KK  INDUST
  146     KM    PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  147     BA  .00697
  148     LS       0     98.0
  149     UD     .173

  150     KK  RTINDU
  151     KM    RUNOFF GENERATED THROUGH INDUSTRIAL ROAD WILL WEIR EASTWARD INTO SHELBORNE CH
  152     KM    RUNOFF IS ROUTED THROUGH CHANNEL TO I-15 R.O.W.
  153     RK     600     .013    0.030        0     TRAP      20.      3.0

  154     KK     NX6
  155     KM    ONSITE BASIN NX6
  156     BA  .00612
  157     LS       0     77.0
  158     UD     .156

  159     KK     NX7
  160     KM    ONSITE BASIN NX7
  161     BA  .00694
  162     LS       0     96.1
  163     UD     .078

  164     KK    CMX5
  165     KM    COMBINE RTCX4, RTINDU, NX6 AND NX7
  166     KM    TOTAL RUNOFF REACHING I-15 R.O.W AT SHELBORNE CHANNEL
  167     HC       4

  168     KK     NX9
  169     KM    ONSITE BASIN NX9
  170     BA  .01758
  171     LS       0     77.0
  172     UD     .255

  173     KK   RTNX9
  174     KM    ROUT RUNOFF FROM BASIN NX9 THROUGH BASIN NX10 TO I-15 R.O.W.
  175     RK     650     .015    0.030        0     TRAP      20.    100.0

  176     KK    NX10
  177     KM    ONSITE BASIN NX10
  178     BA  .00590
  179     LS       0     77.0
  180     UD     .199
```

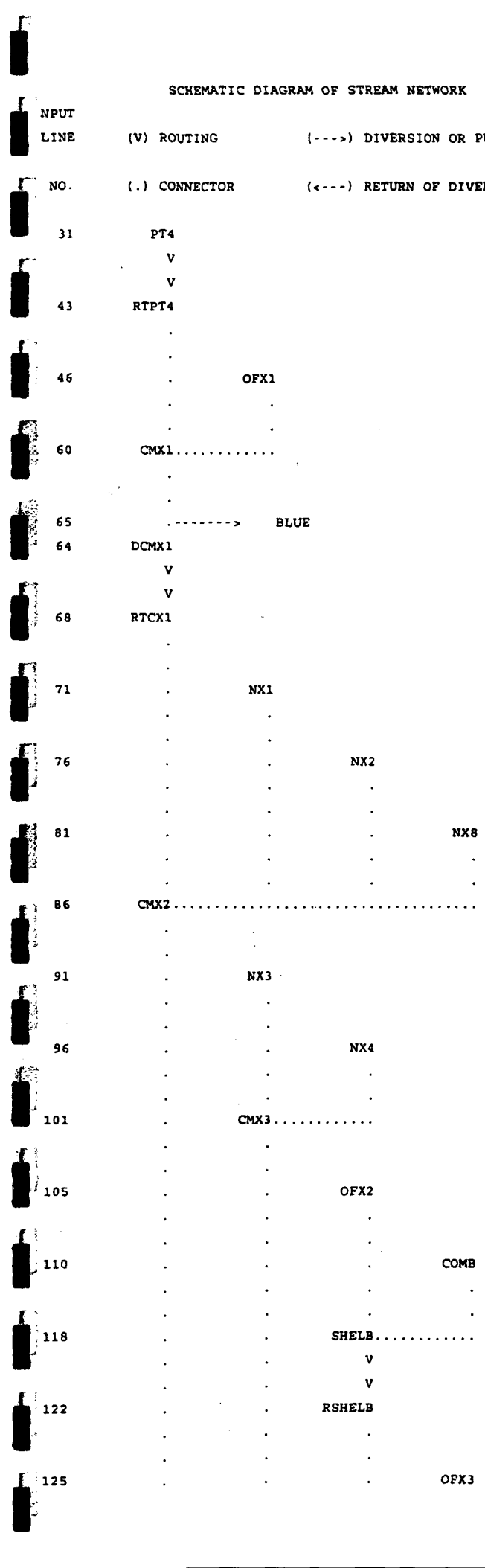
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  181     KK    OFX4
  182     KM   OFFSITE BASIN OFX4
  183     BA  .05329
  184     LS       0    84.7
  185     UD    .350

  186     KK    CMX6
  187     KM   COMBINE RTNX9, NX10 AND OFX4
  188     KM   TOTAL RUNOFF REACHING I-15 R.O.W AT CAMERO AVENUE ALIGNMENT
  189     HC       3
  190     ZZ
```

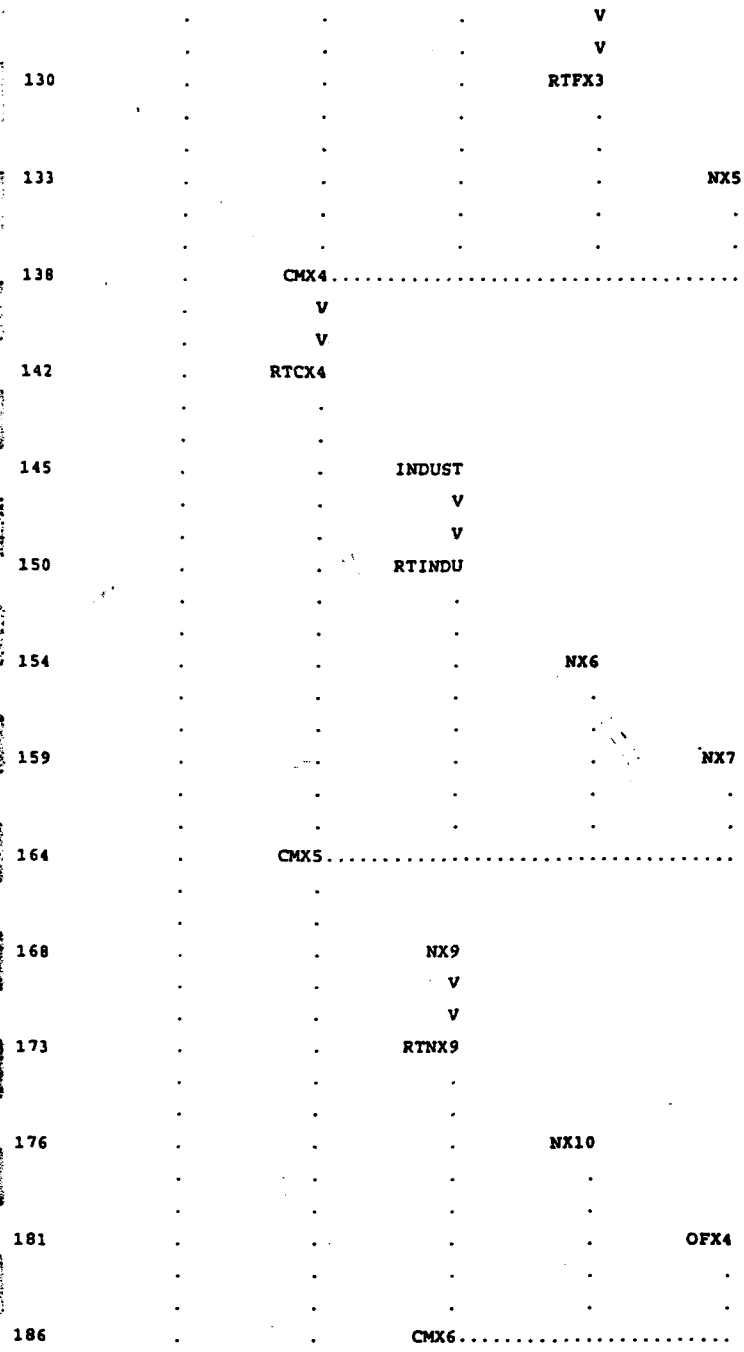
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW





**) RUNOFF ALSO COMPUTED AT THIS LOCATION

	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 0.99 0.98 0.90

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

					RATIOS APPLIED TO PRECIPITATION			
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4
					1.00	0.99	0.98	0.90
HYDROGRAPH AT	PT4	6.40	1	FLOW	1961.	1961.	1961.	1961.
				TIME	4.08	4.08	4.08	4.08
ROUTED TO	RTPT4	6.40	1	FLOW	1941.	1941.	1941.	1941.
				TIME	4.25	4.25	4.25	4.25
HYDROGRAPH AT	OFX1	0.37	1	FLOW	108.	106.	103.	84.
				TIME	4.17	4.17	4.17	4.17
2 COMBINED AT	CMX1	6.77	1	FLOW	2048.	2045.	2043.	2025.
				TIME	4.25	4.25	4.25	4.25
DIVERSION TO	BLUE	6.77	1	FLOW	100.	100.	100.	100.
				TIME	3.17	3.17	3.17	3.17
HYDROGRAPH AT	DCMX1	6.77	1	FLOW	1948.	1945.	1943.	1925.
				TIME	4.25	4.25	4.25	4.25
ROUTED TO	RTCX1	6.77	1	FLOW	1938.	1936.	1934.	1916.
				TIME	4.33	4.33	4.33	4.33
HYDROGRAPH AT	NX1	0.02	1	FLOW	33.	32.	32.	29.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	NX2	0.02	1	FLOW	37.	37.	36.	34.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	NX8	0.01	1	FLOW	13.	13.	13.	12.
				TIME	3.50	3.50	3.50	3.50
4 COMBINED AT	CMX2	6.81	1	FLOW	1945.	1943.	1940.	1923.
				TIME	4.33	4.33	4.33	4.33
HYDROGRAPH AT	NX3	0.02	1	FLOW	35.	35.	34.	32.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	NX4	0.02	1	FLOW	27.	27.	26.	24.
				TIME	3.58	3.58	3.58	3.58
2 COMBINED AT	CMX3	0.04	1	FLOW	62.	62.	61.	56.
				TIME	3.58	3.58	3.58	3.58
HYDROGRAPH AT	OFX2	0.42	1	FLOW	193.	189.	185.	158.
				TIME	4.08	4.08	4.08	4.08
HYDROGRAPH AT	COMB	4.66	1	FLOW	451.	451.	451.	451.
				TIME	0.08	0.08	0.08	0.08
1 COMBINED AT	SHELB	5.08	1	FLOW	644.	640.	636.	609.

				TIME	4.08	4.08	4.08	4.08
OUTED TO	RSHELB	5.08	1	FLOW	642.	639.	635.	608.
				TIME	4.08	4.08	4.08	4.08
YDROGRAPH AT	OFX3	0.04	1	FLOW	39.	38.	38.	34.
				TIME	3.75	3.75	3.75	3.75
ROUTED TO	RTFX3	0.04	1	FLOW	39.	38.	38.	33.
				TIME	3.75	3.75	3.75	3.75
YDROGRAPH AT	NX5	0.02	1	FLOW	10.	10.	10.	8.
				TIME	3.75	3.75	3.75	3.83
4 COMBINED AT	CMX4	5.18	1	FLOW	687.	683.	678.	646.
				TIME	4.00	4.00	4.00	4.00
ROUTED TO	RTCX4	5.18	1	FLOW	686.	682.	678.	646.
				TIME	4.00	4.00	4.00	4.00
YDROGRAPH AT	INDUST	0.01	1	FLOW	12.	12.	12.	11.
				TIME	3.58	3.58	3.58	3.58
OUTED TO	RTINDU	0.01	1	FLOW	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58
YDROGRAPH AT	NX6	0.01	1	FLOW	5.	5.	5.	4.
				TIME	3.58	3.58	3.58	3.58
YDROGRAPH AT	NX7	0.01	1	FLOW	14.	14.	14.	13.
				TIME	3.50	3.50	3.50	3.50
4 COMBINED AT	CMX5	5.20	1	FLOW	694.	690.	686.	653.
				TIME	4.00	4.00	4.00	4.00
YDROGRAPH AT	NX9	0.02	1	FLOW	11.	11.	11.	9.
				TIME	3.67	3.67	3.67	3.75
ROUTED TO	RTNX9	0.02	1	FLOW	11.	11.	11.	9.
				TIME	3.75	3.75	3.75	3.75
HYDROGRAPH AT	NX10	0.01	1	FLOW	4.	4.	4.	3.
				TIME	3.67	3.67	3.67	3.67
HYDROGRAPH AT	OFX4	0.05	1	FLOW	44.	43.	42.	37.
				TIME	3.75	3.75	3.75	3.83
3 COMBINED AT	CMX6	0.08	1	FLOW	58.	57.	56.	49.
				TIME	3.75	3.75	3.75	3.75

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									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.99									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.98									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.90									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 1.00									
RTCX1	MANE	0.79	1946.67	256.75	0.63	5.00	1938.38	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2290E+03 EXCESS=0.0000E+00 OUTFLOW=0.2276E+03 BASIN STORAGE=0.1800E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.99									
RTCX1	MANE	0.79	1944.03	256.82	0.63	5.00	1936.02	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2287E+03 EXCESS=0.0000E+00 OUTFLOW=0.2273E+03 BASIN STORAGE=0.1800E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.98									
RTCX1	MANE	0.80	1940.89	257.09	0.63	5.00	1933.62	260.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2284E+03 EXCESS=0.0000E+00 OUTFLOW=0.2270E+03 BASIN STORAGE=0.1799E+01 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.90

FOR PLAN = 1 RATIO= 1.00

RTCX4	MANE	0.30	686.88	240.51	0.92	5.00	686.50	240.00	0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2539E+03 EXCESS=0.0000E+00 OUTFLOW=0.2539E+03 BASIN STORAGE=-.2676E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.99

RTCX4	MANE	0.30	682.51	240.51	0.92	5.00	682.13	240.00	0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2533E+03 EXCESS=0.0000E+00 OUTFLOW=0.2534E+03 BASIN STORAGE=-.2678E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.98

RTCX4	MANE	0.30	678.15	240.51	0.92	5.00	677.77	240.00	0.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2528E+03 EXCESS=0.0000E+00 OUTFLOW=0.2528E+03 BASIN STORAGE=-.2681E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.90

RTCX4	MANE	0.30	645.94	240.49	0.90	5.00	645.59	240.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2488E+03 EXCESS=0.0000E+00 OUTFLOW=0.2489E+03 BASIN STORAGE=-.2700E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 1.00

RTINDU	MANE	1.05	12.18	217.28	2.53	5.00	11.73	215.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9410E+00 EXCESS=0.0000E+00 OUTFLOW=0.9404E+00 BASIN STORAGE=0.2441E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.99

RTINDU	MANE	0.97	12.05	217.31	2.50	5.00	11.61	215.00	2.50

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9307E+00 EXCESS=0.0000E+00 OUTFLOW=0.9302E+00 BASIN STORAGE=0.2436E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.98

RTINDU	MANE	0.97	11.94	217.25	2.47	5.00	11.49	215.00	2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9205E+00 EXCESS=0.0000E+00 OUTFLOW=0.9192E+00 BASIN STORAGE=0.2575E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

RTINDU	MANE	1.02	10.97	216.62	2.27	5.00	10.56	215.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8439E+00 EXCESS=0.0000E+00 OUTFLOW=0.8428E+00 BASIN STORAGE=0.2421E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 1.00

RTNX9	MANE	1.88	11.07	223.83	0.90	5.00	11.07	225.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8497E+00 EXCESS=0.0000E+00 OUTFLOW=0.8465E+00 BASIN STORAGE=0.4708E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.99

RTNX9	MANE	1.75	10.84	224.16	0.88	5.00	10.84	225.00	0.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8326E+00 EXCESS=0.0000E+00 OUTFLOW=0.8276E+00 BASIN STORAGE=0.4848E-02 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.98

RTNX9	MANE	1.81	10.61	224.80	0.87	5.00	10.61	225.00	0.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.8156E+00 EXCESS=0.0000E+00 OUTFLOW=0.8117E+00 BASIN STORAGE=0.4688E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.90

RTNX9	MANE	1.86	8.96	227.03	0.73	5.00	8.92	225.00	0.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6913E+00 EXCESS=0.0000E+00 OUTFLOW=0.6874E+00 BASIN STORAGE=0.4298E-02 PERCENT ERROR= -0.1

*** NORMAL END OF HEC-1 ***

REVISED HEC-1 ANALYSIS TO INCLUDE
THE NORTHEASTERLY FLOWS ALONG BLUE DIAMOND ROAD
(10-YEAR STORM EVENTS)

FLOOD HYDROGRAPH PACKAGE (HEC-1)
MAY 1991
VERSION 4.0.1E
Lahey F77L-EM/32 version 5.01
Dodson & Associates, Inc.
RUN DATE 03/18/03 TIME 13:34:55

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.

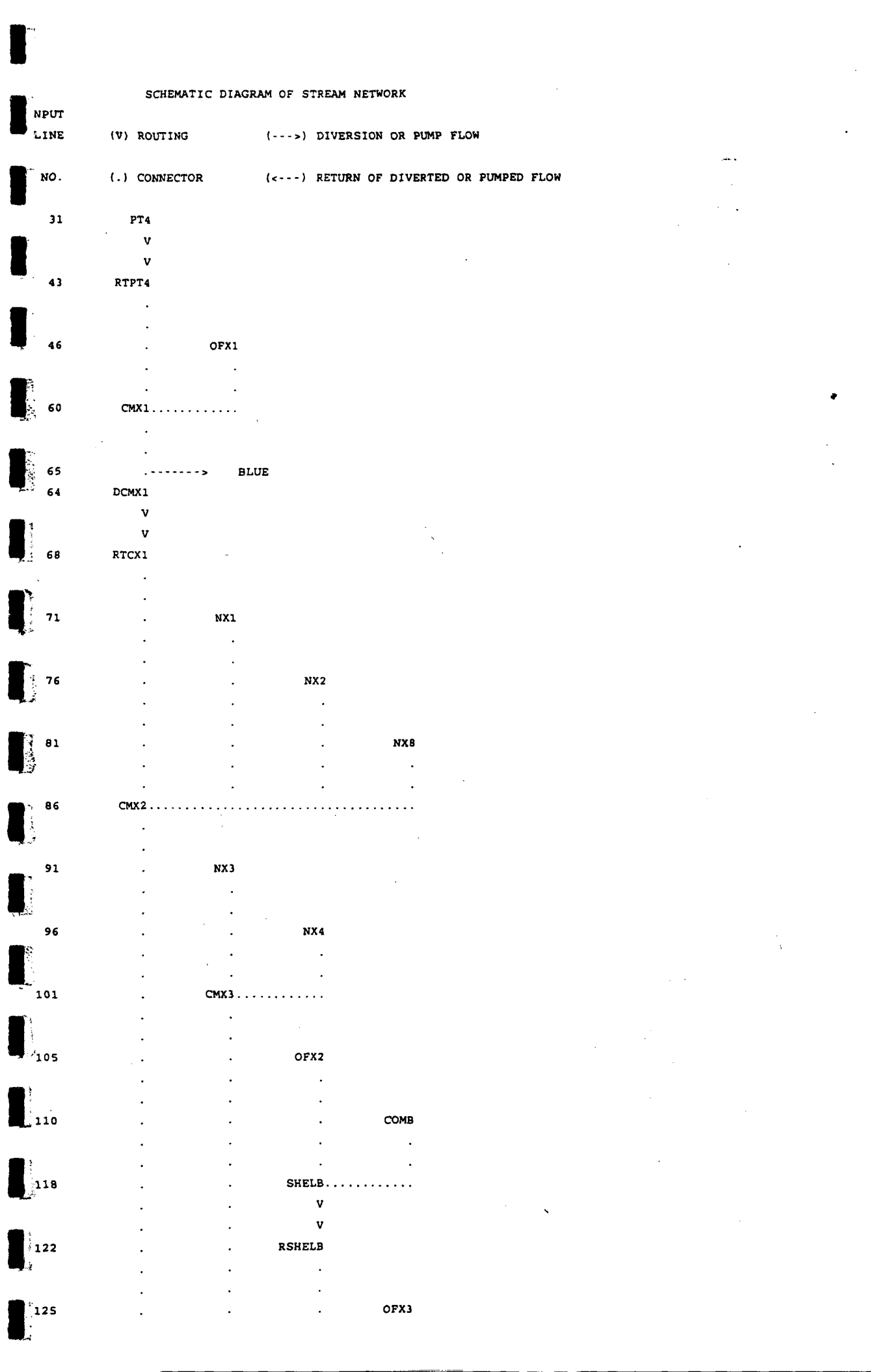
THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, 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
  52      PC    .251    .256     .27    .278    .281    .283    .295    .322    .352    .409
  53      PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
  54      PC     .86    .868    .876    .888     .91    .926    .937     .95     .97    .976
  55      PC    .982    .985    .987    .989     .99    .993    .993    .994    .995    .998
  56      PC    .998    .999     1.0
  57      BA  .36875
  58      LS       0    72.9
  59      UD    .651

  60      KK    CMX1
  61      KM    COMBINE RTPT4 AND OFX1 (TOTAL OFFSITE RUNOF IMPACTING SILVERTON)
  62      KM    IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  63      HC       2

  64      KK    DCMX1
  65      DT     BLUE
  66      DI       0     100    1900
  67      DQ       0     100     100

  68      KK    RTCX1
  69      KM    ROUTE CMX1 THROUGH BASIN THROUGH THE PARKING LOT NORTH OF SILVERTON HOTEL/CAS
  70      RK    1700    .008   0.016       0    TRAP      2.    25.0

  71      KK     NX1
  72      KM    ONSITE BASIN NX1
  73      BA  .01754
  74      LS       0    98.0
  75      UD    .121

  76      KK     NX2
  77      KM    ONSITE BASIN NX2
  78      BA  .02017
  79      LS       0    98.0
  80      UD    .137

  81      KK     NX8
  82      KM    ONSITE BASIN NX8
  83      BA  .00657
  84      LS       0    96.1
  85      UD    .081

  86      KK    CMX2
  87      KM    COMBINE RTCX1, NX1, NX2 AND NX8
  88      KM    TOTAL RUNOFF REACHING THE 4:12'X4' RCB UNDERNEATH I-15 !!FROM THE WEST!!
  89      KM    IF THE FLOW SPLIT AT HINSON/WINDMILL IS NOT CONSIDERED
  90      HC       4

  91      KK     NX3
  92      KM    ONSITE BASIN NX3
  93      BA  .02052
  94      LS       0    95.0
  95      UD    .149
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  138     KK    CMX4
  139     KM    COMBINE CMX3, RTFX2,RTFX3 AND NX5
  140     KM    TOTAL RUNOFF REACHING 2:5.5'X3' RCBC ALONG SHELBORNE CHANNEL UNDERNEATH INDUS
  141     HC       4

  142     KK    RTCX4
  143     KM    ROUTE CMX4 TO I-15 R.O.W THROUGH SHELBORNE CHANNEL
  144     RK     600    .013   0.030       0    TRAP     20.     3.0

  145     KK  INDUST
  146     KM    PORTION OF INDUSTRIAL ROAD WITHIN THE SUBJECT SITE
  147     BA  .00697
  148     LS       0    98.0
  149     UD    .173

  150     KK  RTINDU
  151     KM    RUNOFF GENERATED THROUGH INDUSTRIAL ROAD WILL WEIR EASTWARD INTO SHELBORNE CH
  152     KM    RUNOFF IS ROUTED THROUGH CHANNEL TO I-15 R.O.W.
  153     RK     600    .013   0.030       0    TRAP     20.     3.0

  154     KK     NX6
  155     KM    ONSITE BASIN NX6
  156     BA  .00612
  157     LS       0    77.0
  158     UD    .156

  159     KK     NX7
  160     KM    ONSITE BASIN NX7
  161     BA  .00694
  162     LS       0    96.1
  163     UD    .078

  164     KK    CMX5
  165     KM    COMBINE RTCX4, RTINDU, NX6 AND NX7
  166     KM    TOTAL RUNOFF REACHING I-15 R.O.W AT SHELBORNE CHANNEL
  167     HC       4

  168     KK     NX9
  169     KM    ONSITE BASIN NX9
  170     BA  .01758
  171     LS       0    77.0
  172     UD    .255

  173     KK   RTNX9
  174     KM   ROUT RUNOFF FROM BASIN NX9 THROUGH BASIN NX10 TO I-15 R.O.W.
  175     RK     650    .015   0.030       0    TRAP     20.   100.0

  176     KK    NX10
  177     KM   ONSITE BASIN NX10
  178     BA  .00590
  179     LS       0    77.0
  180     UD    .199
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

NPUT
LINE (V) ROUTING (---->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*        MAY  1991                      *
*      VERSION 4.0.1E                   *
*    Lahey F77L-EM/32 version 5.01      *
*     Dodson & Associates, Inc.         *
*  RUN DATE  03/18/03  TIME  13:34:55   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 551-1748               *
*                                       *
*****************************************
```


CONCEPTUAL DRAINAGE STUDY FOR SILVERTON PARCEL MAP
EXISTING CONDITION -
USING SCS METHODS AND KINEMATIC WAVE ROUTING
MASTER PLAN ADJUSTED 6-HOUR RAINFALL AND STORM DISTRIBUTION
LOCHSA JOB# 6904

INPUT FILE NAME: 6904X10.DAT

REVISED ON MARCH 2003 TO INCLUDE NORTHEASTERLY FLOWS DIVERTED TO THE SITE THROUGH BLUE DIAMOND ROAD

****
****

ONSITE AND OFFSITE BASINS ARE INSIDE McCARRAN AIRPORT RAINFALL AREA

10 & 100 YEAR - 6 HOUR STORM EVENT
PRECIPITATION BASED ON TABLE 505
10-YEAR ADJUSTED RAINFALL DEPTH = 1.58in
100-YEAR ADJUSTED RAINFALL DEPTH = 2.77in

10-YEAR RAINFALL DEPTH RATIO (JR CARD) = 1.58/2.77 = 0.570
10-YEAR USING A 0.905 DARF =.57 * 0.905= 0.520

****

****

28 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		73	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		0600	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 6.00 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

0.57 0.52

				TIME	4.17	4.17
OUTED TO	RSHELB	5.08	1	FLOW	271.	259.
				TIME	4.17	4.17
YDROGRAPH AT	OFX3	0.04	1	FLOW	16.	13.
				TIME	3.75	3.75
OUTED TO	RTFX3	0.04	1	FLOW	16.	13.
				TIME	3.83	3.83
YDROGRAPH AT	NX5	0.02	1	FLOW	2.	1.
				TIME	3.83	3.92
4 COMBINED AT	CMX4	5.18	1	FLOW	289.	274.
				TIME	4.08	4.08
ROUTED TO	RTCX4	5.18	1	FLOW	289.	274.
				TIME	4.08	4.08
YDROGRAPH AT	INDUST	0.01	1	FLOW	7.	6.
				TIME	3.58	3.58
OUTED TO	RTINDU	0.01	1	FLOW	6.	6.
				TIME	3.58	3.67
YDROGRAPH AT	NX6	0.01	1	FLOW	1.	1.
				TIME	3.67	3.67
YDROGRAPH AT	NX7	0.01	1	FLOW	8.	7.
				TIME	3.50	3.50
4 COMBINED AT	CMX5	5.20	1	FLOW	292.	277.
				TIME	4.00	4.00
YDROGRAPH AT	NX9	0.02	1	FLOW	3.	2.
				TIME	3.75	3.75
OUTED TO	RTNX9	0.02	1	FLOW	3.	2.
				TIME	3.83	3.92
HYDROGRAPH AT	NX10	0.01	1	FLOW	1.	1.
				TIME	3.67	3.75
HYDROGRAPH AT	OFX4	0.05	1	FLOW	16.	13.
				TIME	3.83	3.83
3 COMBINED AT	CMX6	0.08	1	FLOW	19.	15.
				TIME	3.83	3.83

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= 0.57									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.52									
RTPT4	MANE	4.74	1957.98	256.53	0.73	5.00	1941.20	255.00	0.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2572E+03 EXCESS=0.0000E+00 OUTFLOW=0.2479E+03 BASIN STORAGE=0.1119E+02 PERCENT ERROR= -0.7

FOR PLAN = 1 RATIO= 0.57									
RTCX1	MANE	0.78	1859.31	257.02	0.60	5.00	1854.63	260.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2186E+03 EXCESS=0.0000E+00 OUTFLOW=0.2169E+03 BASIN STORAGE=0.1778E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52									
RTCX1	MANE	0.78	1852.82	257.09	0.60	5.00	1848.32	260.00	0.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2178E+03 EXCESS=0.0000E+00 OUTFLOW=0.2163E+03 BASIN STORAGE=0.1770E+01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.57									
RSHELB	MANE	1.07	271.62	251.71	0.43	5.00	271.45	250.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1154E+03 EXCESS=0.0000E+00 OUTFLOW=0.1155E+03 BASIN STORAGE=-.4807E+00 PERCENT ERROR= 0.3

FOR PLAN = 1 RATIO= 0.52									
RSHELB	MANE	1.07	259.27	251.71	0.42	5.00	259.01	250.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1140E+03 EXCESS=0.0000E+00 OUTFLOW=0.1141E+03 BASIN STORAGE=-.4843E+00 PERCENT ERROR= 0.3

FOR PLAN = 1 RATIO= 0.57									
RTFX3	MANE	2.53	15.86	229.75	0.63	5.00	15.82	230.00	0.63

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1267E+01 EXCESS=0.0000E+00 OUTFLOW=0.1253E+01 BASIN STORAGE=0.1579E-01 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTFX3	MANE	2.79	13.32	230.01	0.53	5.00	13.32	230.00	0.53

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.1067E+01 EXCESS=0.0000E+00 OUTFLOW=0.1052E+01 BASIN STORAGE=0.1512E-01 PERCENT ERROR= 0.0

FOR PLAN = 1 RATIO= 0.57

RTCX4	MANE	0.37	288.55	245.56	0.43	5.00	288.52	245.00	0.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1189E+03 EXCESS=0.0000E+00 OUTFLOW=0.1189E+03 BASIN STORAGE=-.1663E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.52

RTCX4	MANE	0.37	273.56	245.56	0.42	5.00	273.53	245.00	0.42

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1170E+03 EXCESS=0.0000E+00 OUTFLOW=0.1170E+03 BASIN STORAGE=-.1678E+00 PERCENT ERROR= 0.1

FOR PLAN = 1 RATIO= 0.57

RTINDU	MANE	1.21	6.76	217.71	1.35	5.00	6.43	215.00	1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5031E+00 EXCESS=0.0000E+00 OUTFLOW=0.5021E+00 BASIN STORAGE=0.1787E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTINDU	MANE	1.29	6.14	217.63	1.22	5.00	5.83	220.00	1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4525E+00 EXCESS=0.0000E+00 OUTFLOW=0.4519E+00 BASIN STORAGE=0.1630E-02 PERCENT ERROR= -0.2

FOR PLAN = 1 RATIO= 0.57

RTNX9	MANE	2.58	2.67	230.93	0.24	5.00	2.65	230.00	0.24

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2246E+00 EXCESS=0.0000E+00 OUTFLOW=0.2226E+00 BASIN STORAGE=0.2301E-02 PERCENT ERROR= -0.1

FOR PLAN = 1 RATIO= 0.52

RTNX9	MANE	2.73	1.95	232.60	0.18	5.00	1.94	235.00	0.18

ONTINUITY SUMMARY (AC-FT) - INFLOW=0.1715E+00 EXCESS=0.0000E+00 OUTFLOW=0.1695E+00 BASIN STORAGE=0.2042E-02 PERCENT ERROR= 0.0

*** NORMAL END OF HEC-1 ***

LOCHSA ENGINEERING
JESS S. HALDEMAN, S.E.
MARK L. HEDGE, P.E.
KENNETH W. (BILL) KARREN, JR., S.E.
DAVID S. PETERSON, S.E.
TED T. EGERTON, P.E.

March 07, 2003

Mr. David Betley, P.E.
Clark County Development Services Department
500 S. Grand Central Parkway
Las Vegas, Nevada 89106

RE: Addendum #1 to the Conceptual Drainage Study for MSM-020-03
HTE #03-8397.
Lochsa Job #6904

Dear Mr. Betley:

The following are responses to comments regarding the Conceptual Drainage Study listed above.

Comment #1: The report has been submitted as a Conceptual Drainage Study. County policy limits a Conceptual Drainage Study to the following two uses:

a. The establishment of existing conditions of a site by defining onsite and offsite flows. Approval of this type of evaluation does not allow ~~subdivision or parcel mapping of property, or~~ construction of any kind.

b. The evaluation of a drainage control proposal. Such a proposal would include onsite and offsite flow evaluation, detailed plans and calculations describing the drainage control facilities. Approval of this type of evaluation does not allow subdivision or parcel mapping of property, or construction of any kind.

It appears the purpose is 1(a) above;

Response#1: **The purpose of the study is the establishment of existing onsite and offsite flow conditions to satisfy the requirement for the Silverton parcel map (MSM-020-03), i.e. the purpose is 1(a) above. Please also refer to Clark County comment on Item 1(a).**

Comment #2: Existing contours must be provided for the offsite basin map. In addition, to help clarify which reference material is being utilized, a map with the flow quantities and the reference source labeled at the location where the flow quantity is concentrated must be provided. This must be addressed;

Response #2: **A new offsite basin map is provided with this submittal (Exhibit OFF1). Per Clark County's comment on this Item, a 24" x 36" size map is used for clarity using the Work Map for Duck Creek/Blue Diamond Washes FIS Restudy by G.C. Wallace Inc. All concentration points and drainage facilities referred to in the hydrology analysis and discussion are also labeled on the basin map. For the eastbound offsite flows impacting the Silverton site, the only referenced flow quantity is the concentration**

point PT4(1961 cfs, 100-year storm event) as determined in the 2002 Duck Creek/Blue Diamond Washes FIS Restudy by G.C.Wallace, Inc. To facilitate the review of the FIS hydrology analysis and determination of combined flow values at PT4, the existing condition basin maps (Figure 6A and 6B) from the FIS are also provided in this submittal in 24"x36" size map. The HEC-1 analysis from the FIS Restudy was included in the original submittal.

Comment #3: It is unclear why the flow diverted through the UPRR south of the 40-foot x 7-foot bridge is not combined downstream in the subject study hydrologic analysis. It is not clear from the reference material provided that those flows do not impact this site. This must be addressed, and revisions provided as necessary;

Response #3: **The next eastbound flow crossing the UPRR south of the 40-ft x 7-ft bridge is through the 2:36-inch RCP's approximately 900 feet south of Wigwam Avenue Alignment. As shown in the attached offsite basin map(ExhibitOFF1) and the referenced FIS Figure 6B, the runoff through the 2:36-inch RCP's and the offsite basins south of Wigwam Avenue will flow eastward and will not directly impact the subject site. As described in the original submittal (Page 6), these flow impact the western I-15 ROW. The topographic maps and the field investigation illustrate that the area along the western R.O.W. of I-15 represents a natural detention area for the eastbound flows, with several flow outlets through different culverts underneath I-15. The 4:12'x4' RCBC east of Silverton represents one of these flow outlets for the natural reservoir along I-15. The Blue Diamond Road/I-15 Interchange NDOT Drainage Report (Reference 5) analyzed the WSE and runoff along I-15 taking into consideration the natural reservoir topography, the entire eastbound flows, and all the existing culverts. The referenced HEC-1 analysis of the ponding WSE along I-15, near the Silverton site, was attached to the original submittal. The results of the reservoir routing (card BDINT, line 629 in the referenced HEC-1), illustrates a pond-like condition near the 4:12'x4' RCBC east of Silverton with WSE at 2270.75 ft during the 100-year storm events. The 2002 Duck Creek/Blue Diamond Washes FIS Restudy modeled the flows impacting I-15 to flow north towards the 4:12'x4' RCBC east of Silverton. However, the FIS stated in their report that the north flows were modeled by "approximate method", as shown in the excerpts attached with this submittal. Therefore, the subject conceptual study adopted the reservoir analysis modeled in the Blue Diamond Road/I-15 Interchange NDOT Report.**

The total offsite and onsite runoff flows conveyed through the site are identified in the HEC-1 analysis as CMX2, CMX5 and CMX6. During a 100-year storm event, the runoff at these combination points is part of the total runoff flows used in the reservoir routing modeled in the NDOT Report. Runoff at CMX2 and CMX6 directly drain impact to the 4:12'x4' RCBC and 48"x76" CMP, respectively. Runoff at CMX5 will reach both the 4:12'x4' RCBC and 48"x76" CMP. The WSE along the eastern boundary of the subject site is controlled by all the culverts underneath I-15, and the offsite runoff flows west of I-15 and north of Cactus Avenue. No revision to combine CMX2, CMX5 and CMX6 was therefore deemed necessary.

Comment #4: It appears that the referenced basin maps provided do not correspond to the referenced hydrologic analyses provided. Appropriate maps with the referenced basins delineated must be provided to help clarify the review;

Response #4: **The provided referenced basin maps do correspond to the referenced hydrologic analysis. Please note that in the referenced HEC-1 from the NDOT Report, the analysis between lines 33 through 212 is a copy from the Corps of Engineers (COE) analysis for the offsite basins used in the design of the Blue Diamond Detention Basin. No basin maps were available for these COE basins. Please also note that the only hydrologic information adopted from the NDOT report is the reservoir routing of flows along I-15 western ROW. The runoff flow values impacting the reservoir routing west of the UPRR are limited to the flow capacity of culverts underneath UPRR. Therefore, the COE basins used in the referenced HEC-1 analysis does not impact the reservoir routing results.**

Comment#5: The concentration points provided on the HEC-1 analyses must be shown on the offsite basin maps to help clarify the review. In addition, the location of concentration point PT4 from the referenced hydrologic analysis must be shown on the basin map. Also scale (1" = 3000') on the enlarged offsite basin map is not correct;

Response #5: **A new offsite basin map is provided with this submittal (Exhibit OFF1) to help clarify the review. Please also refer to the response to Comment #2. Also, the enlarged offsite basin (delineated on 2002 MPU Figure H-20) is deleted and a new exhibit (Figure 4) is included with this submittal.**

Comment#6: It must be acknowledged that the offsite flow taken through the site must be within a drainage easement. The future technical drainage studies must address drainage easements;

Response#6: **Lochsa Engineering has notified the property owner with this requirement and the need to address it in any future technical drainage studies.**

Comment#7: Clark County Regional Flood Control District (CCRFCD) concurrence is required since the subject site is within a FEMA designated flood hazard area Zone A and is impacting an existing regional Master Plan Facility. It is the responsibility of the applicant to submit a copy of the drainage study and any addenda to the CCRFCD;

Response #7: **Acknowledged.**

Concurrence by Clark County Public Works:

Comments:

Item 1a Revised as noted. The purpose of the study is to satisfy the drainage study requirement imposed on parcel map MSM-020-03.

Item 2 The offsite Basin Map, Figure 3, is not acceptable as submitted for the following reasons: a) the map is not scalable because the scale is 0.67"± = 1000', revise the map using scale available on an engineering scale. b) contour lines are not legible and their elevations not labeled. The engineer is recommended to use 24" x 36" size map for clarity and to label also all concentration points and drainage facilities referred to in the hydrology analysis and discussion. The engineer may use the Work Map for Duck Creek/Blue Diamond Washes FIS Restudy by G.C. Wallace Inc. which is to scale 1"=400' with 4' contour intervals and legibly labeled contours.

Response to Item 2:

A new offsite basin map is provided with this submittal (Exhibit OFF1) to help clarify the review. Please also refer to the response to Comment #2.

Additional Comments:

Comment#8: Revise Drainage study title to: MSM 020-03 in lieu of "Silverton";

Response #8: **The drainage study title is revised as requested.**

Comment#9: Any new construction on the site requires a new Technical Drainage Study;

Response #9: **Acknowledged.**

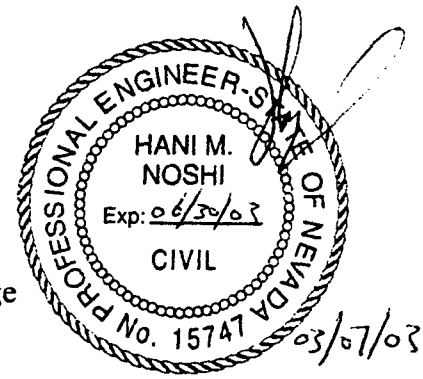
Comment#10: Label Camero on Sheet DR1 "Drainage Basin Map, existing condition";

Response #10: **Sheet DR1 has been revised to label Camero Avenue alignment.**

Thank you for your cooperation. Please contact our office if you have any further questions.

Sincerely,

LOCHSA ENGINEERING



Hani M. Noshi, Ph.D., P.E.
Director of Flood Control and Drainage

1.3 Description of Property

The subject site is approximately 93.0 acres at southwest Blue Diamond Road and I-15 intersection. At present, the majority of project site is developed as the Silverton Hotel/Casino and RV park. The remaining southern portion of the site is currently undeveloped with sparse vegetation cover. The site generally slopes to the east toward I-15, at approximately 1.0 percent. Review of the 2002 Flood Control Master Plan Update's (Reference 3), Figure H-20, indicates that the site is within the hydrologic soil groups A and B. Soil groups A and B are defined as "High infiltration rate, low runoff potential" and "Moderate infiltration rate, moderately low runoff potential", respectively. The Curve Numbers (CN) for the existing and developed condition has been determined from Table 602 of the CCRFCD Hydrologic Criteria and Drainage Design Manual.

2 DRAINAGE DESCRIPTION

2.1 Existing Drainage Conditions

In the 2002 Las Vegas Valley Flood Control Master Plan Update, the valley was hydrologically divided into nine watersheds and each watershed was further divided into subareas. The onsite and offsite basins of the subject project area all falls within the Duck Creek/Blue Diamond Watershed.

A. Offsite and Onsite Drainage

Offsite flows impact the subject site from the west and southwest. The offsite and onsite flows are concentrated along three routes, namely, the Silverton Hotel/Casino parking lot, Shelborne earth channel, and Camero Avenue alignment. A discussion of the offsite and onsite flows within the three routes is provided in this section.

A.1. Silverton Hotel and Casino Parking Lot

The offsite flows were analyzed in several studies. The Blue Diamond Road/I-15 Interchange Report (Reference 5) prepared in January 2001 by PBS&J for Nevada Department of Transportation (NDOT) determined the hydrologic patterns and runoff flows of the offsite basins impacting the interchange. The study used FLO-2D analysis to determine the flow splits and the amount of runoff impacting the interchange from the east. As shown in the attached referenced HEC-1 analysis and basin map(Figure3), the study determined the 100-year storm runoff conveyed eastward through the 40' wide x 7' height UPRR bridge to be 1537 cfs (combination point NI1B in the attached referenced HEC-1). The study determined the 100-year storm runoff flow within the Middle Branch Blue Diamond Wash near the intersection of Hinson Street alignment and Windmill Lane alignment to be 1534 cfs (combination point HINWIN in the attached referenced HEC-1). At the intersection, the runoff flows split into northeast-bound and eastbound flows. The eastbound flows represents the amount of runoff flows that will impact the Silverton Hotel/Casino for the existing conditions, whereas the northeast flows drain to a low area at the intersection of Valley View Boulevard and Mesa Verde Lane. The study's FLO-2D analysis determined the eastbound flows at the intersection to be 522 cfs, i.e. approximately 33% of the total flows at the intersection. The 522 cfs is combined with runoff generated from basins A4B and I1D at combination point SILV(528 cfs). The combined runoff at SILV is the total runoff impacting the Silverton Hotel/Casino in the existing conditions as determined in Reference 5.

The most current Duck Creek/Blue Diamond Washes 2002 FIS Restudy by G.C. Wallace, Inc. (Reference 6) has determined the 100-year storm runoff conveyed eastward through the 40' wide x 7' height UPRR bridge to be 1961 cfs (combination point PT4 in the attached referenced HEC-1

and Figures 6A and 6B). As shown in the attached material from the referenced studies, the total runoff through the 40'x7' UPRR bridge (PT4, reference 6) is approximately 400cfs more than that determined in the Blue Diamond Interchange study (Combination point NI1B, reference 5). The difference is due to the additional runoff flows draining from the area north of the UPRR bridge that was included in the FIS restudy (input hydrograph HYDRO1 in the the referenced HEC-1). However, the FIS restudy has adopted the same 33% split ratio at Hinson/Windmill alignment intersection to determine the eastbound flows impacting Silverton Hotel/Casino. The FIS restudy determined the total runoff within the wash near the Hinson/Windmill intersection to be 1890cfs (routed flow at RPT4A in the attached referenced HEC-1). The restudy determined the northeast and eastbound split flows to be 1260 cfs and 630 cfs, respectively. The FIS combined runoff from basin B14B with the eastbound flows to determine the total runoff flows reaching the 4: 4'x12' RCB culvert underneath I-15 at the eastern Silverton boundaries. The FIS restudy determined the total eastbound flows draining through the 4: 4'x12' RCB culverts to be 764 cfs (combination point PT22W in the attached referenced HEC-1) during the100-year storm event.

The Hydrology Study for Industrial Road Realignment by the Keith Companies (Reference 7, approved in July, 2000) adopted 1705 cfs as the total runoff flow capacity through the 40'x7' UPRR bridge, as determined in the approved Pinnacle Peaks Drainage Study. The Industrial Road study did not assume any split flow at Hinson/Windmill intersection and determined the total runoff impacting Blue Diamond and Industrial Road intersection to be 1750 cfs during the 100-year storm event.

In the subject study, the 1961 cfs runoff flow for the 100-year storm event is adopted for the flow through the 40' x 7' UPRR bridge as determined in the 2002 FIS restudy. No permanent

structure exists at the Hinson/Windmill alignment intersection to maintain the flow split. Due to the uncertainty of the split flow in the existing condition and for a more conservative analysis, the entire flows are assumed to travel east and impact the subject site. The runoff generated through the offsite area between the UPRR bridge and Silverton Hotel/Casino is delineated as offsite basin OFX1(19/106 cfs). Basin OFX1 is a portion of the FIS restudy basin B14B. The offsite basins are delineated on the FIS basin map(Referenced Figure6B). The attached Figure 3 in Appendix C illustrates the offsite basin delineation within the FIS restudy basins. The total runoff impacting the Old Industrial Road and Blue Diamond intersection is determined to be 2045 cfs during the 100-year storm event (HEC-1 concentration point CMX1). A portion of this runoff will be contained in the northern half of Blue Diamond Road and flows east. As shown in the FlowMaster analysis included in Appendix B, Blue Diamond half street capacity near the subject site is determined to be approximately 114 cfs. A 100 cfs-diversion is used in the HEC-1 model to divert these east flows from the total runoff at impacting the Silverton parking lot. The total offsite runoff impacting the Silverton parking lot is determined to be 1945 cfs during the 100-year storm event (HEC-1 concentration point DCMX1). The runoff impacting the parking lot will split through the northern and southern parking lots around the Hotel/Casino building. The runoff conveyed through the north and south parking lots during the 100-year storm events is determined to be 1760 cfs and 185 cfs, respectively. The split flow analysis is described in detail in the following section.

The north and south flows are combined at concentration point CMX2(1943 cfs for the 100-year storm) with onsite runoff generated from basins NX1(18/33 cfs), NX2(21/37 cfs) and NX8(7/13 cfs). The runoff at CMX2 represents the total eastbound flows directly draining to the 4:12'x4' RCBC underneath I-15. However, the runoff flows impacting the RCBC are not limited to the

of the building. Maintaining the same WSE and the determined slope from the FlowMaster analysis, the flows (Q) in the north and south sections are determined. To check the results of the flow split analysis, the north and south flows are combined and compared with the 1945 cfs flow value determined in the HEC-1 analysis. The north and south flows are then corrected maintaining the same split ratio determined in the FlowMaster analysis. Using this split flow analysis, flows through the north and south parking lots are determined to be 1760 and 185 cfs, respectively.

The second model analyzes runoff flows through the north parking lot. The 4:12'x4' RCBC's underneath I-15 represents the downstream end of the model. As described above, the runoff along the western R.O.W of I-15 near the RCBC will pond in a reservoir-like pattern. The WSE upstream the RCBC is determined by the Blue Diamond Road/I-15 Interchange Report (Reference 5) to be 2270.75 ft during the 100-year storm events. The WSE at the downstream end boundary for the model was therefore set to 2270.75 ft.

The pond WSE extends through a big section of the south parking lot. Due to the much larger flows and WSE's conveyed through the north parking lot, and the relatively short path for runoff flows in the south parking lot, no HEC-RAS analysis was provided for the south parking lot.

The HEC-RAS and split flow analysis are included in Appendix B. Exhibit HR1 illustrates the WSE within the parking lot.

A.2. Shelborne Earth Channel

The Hydrology Study for Industrial Road Realignment by the Keith Companies (Reference 7) analyzed the offsite runoff flows impacting the Shelborne Channel. In their analysis they determined runoff from the 2:36" RCP's underneath UPRR (160 cfs) to drain into the Shelborne

"AE" are described by the Federal Emergency Management Agency (FEMA) as *"Special flood hazard areas inundated by the 1% annual chance flood; Flood depth of 1 foot" and "Special flood hazard areas inundated by 100-year flood; Base flood elevations determined"*, respectively. Zone X is defined by FEMA as "*Areas determined to be outside the 0.2% annual chance flood.*"

2.4 Previous Drainage Studies

The overall area is covered within the CCRFCD *"2002 Las Vegas Valley Flood Control Master Plan Update, Volume I and II"* (Reference 2 and 3). The offsite flow impacting the site was analyzed in several studies. The Blue Diamond Road/I-15 Interchange Report (Reference 5) prepared in January 2001 by PBS&J for Nevada Department of Transportation (NDOT), Duck Creek/Blue Diamond Washes 2002 FIS Restudy by G.C. Wallace, Inc. (Reference 6), and the Hydrology Study for Industrial Road Realignment by the Keith Companies (Reference 7, approved in July, 2000) were reviewed and utilized in the determination of the offsite flows. Lochsa Engineering concurs with these information from the referenced studies that was used in the subject study analysis.

3. PROPOSED DRAINAGE FACILITIES

3.1 General Description

No development is proposed though this study. The purpose of the study is to analyze and determine the existing offsite flows impacting the site and the existing onsite drainage patterns.

3.2 Compliance with Regulations and Adopted Plans

The hydrologic analysis and drainage design of this development is in compliance with local

requirements, including the Clark County Regional Flood Control District (CCRFCD) *"Hydrologic Criteria and Drainage Design Manual"* (HCDDM) (Reference 1), and the CCRFCD *"2002 Las Vegas Valley Flood Control Master Plan Update"* (Reference 3).

3.3 Hydrologic Criteria

The onsite and offsite basins of the subject project area all falls within the Duck Creek/Blue Diamond Watershed. The hydrologic analysis and drainage of the project site is carried out in accordance with the Hydrologic Criteria and Drainage Design Manual (HCDDM) of the CCRFCD (Reference 3). The rainfall values used for the hydrologic analysis of the existing site represent the 10-year and 100-year storm recurrence events, each with a six-hour duration. The site is within the boundary for using the McCarran Airport Rainfall Data, therefore precipitation data was determined using Table 505 of the HCDDM (Reference 1). The adjusted point rainfall values for the 6-hour, 10- and 100 year storm events are determined from Table 505 as 1.58 and 2.77 inches, respectively. The rainfall losses due to infiltration, interception, etc. are represented using the SCS curve number (CN) method recommended in the CCRFCD's Manual (Reference 1). The SCS method divides the soils into four hydrological groups as A, B, C and D. Review of the 2002 Flood Control Master Plan Update's (Reference 3), Figure H-20, indicates that the site is within the hydrologic soil groups A and B. Soil groups A and B are defined as "High infiltration rate, low runoff potential" and "Moderate infiltration rate, moderately low runoff potential", respectively. The Curve Numbers (CN) for the existing and developed condition has been determined from Table 602 of the CCRFCD Hydrologic Criteria and Drainage Design Manual. The runoff hydrograph is determined from the design precipitation for each sub-basin using the Soil Conservation Service (SCS) unit hydrograph method.

3.4 Facility Design Calculations

No development is proposed though this study. The purpose of the study is to analyze and determine the existing offsite flows impacting the site and the existing onsite drainage patterns.

4. CONCLUSIONS AND RECOMMENDATIONS

1. This project is in compliance with the applicable drainage laws as recognized by the State of Nevada.

2. This project is in compliance with the CCRFCD "2002 Las Vegas Valley Flood Control Master Plan Update", the CCRFCD "*Hydrologic Criteria and Drainage Design Manual*" (Reference 1).

3. As part of the Silverton Parcel Map(MSM-020-03) requirement, the purpose of this conceptual study is to determine the offsite flows impacting the subject site and the drainage patterns through the site in the existing conditions .

4. The runoff flows impacting the Silverton Hotel/Casino at the (Old) Industrial Road and Blue Diamond intersection is determined to be 1945 cfs during the 100-year storm event. The offsite runoff flows through the Silverton parking lot is analyzed using the HEC-RAS model and WSE was determined for the 100-year storm events. The runoff flows was determined to split through the north and south parking lots, with the majority of the flows conveyed through the north parking lot. The 100-year storm event runoff flows through north and south parking lots was determined to be 1760 cfs and 185 cfs, respectively.

5. The total eastward runoff conveyed through the Shelborne Channel alignment before it drains onto I-15 is determined to be 232 during the 100-year storm events.

revised

APPENDIX A

HYDROLOGIC ANALYSIS

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

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

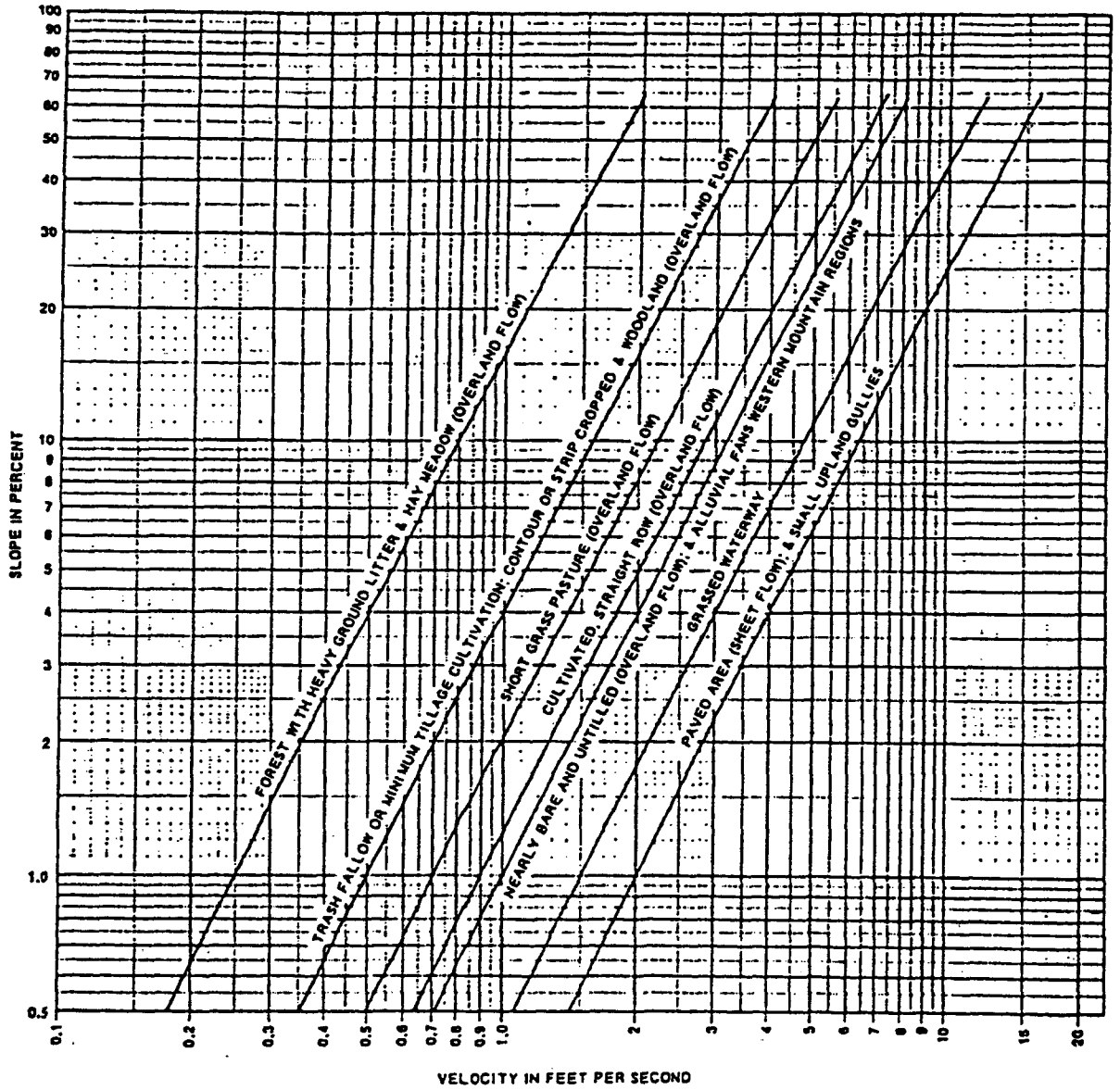
[1]Average runoff condition, and $I_a = 0.2S$.

[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

TRAVEL TIME VELOCITY



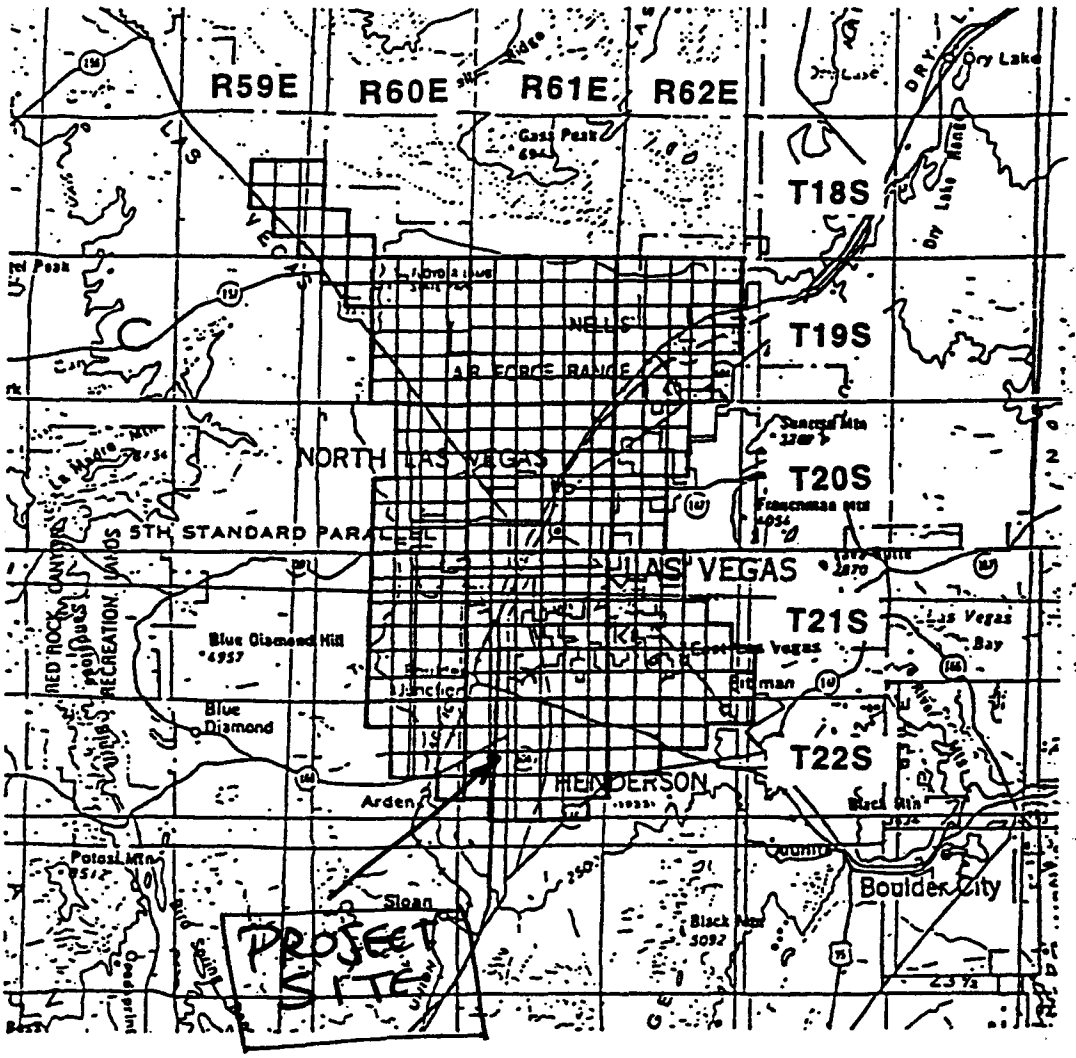
Revision	Date

WRC ENGINEERING

REFERENCE: SCS National Engineering Handbook
Section 4, Hydrology, March, 1985

FIGURE 602

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 (sec. 17)
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

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

	RECURRENCE INTERVAL					
TIME	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

DEVELOPMENT: SILVERTON CONCEPTUAL DRAINAGE STUDY
CALCULATED BY: HMN
PROJECT NUMBER: 6904

DATE: JANUARY 2003

SUB-BASIN DATA				INITIAL/OVERLAND TIME (ti)			TRAVEL TIME (tt)				tc CHECK (URBANIZED BASINS)		FINAL tc	REMARKS			
DESIGN (1)	K (2)	AREA Ac (3)	AREA Square Miles (4)	LENGTH Ft (5)	SLOPE % (6)	ti Min (7)	LENGTH Ft (8)	SLOPE % (9)	VELOCITY FPS (10)	tt Min (11)	TOTAL LENGTH Ft (12)	tc =(L/180)+10 Min (13)	Min (14)	CN (15)	tL Hrs (16)	Urbanized?	Soil Type
NX1	0.9036	11.23	0.017540	150	2.1	3.4	1,630	0.8	3.1	8.7	1,780	19.9	12.1	98.0	0.121	YES	A
NX2	0.9036	12.91	0.020167	220	2.3	4.0	1,600	0.8	2.7	9.7	1,820	20.1	13.7	98.0	0.137	YES	A
NX3	0.8640	13.13	0.020522	180	1.1	5.5	1,900	0.9	3.4	9.4	2,080	21.6	14.9	95.0	0.149	YES	A/B
NX4	0.8640	9.87	0.015427	170	1.5	4.9	1,650	1.0	3.3	8.4	1,820	20.1	13.3	95.0	0.133	YES	A/B
NX5	0.5894	13.37	0.020891	460	1.5	17.1	1,400	1.5	1.7	14.0	-	-	31.1	74.2	0.311	NO	A/B
NX6	0.6264	3.91	0.006117	120	1.3	8.7	540	1.3	1.3	6.9	-	-	15.6	77.0	0.156	NO	B
NX7	0.8785	4.44	0.006940	220	2.5	4.4	510	0.8	2.5	3.4	730	14.1	7.8	96.1	0.078	YES	B
NX8	0.8785	4.21	0.006573	190	2.6	4.0	650	0.9	2.6	4.1	840	14.7	8.1	96.1	0.081	YES	B
NX9	0.6264	11.25	0.017583	280	1.4	12.7	1,080	1.1	1.4	12.8	-	-	25.5	77.0	0.255	NO	B
NX10	0.6264	3.78	0.005902	185	1.1	11.3	480	1.5	0.9	8.6	-	-	19.9	77.0	0.199	NO	B
INDUST	0.9036	4.46	0.006965	50	2.0	2.0	2,220	0.8	2.4	15.4	2,270	22.6	17.3	98.0	0.173	YES	B
OFX1	0.5716	236.00	0.368750	500	1.0	21.3	9,000	1.5	3.4	43.8	-	-	65.1	72.9	0.651	NO	A/C
OFX2	0.6528	270.00	0.421875	500	1.0	18.0	8,250	1.6	3.3	41.6	-	-	59.6	79.0	0.596	NO	A/D
OFX3	0.7716	24.03	0.037545	500	1.8	10.9	2,130	1.2	2.0	17.8	-	-	28.7	88.0	0.287	NO	D
OFX4	0.7280	34.11	0.053290	290	2.1	8.9	3,300	1.3	2.1	26.1	-	-	35.0	84.7	0.350	NO	B/D

ti = 1.8 (1.1 - K) L^(0.5) / S^(1/3)

K = 0.0132 CN - 0 39

tt = L / (60 V)

tc = ti + tt

tL= tLAG = 0.6 tc

LOCATION: Onsite and Offsite

HYDROLOGIC CONDITION: Existing

TRIAL: Final Iteration

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: **NX1**
Total Area: 11.23 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	11.23	A	100%	98	98.0
Total:	11.23	------	100%	----------	98.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: **NX2**
Total Area: 12.91 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	12.91	A	100%	98	98.0
Total:	12.91	------	100%	----------	98.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: **NX3**
Total Area: 13.13 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	10.51	A	80%	98	78.4
Open Space: Poor Condition	1.31	A	10%	68	6.8
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	1.31	B	10%	98	9.8
Total:	13.13	------	100%	----------	95.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: NX7
Total Area: 4.44 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	4.00	B	90%	98	88.2
Open Space: Poor Condition	0.44	B	10%	79	7.9
Total:	4.44	------	100%	----------	96.1

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: NX8
Total Area: 4.21 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	3.37	B	80%	98	78.4
Open Space: Poor Condition	0.42	B	10%	79	7.9
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	0.42	A	10%	98	9.8
Total:	4.21	------	100%	----------	96.1

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: NX9
Total Area: 11.25 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Desert Shrub: Poor Condition	11.25	B	100%	77	77.0
Total:	11.25	------	100%	----------	77.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: NX10
Total Area: 3.78 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Desert Shrub: Poor Condition	3.78	B	100%	77	77.0
Total:	3.78	-------	100%	----------	77.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: INDUST
Total Area: 4.46 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	2.23	A	50%	98	49.0
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	2.23	B	50%	98	49.0
Total:	4.46	-------	100%	----------	98.0

Curve Number Calculations
SILVERTON CONCEPTUAL DRAINAGE STUDY

Sub-Basin: OFX1
Total Area: 236.00 Acres

Land Use/Cover type	Area [A] (acres)	Soil Type	Percentage, P [P]	Cruve Number [CN]	Product (CN x P)
Desert Shrub: Poor Condition	165.20	A	70%	63	44.1
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	59.00	A	25%	98	24.5
Desert Shrub: Poor Condition	11.80	C	5%	85	4.3
Total:	236.00	-------	100%	----------	72.9

HEC-1 TO DETERMINE THE HYDROGRAPH ORDINATES AT PT4 AS ANALYZED IN THE DUCK CREEK/BLUE DIAMOND WASHES FIS RESTUDY

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  78      KK   DVBD3
  79      KM   DIVERSION EAST THRU 8'x4' RCB AT UPRR LOCATED 1700 FT NORTH OF BLUE DIAMOND
  80      DT   DVBD3
  81      DI       0     238     500    1000    1500    2000
  82      DQ       0     238     252     271     288     304
          *

  83      KK   RPT3A
  84      KM   ROUTE BYPASS FROM DVBD3 NORTH ALONG WEST SIDE OF UPRR TO UPPR CULVERT BD4
  85      KM   MUSKINGUM ROUTING UNSTABLE
  86      RD    1200   0.008    0.03       0    TRAP      35       3
          *

  87      KK   DVBD4
  88      KM   "DIVERSION EAST THRU 2-36"" RCP'S AT UPRR LOCATED 3000 FT NORTH OF BLUE DIAMO
  89      DT   DVBD4
  90      DI       0      97     500    1000    1500    2000
  91      DQ       0      97     149     202     252     296
          *

  92      KK   RPT3B
  93      KM   ROUTE BYPASS FROM DVBD4 NORTH ALONG WEST SIDE OF UPRR TO UPPR BRIDGE
  94      RM       1   0.119    0.15
          *

  95      KK    B11S
  96      KM   SOUTHERN PORTION OF BASIN B11 TIES INTO HYDRO1 BOUNDARY AREA
  97      BA   1.121
  98      PB    2.82
  99      LS       0    78.0
 100      UD   0.580
          *

 101      KK  HYDRO1
 102      KM   INFLOW HYDROGRAPH
 103      KM   "REFERENCED FROM ""LOMR FOR AREA DOWNSTREAM OF UPPER BLUE DIAMOND D.B."""
 104      KM   "SEE COMBINATION POINT C-5, DARF RATIO 0.98, OF HEC-1 FROM REFERENCED LOMR"
 105      BA   0.630
 106      QI       0       0       0       0       0       0       0       0       0       0
 107      QI       0       0       0       0       0       0       0       0       0       0
 108      QI       0       0       1       7      14      29      45      58      69      76
 109      QI      82      86      90      94      99     100     101     100     100     100
 110      QI     102     109     126     161     223     318     430     538     604     623
 111      QI     607     569     525     480     437     397     363     335     316     306
 112      QI     304     310     321     333     339     332     314     289     264     239
 113      QI     217     198     182     169     159     150     143     137     131     127
 114      QI     122     118     114     110     107     104     102     101     100      99
 115      QI      98      98      97      97      97      97      97      96      96      96
 116      QI      96      96      96      97      96      96      96      96      96      96
 117      QI      96      96      96      96      96      96      96      96      96      96
 118      QI      96      96      96      96      96      96      96      96      96      96
 119      QI      96      96      96      96      96      96      96      96      96      96
 120      QI      96      96      96      96      96      96      96      96      96      96
 121      QI      96      96      96      96      96      95      95      95      95      95
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  164     KK   PT22W
  165     KM   COMBINE PT4 AND BASIN B14B
  166     HC       2
          *

  167     KK   D012A
  168     BA  10.211
  169     PB    2.95
  170     LS       0    83.0
  171     UD   1.320
          *

  172     KK  RD012A
  173     KM   ROUTE BASIN D012A TO I15 CULVERT 3 - 12'x4' RCB'S (DCWA 1429)
  174     KM   MUSKINGUM ROUTING UNSTABLE
  175     RD     750   0.007   0.030       0    TRAP      65      10
          *

  176     KK  DVI151
  177     KM   DIVERSION EAST THRU I15 CULVERT 3 - 12'x4' RCB'S (DCWA 1429)
  178     DT  DVI151
  179     DI       0     993    1305    1778    2400    3146
  180     DQ       0     992    1100    1200    1298    1389
          *

  181     KK   RI151
  182     KM   ROUTE BYPASS FROM 3 - 12'x4' RCB'S TO I15 BRIDGE 24'x4' (IS15 0199)
  183     RM       1   0.071   0.150
          *

  184     KK  DVI152
  185     KM   DIVERSION EAST THRU I15 BRIDGE 24'x4' (IS15 0199)
  186     DT  DVI152
  187     DI       0     128     466     929    1506    2268    3133    3815
  188     DQ       0      47     190     362     550     733     896    1040
          *

  189     KK   RI152
  190     KM   ROUTE BYPASS FROM I15 BRIDGE 24'x4' TO I15 BRIDGE 36'x4' (IS15 0233)
  191     RM       1   0.123   0.150
          *

  192     KK     D01
  193     BA   9.536
  194     PB    3.42
  195     LS       0    83.0
  196     UD   1.000
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  232     KK   RPT10
  233     KM   ROUTE PT10 TO PT11
  234     RM       3    0.82   0.150
          *

  235     KK    D006
  236     BA   8.518
  237     PB    3.24
  238     LS       0    83.0
  239     UD   0.850
          *

  240     KK    PT11
  241     KM   "COMBINE PT10, BASINS D002 AND D006"
  242     HC       3
          *

  243     KK   RPT11
  244     KM   ROUTE PT11 TO PT12
  245     RM       1    0.18   0.150
          *

  246     KK     D2A
  247     BA   0.988
  248     PB    3.16
  249     LS       0    84.0
  250     UD   0.280
          *

  251     KK    PT12
  252     KM   "COMBINE PT9, PT11 AND BASIN D2A"
  253     HC       3
          *

  254     KK   RPT12
  255     KM   ROUTE PT12 TO PT13
  256     RM       3    0.83   0.150
          *

  257     KK     D2B
  258     BA   7.503
  259     PB    3.06
  260     LS       0    80.1
  261     UD   1.180
          *

  262     KK    PT13
  263     KM   COMBINE PT12 AND BASIN D2B
  264     HC       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  433     KK   RPT24
  434     KM   ROUTE PT24 TO PT25
  435     RM       1   0.086   0.150
          *

  436     KK RDVI153
  437     KM   RETURN FLOW PASSING THRU I153 AT PT14 (IS15 0233)
  438     DR  DVI153
          *

  439     KK RDVI153
  440     KM   ROUTE DVI153 TO PT25
  441     RM       1   0.112   0.150
          *

  442     KK    D009
  443     BA   3.621
  444     PB    3.31
  445     LS       0    83.0
  446     UD   0.510
          *

  447     KK   RD009
  448     KM   ROUTE BASIN D009 TO PT5
  449     RM       1     0.1     0.1
          *

  450     KK    D004
  451     BA   2.400
  452     PB    3.30
  453     LS       0    85.0
  454     UD   0.700
          *

  455     KK     PT5
  456     KM   COMBINE BASINS D009 AND D004
  457     HC       2
          *

  458     KK    RPT5
  459     KM   ROUTE PT5 TO PT6
  460     RM       2    0.44    0.15
          *

  461     KK     D08
  462     BA  11.912
  463     PB    3.28
  464     LS       0    85.0
  465     UD   1.650
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

466       KK     PT6
467       KM   COMBINE PT5 AND BASIN D08
468       HC       2
          *

469       KK    RPT6
470       KM   ROUTE PT6 TO PT7
471       RM       3    0.81   0.150
          *

472       KK    D010
473       BA  I0.434
474       PB    3.15
475       LS       0    84.0
476       UD   1.050
          *

477       KK     D07
478       BA   4.280
479       PB    3.20
480       LS       0    84.0
481       UD   1.100
          *

482       KK     PT7
483       KM   "COMBINE PT6, BASINS D010 AND D07"
484       HC       3
          *

485       KK    RPT7
486       KM   ROUTE PT7 TO PT8
487       RM       3   0.224   0.150
          *

488       KK   D012B
489       BA   0.566
490       PB    2.77
491       LS       0    83.0
492       UD   0.642
          *

493       KK     PT8
494       KM   COMBINE BASIN D012B AND PT7
495       HC       2
          *

496       KK  DVPITT
497       KM   DIVERSION EAST ACROSS LAS VEGAS BLVD. TO PITTMAN WATERSHED - DOES NOT RETURN
498       KM   REFERENCED FROM 1995 PITTMAN WASH FIS RESTUDY BY NIMBUS
499       KM   "MODIFIED TO RETAIN 10% OF ACTUAL DIVERTED FLOW TO DIVERT LATER AT ""DVROSE""
500       DT  DVPITT
501       DI       0    3586    3710    3835    3961    5795    7737
502       DQ       0    1554    1618    1681    1747    2774    3933
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

503       KK  DVROSE
504       KM   DIVERSION NORTH ACROSS ST. ROSE PARKWAY (FORMERLY LAKE MEAD DRIVE)
505       KM   DIVERSION BYPASSES LDCDB VIA BASIN D5A AND COMBINES AT PT29
506       KM   REFERENCED FROM 1995 PITTMAN WASH FIS RESTUDY BY NIMBUS
507       DT  DVROSE
508       DI       0    1673    1721    1770    2214    3021    3803
509       DQ       0     359     371     384     396     579     774
          *

510       KK    RPT8
511       KM   ROUTE BYPASS FROM DVROSE AT PT8 TO PT25
512       RM       6    0.49   0.150
          *

513       KK     D4A
514       BA   1.873
515       PB    2.80
516       LS       0    83.8     0.0
517       UD   0.245
          *

518       KK    PT25
519       KM   "COMBINE PT24, BASIN D4A, DVI153, AND BYPASS FROM PT8"
520       HC       4
          *

521       KK   RPT25
522       KM   ROUTE PT25 TO PT26
523       RM       1   0.099   0.150
          *

524       KK     D4B
525       BA   2.033
526       PB    2.80
527       LS       0    83.8     8.0
528       UD   0.243
          *

529       KK    PT26
530       KM   COMBINE PT25 AND BASIN D4
531       HC       2
          *

532       KK   RPT26
533       KM   ROUTE PT26 TO LOWER DUCK CREEK DETENTION BASIN (LDCDB)
534       RM       1   0.083   0.150
          *

535       KK RDVI154
536       KM   "RETURN FLOW PASSING THRU I15 BRIDGE, I154 (IS15 0315)"
537       DR  DVI154
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  538     KK RDVI154
  539     KM   ROUTE DVI154 TO LAS VEGAS BLVD.
  540     RD    2700   0.007   0.015       0    TRAP      25       2
          *
  541     KK RDVI154
  542     KM   ROUTE DVI154 FROM LAS VEGAS BLVD. TO PT27
  543     KM   "2-78"" CMP (EQUIVALENT RECTANGULAR CHANNEL DETERMINED BY COMPARING VELOCITY)
  544     RD    1300   0.017   0.015       0    TRAP      28       0
          *
  545     KK RDVI155
  546     KM   "RETURN FLOW PASSING THRU I15 BRIDGE, I155 (IS15 0359)"
  547     DR  DVI155
          *
  548     KK RDVI155
  549     KM   ROUTE DVI155 TO AGATE AVENUE
  550     RD    1100    0.01   0.040       0    TRAP      15       3
          *
  551     KK RDVI155
  552     KM   ROUTE DVI155 FROM AGATE AVENUE TO LAS VEGAS BLVD.
  553     KM   "3-10'x5' RCB, INCLUDES PORTION OF TRAP CHANNEL"
  554     RD    1530    0.01   0.015       0    TRAP      30       0
          *
  555     KK RDVI155
  556     KM   ROUTE DVI155 FROM LAS VEGAS BLVD. TO PT27
  557     KM   "2-96"" CMP (EQUIVALENT RECTANGULAR CHANNEL DETERMINED BY COMPARING VELOCITY)
  558     RD     800   0.006   0.015       0    TRAP      35       0
          *
  559     KK RDVI155
  560     KM   ROUTE DVI155 FROM LAS VEGAS BLVD. TO PT27
  561     KM   "2-84"" CMP (EQUIVALENT RECTANGULAR CHANNEL DETERMINED BY COMPARING VELOCITY)
  562     RD    1100   0.012   0.015       0    TRAP      30       0
          *
  563     KK    PT27
  564     KM   COMBINE DVI154 AND DVI155
  565     HC       2
          *
  566     KK   RPT27
  567     KM   ROUTE PT27 TO LOWER DUCK CREEK DETENTION BASIN (LDCDB)
  568     KM   "3-96"" CIPCP (EQUIVALENT RECTANGULAR CHANNEL)"
  569     RD    1100   0.009   0.015       0    TRAP      56       0
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  570     KK   RPT27
  571     KM   ROUTE PT27 TO LOWER DUCK CREEK DETENTION BASIN (LDCDB)
  572     KM   3-8'x8' RCB (EQUIVALENT RECTANGULAR CHANNEL)
  573     RD     570   0.004   0.015       0    TRAP      24       0
          *

  574     KK    B18C
  575     BA   1.259
  576     PB    2.77
  577     LS       0    75.4    25.0
  578     UD   0.380
          *

  579     KK    PT28
  580     KM   "COMBINE PT26, PT27, AND BASIN B18C AT LDCDB"
  581     HC       3
          *

  582     KK   LDCDB
  583     KM   LOWER DUCK CREEK DETENTION BASIN
  584     RS       1    STOR       0
  585     SV       0     2.8    37.5   120.3     229     340   453.8     570     689     810
  586     SV     934    1061    1190
  587     SE    2183    2184    2186    2188    2190    2192    2194    2196    2198    2200
  588     SE    2202    2204    2206
  589     SQ       0     126     654    1825    3310    4310    5118    5815    6437    7004
  590     SQ    7528    8018    8480
  591     SE    2183    2184    2186    2188    2190    2192    2194    2196    2198    2200
  592     SE    2202    2204    2206
  593     KO       1
          *

  594     KK  RLDCDB
  595     KM   ROUTE THE OUTFALL FROM THE LOWER DUCK CREEK DETENTION BASIN TO PT29
  596     RD    1100   0.004   0.015       0    TRAP      46     1.5
          *

  597     KK     D5A
  598     BA   1.325
  599     PB    2.79
  600     LS       0    88.0    15.0
  601     UD   0.350
          *

  602     KK    RD5A
  603     KM   ROUTE BASIN D5A TO PT29
  604     RM       1    0.12   0.150
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  605     KK RDVROSE
  606     KM   RETURN FLOW CROSSING ST. ROSE PARKWAY (FORMERLY LAKE MEAD DRIVE).
  607     DR  DVROSE
          *

  608     KK RDVROSE
  609     KM   ROUTE DIVERSION DVROSE TO PT29
  610     RM       6    0.49   0.150
          *

  611     KK    PT29
  612     KM   "COMBINE BASIN D5A, BYPASS FROM DVROSE, AND OUTFALL FROM LDCDB"
  613     HC       3
          *

  614     KK   RPT29
  615     KM   ROUTE PT29 TO PT30
  616     RD    1800   0.011   0.015       0    TRAP      46     1.5
          *

  617     KK    B16B
  618     BA   0.701
  619     PB    2.77
  620     LS       0    83.1    32.0
  621     UD   0.380
          *

  622     KK   RB16B
  623     KM   ROUTE BASIN B16B TO PT30
  624     RD    1900   0.008   0.015       0    TRAP       0      50
          *

  625     KK    PT30
  626     KM   COMBINE PT29 AND BASIN B16B
  627     HC       2
          *

  628     KK   RPT30
  629     KM   ROUTE PT30 TO PT31
  630     RD    2900   0.005   0.015       0    TRAP      20       3
          *

  631     KK    B16A
  632     BA   0.906
  633     PB    2.77
  634     LS       0    78.2    17.0
  635     UD   0.710
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  636     KK     D5B
  637     BA   0.602
  638     PB    2.77
  639     LS       0    82.8    46.0
  640     UD   0.710
          *

  641     KK    PT31
  642     KM   "COMBINE PT30, BASINS B16A AND D5B"
  643     HC       3
          *

  644     KK   RPT31
  645     KM   ROUTE PT31 TO PT32
  646     RD    3200   0.016   0.015       0    TRAP      15       1
          *

  647     KK    PT32
  648     KM   COMBINE PT23 AND PT31 AT DUCK CREEK/MIDDLE BRANCH BLUE DIAMOND CONFLUENCE
  649     HC       2
          *

  650     KK   RPT32
  651     KM   ROUTE PT32 TO PT34
  652     RD    2700   0.009   0.015       0    TRAP      70       2
          *

  653     KK  HYDRO2
  654     KM   INFLOW HYDROGRAPH
  655     KM   "PT C-11 REFERENCED FROM ""LOMR FOR AREA DOWNSTREAM OF UPPER BLUE DIAMOND D.B
  656     KM   "SEE COMBINATION POINT C-11, DARF RATIO 0.98 OF HEC-1 FROM REFERENCED LOMR"
  657     BA   0.380
  658     QI       0       0       0       0       0       0       0       0       0       0
  659     QI       0       0       0       0       0       0       0       0       0       0
  660     QI       0       0       0       0       0       0       0       0       0       0
  661     QI       0       0       0       0       0       0       0       0       0       0
  662     QI       0       0       1       3       5       9      14      19      23      27
  663     QI      30      32      33      33      32      31      29      28      27      27
  664     QI      27      27      32      36      36      35      33      31      29      26
  665     QI      24      22      20      19      17      16      15      14      13      12
  666     QI      11      10       9       8       8       7       6       6       5       5
  667     QI       4       4       4       3       3       3       3       3       2       2
  668     QI       2       2       2       2       2       2       1       1       1       1
  669     QI       1       1       1       1       1       1       1       1       1       1
  670     QI       1       1       1       1       1       1       1       0       0       0
  671     QI       0       0       0       0       0       0       0       0       0       0
  672     QI       0       0       0       0       0       0       0       0       0       0
  673     QI       0       0       0       0       0       0       0       0       0       0
  674     QI       0       0       0       0       0       0       0       0       0       0
  675     QI       0       0       0       0       0       0       0       0       0       0
  676     QI       0       0       0       0       0       0       0       0       0       0
  677     QI       0       0       0       0       0       0       0       0       0       0
  678     QI       0       0       0       0       0       0       0       0       0       0
  679     QI       0       0       0       0       0       0       0       0       0       0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
  680     QI       0       0       0       0       0       0       0       0       0       0
  681     QI       0       0       0       0       0       0       0       0       0       0
  682     QI       0       0       0       0       0       0       0       0       0       0
  683     QI       0       0       0       0       0       0       0       0       0       0
  684     QI       0       0       0       0       0       0       0       0       0       0
  685     QI       0       0       0       0       0       0       0       0       0       0
  686     QI       0       0       0       0       0       0       0       0       0       0
  687     QI       0       0       0       0       0       0       0       0       0       0
          *

  688     KK RHYDRO2
  689     KM   ROUTE HYDRO2 TO PT33W
  690     RM       8    0.76   0.150
          *

  691     KK     B12
  692     BA   0.969
  693     PB    2.77
  694     LS       0    68.4     1.0
  695     UD   0.390
          *

  696     KK   PT33W
  697     KM   COMBINE HYDRO2 AND BASIN B12
  698     HC       2
          *
  699     KM   KK RDVBD7
  700     KM   "RETURN FLOW SPLIT, DVBD7, FROM MIDDLE BRANCH "
  701     KM   DR DVBD7
          *
  702     KM   KK RDVBD7
  703     KM   ROUTE DVBD7 TO PT33
  704     KM   RM 2 0.2 0.150
          *
  705     KM   DUMM
  706     QI    0.01

  707     KK    PT33
  708     KM   COMBINE PT33W AND DVBD7
  709     HC       2
          *

  710     KK   RPT33
  711     KM   ROUTE PT33 TO PT34W
  712     RM       4     0.3   0.100
          *

  713     KK    B15A
  714     BA   0.959
  715     PB    2.77
  716     LS       0    77.6    14.0
  717     UD   0.500
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  718     KK   PT34W
  719     KM   COMBINE PT33 AND BASIN B15A
  720     HC       2
          *

  721     KK    PT34
  722     KM   COMBINE PT34W AND PT32
  723     HC       2
          *

  724     KK    MNWB
  725     BA   0.442
  726     PB    2.77
  727     LS       0     85.0      2.0
  728     UD   0.742
          *

  729     KK   RMNWB
  730     KM   ROUTE MNWB NORTH ALONG I15 TO PT35
  731     RD    2200   0.007   0.025        0    TRAP      20      10
          *

  732     KK    MNWC
  733     BA   0.596
  734     PB    2.77
  735     LS       0     85.0      7.0
  736     UD   0.738
          *

  737     KK    PT35
  738     KM   COMBINE BASINS MNWB AND MNWC
  739     HC       2
          *

  740     KK   RPT35
  741     KM   ROUTE PT35 TO PT36
  742     RM       1   0.055   0.150
          *

  743     KK    MNWD
  744     BA   0.078
  745     PB    2.77
  746     LS       0     85.0     13.0
  747     UD   0.321
          *

  748     KK    PT36
  749     KM   COMBINE PT35 AND BASIN MNWD
  750     HC       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  751     KK   RPT36
  752     KM   ROUTE PT36 TO PT37
  753     RM       2   0.192   0.150
          *

  754     KK    MC2
  755     BA   0.919
  756     PB    2.77
  757     LS       0    74.9    28.0
  758     UD   0.873
          *

  759     KK    PT37
  760     KM   COMBINE PT36 AND BASIN MC2
  761     HC       2
          *

  762     KK   RPT37
  763     KM   ROUTE PT37 TO PT38
  764     RD    5200    0.01   0.015       0    TRAP      20       2
          *

  765     KK    B10A
  766     BA   1.601
  767     PB    2.77
  768     LS       0    74.9    32.0
  769     UD   0.217
          *

  770     KK    PT38
  771     KM   COMBINE PT37 AND BASIN B10A
  772     HC       2
          *

  773     KK   RPT38
  774     KM   ROUTE PT38 TO PT39
  775     RD    2100   0.002   0.015       0    TRAP      20       2
          *

  776     KK    PT39
  777     KM   COMBINE PT34 AND PT38
  778     HC       2
          *

  779     KK   RPT39
  780     KM   ROUTE PT39 TO PT40
  781     RD    2500   0.006   0.025       0    TRAP      70       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  782     KK      D6
  783     BA   1.564
  784     PB    2.77
  785     LS       0    78.3    43.0
  786     UD   0.500
          *

  787     KK     PT40
  788     KM   COMBINE PT39 AND BASIN D6
  789     HC       2
          *

  790     KK   RPT40
  791     KM   ROUTE PT40 TO PT41
  792     RM       1    0.08   0.200
          *

  793     KK      D7
  794     BA   0.850
  795     PB    2.77
  796     LS       0    77.3    23.0
  797     UD   0.710
          *

  798     KK     PT41
  799     KM   COMBINE PT40 AND BASIN D7
  800     HC       2
          *

  801     KK   RPT41
  802     KM   ROUTE PT41 TO PT42
  803     RD    4150   0.006   0.015       0    TRAP      50       0
          *

  804     KK      D8
  805     BA   1.258
  806     PB    2.77
  807     LS       0    77.8    34.0
  808     UD   0.230
          *

  809     KK     RD8
  810     KM   ROUTE BASIN D8 TO PT42
  811     RM       1   0.088   0.150
          *

  812     KK     PT42
  813     KM   COMBINE PT41 AND BASIN D8
  814     HC       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10 .

  815     KK   RPT42
  816     KM   ROUTE PT42 TO PT44
  817     RD    3650   0.011   0.015       0    TRAP      28       2
          *

  818     KK    B10B
  819     BA   0.848
  820     PB    2.77
  821     LS       0    74.9    44.0
  822     UD   0.687
          *

  823     KK   RB10B
  824     KM   ROUTE BASIN B10B TO PT43
  825     RM       6    0.46   0.100
          *

  826     KK     D9A
  827     BA   0.861
  828     PB    2.77
  829     LS       0    72.8    16.0
  830     UD   1.100
          *

  831     KK    PT43
  832     KM   COMBINE BASINS B10B AND D9A
  833     HC       2
          *

  834     KK   RPT43
  835     KM   ROUTE PT43 TO PT44
  836     RD    4050    0.01   0.016       0    TRAP       0      16
          *

  837     KK    PT44
  838     KM   COMBINE PT42 AND PT43
  839     HC       2
          *

  840     KK   RPT44
  841     KM   ROUTE PT44 TO PT45
  842     RM       1   0.119   0.150
          *

  843     KK     D9B
  844     BA   1.544
  845     PB    2.77
  846     LS       0    77.8    17.0
  847     UD   0.410
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  885     KK   RMCDB
  886     KM   ROUTE OUTFALL FROM MCDB TO PT47
  887     RD    3300   0.006   0.013       0    CIRC       4       0
          *

  888     KK  RTORAW
  889     KM   FLOW BYPASSING THE MCCARRAN DETENTION FACILITIES RETURNED IN RAWHIDE CHANNEL
  890     DR   TORAW
          *

  891     KK    PT47
  892     KM   COMBINE OUTFALL FROM MCCARRAN DETENTION FACILITIES AND BYPASSED FLOW
  893     HC       2
          *

  894     KK   RPT47
  895     KM   ROUTE PT47 THRU RAWHIDE CHANNEL TO PT48W
  896     RD   15700   0.015   0.015       0    TRAP      11     1.5
          *

  897     KK      RH
  898     BA   1.355
  899     PB    2.77
  900     LS       0    72.0     6.0
  901     UD   0.340
          *

  902     KK   PT48W
  903     KM   COMBINE PT47 AND BASIN RH
  904     HC       2
          *

  905     KK     B20
  906     BA   0.790
  907     PB    2.77
  908     LS       0    82.4     8.0
  909     UD   0.710
          *

  910     KK    RB20
  911     KM   ROUTE BASIN B20 TO PT48
  912     KM   MUSKINGUM ROUTING UNSTABLE
  913     RD    1800   0.017   0.030       0    TRAP      30      10
          *

  914     KK    PT48
  915     KM   "COMBINE PT46, PT48W, AND BASIN B20"
  916     HC       3
          *
```

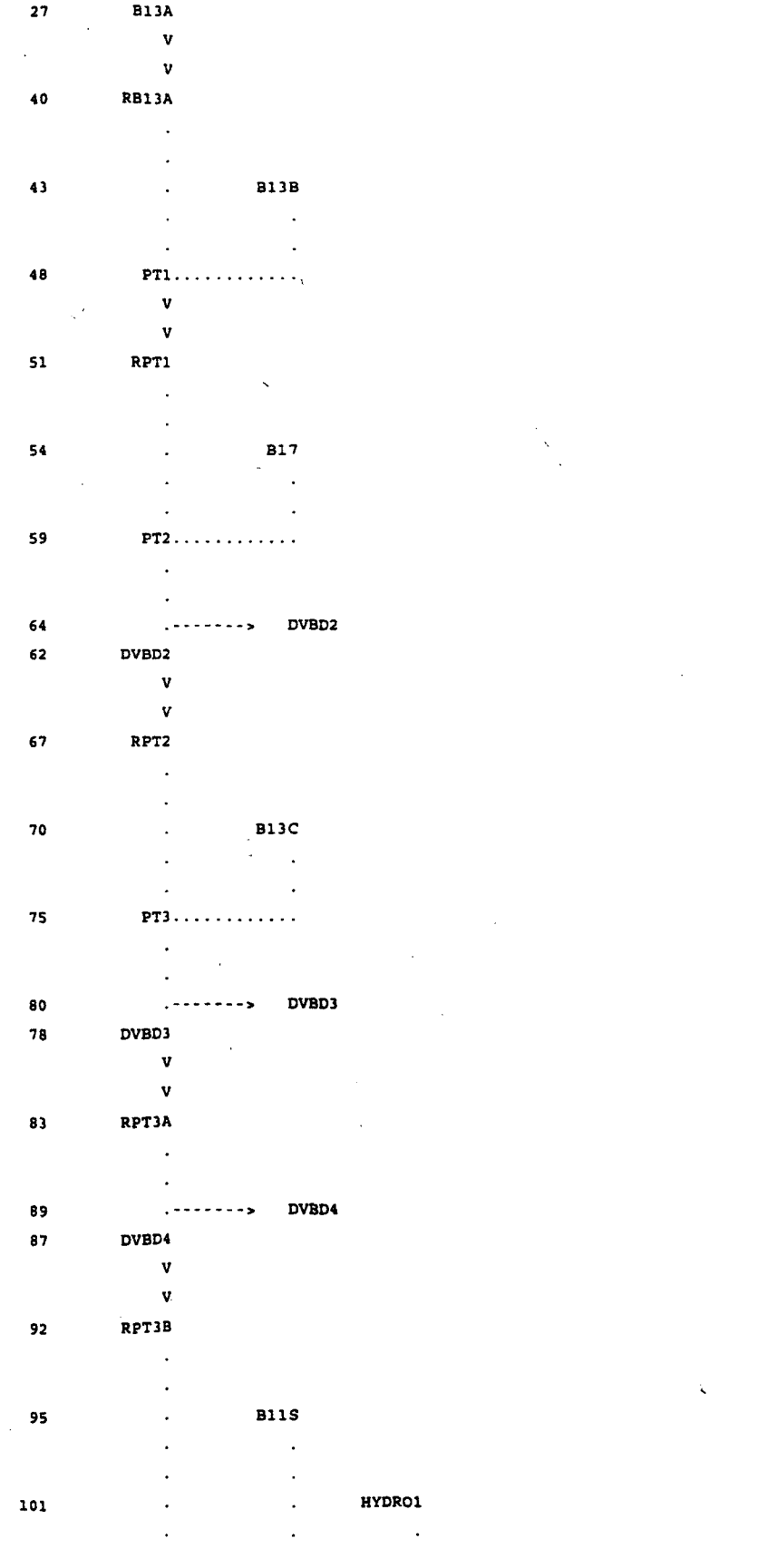
```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 952          KK    PT51
 953          KM   COMBINE PT50 AND BASIN D11B
 954          HC       2
 955          ZZ
```

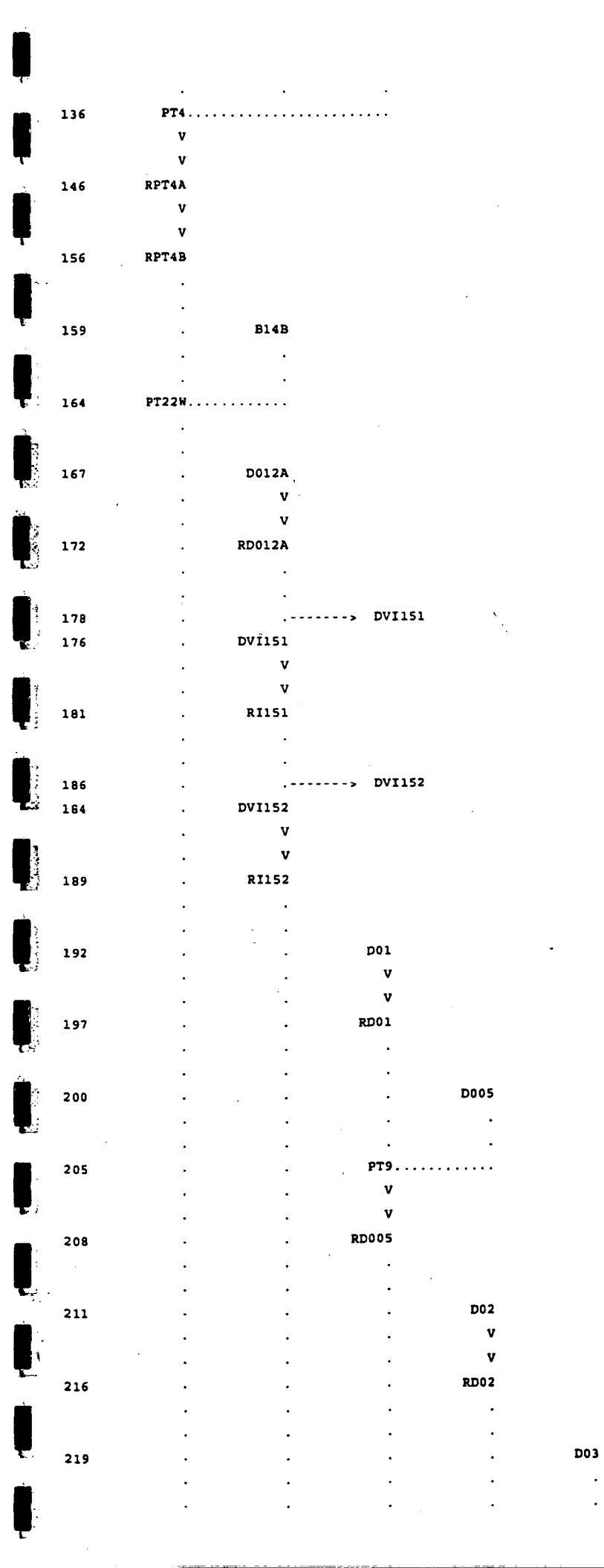
SCHEMATIC DIAGRAM OF STREAM NETWORK

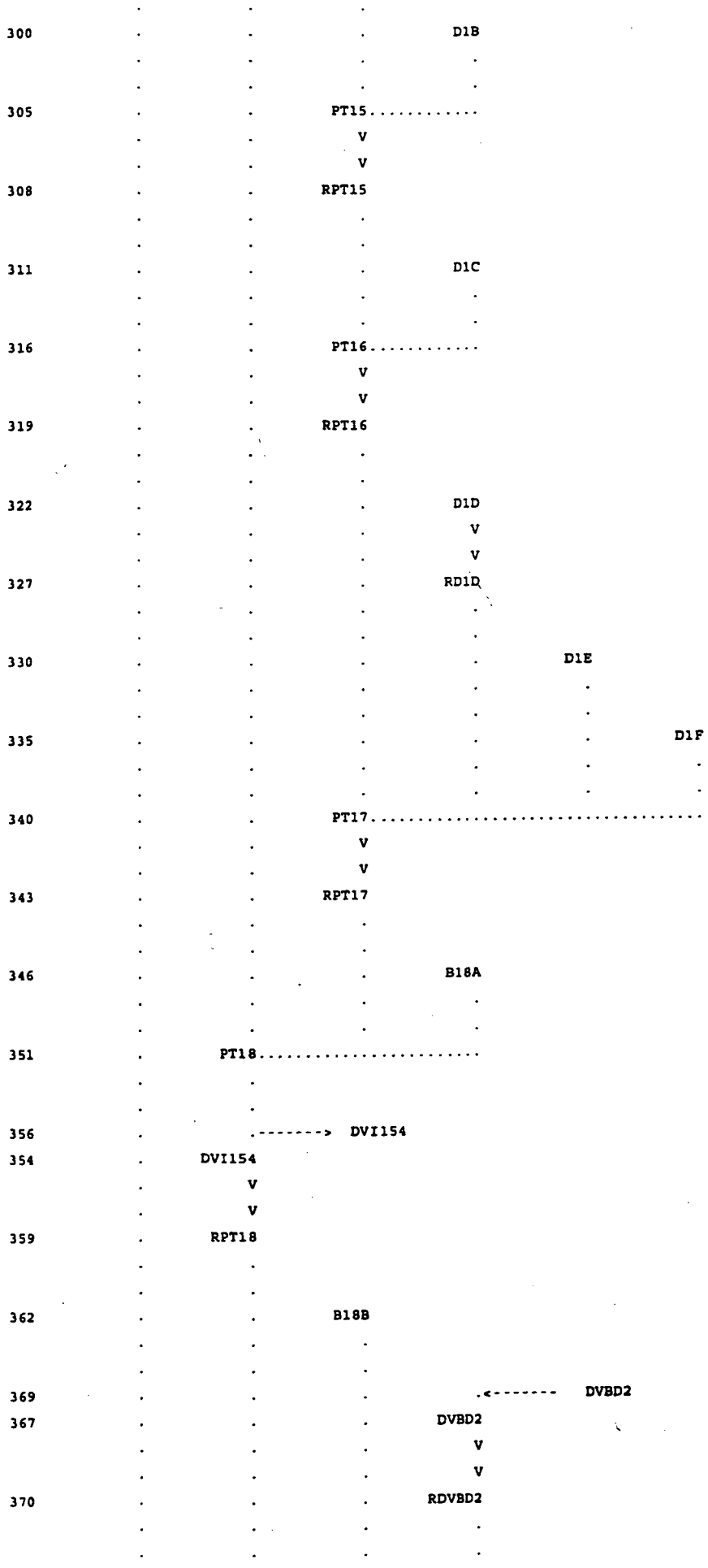
INPUT LINE NO.

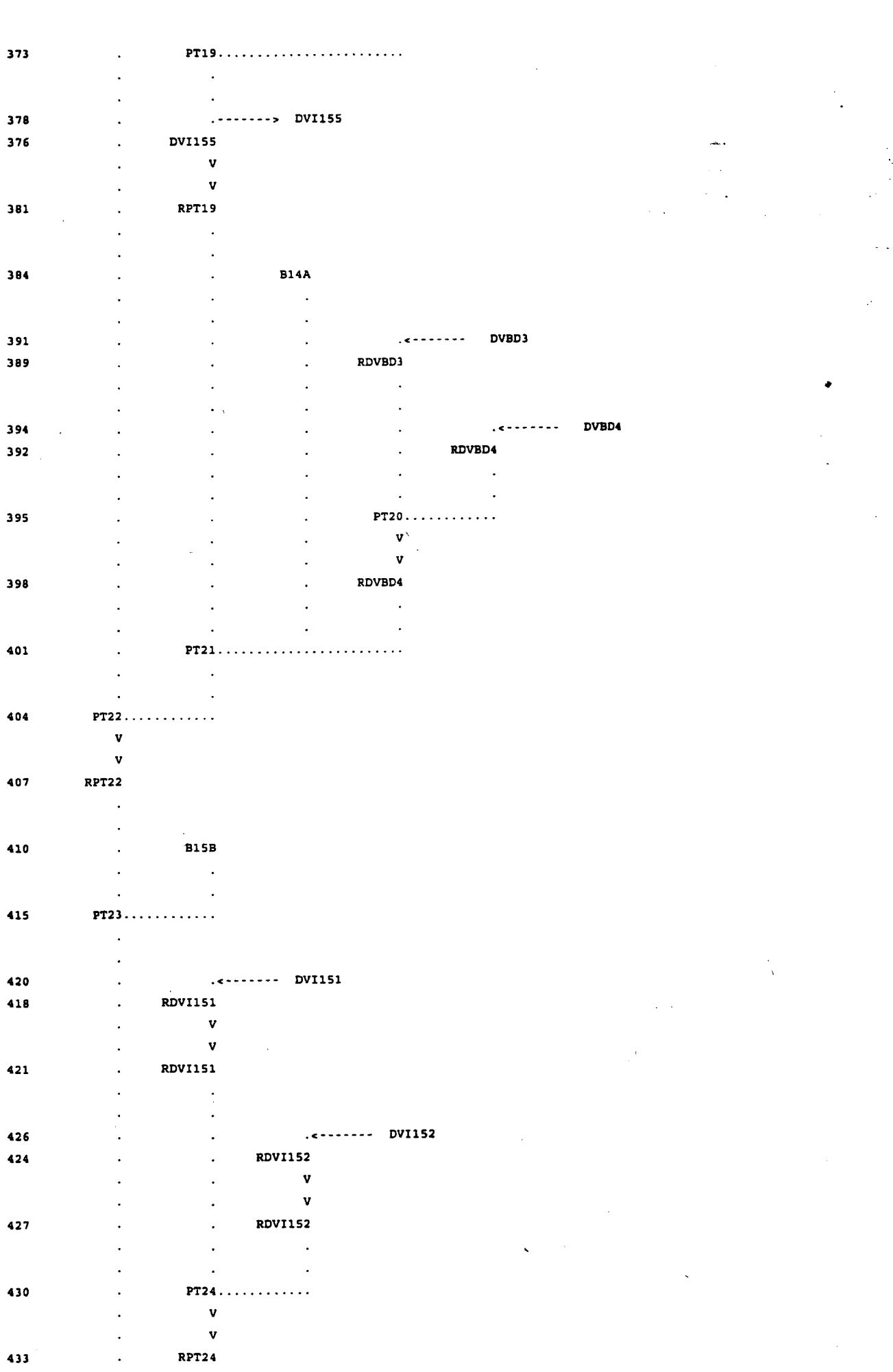
(V) ROUTING (---->) DIVERSION OR PUMP FLOW

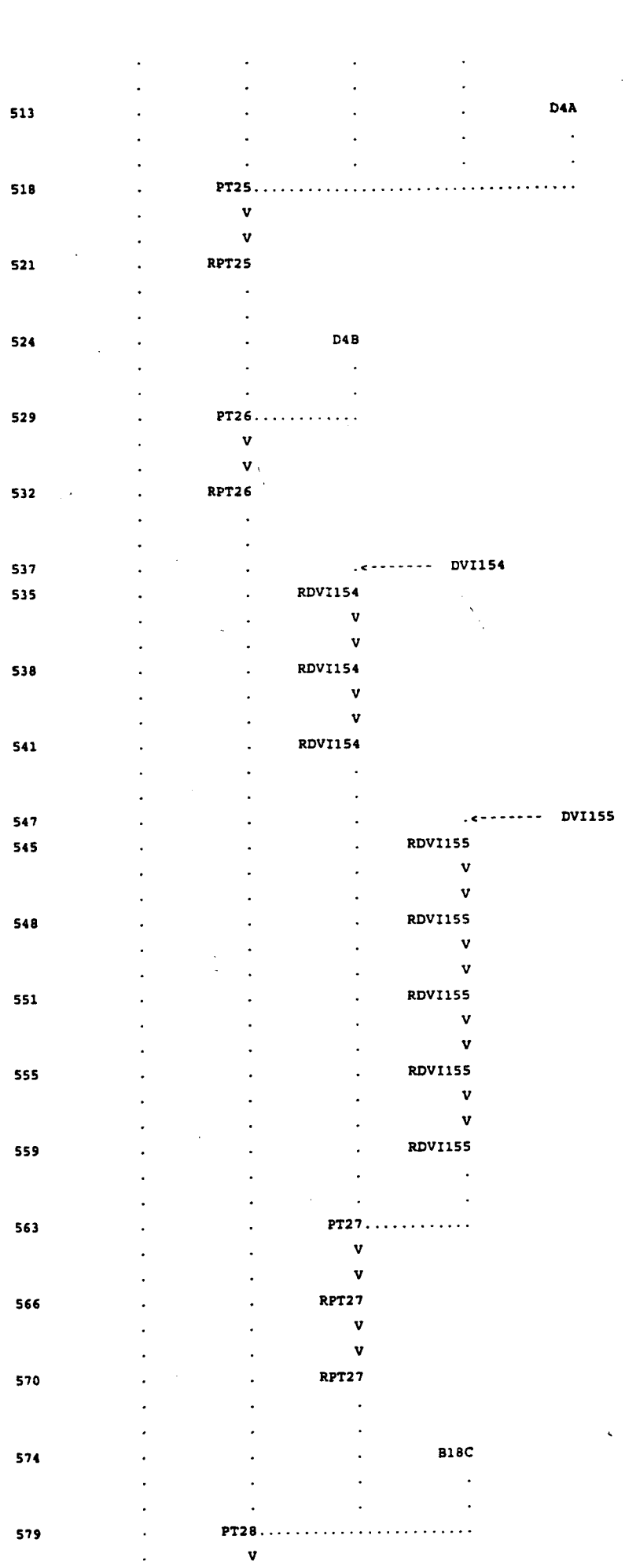
(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

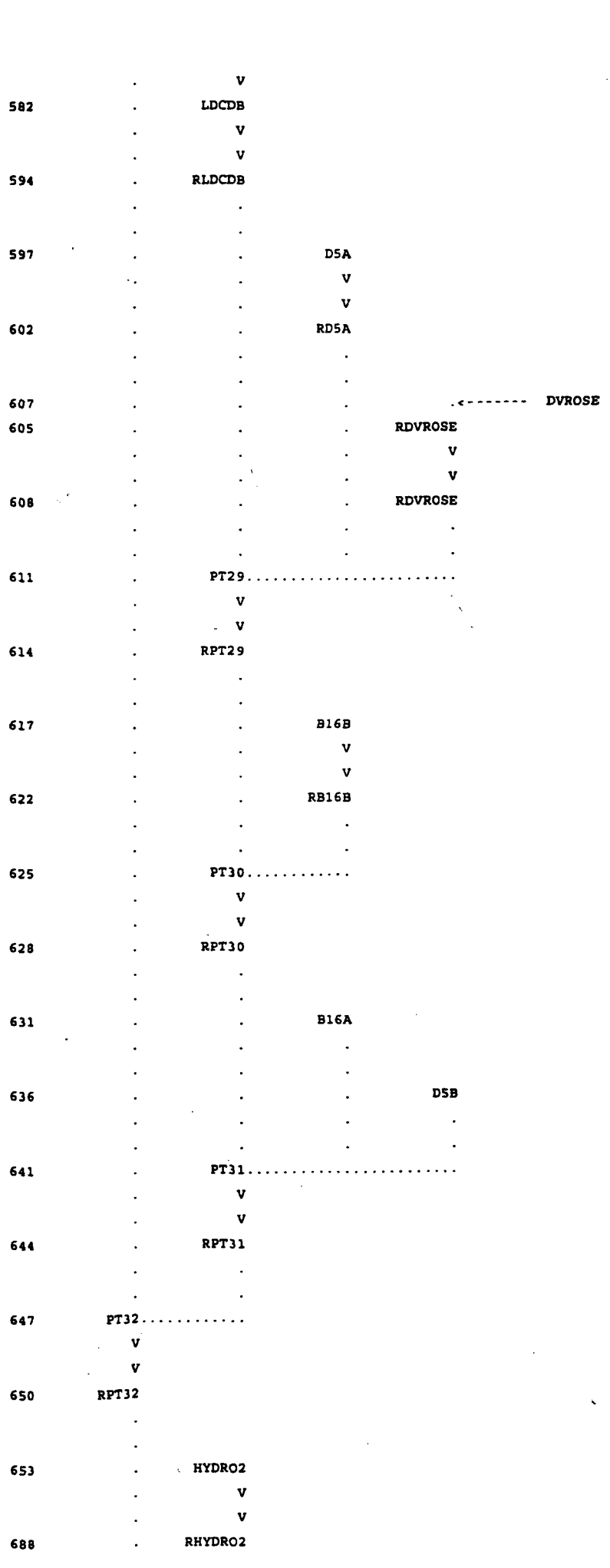


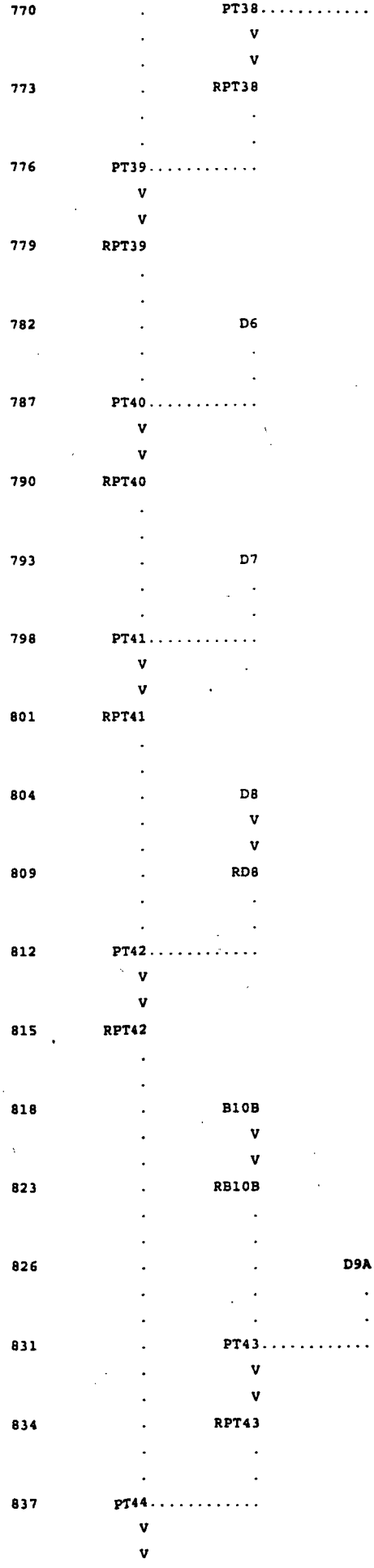

136 PT4
146 RPT4A
156 RPT4B
159 B14B
164 PT22W
167 D012A
172 RD012A
178 DVI151
176 DVI151
181 RI151
186 DVI152
184 DVI152
189 RI152
192 D01
197 RD01
200 D005
205 PT9
208 RD005
211 D02
216 RD02
219 D03

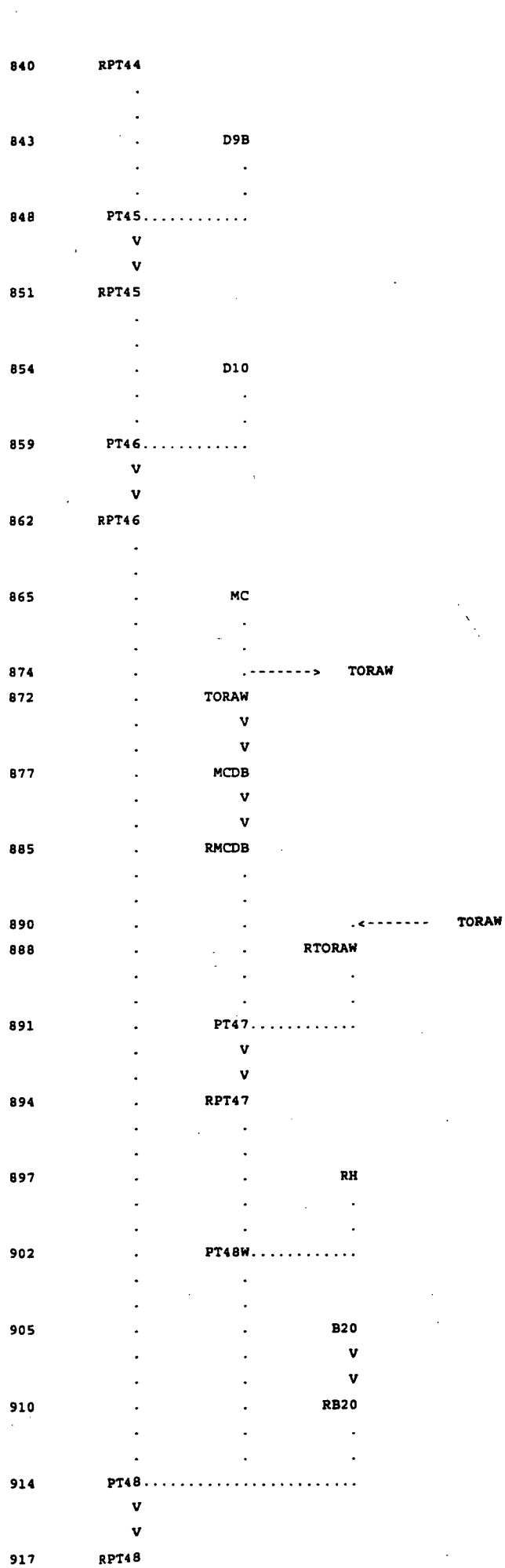

300 D1B
305 PT15
308 RPT15
311 D1C
316 PT16
319 RPT16
322 D1D
327 RD1D
330 D1E
335 D1F
340 PT17
343 RPT17
346 B18A
351 PT18
356 DVI154
354 DVI154
359 RPT18
362 B18B
369 DVBD2
367 DVBD2
370 RDVBD2

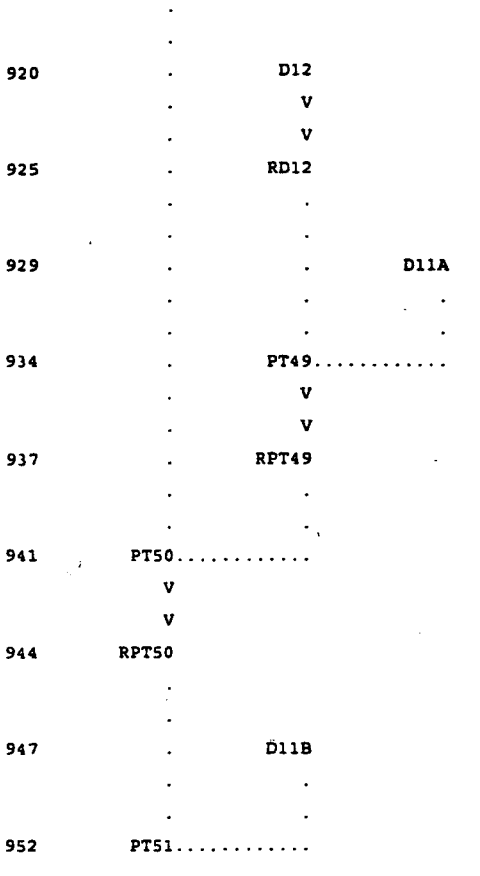

373 PT19
378 DVI155
376 DVI155
381 RPT19
384 B14A
391 DVBD3
389 RDVBD3
394 DVBD4
392 RDVBD4
395 PT20
398 RDVBD4
401 PT21
404 PT22
407 RPT22
410 B15B
415 PT23
420 DVI151
418 RDVI151
421 RDVI151
426 DVI152
424 RDVI152
427 RDVI152
430 PT24
433 RPT24


513
D4A
518
PT25
521
RPT25
524
D4B
529
PT26
532
RPT26
537
DVI154
535
RDVI154
538
RDVI154
541
RDVI154
547
DVI155
545
RDVI155
548
RDVI155
551
RDVI155
555
RDVI155
559
RDVI155
563
PT27
566
RPT27
570
RPT27
574
B18C
579
PT28


582 LDCDB
594 RLDCDB
597 D5A
602 RD5A
607 DVROSE
605 RDVROSE
608 RDVROSE
611 PT29
614 RPT29
617 B16B
622 RB16B
625 PT30
628 RPT30
631 B16A
636 D5B
641 PT31
644 RPT31
647 PT32
650 RPT32
653 HYDRO2
688 RHYDRO2


770 PT38
V
V
773 RPT38
776 PT39
V
V
779 RPT39
782 D6
787 PT40
V
V
790 RPT40
793 D7
798 PT41
V
V
801 RPT41
804 D8
V
V
809 RD8
812 PT42
V
V
815 RPT42
818 B10B
V
V
823 RB10B
826 D9A
831 PT43
V
V
834 RPT43
837 PT44
V
V


840 RPT44
843 D9B
848 PT45
851 RPT45
854 D10
859 PT46
862 RPT46
865 MC
874 TORAW
872 TORAW
877 MCDB
885 RMCDB
890 TORAW
888 RTORAW
891 PT47
894 RPT47
897 RH
902 PT48W
905 B20
910 RB20
914 PT48
917 RPT48



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ERRORS IN STREAM SYSTEM

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
0.99 0.98 0.95 0.93 0.92 0.91 0.90 0.89 0.88

*** ***

136 KK
****
* *
* PT4 *
* *
****

144 KO OUTPUT CONTROL VARIABLES
IPRNT 2 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

145 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

***

****

HYDROGRAPH AT STATION PT4
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 0.99

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	84.	1		0500	61	1419.	1		0730	91	100.
1		0005	2	0.	1		0235	32	89.	1		0505	62	1438.	1		0735	92	99.
1		0010	3	0.	1		0240	33	94.	1		0510	63	1447.	1		0740	93	98.
1		0015	4	0.	1		0245	34	100.	1		0515	64	1435.	1		0745	94	98.
1		0020	5	0.	1		0250	35	107.	1		0520	65	1392.	1		0750	95	98.
1		0025	6	0.	1		0255	36	109.	1		0525	66	1315.	1		0755	96	97.
1		0030	7	0.	1		0300	37	112.	1		0530	67	1210.	1		0800	97	97.
1		0035	8	0.	1		0305	38	113.	1		0535	68	1091.	1		0805	98	96.
1		0040	9	0.	1		0310	39	116.	1		0540	69	969.	1		0810	99	96.
1		0045	10	0.	1		0315	40	123.	1		0545	70	849.	1		0815	100	96.
1		0050	11	0.	1		0320	41	138.	1		0550	71	739.	1		0820	101	96.
1		0055	12	0.	1		0325	42	171.	1		0555	72	642.	1		0825	102	96.
1		0100	13	0.	1		0330	43	245.	1		0600	73	557.	1		0830	103	96.
1		0105	14	0.	1		0335	44	416.	1		0605	74	483.	1		0835	104	97.
1		0110	15	0.	1		0340	45	718.	1		0610	75	419.	1		0840	105	96.
1		0115	16	0.	1		0345	46	1116.	1		0615	76	361.	1		0845	106	96.
1		0120	17	0.	1		0350	47	1539.	1		0620	77	309.	1		0850	107	96.
1		0125	18	0.	1		0355	48	1912.	1		0625	78	261.	1		0855	108	96.

1	0130	19	0.	*	1	0400	49	2164.	*	1	0630	79	216.	*	1	0900	109	96.
1	0135	20	0.	*	1	0405	50	2278.	*	1	0635	80	178.	*	1	0905	110	96.
1	0140	21	0.	*	1	0410	51	2270.	*	1	0640	81	151.	*	1	0910	111	96.
1	0145	22	0.	*	1	0415	52	2172.	*	1	0645	82	137.	*	1	0915	112	96.
1	0150	23	1.	*	1	0420	53	2023.	*	1	0650	83	127.	*	1	0920	113	96.
1	0155	24	7.	*	1	0425	54	1854.	*	1	0655	84	119.	*	1	0925	114	96.
1	0200	25	14.	*	1	0430	55	1696.	*	1	0700	85	114.	*	1	0930	115	96.
1	0205	26	29.	*	1	0435	56	1567.	*	1	0705	86	110.	*	1	0935	116	96.
1	0210	27	45.	*	1	0440	57	1473.	*	1	0710	87	106.	*	1	0940	117	96.
1	0215	28	58.	*	1	0445	58	1419.	*	1	0715	88	105.	*	1	0945	118	96.
1	0220	29	69.	*	1	0450	59	1399.	*	1	0720	89	103.	*	1	0950	119	96.
1	0225	30	77.	*	1	0455	60	1402.	*	1	0725	90	101.	*	1	0955	120	96.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	9.92-HR
2278.	4.08	(CFS)	668.	421.	421.	421.
		(INCHES)	0.971	1.010	1.010	1.010
		(AC-FT)	331.	345.	345.	345.

CUMULATIVE AREA = 6.40 SQ MI

****

HYDROGRAPH AT STATION PT4

SUM OF 3 HYDROGRAPHS

PLAN 1, RATIO = 0.98

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0230	31	83.	*	1		0500	61	1386.	*	1		0730	91	100.
1		0005	2	0.	*	1		0235	32	88.	*	1		0505	62	1405.	*	1		0735	92	99.
1		0010	3	0.	*	1		0240	33	94.	*	1		0510	63	1414.	*	1		0740	93	98.
1		0015	4	0.	*	1		0245	34	99.	*	1		0515	64	1404.	*	1		0745	94	98.
1		0020	5	0.	*	1		0250	35	106.	*	1		0520	65	1363.	*	1		0750	95	98.
1		0025	6	0.	*	1		0255	36	108.	*	1		0525	66	1286.	*	1		0755	96	97.
1		0030	7	0.	*	1		0300	37	111.	*	1		0530	67	1184.	*	1		0800	97	97.
1		0035	8	0.	*	1		0305	38	112.	*	1		0535	68	1067.	*	1		0805	98	96.
1		0040	9	0.	*	1		0310	39	115.	*	1		0540	69	947.	*	1		0810	99	96.
1		0045	10	0.	*	1		0315	40	121.	*	1		0545	70	829.	*	1		0815	100	96.
1		0050	11	0.	*	1		0320	41	136.	*	1		0550	71	722.	*	1		0820	101	96.
1		0055	12	0.	*	1		0325	42	168.	*	1		0555	72	626.	*	1		0825	102	96.
1		0100	13	0.	*	1		0330	43	238.	*	1		0600	73	543.	*	1		0830	103	96.
1		0105	14	0.	*	1		0335	44	400.	*	1		0605	74	470.	*	1		0835	104	97.
1		0110	15	0.	*	1		0340	45	693.	*	1		0610	75	407.	*	1		0840	105	96.
1		0115	16	0.	*	1		0345	46	1083.	*	1		0615	76	350.	*	1		0845	106	96.
1		0120	17	0.	*	1		0350	47	1498.	*	1		0620	77	299.	*	1		0850	107	96.
1		0125	18	0.	*	1		0355	48	1866.	*	1		0625	78	252.	*	1		0855	108	96.
1		0130	19	0.	*	1		0400	49	2114.	*	1		0630	79	208.	*	1		0900	109	96.
1		0135	20	0.	*	1		0405	50	2227.	*	1		0635	80	172.	*	1		0905	110	96.
1		0140	21	0.	*	1		0410	51	2220.	*	1		0640	81	148.	*	1		0910	111	96.
1		0145	22	0.	*	1		0415	52	2124.	*	1		0645	82	135.	*	1		0915	112	96.
1		0150	23	1.	*	1		0420	53	1979.	*	1		0650	83	126.	*	1		0920	113	96.
1		0155	24	7.	*	1		0425	54	1813.	*	1		0655	84	119.	*	1		0925	114	96.
1		0200	25	14.	*	1		0430	55	1658.	*	1		0700	85	114.	*	1		0930	115	96.
1		0205	26	29.	*	1		0435	56	1531.	*	1		0705	86	110.	*	1		0935	116	96.

1	0210	27	45.	*	1	0440	57	1439.	*	1	0710	87	106.	*	1	0940	117	96.
1	0215	28	58.	*	1	0445	58	1385.	*	1	0715	88	104.	*	1	0945	118	96.
1	0220	29	69.	*	1	0450	59	1366.	*	1	0720	89	103.	*	1	0950	119	96.
1	0225	30	77.	*	1	0455	60	1369.	*	1	0725	90	101.	*	1	0955	120	96.
				*					*					*				

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
(CFS)	(HR)		6-HR	24-HR	72-HR	9.92-HR
2227.	4.08	(CFS)	653.	412.	412.	412.
		(INCHES)	0.949	0.989	0.989	0.989
		(AC-FT)	324.	337.	337.	337.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 0.95

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	31	83.	*	1		0500	61	1331.	*	1		0730	91	100.
1		0005	2	0.	*	1		0235	32	88.	*	1		0505	62	1351.	*	1		0735	92	99.
1		0010	3	0.	*	1		0240	33	93.	*	1		0510	63	1361.	*	1		0740	93	98.
1		0015	4	0.	*	1		0245	34	98.	*	1		0515	64	1351.	*	1		0745	94	98.
1		0020	5	0.	*	1		0250	35	104.	*	1		0520	65	1313.	*	1		0750	95	98.
1		0025	6	0.	*	1		0255	36	107.	*	1		0525	66	1240.	*	1		0755	96	97.
1		0030	7	0.	*	1		0300	37	109.	*	1		0530	67	1141.	*	1		0800	97	97.
1		0035	8	0.	*	1		0305	38	110.	*	1		0535	68	1027.	*	1		0805	98	96.
1		0040	9	0.	*	1		0310	39	113.	*	1		0540	69	911.	*	1		0810	99	96.
1		0045	10	0.	*	1		0315	40	119.	*	1		0545	70	797.	*	1		0815	100	96.
1		0050	11	0.	*	1		0320	41	133.	*	1		0550	71	692.	*	1		0820	101	96.
1		0055	12	0.	*	1		0325	42	163.	*	1		0555	72	599.	*	1		0825	102	96.
1		0100	13	0.	*	1		0330	43	227.	*	1		0600	73	519.	*	1		0830	103	96.
1		0105	14	0.	*	1		0335	44	374.	*	1		0605	74	449.	*	1		0835	104	97.
1		0110	15	0.	*	1		0340	45	653.	*	1		0610	75	388.	*	1		0840	105	96.
1		0115	16	0.	*	1		0345	46	1028.	*	1		0615	76	332.	*	1		0845	106	96.
1		0120	17	0.	*	1		0350	47	1431.	*	1		0620	77	283.	*	1		0850	107	96.
1		0125	18	0.	*	1		0355	48	1789.	*	1		0625	78	238.	*	1		0855	108	96.
1		0130	19	0.	*	1		0400	49	2032.	*	1		0630	79	195.	*	1		0900	109	96.
1		0135	20	0.	*	1		0405	50	2143.	*	1		0635	80	163.	*	1		0905	110	96.
1		0140	21	0.	*	1		0410	51	2137.	*	1		0640	81	145.	*	1		0910	111	96.
1		0145	22	0.	*	1		0415	52	2046.	*	1		0645	82	134.	*	1		0915	112	96.
1		0150	23	1.	*	1		0420	53	1905.	*	1		0650	83	125.	*	1		0920	113	96.
1		0155	24	7.	*	1		0425	54	1745.	*	1		0655	84	119.	*	1		0925	114	96.
1		0200	25	14.	*	1		0430	55	1595.	*	1		0700	85	114.	*	1		0930	115	96.
1		0205	26	29.	*	1		0435	56	1472.	*	1		0705	86	109.	*	1		0935	116	96.
1		0210	27	45.	*	1		0440	57	1383.	*	1		0710	87	106.	*	1		0940	117	96.
1		0215	28	58.	*	1		0445	58	1330.	*	1		0715	88	104.	*	1		0945	118	96.
1		0220	29	69.	*	1		0450	59	1311.	*	1		0720	89	103.	*	1		0950	119	96.
1		0225	30	77.	*	1		0455	60	1315.	*	1		0725	90	101.	*	1		0955	120	96.
					*						*						*					

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

PEAK FLOW (CFS)	TIME (HR)		6-HR	24-HR	72-HR	9.92-HR
2143.	4.08	(CFS)	629.	397.	397.	397.
		(INCHES)	0.913	0.953	0.953	0.953
		(AC-FT)	312.	325.	325.	325.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 0.93

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	83.	1		0500	61	1277.	1		0730	91	100.
1		0005	2	0.	1		0235	32	87.	1		0505	62	1297.	1		0735	92	99.
1		0010	3	0.	1		0240	33	92.	1		0510	63	1308.	1		0740	93	98.
1		0015	4	0.	1		0245	34	97.	1		0515	64	1300.	1		0745	94	98.
1		0020	5	0.	1		0250	35	103.	1		0520	65	1263.	1		0750	95	97.
1		0025	6	0.	1		0255	36	105.	1		0525	66	1193.	1		0755	96	97.
1		0030	7	0.	1		0300	37	107.	1		0530	67	1097.	1		0800	97	97.
1		0035	8	0.	1		0305	38	108.	1		0535	68	987.	1		0805	98	96.
1		0040	9	0.	1		0310	39	111.	1		0540	69	875.	1		0810	99	96.
1		0045	10	0.	1		0315	40	116.	1		0545	70	764.	1		0815	100	96.
1		0050	11	0.	1		0320	41	130.	1		0550	71	663.	1		0820	101	96.
1		0055	12	0.	1		0325	42	158.	1		0555	72	573.	1		0825	102	96.
1		0100	13	0.	1		0330	43	217.	1		0600	73	495.	1		0830	103	96.
1		0105	14	0.	1		0335	44	349.	1		0605	74	427.	1		0835	104	97.
1		0110	15	0.	1		0340	45	614.	1		0610	75	368.	1		0840	105	96.
1		0115	16	0.	1		0345	46	975.	1		0615	76	315.	1		0845	106	96.
1		0120	17	0.	1		0350	47	1364.	1		0620	77	267.	1		0850	107	96.
1		0125	18	0.	1		0355	48	1713.	1		0625	78	223.	1		0855	108	96.
1		0130	19	0.	1		0400	49	1950.	1		0630	79	184.	1		0900	109	96.
1		0135	20	0.	1		0405	50	2060.	1		0635	80	158.	1		0905	110	96.
1		0140	21	0.	1		0410	51	2055.	1		0640	81	142.	1		0910	111	96.
1		0145	22	0.	1		0415	52	1967.	1		0645	82	132.	1		0915	112	96.
1		0150	23	1.	1		0420	53	1832.	1		0650	83	125.	1		0920	113	96.
1		0155	24	7.	1		0425	54	1677.	1		0655	84	118.	1		0925	114	96.
1		0200	25	14.	1		0430	55	1533.	1		0700	85	113.	1		0930	115	96.
1		0205	26	29.	1		0435	56	1413.	1		0705	86	109.	1		0935	116	96.
1		0210	27	45.	1		0440	57	1326.	1		0710	87	106.	1		0940	117	96.
1		0215	28	58.	1		0445	58	1276.	1		0715	88	104.	1		0945	118	96.
1		0220	29	69.	1		0450	59	1257.	1		0720	89	103.	1		0950	119	96.
1		0225	30	76.	1		0455	60	1261.	1		0725	90	101.	1		0955	120	96.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
2060.	4.08	(CFS)	604.	382.	382.	382.
		(INCHES)	0.878	0.917	0.917	0.917
		(AC-FT)	300.	313.	313.	313.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4

SUM OF 3 HYDROGRAPHS

PLAN 1, RATIO = 0.92

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	83.	1		0500	61	1256.	1		0730	91	99.
1		0005	2	0.	1		0235	32	87.	1		0505	62	1275.	1		0735	92	99.
1		0010	3	0.	1		0240	33	92.	1		0510	63	1286.	1		0740	93	98.
1		0015	4	0.	1		0245	34	96.	1		0515	64	1279.	1		0745	94	98.
1		0020	5	0.	1		0250	35	102.	1		0520	65	1243.	1		0750	95	97.
1		0025	6	0.	1		0255	36	105.	1		0525	66	1174.	1		0755	96	97.
1		0030	7	0.	1		0300	37	107.	1		0530	67	1080.	1		0800	97	97.
1		0035	8	0.	1		0305	38	108.	1		0535	68	971.	1		0805	98	96.
1		0040	9	0.	1		0310	39	110.	1		0540	69	860.	1		0810	99	96.
1		0045	10	0.	1		0315	40	115.	1		0545	70	751.	1		0815	100	96.
1		0050	11	0.	1		0320	41	128.	1		0550	71	651.	1		0820	101	96.
1		0055	12	0.	1		0325	42	156.	1		0555	72	562.	1		0825	102	96.
1		0100	13	0.	1		0330	43	212.	1		0600	73	485.	1		0830	103	96.
1		0105	14	0.	1		0335	44	339.	1		0605	74	418.	1		0835	104	97.
1		0110	15	0.	1		0340	45	599.	1		0610	75	360.	1		0840	105	96.
1		0115	16	0.	1		0345	46	953.	1		0615	76	307.	1		0845	106	96.
1		0120	17	0.	1		0350	47	1339.	1		0620	77	260.	1		0850	107	96.
1		0125	18	0.	1		0355	48	1684.	1		0625	78	217.	1		0855	108	96.
1		0130	19	0.	1		0400	49	1918.	1		0630	79	179.	1		0900	109	96.
1		0135	20	0.	1		0405	50	2027.	1		0635	80	156.	1		0905	110	96.
1		0140	21	0.	1		0410	51	2023.	1		0640	81	141.	1		0910	111	96.
1		0145	22	0.	1		0415	52	1936.	1		0645	82	132.	1		0915	112	96.
1		0150	23	1.	1		0420	53	1803.	1		0650	83	124.	1		0920	113	96.
1		0155	24	7.	1		0425	54	1650.	1		0655	84	118.	1		0925	114	96.
1		0200	25	14.	1		0430	55	1508.	1		0700	85	113.	1		0930	115	96.
1		0205	26	29.	1		0435	56	1389.	1		0705	86	109.	1		0935	116	96.
1		0210	27	45.	1		0440	57	1304.	1		0710	87	106.	1		0940	117	96.
1		0215	28	58.	1		0445	58	1253.	1		0715	88	104.	1		0945	118	96.
1		0220	29	69.	1		0450	59	1235.	1		0720	89	102.	1		0950	119	96.
1		0225	30	76.	1		0455	60	1239.	1		0725	90	101.	1		0955	120	96.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	9.92-HR
2027.	4.08	(CFS)	595.	376.	376.	376.
		(INCHES)	0.864	0.903	0.903	0.903
		(AC-FT)	295.	308.	308.	308.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4

SUM OF 3 HYDROGRAPHS

PLAN 1, RATIO = 0.91

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	82.	1		0500	61	1240.	1		0730	91	99.
1		0005	2	0.	1		0235	32	87.	1		0505	62	1260.	1		0735	92	99.
1		0010	3	0.	1		0240	33	91.	1		0510	63	1271.	1		0740	93	98.
1		0015	4	0.	1		0245	34	96.	1		0515	64	1264.	1		0745	94	98.
1		0020	5	0.	1		0250	35	102.	1		0520	65	1229.	1		0750	95	97.
1		0025	6	0.	1		0255	36	104.	1		0525	66	1161.	1		0755	96	97.
1		0030	7	0.	1		0300	37	106.	1		0530	67	1068.	1		0800	97	97.
1		0035	8	0.	1		0305	38	107.	1		0535	68	960.	1		0805	98	96.
1		0040	9	0.	1		0310	39	110.	1		0540	69	850.	1		0810	99	96.
1		0045	10	0.	1		0315	40	115.	1		0545	70	742.	1		0815	100	96.
1		0050	11	0.	1		0320	41	127.	1		0550	71	643.	1		0820	101	96.
1		0055	12	0.	1		0325	42	155.	1		0555	72	555.	1		0825	102	96.
1		0100	13	0.	1		0330	43	209.	1		0600	73	479.	1		0830	103	96.
1		0105	14	0.	1		0335	44	332.	1		0605	74	412.	1		0835	104	97.
1		0110	15	0.	1		0340	45	588.	1		0610	75	355.	1		0840	105	96.
1		0115	16	0.	1		0345	46	939.	1		0615	76	302.	1		0845	106	96.
1		0120	17	0.	1		0350	47	1320.	1		0620	77	256.	1		0850	107	96.
1		0125	18	0.	1		0355	48	1663.	1		0625	78	213.	1		0855	108	96.
1		0130	19	0.	1		0400	49	1895.	1		0630	79	176.	1		0900	109	96.
1		0135	20	0.	1		0405	50	2004.	1		0635	80	155.	1		0905	110	96.
1		0140	21	0.	1		0410	51	2000.	1		0640	81	141.	1		0910	111	96.
1		0145	22	0.	1		0415	52	1914.	1		0645	82	131.	1		0915	112	96.
1		0150	23	1.	1		0420	53	1783.	1		0650	83	124.	1		0920	113	96.
1		0155	24	7.	1		0425	54	1631.	1		0655	84	118.	1		0925	114	96.
1		0200	25	14.	1		0430	55	1490.	1		0700	85	113.	1		0930	115	96.
1		0205	26	29.	1		0435	56	1373.	1		0705	86	109.	1		0935	116	96.
1		0210	27	45.	1		0440	57	1288.	1		0710	87	106.	1		0940	117	96.
1		0215	28	58.	1		0445	58	1238.	1		0715	88	104.	1		0945	118	96.
1		0220	29	69.	1		0450	59	1220.	1		0720	89	102.	1		0950	119	96.
1		0225	30	76.	1		0455	60	1224.	1		0725	90	101.	1		0955	120	96.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
(CFS)	(HR)		6-HR	24-HR	72-HR	9.92-HR
2004.	4.08	(CFS)	588.	372.	372.	372.
		(INCHES)	0.854	0.894	0.894	0.894
		(AC-FT)	292.	305.	305.	305.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4

SUM OF 3 HYDROGRAPHS

PLAN 1, RATIO = 0.90

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	82.	1		0500	61	1229.	1		0730	91	99.
1		0005	2	0.	1		0235	32	87.	1		0505	62	1249.	1		0735	92	99.
1		0010	3	0.	1		0240	33	91.	1		0510	63	1261.	1		0740	93	98.
1		0015	4	0.	1		0245	34	96.	1		0515	64	1254.	1		0745	94	98.
1		0020	5	0.	1		0250	35	102.	1		0520	65	1219.	1		0750	95	97.
1		0025	6	0.	1		0255	36	104.	1		0525	66	1152.	1		0755	96	97.

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0030	7	0.	*	1	0300	37	106.	*	1	0530	67	1059.	*	1	0800	97	97.	
1	0035	8	0.	*	1	0305	38	107.	*	1	0535	68	952.	*	1	0805	98	96.	
1	0040	9	0.	*	1	0310	39	109.	*	1	0540	69	843.	*	1	0810	99	96.	
1	0045	10	0.	*	1	0315	40	114.	*	1	0545	70	735.	*	1	0815	100	96.	
1	0050	11	0.	*	1	0320	41	127.	*	1	0550	71	637.	*	1	0820	101	96.	
1	0055	12	0.	*	1	0325	42	154.	*	1	0555	72	550.	*	1	0825	102	96.	
1	0100	13	0.	*	1	0330	43	207.	*	1	0600	73	474.	*	1	0830	103	96.	
1	0105	14	0.	*	1	0335	44	327.	*	1	0605	74	408.	*	1	0835	104	97.	
1	0110	15	0.	*	1	0340	45	581.	*	1	0610	75	351.	*	1	0840	105	96.	
1	0115	16	0.	*	1	0345	46	929.	*	1	0615	76	299.	*	1	0845	106	96.	
1	0120	17	0.	*	1	0350	47	1307.	*	1	0620	77	253.	*	1	0850	107	96.	
1	0125	18	0.	*	1	0355	48	1647.	*	1	0625	78	210.	*	1	0855	108	96.	
1	0130	19	0.	*	1	0400	49	1879.	*	1	0630	79	174.	*	1	0900	109	96.	
1	0135	20	0.	*	1	0405	50	1987.	*	1	0635	80	154.	*	1	0905	110	96.	
1	0140	21	0.	*	1	0410	51	1984.	*	1	0640	81	140.	*	1	0910	111	96.	
1	0145	22	0.	*	1	0415	52	1899.	*	1	0645	82	131.	*	1	0915	112	96.	
1	0150	23	1.	*	1	0420	53	1768.	*	1	0650	83	124.	*	1	0920	113	96.	
1	0155	24	7.	*	1	0425	54	1618.	*	1	0655	84	118.	*	1	0925	114	96.	
1	0200	25	14.	*	1	0430	55	1478.	*	1	0700	85	113.	*	1	0930	115	96.	
1	0205	26	29.	*	1	0435	56	1361.	*	1	0705	86	109.	*	1	0935	116	96.	
1	0210	27	45.	*	1	0440	57	1277.	*	1	0710	87	106.	*	1	0940	117	96.	
1	0215	28	58.	*	1	0445	58	1227.	*	1	0715	88	104.	*	1	0945	118	96.	
1	0220	29	69.	*	1	0450	59	1209.	*	1	0720	89	102.	*	1	0950	119	96.	
1	0225	30	76.	*	1	0455	60	1213.	*	1	0725	90	101.	*	1	0955	120	96.	

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
1987.	4.08	(CFS)	583.	369.	369.	369.
		(INCHES)	0.847	0.887	0.887	0.887
		(AC-FT)	289.	303.	303.	303.

CUMULATIVE AREA = 6.40 SQ MI

Total Runoff through UPRR Drid

HYDROGRAPH AT STATION PT4
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 0.89

Hydrograph ordinates Used in 6904X.DA

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	0230	31	82.	*	1	0500	61	1212.	*	1	0730	91	99.	
1	0005	2	0.	*	1	0235	32	87.	*	1	0505	62	1232.	*	1	0735	92	99.	
1	0010	3	0.	*	1	0240	33	91.	*	1	0510	63	1243.	*	1	0740	93	98.	
1	0015	4	0.	*	1	0245	34	96.	*	1	0515	64	1238.	*	1	0745	94	98.	
1	0020	5	0.	*	1	0250	35	102.	*	1	0520	65	1204.	*	1	0750	95	97.	
1	0025	6	0.	*	1	0255	36	104.	*	1	0525	66	1137.	*	1	0755	96	97.	
1	0030	7	0.	*	1	0300	37	106.	*	1	0530	67	1045.	*	1	0800	97	97.	
1	0035	8	0.	*	1	0305	38	106.	*	1	0535	68	940.	*	1	0805	98	96.	
1	0040	9	0.	*	1	0310	39	109.	*	1	0540	69	831.	*	1	0810	99	96.	
1	0045	10	0.	*	1	0315	40	113.	*	1	0545	70	725.	*	1	0815	100	96.	
1	0050	11	0.	*	1	0320	41	126.	*	1	0550	71	628.	*	1	0820	101	96.	
1	0055	12	0.	*	1	0325	42	153.	*	1	0555	72	541.	*	1	0825	102	96.	
1	0100	13	0.	*	1	0330	43	204.	*	1	0600	73	466.	*	1	0830	103	96.	
1	0105	14	0.	*	1	0335	44	320.	*	1	0605	74	401.	*	1	0835	104	97.	

1	0110	15	0.	*	1	0340	45	569.	*	1	0610	75	344.	*	1	0840	105	96.
1	0115	16	0.	*	1	0345	46	912.	*	1	0615	76	293.	*	1	0845	106	96.
1	0120	17	0.	*	1	0350	47	1287.	*	1	0620	77	248.	*	1	0850	107	96.
1	0125	18	0.	*	1	0355	48	1623.	*	1	0625	78	206.	*	1	0855	108	96.
1	0130	19	0.	*	1	0400	49	1853.	*	1	0630	79	170.	*	1	0900	109	96.
1	0135	20	0.	*	1	0405	50	1961.	*	1	0635	80	152.	*	1	0905	110	96.
1	0140	21	0.	*	1	0410	51	1958.	*	1	0640	81	139.	*	1	0910	111	96.
1	0145	22	0.	*	1	0415	52	1874.	*	1	0645	82	131.	*	1	0915	112	96.
1	0150	23	1.	*	1	0420	53	1745.	*	1	0650	83	124.	*	1	0920	113	96.
1	0155	24	7.	*	1	0425	54	1596.	*	1	0655	84	118.	*	1	0925	114	96.
1	0200	25	14.	*	1	0430	55	1458.	*	1	0700	85	113.	*	1	0930	115	96.
1	0205	26	29.	*	1	0435	56	1343.	*	1	0705	86	109.	*	1	0935	116	96.
1	0210	27	45.	*	1	0440	57	1259.	*	1	0710	87	106.	*	1	0940	117	96.
1	0215	28	58.	*	1	0445	58	1210.	*	1	0715	88	104.	*	1	0945	118	96.
1	0220	29	69.	*	1	0450	59	1192.	*	1	0720	89	102.	*	1	0950	119	96.
1	0225	30	76.	*	1	0455	60	1196.	*	1	0725	90	101.	*	1	0955	120	96.
				*					*					*				

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	9.92-HR
1961.	4.08	(CFS)	575.	365.	365.	365.
		(INCHES)	0.836	0.875	0.875	0.875
		(AC-FT)	285.	299.	299.	299.

CUMULATIVE AREA = 6.40 SQ MI

HYDROGRAPH AT STATION PT4
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 0.88

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	31	82.	*	1		0500	61	1191.	*	1		0730	91	99.
1		0005	2	0.	*	1		0235	32	86.	*	1		0505	62	1211.	*	1		0735	92	99.
1		0010	3	0.	*	1		0240	33	91.	*	1		0510	63	1222.	*	1		0740	93	98.
1		0015	4	0.	*	1		0245	34	95.	*	1		0515	64	1217.	*	1		0745	94	98.
1		0020	5	0.	*	1		0250	35	101.	*	1		0520	65	1184.	*	1		0750	95	97.
1		0025	6	0.	*	1		0255	36	103.	*	1		0525	66	1118.	*	1		0755	96	97.
1		0030	7	0.	*	1		0300	37	105.	*	1		0530	67	1028.	*	1		0800	97	97.
1		0035	8	0.	*	1		0305	38	106.	*	1		0535	68	924.	*	1		0805	98	96.
1		0040	9	0.	*	1		0310	39	108.	*	1		0540	69	817.	*	1		0810	99	96.
1		0045	10	0.	*	1		0315	40	113.	*	1		0545	70	712.	*	1		0815	100	96.
1		0050	11	0.	*	1		0320	41	125.	*	1		0550	71	616.	*	1		0820	101	96.
1		0055	12	0.	*	1		0325	42	151.	*	1		0555	72	531.	*	1		0825	102	96.
1		0100	13	0.	*	1		0330	43	202.	*	1		0600	73	457.	*	1		0830	103	96.
1		0105	14	0.	*	1		0335	44	314.	*	1		0605	74	392.	*	1		0835	104	97.
1		0110	15	0.	*	1		0340	45	556.	*	1		0610	75	337.	*	1		0840	105	96.
1		0115	16	0.	*	1		0345	46	892.	*	1		0615	76	286.	*	1		0845	106	96.
1		0120	17	0.	*	1		0350	47	1261.	*	1		0620	77	241.	*	1		0850	107	96.
1		0125	18	0.	*	1		0355	48	1593.	*	1		0625	78	200.	*	1		0855	108	96.
1		0130	19	0.	*	1		0400	49	1821.	*	1		0630	79	168.	*	1		0900	109	96.
1		0135	20	0.	*	1		0405	50	1927.	*	1		0635	80	151.	*	1		0905	110	96.
1		0140	21	0.	*	1		0410	51	1925.	*	1		0640	81	139.	*	1		0910	111	96.
1		0145	22	0.	*	1		0415	52	1843.	*	1		0645	82	130.	*	1		0915	112	96.

1	0150	23	1.	*	1	0420	53	1716.	*	1	0650	83	124.	*	1	0920	113	96.
1	0155	24	7.	*	1	0425	54	1570.	*	1	0655	84	117.	*	1	0925	114	96.
1	0200	25	14.	*	1	0430	55	1433.	*	1	0700	85	113.	*	1	0930	115	96.
1	0205	26	29.	*	1	0435	56	1319.	*	1	0705	86	109.	*	1	0935	116	96.
1	0210	27	45.	*	1	0440	57	1237.	*	1	0710	87	106.	*	1	0940	117	96.
1	0215	28	58.	*	1	0445	58	1188.	*	1	0715	88	104.	*	1	0945	118	96.
1	0220	29	69.	*	1	0450	59	1170.	*	1	0720	89	102.	*	1	0950	119	96.
1	0225	30	76.	*	1	0455	60	1174.	*	1	0725	90	101.	*	1	0955	120	96.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	9.92-HR
1927.	4.08	(CFS)	566.	359.	359.	359.
		(INCHES)	0.822	0.862	0.862	0.862
		(AC-FT)	281.	294.	294.	294.

CUMULATIVE AREA = 6.40 SQ MI

*** ***

582 KK

```
**************
*            *
*     LDCDB  *
*            *
**************
```

593 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

584 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	0.00	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

585 SV	STORAGE	0.0	2.8	37.5	120.3	229.0	340.0	453.8	570.0	689.0	810.0
		934.0	1061.0	1190.0							
587 SE	ELEVATION	2183.00	2184.00	2186.00	2188.00	2190.00	2192.00	2194.00	2196.00	2198.00	2200.00
		2202.00	2204.00	2206.00							
589 SQ	DISCHARGE	0.	126.	654.	1825.	3310.	4310.	5118.	5815.	6437.	7004.
		7528.	8018.	8480.							
591 SE	ELEVATION	2183.00	2184.00	2186.00	2188.00	2190.00	2192.00	2194.00	2196.00	2198.00	2200.00
		2202.00	2204.00	2206.00							

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

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	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
					0.99	0.98	0.95	0.93	0.92	0.91	0.90	0.89	0.88
HYDROGRAPH AT	B13A	1.29	1	FLOW	988.	967.	933.	898.	884.	875.	868.	857.	843.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RB13A	1.29	1	FLOW	889.	870.	839.	807.	795.	786.	780.	770.	757.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.83	4.83
HYDROGRAPH AT	B13B	0.54	1	FLOW	228.	223.	215.	207.	204.	201.	200.	197.	194.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
2 COMBINED AT	PT1	1.83	1	FLOW	1113.	1089.	1050.	1011.	995.	984.	976.	964.	948.
				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
ROUTED TO	RPT1	1.83	1	FLOW	1082.	1059.	1021.	982.	967.	956.	949.	937.	921.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
HYDROGRAPH AT	B17	0.82	1	FLOW	428.	418.	402.	387.	381.	376.	373.	368.	362.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
2 COMBINED AT	PT2	2.64	1	FLOW	1379.	1350.	1301.	1252.	1232.	1219.	1209.	1193.	1174.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
DIVERSION TO	DVBD2	2.64	1	FLOW	504.	495.	481.	466.	460.	456.	453.	449.	443.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
HYDROGRAPH AT	DVBD2	2.64	1	FLOW	875.	855.	820.	786.	772.	763.	756.	745.	731.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
ROUTED TO	RPT2	2.64	1	FLOW	874.	853.	819.	785.	771.	761.	755.	744.	730.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
HYDROGRAPH AT	B13C	2.01	1	FLOW	1582.	1548.	1490.	1432.	1409.	1393.	1382.	1363.	1340.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	PT3	4.65	1	FLOW	1780.	1738.	1668.	1598.	1570.	1550.	1536.	1514.	1486.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO	DVBD3	4.65	1	FLOW	297.	296.	293.	291.	290.	290.	289.	288.	288.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT	DVBD3	4.65	1	FLOW	1483.	1442.	1375.	1307.	1280.	1261.	1247.	1226.	1199.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO	RPT3A	4.65	1	FLOW	1471.	1429.	1361.	1293.	1267.	1249.	1235.	1214.	1186.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO	DVBD4	4.65	1	FLOW	249.	245.	238.	231.	229.	227.	226.	223.	221.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT	DVBD4	4.65	1	FLOW	1222.	1184.	1123.	1062.	1039.	1022.	1010.	990.	966.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO	RPT3B	4.65	1	FLOW	1179.	1144.	1085.	1026.	1003.	986.	974.	956.	932.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT	B11S	1.12	1	FLOW	499.	484.	459.	435.	425.	419.	414.	406.	397.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT	HYDRO1	0.63	1	FLOW	623.	623.	623.	623.	623.	623.	623.	623.	623.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
3 COMBINED AT	PT4	6.40	1	FLOW	2278.	2227.	2143.	2060.	2027.	2004.	1987.	1961.	1927.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO	RPT4A	6.40	1	FLOW	2197.	2148.	2067.	1986.	1954.	1932.	1916.	1890.	1858.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO	RPT4B	6.40	1	FLOW	2139.	2091.	2012.	1934.	1903.	1881.	1865.	1840.	1809.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
HYDROGRAPH AT	B14B	0.99	1	FLOW	454.	440.	417.	395.	385.	379.	375.	368.	359.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	PT22W	7.39	1	FLOW	2330.	2276.	2187.	2098.	2063.	2039.	2021.	1993.	1958.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT	D012A	10.21	1	FLOW	3668.	3576.	3423.	3271.	3211.	3169.	3139.	3091.	3031.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
ROUTED TO	RD012A	10.21	1	FLOW	3665.	3572.	3420.	3268.	3207.	3165.	3135.	3087.	3027.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
DIVERSION TO	DVI151	10.21	1	FLOW	1452.	1441.	1422.	1404.	1396.	1391.	1388.	1382.	1374.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
HYDROGRAPH AT	DVI151	10.21	1	FLOW	2212.	2131.	1997.	1864.	1811.	1774.	1748.	1705.	1652.
				TIME	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
ROUTED TO	RI151	10.21	1	FLOW	2205.	2124.	1991.	1858.	1805.	1768.	1742.	1700.	1647.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
DIVERSION TO	DVI152	10.21	1	FLOW	718.	699.	666.	635.	622.	613.	607.	597.	584.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
HYDROGRAPH AT	DVI152	10.21	1	FLOW	1487.	1426.	1324.	1223.	1183.	1155.	1135.	1103.	1063.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
ROUTED TO	RI152	10.21	1	FLOW	1470.	1409.	1309.	1209.	1169.	1141.	1122.	1090.	1051.
				TIME	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
HYDROGRAPH AT	D01	9.54	1	FLOW	5256.	5131.	4923.	4717.	4634.	4577.	4536.	4470.	4389.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
ROUTED TO	RD01	9.54	1	FLOW	4748.	4635.	4448.	4262.	4188.	4136.	4099.	4040.	3966.
				TIME	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
HYDROGRAPH AT	D005	2.73	1	FLOW	1638.	1598.	1530.	1464.	1437.	1418.	1405.	1384.	1357.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT	PT9	12.27	1	FLOW	5597.	5465.	5245.	5026.	4939.	4878.	4835.	4766.	4680.

				TIME	5.08	5.08	5.08	5.08	5.17	5.17	5.17	5.17	5.17
ROUTED TO	RD005	12.27	1	FLOW	5494.	5365.	5150.	4936.	4850.	4791.	4748.	4680.	4596.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT	D02	5.91	1	FLOW	3219.	3143.	3015.	2889.	2838.	2803.	2778.	2737.	2687.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
ROUTED TO	RD02	5.91	1	FLOW	2942.	2872.	2756.	2641.	2595.	2563.	2540.	2503.	2458.
				TIME	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
HYDROGRAPH AT	D03	11.99	1	FLOW	6792.	6630.	6361.	6093.	5986.	5911.	5858.	5773.	5667.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT	D04	6.95	1	FLOW	3740.	3653.	3508.	3365.	3308.	3268.	3239.	3193.	3136.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
2 COMBINED AT	PT10	18.94	1	FLOW	10504.	10256.	9845.	9436.	9273.	9159.	9077.	8947.	8785.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
ROUTED TO	RPT10	18.94	1	FLOW	9031.	8818.	8465.	8113.	7973.	7875.	7805.	7694.	7555.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT	D006	8.52	1	FLOW	4827.	4710.	4515.	4322.	4244.	4191.	4152.	4091.	4014.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
3 COMBINED AT	PT11	33.37	1	FLOW	14638.	14296.	13729.	13164.	12939.	12781.	12669.	12490.	12266.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
ROUTED TO	RPT11	33.37	1	FLOW	14444.	14107.	13546.	12988.	12765.	12610.	12499.	12321.	12100.
				TIME	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
HYDROGRAPH AT	D2A	0.99	1	FLOW	1053.	1028.	988.	947.	931.	920.	911.	899.	882.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT	PT12	46.63	1	FLOW	20027.	19555.	18772.	17993.	17682.	17465.	17311.	17063.	16755.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
ROUTED TO	RPT12	46.63	1	FLOW	18471.	18036.	17314.	16595.	16309.	16108.	15966.	15737.	15453.
				TIME	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17
HYDROGRAPH AT	D2B	7.50	1	FLOW	2688.	2616.	2496.	2377.	2329.	2296.	2273.	2235.	2188.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
2 COMBINED AT	PT13	54.13	1	FLOW	19780.	19311.	18532.	17757.	17449.	17235.	17082.	16838.	16534.
				TIME	6.08	6.08	6.08	6.08	6.17	6.17	6.17	6.17	6.17
ROUTED TO	RPT13	54.13	1	FLOW	18582.	18141.	17409.	16681.	16391.	16188.	16044.	15813.	15524.
				TIME	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
HYDROGRAPH AT	D06	11.68	1	FLOW	5379.	5252.	5041.	4831.	4747.	4689.	4647.	4580.	4497.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
ROUTED TO	RD06	11.68	1	FLOW	4870.	4755.	4565.	4376.	4301.	4248.	4210.	4150.	4075.
				TIME	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
HYDROGRAPH AT	D3	6.64	1	FLOW	1871.	1814.	1720.	1628.	1591.	1565.	1547.	1518.	1482.
				TIME	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
4 COMBINED AT	PT14	82.66	1	FLOW	21706.	21177.	20300.	19428.	19081.	18838.	18666.	18389.	18045.

				TIME	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
DIVERSION TO	DVI153	82.66	1	FLOW	14022.	13634.	12992.	12353.	12099.	11921.	11795.	11592.	11340.
				TIME	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
HYDROGRAPH AT	DVI153	82.66	1	FLOW	7685.	7543.	7308.	7075.	6982.	6917.	6871.	6797.	6705.
				TIME	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
ROUTED TO	RPT14	82.66	1	FLOW	7643.	7503.	7270.	7038.	6946.	6882.	6836.	6763.	6671.
				TIME	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
HYDROGRAPH AT	D1A	2.29	1	FLOW	1324.	1292.	1239.	1186.	1165.	1150.	1140.	1123.	1102.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO	RD1A	2.29	1	FLOW	1301.	1270.	1218.	1166.	1145.	1131.	1120.	1104.	1083.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
HYDROGRAPH AT	D1B	0.32	1	FLOW	149.	146.	140.	134.	131.	130.	129.	127.	124.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
2 COMBINED AT	PT15	2.61	1	FLOW	1450.	1415.	1357.	1299.	1276.	1260.	1248.	1230.	1207.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
ROUTED TO	RPT15	2.61	1	FLOW	1407.	1373.	1316.	1260.	1238.	1222.	1211.	1193.	1171.
				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
HYDROGRAPH AT	D1C	0.56	1	FLOW	208.	203.	194.	186.	182.	180.	178.	175.	172.
				TIME	4.83	4.83	4.83	4.83	4.92	4.92	4.92	4.92	4.92
2 COMBINED AT	PT16	3.17	1	FLOW	1615.	1576.	1510.	1445.	1420.	1402.	1389.	1368.	1343.
				TIME	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
ROUTED TO	RPT16	3.17	1	FLOW	1580.	1541.	1477.	1414.	1388.	1371.	1358.	1338.	1313.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
HYDROGRAPH AT	D1D	1.23	1	FLOW	819.	798.	764.	729.	716.	706.	699.	688.	675.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO	RD1D	1.23	1	FLOW	790.	770.	736.	703.	690.	681.	674.	664.	651.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT	D1E	0.22	1	FLOW	81.	78.	75.	71.	70.	69.	68.	67.	66.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT	D1F	0.81	1	FLOW	167.	162.	153.	144.	141.	139.	137.	134.	131.
				TIME	5.25	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
4 COMBINED AT	PT17	5.43	1	FLOW	2122.	2069.	1982.	1896.	1861.	1837.	1820.	1793.	1759.
				TIME	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
ROUTED TO	RPT17	5.43	1	FLOW	2057.	2006.	1922.	1838.	1805.	1781.	1765.	1738.	1705.
				TIME	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
HYDROGRAPH AT	B18A	1.50	1	FLOW	329.	316.	294.	273.	265.	259.	255.	248.	240.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
3 COMBINED AT	PT18	89.59	1	FLOW	8399.	8238.	7970.	7705.	7599.	7525.	7473.	7390.	7286.
				TIME	6.92	6.92	6.92	6.92	6.92	7.00	7.00	7.00	7.00
DIVERSION TO	DVI154	89.59	1	FLOW	1366.	1361.	1352.	1343.	1340.	1337.	1335.	1332.	1328.

				TIME	6.92	6.92	7.00	7.00	7.00	7.00	7.00	7.00	7.00
2 COMBINED AT	PT27	0.00	1	FLOW	5573.	5453.	5255.	5059.	4981.	4926.	4888.	4825.	4748.
				TIME	6.92	6.92	7.00	7.00	7.00	7.00	7.00	7.00	7.00
:OUTED TO	RPT27	0.00	1	FLOW	5572.	5453.	5255.	5059.	4981.	4926.	4887.	4825.	4747.
				TIME	6.92	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ROUTED TO	RPT27	0.00	1	FLOW	5572.	5453.	5255.	5059.	4981.	4926.	4887.	4825.	4747.
				TIME	6.92	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
HYDROGRAPH AT	B18C	1.26	1	FLOW	837.	816.	782.	748.	735.	725.	719.	708.	695.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT	PT28	38.38	1	FLOW	24487.	23890.	22900.	21915.	21522.	21248.	21053.	20740.	20350.
				TIME	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83
ROUTED TO	LDCDB	38.38	1	FLOW	15404.	15061.	14493.	13932.	13710.	13555.	13444.	13268.	13050.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
			** PEAK STAGES IN FEET **										
			1	STAGE	2235.97	2234.49	2232.03	2229.60	2228.64	2227.97	2227.49	2226.73	2225.78
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
ROUTED TO	RLDCDB	38.38	1	FLOW	15402.	15059.	14492.	13931.	13708.	13553.	13443.	13267.	13048.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
HYDROGRAPH AT	D5A	1.33	1	FLOW	1335.	1307.	1261.	1215.	1197.	1184.	1175.	1161.	1142.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO	RD5A	1.33	1	FLOW	1259.	1233.	1190.	1147.	1130.	1118.	1110.	1096.	1079.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	RDVROSE	0.00	1	FLOW	1172.	1145.	1100.	1055.	1037.	1024.	1015.	1001.	983.
				TIME	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
ROUTED TO	RDVROSE	0.00	1	FLOW	1163.	1136.	1091.	1046.	1028.	1016.	1007.	993.	975.
				TIME	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
3 COMBINED AT	PT29	39.70	1	FLOW	15789.	15442.	14866.	14297.	14073.	13915.	13803.	13625.	13403.
				TIME	8.25	8.25	8.25	8.17	8.17	8.17	8.17	8.17	8.17
ROUTED TO	RPT29	39.70	1	FLOW	15788.	15442.	14866.	14297.	14071.	13913.	13801.	13623.	13401.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.17	8.17	8.17
HYDROGRAPH AT	B16B	0.70	1	FLOW	627.	614.	592.	570.	562.	556.	551.	544.	536.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO	RB16B	0.70	1	FLOW	615.	602.	580.	559.	550.	544.	540.	533.	525.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
2 COMBINED AT	PT30	40.40	1	FLOW	15788.	15442.	14866.	14297.	14071.	13913.	13801.	13623.	13401.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.17	8.17	8.17
ROUTED TO	RPT30	40.40	1	FLOW	15786.	15440.	14865.	14296.	14071.	13913.	13800.	13622.	13399.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
HYDROGRAPH AT	B16A	0.91	1	FLOW	422.	411.	394.	376.	369.	364.	360.	355.	348.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17

HYDROGRAPH AT	DSB	0.60	1	FLOW	405.	398.	384.	371.	366.	362.	360.	356.	351.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT	PT31	41.91	1	FLOW	15787.	15441.	14866.	14297.	14072.	13914.	13801.	13623.	13400.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
:OUTED TO	RPT31	41.91	1	FLOW	15786.	15439.	14865.	14296.	14071.	13913.	13801.	13622.	13400.
				TIME	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
2 COMBINED AT	PT32	143.12	1	FLOW	18974.	18581.	17930.	17287.	17032.	16853.	16727.	16524.	16273.
				TIME	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17
:OUTED TO	RPT32	143.12	1	FLOW	18974.	18581.	17930.	17286.	17031.	16853.	16726.	16524.	16272.
				TIME	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17
:YDROGRAPH AT	HYDRO2	0.38	1	FLOW	36.	36.	36.	36.	36.	36.	36.	36.	36.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
ROUTED TO	RHYDRO2	0.38	1	FLOW	32.	32.	32.	32.	32.	32.	32.	32.	32.
				TIME	6.08	6.08	6.08	6.08	6.08	6.08	6.08	6.08	6.08
HYDROGRAPH AT	B12	0.97	1	FLOW	274.	262.	244.	225.	218.	213.	210.	204.	197.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT	PT33W	0.97	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
2 COMBINED AT	PT33	1.94	1	FLOW	274.	262.	244.	225.	218.	213.	210.	204.	197.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RPT33	1.94	1	FLOW	248.	238.	221.	205.	198.	194.	190.	185.	179.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT	B15A	0.96	1	FLOW	523.	509.	486.	464.	455.	448.	444.	437.	428.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT	PT34W	2.90	1	FLOW	723.	699.	661.	624.	609.	599.	592.	580.	566.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT	PT34	3.28	1	FLOW	723.	700.	662.	625.	610.	600.	593.	581.	567.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT	MNWB	0.44	1	FLOW	236.	231.	221.	212.	208.	206.	204.	201.	197.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RMNWB	0.44	1	FLOW	236.	231.	221.	212.	208.	206.	204.	201.	197.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT	MNWC	0.60	1	FLOW	330.	322.	309.	297.	292.	288.	285.	281.	276.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT	PT35	1.04	1	FLOW	565.	551.	529.	507.	498.	492.	488.	481.	472.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RPT35	1.04	1	FLOW	561.	548.	526.	504.	495.	489.	485.	478.	469.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT	MNWD	0.08	1	FLOW	72.	71.	68.	65.	64.	64.	63.	62.	61.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

2 COMBINED AT	PT36	1.12	1	FLOW	586.	572.	549.	526.	517.	510.	506.	499.	489.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
OUTED TO	RPT36	1.12	1	FLOW	571.	558.	535.	513.	504.	498.	494.	487.	478.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
YDROGRAPH AT	MC2	0.92	1	FLOW	376.	367.	352.	337.	331.	327.	324.	319.	314.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT	PT37	2.03	1	FLOW	942.	919.	882.	845.	830.	820.	812.	801.	786.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
OUTED TO	RPT37	2.03	1	FLOW	937.	919.	879.	845.	830.	820.	813.	801.	786.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
HYDROGRAPH AT	B10A	1.60	1	FLOW	1451.	1417.	1361.	1306.	1284.	1268.	1258.	1240.	1218.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	PT38	3.64	1	FLOW	1625.	1587.	1521.	1454.	1428.	1411.	1398.	1378.	1352.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RPT38	3.64	1	FLOW	1572.	1538.	1472.	1407.	1385.	1366.	1353.	1336.	1310.
				TIME	3.75	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	PT39	6.91	1	FLOW	2053.	2002.	1913.	1823.	1792.	1766.	1748.	1723.	1688.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
OUTED TO	RPT39	6.91	1	FLOW	2044.	1993.	1903.	1814.	1782.	1757.	1739.	1713.	1679.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
YDROGRAPH AT	D6	1.56	1	FLOW	1162.	1138.	1098.	1058.	1042.	1031.	1023.	1011.	995.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT	PT40	8.48	1	FLOW	3185.	3109.	2980.	2852.	2802.	2767.	2742.	2703.	2653.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
OUTED TO	RPT40	8.48	1	FLOW	3152.	3077.	2950.	2822.	2773.	2738.	2713.	2674.	2625.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
YDROGRAPH AT	D7	0.85	1	FLOW	409.	399.	382.	366.	359.	355.	351.	346.	340.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT	PT41	9.33	1	FLOW	3530.	3445.	3302.	3159.	3104.	3064.	3036.	2993.	2937.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO	RPT41	9.33	1	FLOW	3510.	3426.	3280.	3138.	3085.	3044.	3020.	2973.	2921.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT	D8	1.26	1	FLOW	1242.	1214.	1169.	1123.	1105.	1093.	1084.	1069.	1051.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RD8	1.26	1	FLOW	1177.	1151.	1108.	1065.	1048.	1036.	1027.	1013.	997.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	PT42	10.59	1	FLOW	4284.	4180.	4014.	3840.	3769.	3725.	3689.	3638.	3571.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO	RPT42	10.59	1	FLOW	4266.	4163.	3995.	3826.	3759.	3713.	3675.	3633.	3562.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

2 COMBINED AT	PT47	2.80	1	FLOW	719.	705.	681.	658.	649.	642.	637.	630.	621.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RPT47	2.80	1	FLOW	718.	704.	680.	657.	648.	642.	637.	630.	621.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT	RH	1.36	1	FLOW	605.	585.	551.	519.	506.	497.	490.	480.	467.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT	PT48W	4.16	1	FLOW	1323.	1289.	1231.	1175.	1153.	1138.	1127.	1110.	1089.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT	B20	0.79	1	FLOW	405.	395.	378.	361.	355.	350.	347.	341.	335.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RB20	0.79	1	FLOW	402.	394.	377.	359.	354.	349.	345.	339.	335.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
3 COMBINED AT	PT48	21.29	1	FLOW	7263.	7090.	6806.	6516.	6391.	6320.	6253.	6174.	6052.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RPT48	21.29	1	FLOW	7215.	7044.	6761.	6473.	6350.	6280.	6214.	6135.	6015.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT	D12	0.18	1	FLOW	72.	70.	66.	63.	61.	61.	60.	59.	58.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO	RD12	0.18	1	FLOW	72.	70.	66.	63.	62.	61.	60.	59.	58.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT	D11A	0.16	1	FLOW	131.	127.	121.	114.	112.	110.	109.	107.	104.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	PT49	0.33	1	FLOW	133.	129.	123.	116.	114.	112.	111.	109.	106.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RPT49	0.33	1	FLOW	127.	124.	117.	111.	110.	109.	107.	105.	101.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	PT50	21.63	1	FLOW	7297.	7122.	6835.	6542.	6417.	6346.	6279.	6198.	6077.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO	RPT50	21.63	1	FLOW	7285.	7111.	6823.	6532.	6408.	6337.	6270.	6189.	6068.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT	D11B	0.99	1	FLOW	955.	932.	894.	856.	841.	831.	823.	811.	796.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	PT51	22.62	1	FLOW	7448.	7270.	6977.	6680.	6553.	6481.	6413.	6330.	6207.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33

NORTHERN-HALF STREET FLOW CAPACITY FOR
BLUE DIAMOND ROAD

HEC-RAS ANALYSIS OF FLOW THROUGH PARKING LOT WEST OF SILVERTON HOTEL
(EXISTING CONDITION, FLOW SPLIT MODEL)

HEC-RAS Plan: Flow Split River: Silverton Reach: North Profile: 1945 cfs

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North	-100	1945.00	83.00	86.36	86.36	86.97	0.003735	6.35	312.14	258.34	0.97
North	-200	1945.00	82.00	83.29	83.90	85.88	0.042959	12.92	150.51	259.66	2.99
North	-300	1945.00	79.20	81.00	81.48	82.68	0.021219	10.40	186.95	268.41	2.20
North	-400	1945.00	78.00	79.38	79.85	80.94	0.013952	10.04	193.79	220.51	1.89
North	-500	1945.00	76.20	77.72	78.17	79.30	0.019527	10.08	192.98	279.12	2.14
North	-600	1945.00	75.20	76.62	76.92	77.67	0.011628	8.21	236.87	316.97	1.67
North	-650	1945.00	74.50	75.61	75.97	76.84	0.015722	8.91	218.27	325.00	1.92
North	-700	1945.00	73.50	75.16	75.46	76.25	0.008127	8.37	232.29	353.95	1.47
North	-750	1945.00	73.80	75.34	75.34	75.92	0.003683	6.12	317.79	275.76	1.00

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X     X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X      X    X        X
X     X  X        X    X      X   X     X    X        X
X     X  XXXXXX    XXXX       X    X    X    X   XXXXX
```

PROJECT DATA
Project Title: North
Project File : North.prj
Run Date and Time: 1/28/03 8:46:18 PM

Project in English units

PLAN DATA

Plan Title: Flow Split
Plan File : g:\DRAINAGE\6859\HEC-RAS\North.p06

Geometry Title: Flow split
Geometry File : g:\DRAINAGE\6859\HEC-RAS\North.g05

Flow Title : Flow Split
Flow File : g:\DRAINAGE\6859\HEC-RAS\North.f05

Plan Summary Information:
Number of: Cross Sections = 9 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 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: Flow Split
Flow File : g:\DRAINAGE\6859\HEC-RAS\North.f05

Flow Data (cfs)

River	Reach	RS	1945 cfs
Silverton	North	-100	1945

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	North	1945 cfs	Critical	Normal S = .006

GEOMETRY DATA

Geometry Title: Flow split
Geometry File : g:\DRAINAGE\6859\HEC-RAS\North.g05

CROSS SECTION RIVER: Silverton
REACH: North RS: -100

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	87.5	27	87	41	83	46	83	54.5	85
54.5	84.5	164	85.5	243.9	85	243.9	85.5	257.7	86
287.6	86								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	54.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	257.7	100	100	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	86.97	Element			
Vel Head (ft)	0.62	Wt. n-Val.		0.018	0.016
W.S. Elev (ft)	86.36	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	86.36	Flow Area (sq ft)		301.52	10.62
E.G. Slope (ft/ft)	0.003735	Area (sq ft)		301.52	10.62
Q Total (cfs)	1945.00	Flow (cfs)		1915.02	29.98
Top Width (ft)	258.34	Top Width (ft)		228.44	29.90
Vel Total (ft/s)	6.23	Avg. Vel. (ft/s)		6.35	2.82
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		1.32	0.36
Conv. Total (cfs)	31825.8	Conv. (cfs)		31335.3	490.5
Length Wtd. (ft)	100.00	Wetted Per. (ft)		230.16	30.26
Min Ch El (ft)	83.00	Shear (lb/sq ft)		0.31	0.08
Alpha	1.03	Stream Power (lb/ft s)		1.94	0.23
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		3.39	0.01
C & E Loss (ft)	0.01	Cum SA (acres)		4.25	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -200

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.5	15	86	39	83	41.7	82	55.4	83.2
55.4	82.7	161.9	83	247.5	82	247.5	82.5	260	82.5
260	82	273.9	83	312.6	83.5	312.6	84		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	55.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	312.6	100	100	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	85.88	Element			
Vel Head (ft)	2.59	Wt. n-Val.		0.016	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	370	100	100	110	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

E.G. Elev (ft)	80.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.		0.016	
W.S. Elev (ft)	79.38	Reach Len. (ft)	100.00	100.00	110.00
Crit W.S. (ft)	79.85	Flow Area (sq ft)		193.79	
E.G. Slope (ft/ft)	0.013952	Area (sq ft)		193.79	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	220.51	Top Width (ft)		220.51	
Vel Total (ft/s)	10.04	Avg. Vel. (ft/s)		10.04	
Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	16466.7	Conv. (cfs)		16466.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		221.44	
Min Ch El (ft)	78.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		7.65	
Frctn Loss (ft)	1.70	Cum Volume (acre-ft)		2.05	
C & E Loss (ft)	0.03	Cum SA (acres)		2.52	

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: Silverton
REACH: North RS: -500

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.1	10.9	83.8	29.9	84	46.7	84.5	50.4	84
77.2	79.5	77.2	79	79.3	77	121.1	76.6	162.3	77
264.4	77.4	275.3	77.2	275.3	77.7	284.6	77.7	284.6	77.2
312.4	76.5	312.4	77	322	77.2	322	76.2	364.1	78
437.1	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	46.7	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	364.1	100	100	110	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

E.G. Elev (ft)	79.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.016	
W.S. Elev (ft)	77.72	Reach Len. (ft)	100.00	100.00	110.00
Crit W.S. (ft)	78.17	Flow Area (sq ft)		192.98	
E.G. Slope (ft/ft)	0.019527	Area (sq ft)		192.98	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	279.12	Top Width (ft)		279.12	
Vel Total (ft/s)	10.08	Avg. Vel. (ft/s)		10.08	
Max Chl Dpth (ft)	1.52	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	13918.8	Conv. (cfs)		13918.8	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		281.96	
Min Ch El (ft)	76.20	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		8.41	
Frctn Loss (ft)	1.64	Cum Volume (acre-ft)		1.60	
C & E Loss (ft)	0.00	Cum SA (acres)		1.95	

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: Silverton
REACH: North RS: -600

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.3	16.4	83	54.3	84	83.5	79	83.5	78.5
101.6	76	316.9	75.8	331.7	75.6	331.7	76.1	341.5	76.1
341.5	75.6	368.3	75.2	370.4	75.2	370.4	75.7	379.4	76

379.4	75.5	395.1	76	425.8	77	487.9	79

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	83.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	425.8	50	60	60	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.67	Element			
Vel Head (ft)	1.05	Wt. n-Val.		0.016	
W.S. Elev (ft)	76.62	Reach Len. (ft)	50.00	60.00	60.00
Crit W.S. (ft)	76.92	Flow Area (sq ft)		236.87	
E.G. Slope (ft/ft)	0.011628	Area (sq ft)		236.87	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	316.97	Top Width (ft)		316.97	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8.21	
Max Chl Dpth (ft)	1.42	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	18037.3	Conv. (cfs)		18037.3	
Length Wtd. (ft)	60.00	Wetted Per. (ft)		319.04	
Min Ch El (ft)	75.20	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		4.43	
Frctn Loss (ft)	1.48	Cum Volume (acre-ft)		1.11	
C & E Loss (ft)	0.16	Cum SA (acres)		1.27	

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: Silverton
REACH: North RS: -650

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83	20	82.5	40.5	82.8	57.6	82.8	85.5	78
85.5	77.5	105	75	129.9	74.5	129.9	75	137.7	75
137.7	74.5	219	75	341.5	75.1	360.2	75	395.1	74.7
407.9	75	436.3	76	470.2	77	498.1	78	532.4	79

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	85.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	470.2	50	50	60	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.84	Element			
Vel Head (ft)	1.23	Wt. n-Val.		0.016	
W.S. Elev (ft)	75.61	Reach Len. (ft)	50.00	50.00	60.00
Crit W.S. (ft)	75.97	Flow Area (sq ft)		218.27	
E.G. Slope (ft/ft)	0.015722	Area (sq ft)		218.27	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	325.00	Top Width (ft)		325.00	
Vel Total (ft/s)	8.91	Avg. Vel. (ft/s)		8.91	
Max Chl Dpth (ft)	1.11	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	15512.2	Conv. (cfs)		15512.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		326.06	
Min Ch El (ft)	74.50	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		5.85	
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)		0.80	
C & E Loss (ft)	0.02	Cum SA (acres)		0.82	

CROSS SECTION RIVER: Silverton
REACH: North RS: -700

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.5	42.1	82	63.5	81	84.7	77	88.2	76.5
108.9	74	108.9	73.5	163.1	74	306.5	74	306.5	74.5
320	74.5	320	74	373.3	74.4	425.3	74.3	425.3	74.8
436.3	75.1	436.3	74.6	447.9	75	480.8	76	510.4	77
541.3	78								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	88.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	510.4	60	60 65	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	76.25	Element			
Vel Head (ft)	1.09	Wt. n-Val.		0.016	
W.S. Elev (ft)	75.16	Reach Len. (ft)	60.00	60.00	65.00
Crit W.S. (ft)	75.46	Flow Area (sq ft)		232.29	
E.G. Slope (ft/ft)	0.008127	Area (sq ft)		358.15	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	353.95	Top Width (ft)		353.95	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	21575.6	Conv. (cfs)		21575.6	
Length Wtd. (ft)	60.00	Wetted Per. (ft)		232.24	
Min Ch El (ft)	73.50	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)		4.25	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		0.47	
C & E Loss (ft)	0.04	Cum SA (acres)		0.43	

CROSS SECTION RIVER: Silverton
REACH: North RS: -750

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82	44	81	65.5	80	79.8	77	91	75.5
91	75	108.8	74	184.8	73.8	184.8	74.3	197.7	74.3
197.7	73.8	250.9	74	250.9	80	405.2	80	405.2	75
415	74.92	415	74.42	451	74.18	451	74.68	489.4	74.3
489.4	73.8	500.1	74	513.4	74.63	513.4	75.13	553.7	76.23
553.7	75.73	563.2	76	578.4	76.6	578.4	77.1	615.6	78.23
615.6	77.73	626.6	78	646.2	78.86	646.2	79.36		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	578.4	0	0 0	.1	.3

CROSS SECTION OUTPUT Profile #1945 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	75.92	Element			
Vel Head (ft)	0.58	Wt. n-Val.		0.016	
W.S. Elev (ft)	75.34	Reach Len. (ft)			
Crit W.S. (ft)	75.34	Flow Area (sq ft)		317.79	
E.G. Slope (ft/ft)	0.003683	Area (sq ft)		317.79	
Q Total (cfs)	1945.00	Flow (cfs)		1945.00	
Top Width (ft)	275.76	Top Width (ft)		275.76	
Vel Total (ft/s)	6.12	Avg. Vel. (ft/s)		6.12	
Max Chl Dpth (ft)	1.54	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	32048.9	Conv. (cfs)		32048.9	
Length Wtd. (ft)		Wetted Per. (ft)		280.82	
Min Ch El (ft)	73.80	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)		1.59	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.
Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2
North	-100	.025	.016
North	-200	.025	.016
North	-300	.025	.016
North	-400	.025	.016
North	-500	.025	.016
North	-600	.025	.016
North	-650	.025	.016
North	-700	.025	.016
North	-750	.025	.016

SUMMARY OF REACH LENGTHS

River: Silverton

Reach	River Sta.	Left	Channel	Right
North	-100	100	100	100
North	-200	100	100	100
North	-300	100	100	0
North	-400	100	100	110
North	-500	100	100	110
North	-600	50	60	60
North	-650	50	50	60
North	-700	60	60	65
North	-750	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

Reach	River Sta.	Contr.	Expan.
North	-100	.1	.3
North	-200	.1	.3
North	-300	.1	.3
North	-400	.1	.3
North	-500	.1	.3
North	-600	.1	.3
North	-650	.1	.3
North	-700	.3	.5
North	-750	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
North	-100	1945.00	83.00	86.36	86.36	86.97	0.003735	6.35	312.14	258.34	0.97
North	-200	1945.00	82.00	83.29	83.90	85.88	0.042959	12.92	150.51	259.66	2.99
North	-300	1945.00	79.20	81.00	81.48	82.68	0.021219	10.40	186.95	268.41	2.20
North	-400	1945.00	78.00	79.38	79.85	80.94	0.013952	10.04	193.79	220.51	1.89
North	-500	1945.00	76.20	77.72	78.17	79.30	0.019527	10.08	192.98	279.12	2.14

North	-600	1945.00	75.20	76.62	76.92	77.67	0.011628	8.21	236.87	316.97	1.67
North	-650	1945.00	74.50	75.61	75.97	76.84	0.015722	8.91	218.27	325.00	1.92
North	-700	1945.00	73.50	75.16	75.46	76.25	0.008127	8.37	232.29	353.95	1.47
North	-750	1945.00	73.80	75.34	75.34	75.92	0.003683	6.12	317.79	275.76	1.00

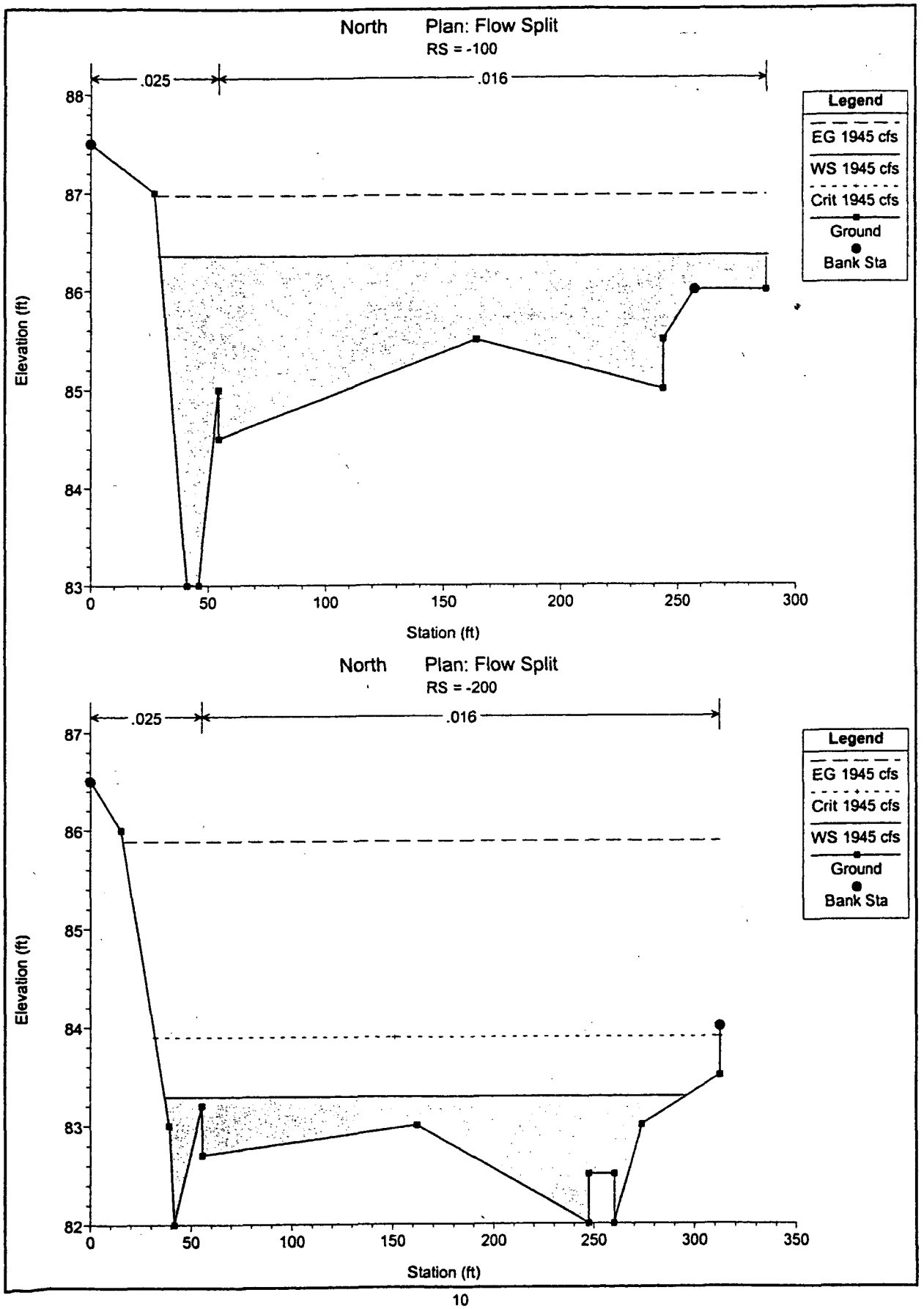
Profile Output Table - HEC-FDA

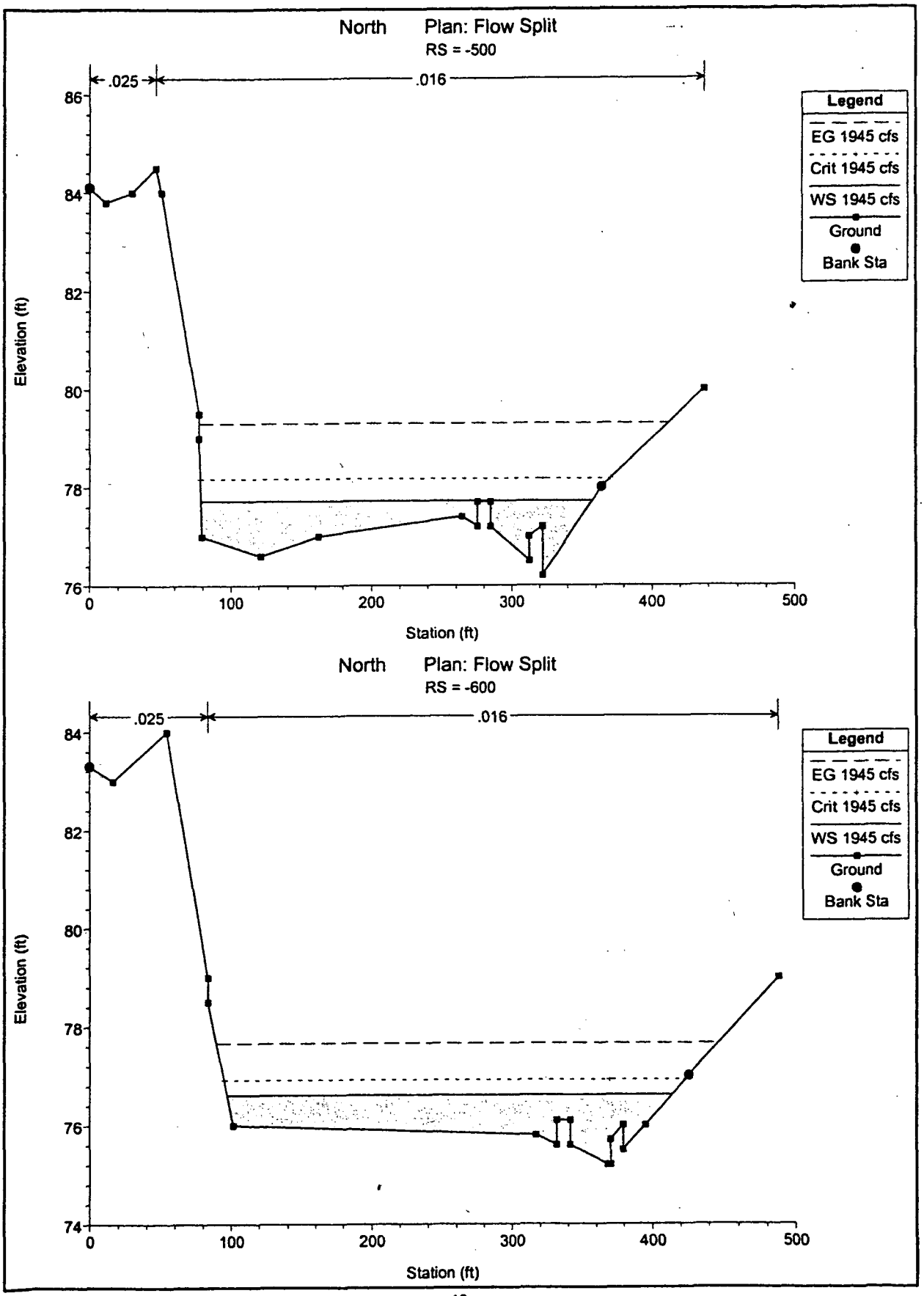
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)
North	-100	1945.00	83.00	86.36
North	-200	1945.00	82.00	83.29
North	-300	1945.00	79.20	81.00
North	-400	1945.00	78.00	79.38
North	-500	1945.00	76.20	77.72
North	-600	1945.00	75.20	76.62
North	-650	1945.00	74.50	75.61
North	-700	1945.00	73.50	75.16
North	-750	1945.00	73.80	75.34

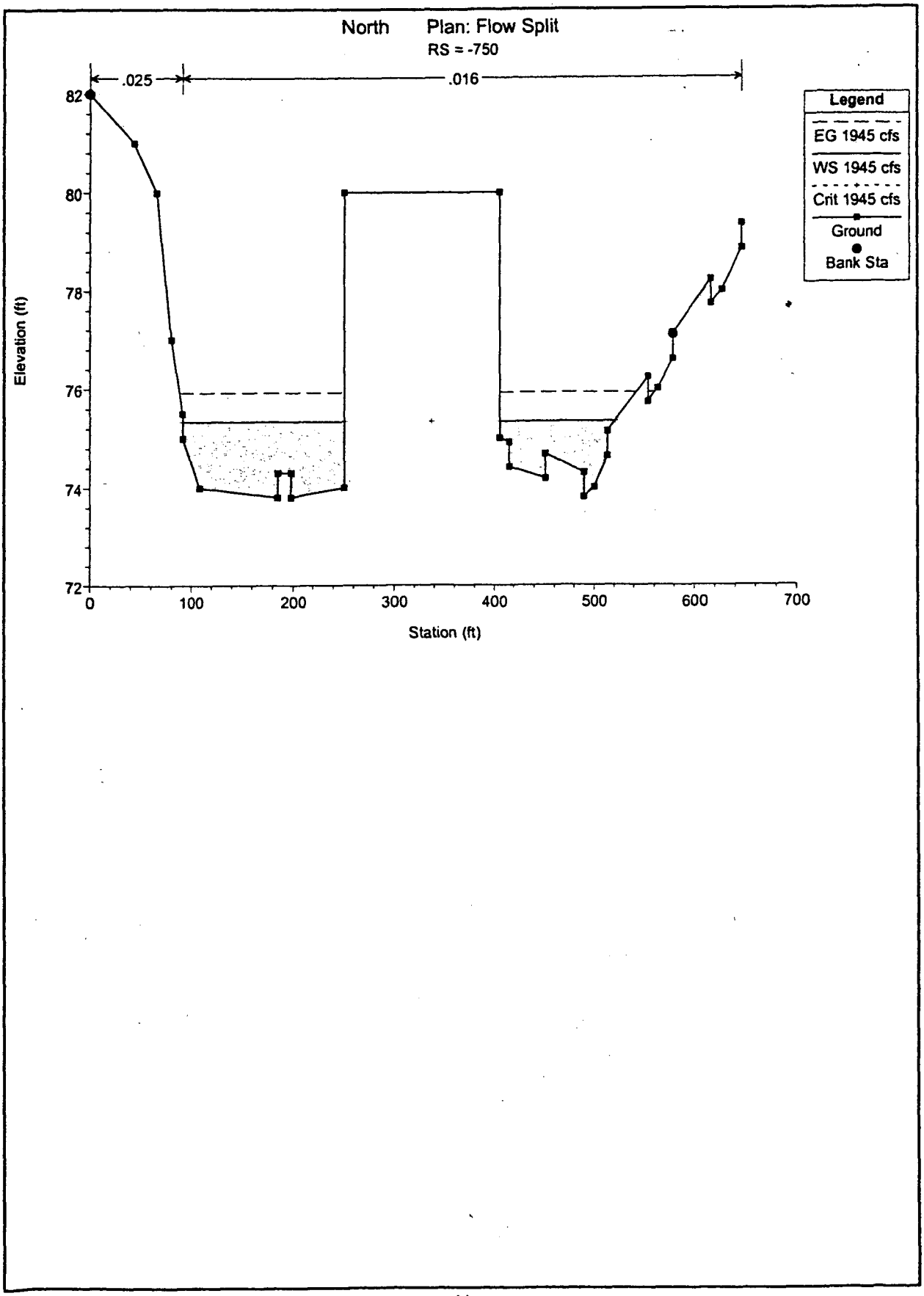
ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Flow Split

River: Silverton Reach: North RS: -100 Profile: 1945 cfs
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Silverton Reach: North RS: -200 Profile: 1945 cfs
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.
River: Silverton Reach: North RS: -300 Profile: 1945 cfs
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.
River: Silverton Reach: North RS: -400 Profile: 1945 cfs
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.
River: Silverton Reach: North RS: -500 Profile: 1945 cfs
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.
River: Silverton Reach: North RS: -600 Profile: 1945 cfs
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.
River: Silverton Reach: North RS: -750 Profile: 1945 cfs
Warning:Divided flow computed for this cross-section.
Warning:Slope too steep for slope area to converge during supercritical flow calculations (normal depth is

below critical
depth). Water surface set to critical depth.


North Plan: Flow Split
RS = -100
.025
.016
Legend
EG 1945 cfs
WS 1945 cfs
Crit 1945 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Plan: Flow Split
RS = -200
.025
.016
Legend
EG 1945 cfs
Crit 1945 cfs
WS 1945 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


North Plan: Flow Split
RS = -500
.025
.016
Legend
EG 1945 cfs
Crit 1945 cfs
WS 1945 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Plan: Flow Split
RS = -600
.025
.016
Legend
EG 1945 cfs
Crit 1945 cfs
WS 1945 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


North
Plan: Flow Split
RS = -750
.025
.016
Legend
EG 1945 cfs
WS 1945 cfs
Crit 1945 cfs
Ground
Bank Sta
Elevation (ft)
82
80
78
76
74
72
0
100
200
300
400
500
600
700
Station (ft)

SPLIT FLOW ANALYSIS AT RIVER STATION -700
(EXISTING CONDITION)

Flow Section at Station -700 to Determine the Flow Split Ratio (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Project Description	
Worksheet	Flow Section at Station -700
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.003400	ft/ft
Discharge	1,945.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Metho	Improved Lotter's Method
Closed Channel Weighting Meth	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	75.16	ft
Elevation Range	73.50 to 82.50	
Flow Area	358.1	ft²
Wetted Perimeter	356.53	ft
Top Width	353.95	ft
Actual Depth	1.66	ft
Critical Elevation	75.13	ft
Critical Slope	0.003790	ft/ft
Velocity	5.43	ft/s
Velocity Head	0.46	ft
Specific Energy	75.62	ft
Froude Number	0.95	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+88.20	0.025
0+88.20	5+41.30	0.016

Natural Channel Points

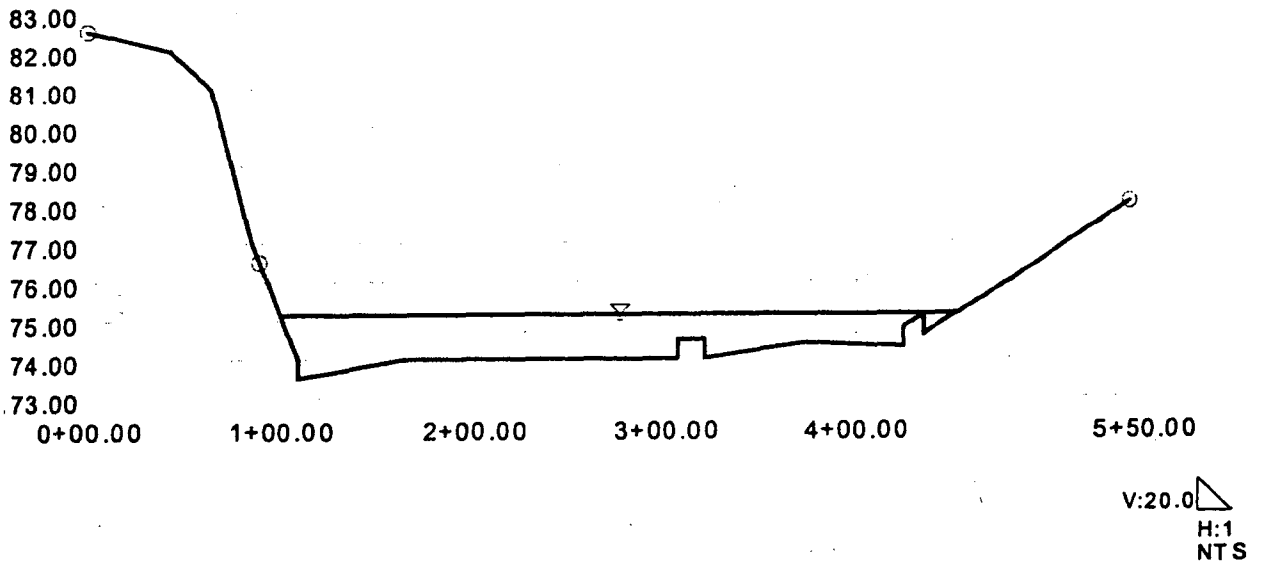
Station (ft)	Elevation (ft)
0+00.00	82.50
0+42.10	82.00
0+63.50	81.00
0+84.70	77.00
0+88.20	76.50
1+08.90	74.00
1+08.90	73.50
1+63.10	74.00
3+06.50	74.00
3+06.50	74.50
3+20.00	74.50
3+20.00	74.00
3+73.30	74.40

© Haestad Methods, Inc.
Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Section at Station -700
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Slope	0.003400	ft/ft
Water Surface Elevation	75.16	ft
Elevation Range	73.50 to 82.50	
Discharge	1,945.00	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Split Flow North of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
3+06.50	74.50
3+20.00	74.50
3+20.00	74.00
3+73.30	74.40

Notes: * To determine the portion of Q within the segment of HEC-RAS Section -700 North of the Existing Hotel Building which will satisfy the WSE determined from the HEC-RAS analysis

* Since North flow (1796.99) + South flow(188.98) = 1985.97 cfs > 1945 cfs

* The corrected North Split Flow = 1760 cfs by proportionality [i.e. (1796.99/1985.97) x 1945 cfs)

Split Flow South of the Silverton Building at Station -700 (Existing, 100-Year Storm)
Worksheet for Irregular Channel

Notes: * To determine the portion of Q within the segment of HEC-RAS Section -700 North of the Existing Hotel Building which will satisfy the WSE determined from the HEC-RAS analysis

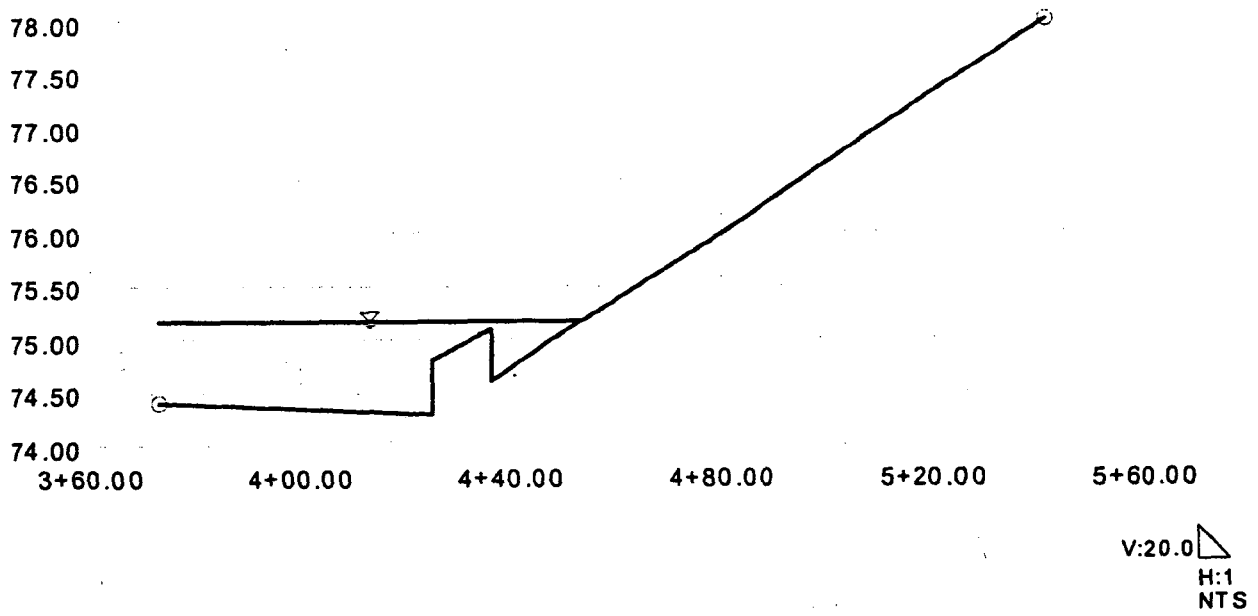
* Since North flow (1796.99) + South flow(188.98) = 1985.97 cfs > 1945 cfs

* The corrected South Split Flow = 185 cfs by proportionality [i.e. (188.98/1985.97) x 1945 cfs)

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Flow Split at Station -700 (South)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Slope	0.003400	ft/ft
Water Surface Elevation	75.16	ft
Elevation Range	74.30 to 78.00	
Discharge	188.98	cfs



© Haestad Methods, Inc.

Lochsa Engineering
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

HEC-RAS Plan: Existing-N River: Silverton Reach: North Profile: 1760 cfs

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
North	-700	1760.00	73.50	75.09	75.56	76.70	0.010016	10.18	172.84	273.46	1.67
North	-750	1760.00	73.80	75.94	75.55	76.44	0.001594	5.67	310.47	163.16	0.72
North	-850	1760.00	73.00	75.54		76.22	0.002337	6.64	264.95	148.84	0.88
North	-950	1760.00	73.00	75.49		75.97	0.001678	5.55	316.99	178.92	0.74
North	-1050	1760.00	72.32	74.91	74.91	75.70	0.003424	7.13	246.80	161.15	1.02
North	-1150	1760.00	70.00	74.25	72.97	74.40	0.000351	3.11	565.46	230.55	0.35
North	-1250	1760.00	70.50	73.57	73.57	74.27	0.003636	6.73	261.53	190.41	1.01
North	-1350	1760.00	70.90	73.09	73.14	73.86	0.004083	7.00	251.31	185.60	1.06
North	-1450	1760.00	70.00	72.83	72.43	73.21	0.001697	4.95	355.52	232.50	0.71
North	-1550	1760.00	69.90	72.16	72.16	72.87	0.003596	6.76	260.47	187.45	1.01
North	-1650	1760.00	69.00	71.81	71.85	72.59	0.003580	7.08	248.50	175.28	1.05
North	-1780	1760.00	68.50	71.26	71.34	72.05	0.004606	7.13	246.96	182.27	1.08
North	-1960	1760.00	68.00	70.78	69.97	70.93	0.000720	3.05	576.87	371.50	0.43
North	-2020	1760.00	67.00	70.69		70.87	0.000722	3.43	513.19	280.46	0.45
North	-2110	1760.00	66.00	70.76		70.81	0.000114	1.65	1067.19	391.43	0.18
North	-2200	1760.00	64.00	70.76		70.80	0.000122	1.62	1084.43	372.32	0.17
North	-2250	1760.00	62.31	70.75		70.79	0.000098	1.41	1251.55	437.97	0.15
North	-2300	1760.00	64.00	70.75	67.81	70.78	0.000101	1.44	1221.20	431.16	0.15

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: North
Project File : North.prj
Run Date and Time: 1/28/03 8:20:30 PM

Project in English units

PLAN DATA

Plan Title: Existing-North Parking Lot
Plan File : g:\DRAINAGE\6859\HEC-RAS\North.p05

Geometry Title: Existing-North Parking Lot
Geometry File : g:\DRAINAGE\6859\HEC-RAS\North.g04

Flow Title : Existing-North Parking Lot
Flow File : g:\DRAINAGE\6859\HEC-RAS\North.f04

Plan Summary Information:
Number of: Cross Sections = 18 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 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: Existing-North Parking Lot
Flow File : g:\DRAINAGE\6859\HEC-RAS\North.f04

Flow Data (cfs)

River	Reach	RS	1760 cfs
Silverton	North	-700	1760

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Silverton	North	1760 cfs	Normal S = .01	Known WS = 70.75

Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)	5.55
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.77
Conv. Total (cfs)	42961.5	Conv. (cfs)	42961.5
Length Wtd. (ft)	100.00	Wetted Per. (ft)	180.31
Min Ch El (ft)	73.00	Shear (lb/sq ft)	0.18
Alpha	1.00	Stream Power (lb/ft s)	1.02
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	15.67
C & E Loss (ft)	0.03	Cum SA (acres)	8.15

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: Silverton
REACH: North RS: -1050

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.75	4.68	79	5.16	79	14.16	79	24.8	80
44.69	80	76.02	79	81.43	78	84.68	77	88.14	76
91.55	75	95.02	74	103.03	73.65	103.03	73.15	123.05	73
148.49	72.32	148.49	72.82	148.99	72.82	160.94	72.82	160.94	72.32
173.47	73	220.9	74	248.03	74.29	248.03	74.79	253	74.9
253	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.03	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	253	150	120	100	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	75.70	Element			
Vel Head (ft)	0.79	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.91	Reach Len. (ft)	150.00	120.00	100.00
Crit W.S. (ft)	74.91	Flow Area (sq ft)		246.80	
E.G. Slope (ft/ft)	0.003424	Area (sq ft)		246.80	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	161.15	Top Width (ft)		161.15	
Vel Total (ft/s)	7.13	Avg. Vel. (ft/s)		7.13	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	30079.8	Conv. (cfs)		30079.8	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		163.34	
Min Ch El (ft)	72.32	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		2.30	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		15.02	
C & E Loss (ft)	0.19	Cum SA (acres)		7.76	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1150

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.1	1.08	77	6.57	76	16.44	76	32.45	77
56.45	77	81.53	76	85.38	75	89.29	74	93.85	73
98.71	72	103.31	71	103.81	71	103.81	70.5	104.91	70.63
107.15	71	147.84	72	147.84	72.5	160.16	72.5	160.16	72
197.27	72	272.5	72	291.35	71	309.75	70	331.12	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	331.12	105	92	62	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.40	Element			
Vel Head (ft)	0.15	Wt. n-Val.		0.016	
W.S. Elev (ft)	74.25	Reach Len. (ft)	105.00	92.00	62.00
Crit W.S. (ft)	72.97	Flow Area (sq ft)		565.46	
E.G. Slope (ft/ft)	0.000351	Area (sq ft)		565.46	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	230.55	Top Width (ft)		230.55	
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)		3.11	
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	94008.5	Conv. (cfs)		94008.5	
Length Wtd. (ft)	92.00	Wetted Per. (ft)		233.45	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.16	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		13.90	
C & E Loss (ft)	0.06	Cum SA (acres)		7.22	

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: Silverton
REACH: North RS: -1250

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76	7.42	75	15.29	75	27.13	76	49.88	76
53.72	76	79.03	76	83.47	75	89.51	74	94.15	73
98.68	72	103.28	71	103.58	71	103.58	70.5	105.08	70.63
107.32	71	148.01	72	148.01	72.5	158.15	72.5	158.15	72
159.65	72.13	197.71	72	272.42	73	272.42	73.5	285.9	73.6
285.9	80								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	103.28	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	285.9	120	105	85	.3	.5

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.27	Element			
Vel Head (ft)	0.70	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.57	Reach Len. (ft)	120.00	105.00	85.00
Crit W.S. (ft)	73.57	Flow Area (sq ft)		261.53	
E.G. Slope (ft/ft)	0.003636	Area (sq ft)		261.53	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	190.41	Top Width (ft)		190.41	
Vel Total (ft/s)	6.73	Avg. Vel. (ft/s)		6.73	
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	29186.9	Conv. (cfs)		29186.9	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		192.74	
Min Ch El (ft)	70.50	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		2.07	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		13.03	
C & E Loss (ft)	0.00	Cum SA (acres)		6.77	

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: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1350

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.1	1.66	75	6.95	74	14.56	74	27.97	75
29.03	75	75.95	75	77.5	75	83.27	74	88.1	73
92.46	72	96.91	71	102.55	71.4	102.55	70.9	104.05	71.03
147.7	71	147.7	71.5	162.18	71.5	162.18	71	163.68	71.13
213.22	72	272.15	73	273.25	73	273.25	73.5	277.8	80

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	102.55	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	277.8	150	135	120	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.86	Element			
Vel Head (ft)	0.76	Wt. n-Val.		0.016	
W.S. Elev (ft)	73.09	Reach Len. (ft)	150.00	135.00	120.00
Crit W.S. (ft)	73.14	Flow Area (sq ft)		251.31	
E.G. Slope (ft/ft)	0.004083	Area (sq ft)		251.31	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	185.60	Top Width (ft)		185.60	
Vel Total (ft/s)	7.00	Avg. Vel. (ft/s)		7.00	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	27543.4	Conv. (cfs)		27543.4	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		187.47	
Min Ch El (ft)	70.90	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		2.39	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		12.41	
C & E Loss (ft)	0.02	Cum SA (acres)		6.32	

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1450

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75	22	72.1	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	115.49	72	120.12	71	125.66	70
127.8	70.5	128.3	70.5	128.3	70	129.91	70.13	166.31	70
173.26	70.82	173.76	70.82	184.55	70.82	184.55	70.57	186.05	70.61
211.54	71	278.27	72	325.62	73	356.76	74	367.73	74.31
367.73	74.81	374.91	74.9	374.91	80				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.66	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	374.91	165	130	70	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.21	Element			
Vel Head (ft)	0.38	Wt. n-Val.		0.017	
W.S. Elev (ft)	72.83	Reach Len. (ft)	165.00	130.00	70.00
Crit W.S. (ft)	72.43	Flow Area (sq ft)		355.52	
E.G. Slope (ft/ft)	0.001697	Area (sq ft)		355.52	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	232.50	Top Width (ft)		232.50	
Vel Total (ft/s)	4.95	Avg. Vel. (ft/s)		4.95	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	42720.0	Conv. (cfs)		42720.0	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		233.96	
Min Ch El (ft)	70.00	Shear (lb/sq ft)		0.16	

Alpha	1.00	Stream Power (lb/ft s)	0.80
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	11.47
C & E Loss (ft)	0.03	Cum SA (acres)	5.67

Warning: Divided flow computed for this cross-section.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1550

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74	22	72.08	23.18	72	31.42	71	32.01	71
36.07	72	40.11	73	44.19	74	48.37	75	74.83	75
102.17	74	106.61	73	111.05	72	115.68	71	120.22	70
124.41	70.4	124.91	70.4	124.91	69.9	167.98	70	169	70.06
169	70.56	179.55	70.56	179.55	70.06	234.07	71	275.41	72
315.98	73	331.81	73.84	331.81	74.34	340.71	74.4	340.71	80

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	340.71	105	80	55	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.87	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.017	
W.S. Elev (ft)	72.16	Reach Len. (ft)	105.00	80.00	55.00
Crit W.S. (ft)	72.16	Flow Area (sq ft)		260.47	
E.G. Slope (ft/ft)	0.003596	Area (sq ft)		260.47	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	187.45	Top Width (ft)		187.45	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.76	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)		1.39	
Conv. Total (cfs)	29348.8	Conv. (cfs)		29348.8	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		189.43	
Min Ch El (ft)	69.90	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		2.09	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		10.55	
C & E Loss (ft)	0.04	Cum SA (acres)		5.05	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1650

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.5	22	71.22	25.21	71	35.02	71	39.59	72
44.24	73	48.98	74	96.9	74	104.05	73	109.88	72
115.33	71	120.59	70	124.43	69.5	124.93	69.5	125.43	69.13
138.1	69	185.01	70	230.94	71	265.98	72	297.99	73
299.25	73.01	299.25	73.51	309.23	73.6	309.23	80		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	124.43	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	309.23	165	135	80	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.59	Element			
Vel Head (ft)	0.78	Wt. n-Val.		0.016	
W.S. Elev (ft)	71.81	Reach Len. (ft)	165.00	135.00	80.00

Crit W.S. (ft)	71.85	Flow Area (sq ft)	248.50
E.G. Slope (ft/ft)	0.003580	Area (sq ft)	248.50
Q Total (cfs)	1760.00	Flow (cfs)	1760.00
Top Width (ft)	175.28	Top Width (ft)	175.28
Vel Total (ft/s)	7.08	Avg. Vel. (ft/s)	7.08
Max Chl Dpth (ft)	2.81	Hydr. Depth (ft)	1.42
Conv. Total (cfs)	29414.1	Conv. (cfs)	29414.1
Length Wtd. (ft)	135.00	Wetted Per. (ft)	175.74
Min Ch El (ft)	69.00	Shear (lb/sq ft)	0.32
Alpha	1.00	Stream Power (lb/ft s)	2.24
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	10.08
C & E Loss (ft)	0.01	Cum SA (acres)	4.71

Warning: Divided flow computed for this cross-section.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1780

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.5	22	69.68	28.14	69	31.25	69	36.26	70
41.27	71	46.27	72	75.34	73	99.51	73	105.11	72
109.71	71	116.34	70	122.87	69	125.27	69	125.27	68.5
158.27	69	175.45	69.55	175.45	70.05	190.42	70.17	190.42	69.67
191.59	69.8	239.54	71	297.08	72.27	297.08	72.77	301.16	72.79
329.68	72.9	329.68	80						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	22	.025	125.27	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	329.68	285	180	130	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.05	Element			
Vel Head (ft)	0.79	Wt. n-Val.		0.017	
W.S. Elev (ft)	71.26	Reach Len. (ft)	285.00	180.00	130.00
Crit W.S. (ft)	71.34	Flow Area (sq ft)		246.96	
E.G. Slope (ft/ft)	0.004606	Area (sq ft)		246.96	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	182.27	Top Width (ft)		182.27	
Vel Total (ft/s)	7.13	Avg. Vel. (ft/s)		7.13	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	25931.8	Conv. (cfs)		25931.8	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		184.32	
Min Ch El (ft)	68.50	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)		2.75	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		9.32	
C & E Loss (ft)	0.00	Cum SA (acres)		4.16	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -1960

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70.2	62	69	110	70	135	68	147.7	68
155.63	69	163.67	70	185.08	71	216.22	71	223.41	70
230.47	69	237.16	68	238.84	68.5	239.34	68.5	239.34	68
240.71	68	268.91	68	281.94	68.28	283.25	68.51	294.14	68.51
294.14	68	370.33	70	419.65	71	477.14	72.21	477.14	72.71
489.87	72.85	542.92	72.95	542.92	80				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	62	.025	110	.016	135	.025	238.84	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	542.92	75	70	45	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.93	Element			
Vel Head (ft)	0.14	Wt. n-Val.		0.018	
W.S. Elev (ft)	70.78	Reach Len. (ft)	75.00	70.00	45.00
Crit W.S. (ft)	69.97	Flow Area (sq ft)		576.87	
E.G. Slope (ft/ft)	0.000720	Area (sq ft)		576.87	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	371.50	Top Width (ft)		371.50	
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)		3.05	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	65570.9	Conv. (cfs)		65570.9	
Length Wtd. (ft)	70.00	Wetted Per. (ft)		373.67	
Min Ch El (ft)	68.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.21	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		7.61	
C & E Loss (ft)	0.00	Cum SA (acres)		3.01	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2020

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70	48	69	66	69	86	68	100	67.42
104.13	67	106.95	67	112.07	68	117	69	121.77	70
126.5	71	130.98	72	176.97	72	182.86	71	188.27	70
194.3	68	200.48	67.7	203.4	67.7	203.4	67.2	246.18	68
304.9	69	349.08	70	381.66	70.95	381.66	71.45	385.55	71.45
385.55	70.95	447.5	72.17	447.5	72.67	480.72	72.8	480.72	80

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	48	.025	66	.016	100	.025	203.4	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	480.72	110	90	50	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
245	295	69	295	340	70	340	375	71

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.87	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.018	
W.S. Elev (ft)	70.69	Reach Len. (ft)	110.00	90.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		513.19	
E.G. Slope (ft/ft)	0.000722	Area (sq ft)		513.19	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	280.46	Top Width (ft)		280.46	
Vel Total (ft/s)	3.43	Avg. Vel. (ft/s)		3.43	
Max Chl Dpth (ft)	3.69	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	65510.1	Conv. (cfs)		65510.1	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		285.20	
Min Ch El (ft)	67.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.28	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		6.74	
C & E Loss (ft)	0.04	Cum SA (acres)		2.49	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Silverton
REACH: North RS: -2110

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.8	88	67.06	88.98	67	101.15	66	120	66
140	67	152.01	67	153.51	67.13	166.89	67	197.91	67.2
197.91	66.7	218.04	67	263.66	68	318.44	69	361.21	70
400.78	71	445.72	71.11	445.72	71.61				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	88	.025	197.91	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	445.72	115	95	60	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.81	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.020	
W.S. Elev (ft)	70.76	Reach Len. (ft)	115.00	95.00	60.00
Crit W.S. (ft)		Flow Area (sq ft)		1067.19	
E.G. Slope (ft/ft)	0.000114	Area (sq ft)		1067.19	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	391.43	Top Width (ft)		391.43	
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)		1.65	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	164903.3	Conv. (cfs)		164903.3	
Length Wtd. (ft)	95.00	Wetted Per. (ft)		393.06	
Min Ch El (ft)	66.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.11	
C & E Loss (ft)	0.00	Cum SA (acres)		1.80	

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2200

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	100	67.28	106.77	67	109.68	66	115.87	65
126.13	64	132.54	64	159.48	65	178.75	66	206.82	67
213.83	67.48	213.83	67.98	221.95	67.98	221.95	67.48	236.59	68
284.28	69	339.29	70	382.8	71	446.41	72	454.18	72.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	100	.035	178.75	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	454.18	50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.80	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.023	
W.S. Elev (ft)	70.76	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		1084.43	
E.G. Slope (ft/ft)	0.000122	Area (sq ft)		1084.43	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	372.32	Top Width (ft)		372.32	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	6.76	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	159156.7	Conv. (cfs)		159156.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		375.03	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.04	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		2.76	
C & E Loss (ft)	0.00	Cum SA (acres)		0.96	

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2250

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.08	82.5	68	95	67	103.8	68.8
104.68	68.8	104.68	62.31	146.31	64	160.11	65	177.31	66
202.53	67	251.11	68	312.06	69	390.15	70	437.97	70.57

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.025	95	.035	177.31	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	437.97	50	50	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.79	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.024	
W.S. Elev (ft)	70.75	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		1251.55	
E.G. Slope (ft/ft)	0.000098	Area (sq ft)		1251.55	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	437.97	Top Width (ft)		437.97	
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	177684.4	Conv. (cfs)		177684.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		446.28	
Min Ch El (ft)	62.31	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.42	
C & E Loss (ft)	0.00	Cum SA (acres)		0.50	

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Silverton
REACH: North RS: -2300

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.5	75	68.13	77.28	68	91.2	67	98.67	66
108.25	65	112.72	64	132.64	64	145.6	65	157.85	66
171.22	67	221.43	68	355.24	69	431.16	69.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	75	.035	171.22	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	431.16	0	0	.1	.3

CROSS SECTION OUTPUT Profile #1760 cfs

			Left OB	Channel	Right OB
E.G. Elev (ft)	70.78	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.023	
W.S. Elev (ft)	70.75	Reach Len. (ft)			
Crit W.S. (ft)	67.81	Flow Area (sq ft)		1221.20	
E.G. Slope (ft/ft)	0.000101	Area (sq ft)		1221.20	
Q Total (cfs)	1760.00	Flow (cfs)		1760.00	
Top Width (ft)	431.16	Top Width (ft)		431.16	
Vel Total (ft/s)	1.44	Avg. Vel. (ft/s)		1.44	
Max Chl Dpth (ft)	6.75	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	174963.3	Conv. (cfs)		174963.3	
Length Wtd. (ft)		Wetted Per. (ft)		434.07	
Min Ch El (ft)	64.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Silverton

Reach	River Sta.	n1	n2	n3	n4	n5
North	-700	.025	.016			
North	-750	.025	.016			
North	-850	.025	.016			
North	-950	.025	.016			
North	-1050	.025	.016			
North	-1150	.025	.016			
North	-1250	.025	.016			
North	-1350	.025	.016			
North	-1450	.016	.025	.016		
North	-1550	.016	.025	.016		
North	-1650	.016	.025	.016		
North	-1780	.016	.025	.016		
North	-1960	.016	.025	.016	.025	.016
North	-2020	.016	.025	.016	.025	.016
North	-2110	.016	.025	.016		
North	-2200	.016	.035	.016		
North	-2250	.016	.025	.035	.016	
North	-2300	.016	.035	.016		

SUMMARY OF REACH LENGTHS

River: Silverton

Reach	River Sta.	Left	Channel	Right
North	-700	60	60	65
North	-750	100	100	100
North	-850	100	100	100
North	-950	100	100	100
North	-1050	150	120	100
North	-1150	105	92	62
North	-1250	120	105	85
North	-1350	150	135	120
North	-1450	165	130	70
North	-1550	105	80	55
North	-1650	165	135	80
North	-1780	285	180	130
North	-1960	75	70	45
North	-2020	110	90	50
North	-2110	115	95	60
North	-2200	50	50	50
North	-2250	50	50	50
North	-2300	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Silverton

Reach	River Sta.	Contr.	Expan.
North	-700	.3	.5
North	-750	.1	.3
North	-850	.1	.3
North	-950	.1	.3
North	-1050	.1	.3
North	-1150	.1	.3
North	-1250	.3	.5
North	-1350	.1	.3
North	-1450	.1	.3
North	-1550	.1	.3
North	-1650	.1	.3
North	-1780	.1	.3
North	-1960	.1	.3
North	-2020	.1	.3

North	-2110	.1	.3
North	-2200	.1	.3
North	-2250	.1	.3
North	-2300	.1	.3

Profile Output Table - Standard Table 1

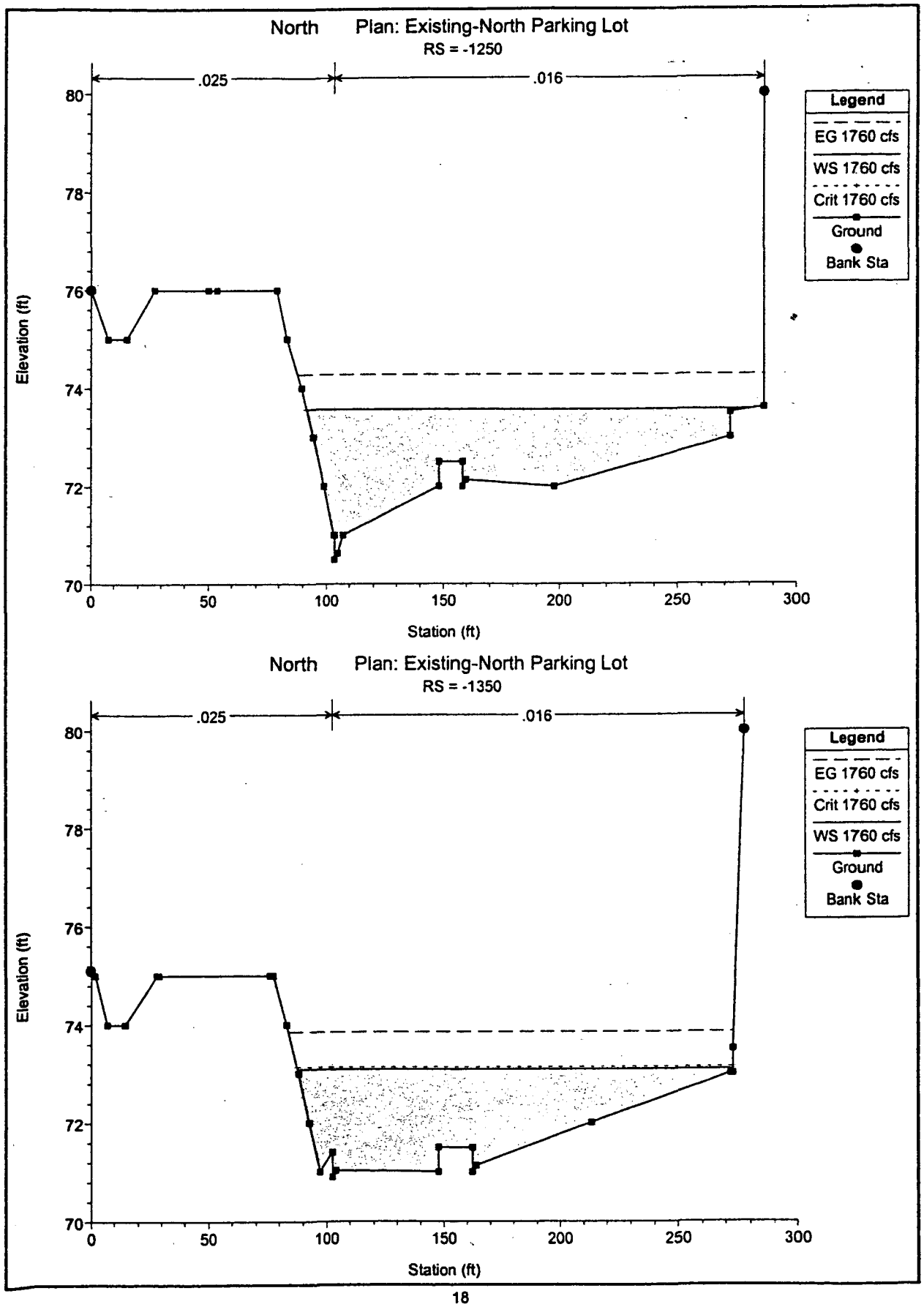
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
North	-700	1760.00	73.50	75.09	75.56	76.70	0.010016	10.18	172.84	273.46	1.67
North	-750	1760.00	73.80	75.94	75.55	76.44	0.001594	5.67	310.47	163.16	0.72
North	-850	1760.00	73.00	75.54		76.22	0.002337	6.64	264.95	148.84	0.88
North	-950	1760.00	73.00	75.49		75.97	0.001678	5.55	316.99	178.92	0.74
North	-1050	1760.00	72.32	74.91	74.91	75.70	0.003424	7.13	246.80	161.15	1.02
North	-1150	1760.00	70.00	74.25	72.97	74.40	0.000351	3.11	565.46	230.55	0.35
North	-1250	1760.00	70.50	73.57	73.57	74.27	0.003636	6.73	261.53	190.41	1.01
North	-1350	1760.00	70.90	73.09	73.14	73.86	0.004083	7.00	251.31	185.60	1.06
North	-1450	1760.00	70.00	72.83	72.43	73.21	0.001697	4.95	355.52	232.50	0.71
North	-1550	1760.00	69.90	72.16	72.16	72.87	0.003596	6.76	260.47	187.45	1.01
North	-1650	1760.00	69.00	71.81	71.85	72.59	0.003580	7.08	248.50	175.28	1.05
North	-1780	1760.00	68.50	71.26	71.34	72.05	0.004606	7.13	246.96	182.27	1.08
North	-1960	1760.00	68.00	70.78	69.97	70.93	0.000720	3.05	576.87	371.50	0.43
North	-2020	1760.00	67.00	70.69		70.87	0.000722	3.43	513.19	280.46	0.45
North	-2110	1760.00	66.00	70.76		70.81	0.000114	1.65	1067.19	391.43	0.18
North	-2200	1760.00	64.00	70.76		70.80	0.000122	1.62	1084.43	372.32	0.17
North	-2250	1760.00	62.31	70.75		70.79	0.000098	1.41	1251.55	437.97	0.15
North	-2300	1760.00	64.00	70.75	67.81	70.78	0.000101	1.44	1221.20	431.16	0.15

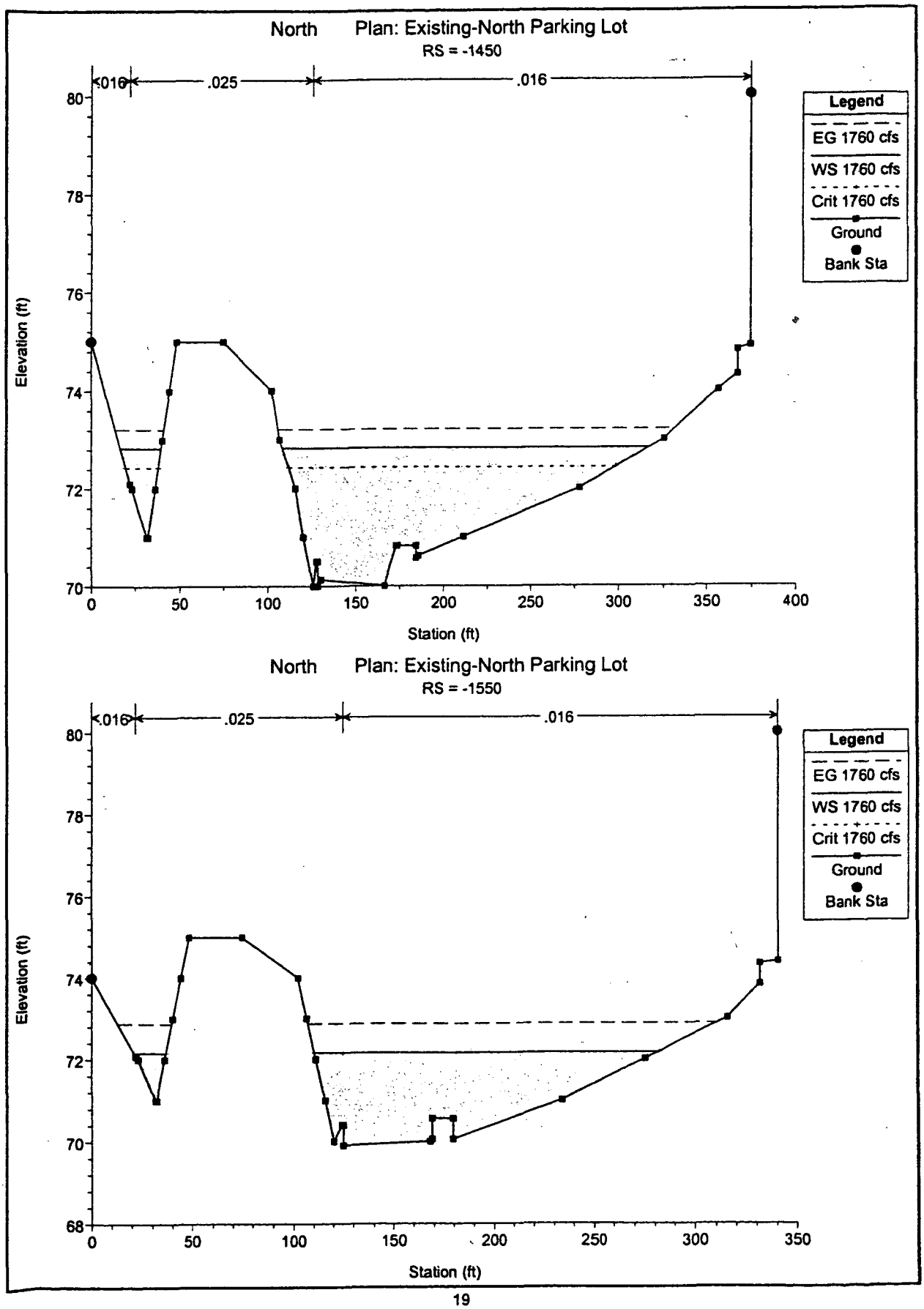
Profile Output Table - HEC-FDA

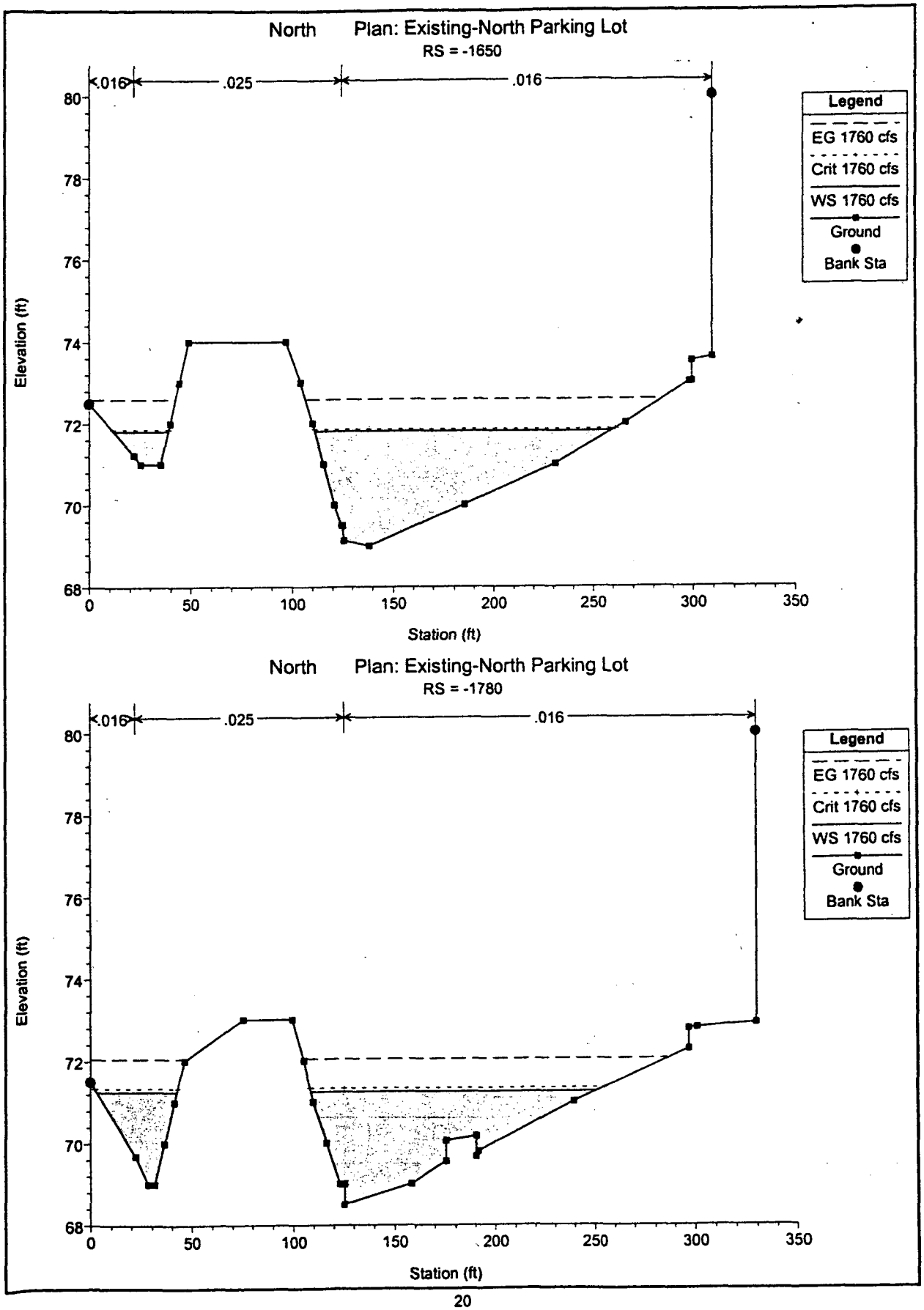
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)
North	-700	1760.00	73.50	75.09
North	-750	1760.00	73.80	75.94
North	-850	1760.00	73.00	75.54
North	-950	1760.00	73.00	75.49
North	-1050	1760.00	72.32	74.91
North	-1150	1760.00	70.00	74.25
North	-1250	1760.00	70.50	73.57
North	-1350	1760.00	70.90	73.09
North	-1450	1760.00	70.00	72.83
North	-1550	1760.00	69.90	72.16
North	-1650	1760.00	69.00	71.81
North	-1780	1760.00	68.50	71.26
North	-1960	1760.00	68.00	70.78
North	-2020	1760.00	67.00	70.69
North	-2110	1760.00	66.00	70.76
North	-2200	1760.00	64.00	70.76
North	-2250	1760.00	62.31	70.75
North	-2300	1760.00	64.00	70.75

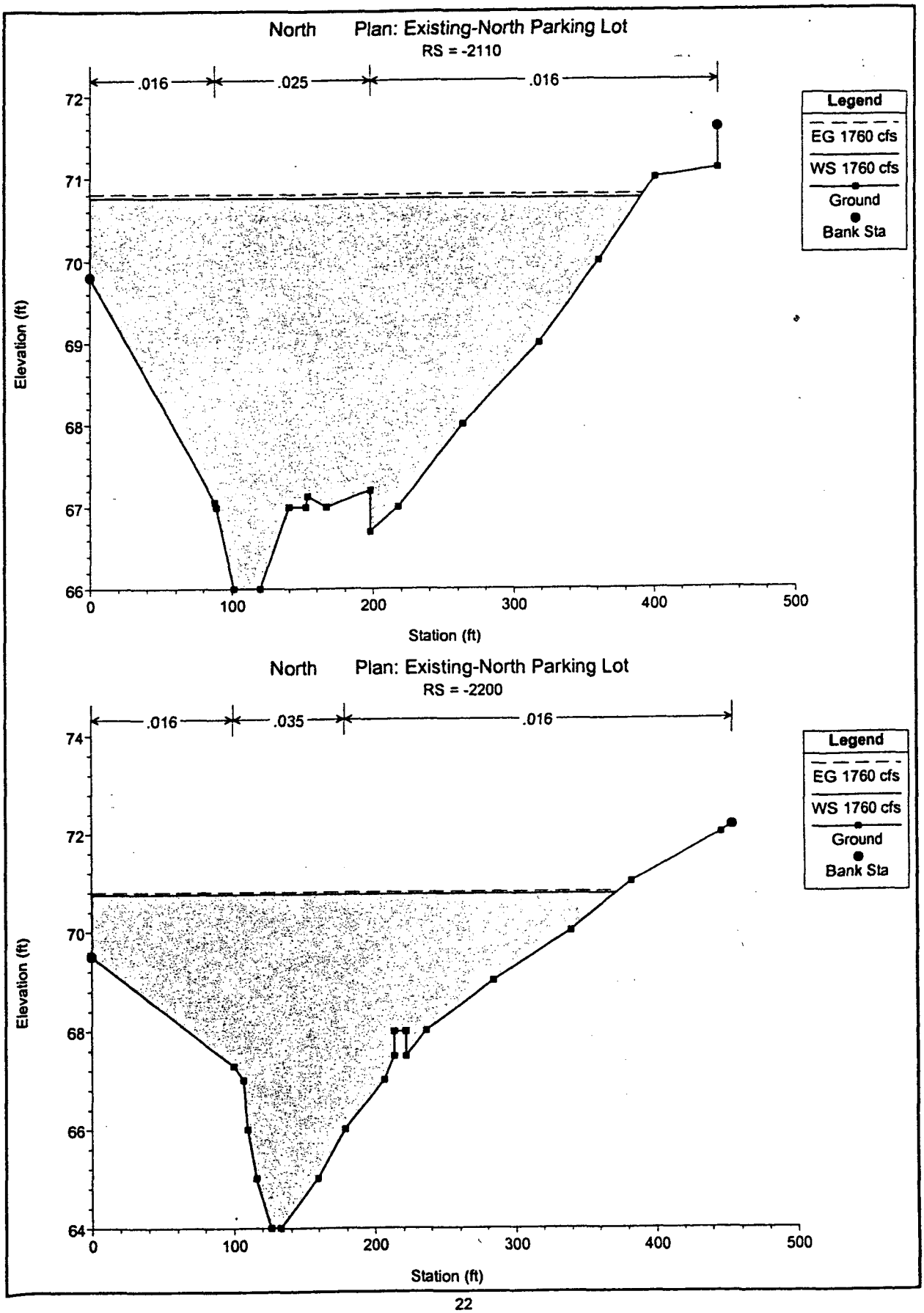
ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Existing-N

River: Silverton Reach: North RS: -750 Profile: 1760 cfs
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Silverton Reach: North RS: -950 Profile: 1760 cfs
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.
River: Silverton Reach: North RS: -1050 Profile: 1760 cfs
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.


North Plan: Existing-North Parking Lot
RS = -1250
.025
.016
Legend
EG 1760 cfs
WS 1760 cfs
Crit 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Plan: Existing-North Parking Lot
RS = -1350
.025
.016
Legend
EG 1760 cfs
Crit 1760 cfs
WS 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)

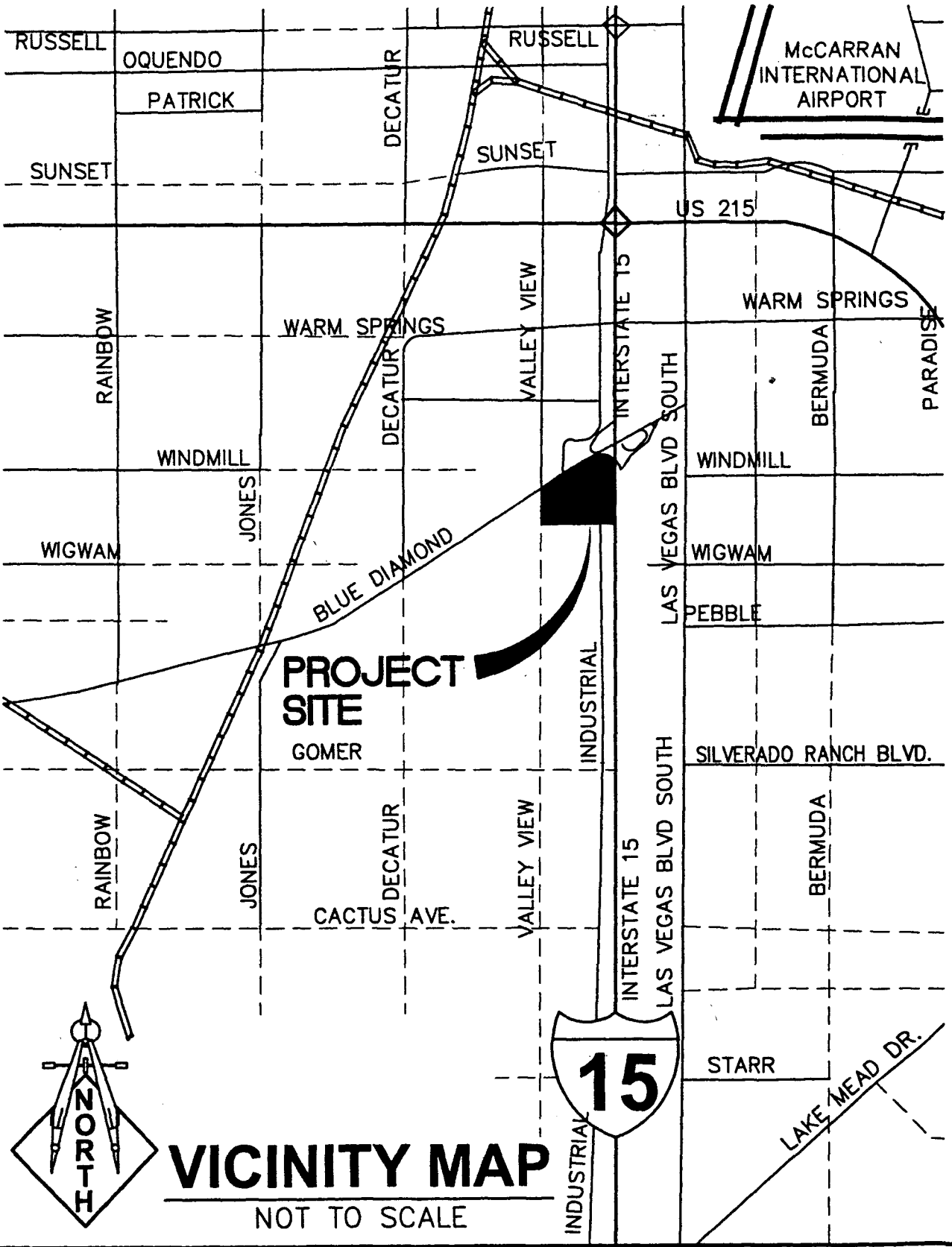

North Plan: Existing-North Parking Lot
RS = -1450
.016
.025
.016
Legend
EG 1760 cfs
WS 1760 cfs
Crit 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Plan: Existing-North Parking Lot
RS = -1550
.016
.025
.016
Legend
EG 1760 cfs
WS 1760 cfs
Crit 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


North
Plan: Existing-North Parking Lot
RS = -1650
.016
.025
.016
Legend
EG 1760 cfs
Crit 1760 cfs
WS 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North
Plan: Existing-North Parking Lot
RS = -1780
.016
.025
.016
Legend
EG 1760 cfs
Crit 1760 cfs
WS 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)


North Plan: Existing-North Parking Lot
RS = -2110
.016
.025
.016
Legend
EG 1760 cfs
WS 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Plan: Existing-North Parking Lot
RS = -2200
.016
.035
.016
Legend
EG 1760 cfs
WS 1760 cfs
Ground
Bank Sta
Elevation (ft)
Station (ft)

APPENDIX C

FIGURES



VICINITY MAP

NOT TO SCALE

DRAWN BY:	WSB	SCALE:	N.T.S
CHECKED BY:	HMN	DATE:	1-28-03

VICINITY MAP (FIGURE 1)

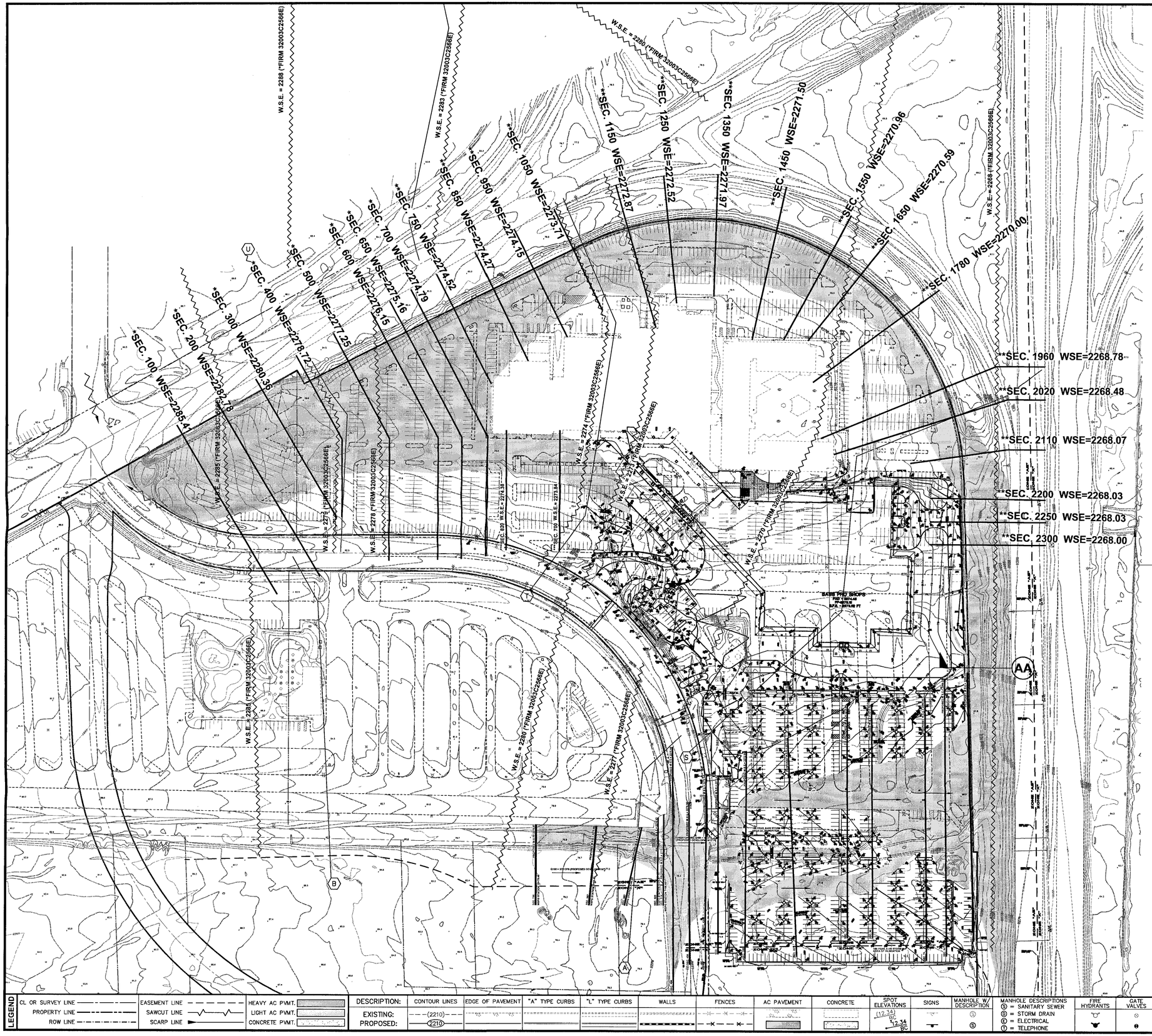
PROJECT No.: 6904

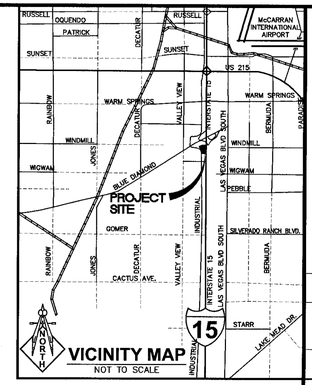
SHEET No. **FIG1**

SHEET 1 OF 1

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
P: 702 365-9312, F: 702 365-9317

SILVERTON HOTEL AND CASINO





VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
•	CONCENTRATION POINT
CMD1	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34)		Ⓢ
PROPOSED:	2210								12.34 BC		Ⓢ

MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
Ⓢ = SANITARY SEWER									
Ⓓ = STORM DRAIN									
Ⓔ = ELECTRICAL									
Ⓣ = TELEPHONE									

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.	DATE:	BY:	DESCRIPTION:

SHEET: PROPOSED FLOOD ZONE REVISION
TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

DRAWN BY:	DESIGNED BY:	CHECKED BY:
WSB	JF	HMN
DATE: 10-10-03	DATE: 10-10-03	DATE: 10-10-03

SEAL

PROJECT No.: 6923.2
SCALE: 1"=60'

SHEET No.
FIGURE 3
SHEET 1 OF 3
DRAWING No.

J:\CAD\6923.2\dwg\drainage\FEMA-CLOMR\C-6923-FLOOD.dwg, 10/13/03 11:42:09 AM, william, 1:100, Lochsa Civil

NOTES

FLOODING SOURCE: NORTH AND MIDDLE BRANCHES OF BLUE DIAMOND WASH; DUCK CREEK
CLARK COUNTY, NEVADA

MAP BASED ON 1-INCH = 400 FEET TOPOGRAPHIC MAPPING
CONTOUR INTERVAL = 4 FEET
FLIGHT DATE: JULY 18, 2000 AND APRIL 18, 2001
BY KENNEY AERIAL MAPPING, INC.

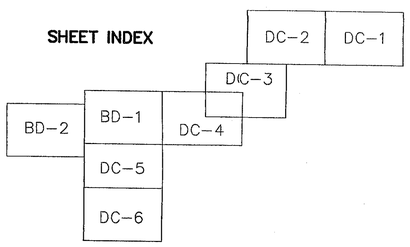
FIRM PANEL(S) AFFECTED: 32003C2566 D, DATED AUGUST 16, 1995
32003C2567 D, DATED AUGUST 16, 1995

ELEVATION REFERENCE MARKERS (ERM)

REFERENCE NUMBER	ELEVATION REFERENCE MARKER ID	ELEVATION (FT, NGVD 29)	LOCATION DESCRIPTION
215	CCBM OC21 9SWS	2240.64	RIVET AND SQUARE ALUMINUM PLATE, IN TOP OF CURB NEAR 1/2 DELTA, WEST PORTION OF PLANTER, NORTHEAST CORNER OF LAS VEGAS BOULEVARD AND WINDMILL LANE.

NAVD 88 = NGVD 29 + 2.37 FT

SHEET INDEX



NORTH
SCALE 1" = 400'

400 0 400 800
SCALE FEET

LEGEND

- 208 — ELEVATION REFERENCE MARKER
- EFFECTIVE 100-YR FLOODPLAIN AND FLOODWAY BOUNDARY
- REVISED 100-YR FLOODPLAIN BOUNDARY
- REVISED 100-YR FLOODWAY BOUNDARY
- SHADED ZONE X
- ZONE AE — REVISED FLOOD ZONE DESIGNATION
- (16100) — HEC-2 CROSS SECTION
- 2058 — BASE FLOOD ELEVATION
- 8562 — 100-YEAR FLOW (CFS, FLOODPLAIN ONLY)

REV.	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE
				GOV. APP.	

DESIGN:
DR.AWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE:03-17-02
PLOT TIME: 16:49:26

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

F:\550-039\dwg\vmap\vsmap\bd-1.dwg Mladwlg

DUCK CREEK/ BLUE DIAMOND WASHES FR RESTUDY
BLUE DIAMOND WASHES FROM INDUSTRIAL ROAD TO PARADISE ROAD
CROSS SECTION EXHIBIT

SHEET
BD-1
7 OF 8 SHTS

G:\LANDDEV\039\dwg\vmap\vsmap\Exhibits\Duck Creek\2000 CCFRD\Misc\Rstdy\Maps\bd-1.dwg, 03/17/2002 02:37:37 PM, william, 1:1, Lochsa Civil

ELEVATION REFERENCE MARKERS (ERM)

REFERENCE NUMBER	ELEVATION REFERENCE MARKER ID	ELEVATION (FT, NGVD 29)	LOCATION DESCRIPTION
217	CCBM OC21 8SSW6	2286.91	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950'± NORTH OF BLUE DIAMOND ROAD.
222	SNWA BRASS CAP	2412.57	FOUND 3" BRASS CAP AT NORTHWEST CORNER OF VAULT (UNMARKED) 200'± WEST OF RAILROAD TRACKS AT BRIDGE OVER WASH "SOUTHERN NEVADA WATER SYSTEM".

NAVD 88 = NGVD 29 + 2.37 FT

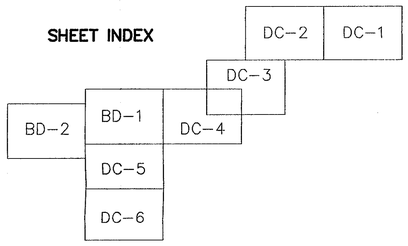
NOTES

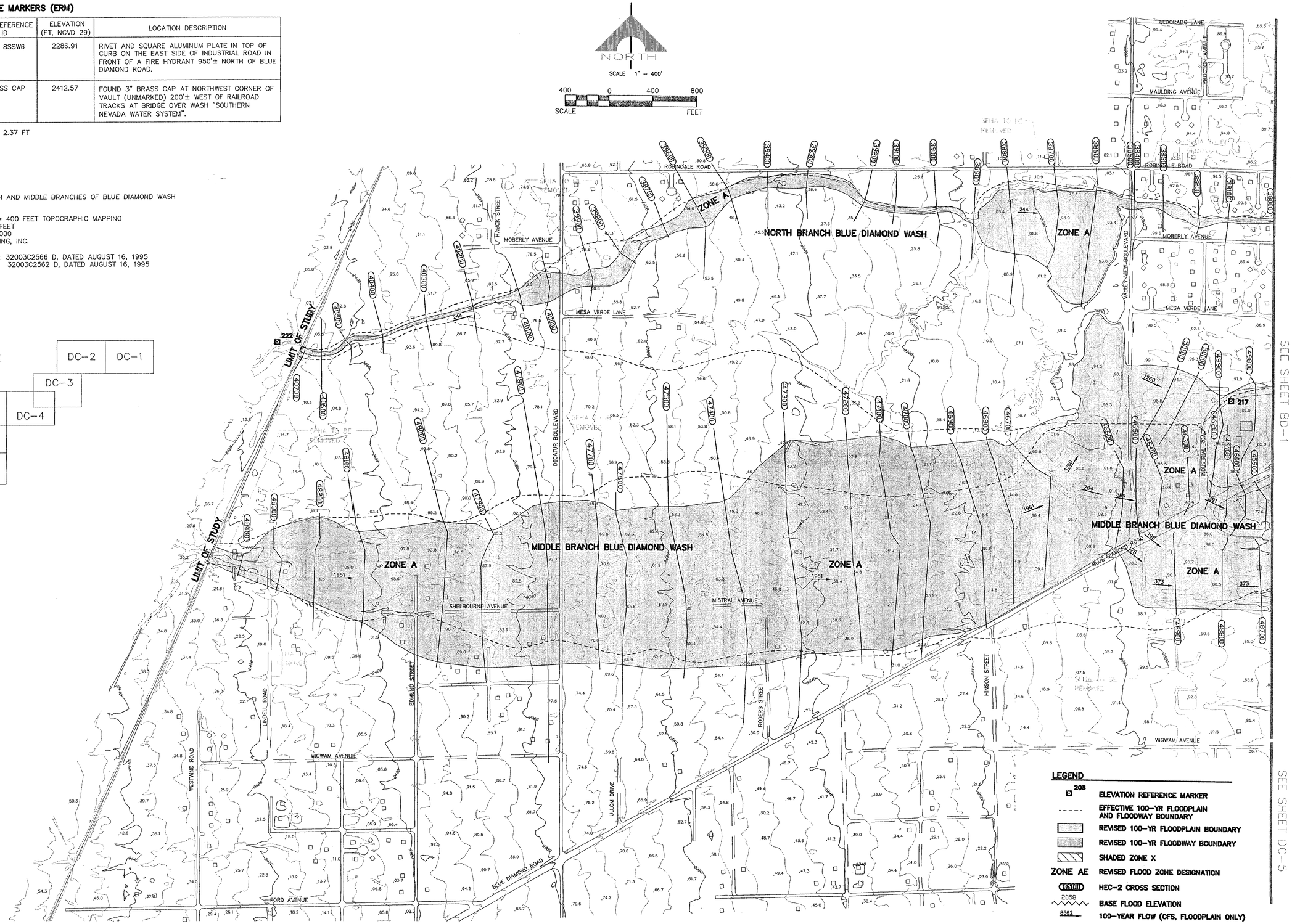
FLOODING SOURCE: NORTH AND MIDDLE BRANCHES OF BLUE DIAMOND WASH
CLARK COUNTY, NEVADA

MAP BASED ON 1-INCH = 400 FEET TOPOGRAPHIC MAPPING
CONTOUR INTERVAL = 4 FEET
FLIGHT DATE: JULY 18, 2000
BY KENNEY AERIAL MAPPING, INC.

FIRM PANEL(S) AFFECTED: 32003C2566 D, DATED AUGUST 16, 1995
32003C2562 D, DATED AUGUST 16, 1995

SHEET INDEX





DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 03-17-02
PLOT TIME: 17:01:03
Mludwig

REV	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	GCW. APP.	DATE

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
(702) 895-2000 • FAX: (702) 364-2299
F:\550-039\dwg\map\xsmap\bd-2.dwg

DUCK CREEK/ BLUE DIAMOND WASHES FIS RESTUDY
BLUE DIAMOND WASHES FROM UPRR TO INDUSTRIAL ROAD

CROSS SECTION EXHIBIT

SHEET
BD-2
8 OF **8** SHTS

G:\DNA\GCW\Drawings\FIRM\MS\DUCK CREEK\2002\Duck Creek2002 03-17-02 GCW\Wallace\Mapsetup\Xsmapsetbd-2.dwg, 03/20/2002 02:38:34 PM, william, 1:1, Lochea Civil

TABLE 2: SUMMARY OF DIVERSION OUTPUT

DIVERSION	FACILITY	FACILITY	DIVERSION		BYPASS	
ID	ID	DESCRIPTION	Q100 (CFS)	DIRECTION	Q100 (CFS)	DIRECTION
DVBD2	BD2	2- 36" RCP	466	EAST	786	NORTH
DVBD3	BD3	7' x 4' RCB	290	EAST	1261	NORTH
DVBD4	BD4	2- 36" RCP	227	EAST	1022	NORTH
DVBD7	NA	NA	1260	NORTH	630	EAST
DVI151	I151	3- 12' x 4' RCB	1326	EAST	1301	NORTH
DVI152	I152	2- 12' x 4' RCB	482	EAST	816	NORTH
DVI153	I153	3- 12' x 4' RCB	5088	EAST	4422	NORTH
DVI154	I154	2- 12' x 4' RCB	1232	EAST	3549	NORTH
DVI155	I155	3- 12' x 5' RCB	2277	EAST	1444	NORTH
DVPITT	NA	NA	3160	EAST	3282	NORTH
DVROSE	NA	NA	544	NORTHEAST	2883	NORTH
TORAW	NA	NA	611	SOUTH	2605	EAST

TABLE 1: SUMMARY OF HEC-1 MODEL

BASIN/ POINT	AREA (SQ MI)	SDN	DARF	FLOW (CFS)	BASIN/ POINT	AREA (SQ MI)	SDN	DARF	FLOW (CFS)
B12A	1.29	3	0.95	233	D010	10.43	4	0.857	3920
B13B	0.54	3	0.975	223	D07	4.28	3	0.936	1804
PT1	1.83	3	0.95	1050	PITT	32.65	5	0.725	6413
PT	0.82	3	0.975	418	D010B	0.57	3	0.975	291
PT2	2.84	3	0.925	1252	PT8	33.21	5	0.725	6442
DVBD2	2.64	3	0.925	466	DVPITT	33.21	5	0.725	3160
DVBD2	2.64	3	0.925	786	DVPITT	33.21	5	0.725	3282
B13C	2.01	3	0.925	1432	DVROSE	33.21	5	0.725	644
PT3	4.65	3	0.908	1550	DVROSE	33.21	5	0.725	2838
DVBD3	4.65	3	0.908	290	D4A	1.87	3	0.95	1634
DVBD3	4.65	3	0.908	1261	PT29	117.75	5	0.58	6470
DVBD4	4.65	3	0.908	227	D4B	2.03	3	0.925	1804
DVBD4	4.65	3	0.908	1022	PT26	119.78	5	0.58	6470
B11B	1.12	3	0.95	459	PT27	94.15	5	0.64	3508
HYDRO1	0.83	3	0.975	623	B16C	1.29	3	0.95	782
PT4	6.4	3	0.895	1961	PT28	132.53	5	0.58	9893
DVBD7	6.4	3	0.895	1260	LDCDB	132.53	5	0.58	7291
DVBD7	6.4	3	0.895	630	D9A	1.33	3	0.95	1261
B14B	0.99	3	0.975	440	PT29	133.56	5	0.58	7484
PT22W	7.39	3	0.885	764	B16B	0.7	3	0.975	614
D09A	10.21	4	0.857	2632	PT30	134.52	5	0.58	7484
DVI151	10.21	4	0.857	1326	B16A	0.91	3	0.975	411
DVI151	10.21	4	0.857	1301	D9B	0.6	3	0.975	398
DVI152	10.21	4	0.857	482	PT31	136.07	5	0.58	7484
DVI152	10.21	4	0.857	816	PT32	143.12	5	0.58	8477
D01	9.54	4	0.865	3763	HYDRO2	0.38	3	0.99	38
D005	2.73	3	0.925	1494	B12	0.57	3	0.975	282
PT5	12.27	5	0.832	3960	PT33W	1.55	3	0.95	244
D02	5.91	3	0.903	2778	PT33	7.75	3	0.885	1286
D03	11.99	4	0.85	4758	B15A	0.99	3	0.975	509
D04	8.95	3	0.895	3193	PT34W	8.71	4	0.975	1292
PT10	18.94	5	0.804	5003	PT34	145.42	5	0.58	9551
D06	8.52	4	0.875	3539	MNWB	0.44	3	0.99	238
PT11	33.37	5	0.725	7588	MNWC	0.6	3	0.975	322
D3A	0.99	3	0.975	1026	PT35	1.04	3	0.95	529
PT12	49.63	5	0.695	9838	MNWD	0.08	3	0.99	72
DJ6	7.5	3	0.885	2188	PT36	1.12	3	0.95	549
PT13	54.13	5	0.64	9471	MC2	0.92	3	0.975	367
D08	11.68	4	0.83	3819	PT37	2.03	3	0.925	945
D3	6.64	4	0.895	1519	B10A	1.6	3	0.95	1381
PT14	62.66	5	0.64	9510	PT38	3.84	3	0.915	1428
DVI153	62.66	5	0.64	5088	PT39	149.08	5	0.58	8562
DVI153	62.66	5	0.64	4422	D5	1.56	3	0.95	1098
D1A	2.29	3	0.925	1185	PT40	150.62	5	0.53	8562
D1B	0.32	3	0.99	149	D7	0.85	3	0.975	399
PT15	2.61	3	0.925	1209	PT41	151.47	5	0.53	8562
D1C	0.56	3	0.975	203	D8	1.28	3	0.95	1169
PT16	3.17	3	0.915	1420	PT42	152.73	5	0.53	8562
D1D	1.23	3	0.95	764	B10B	0.85	3	0.975	476
D1E	0.22	3	0.99	81	D9A	0.86	3	0.975	227
D1F	0.81	3	0.975	182	PT43	1.71	3	0.95	646
PT17	5.43	3	0.903	1825	PT44	154.44	5	0.53	8562
B18A	1.5	3	0.95	294	D9B	1.54	3	0.95	915
PT18	89.59	5	0.64	4761	PT45	155.99	5	0.53	8562
DVI154	89.59	5	0.64	1232	D10	2.51	3	0.925	1683
DVI154	89.59	5	0.64	3549	PT46	158.49	5	0.53	8562
B18B	1.92	3	0.95	1121	MC	2.8	3	0.925	3218
PT19	94.15	5	0.64	3721	TORAW	2.8	3	0.925	611
DVI155	94.15	5	0.64	2277	TORAW	2.8	3	0.925	2605
DVI155	94.15	5	0.64	1444	MCDB	2.8	3	0.925	82
B14A	1.35	3	0.95	1145	PT47	2.8	3	0.925	658
PT20	4.65	3	0.908	516	RH	1.36	3	0.95	551
PT21	97.51	5	0.64	1452	PT48W	4.16	3	0.908	1139
PT22	100.25	5	0.58	1462*	B20	0.79	3	0.975	355
B15B	0.95	3	0.975	355	PT48	163.44	5	0.53	8562
PT23	101.2	5	0.58	1462	D12	0.18	3	0.99	72
PT24	10.21	4	0.857	1605	D11A	0.16	3	0.99	131
D009	3.62	3	0.915	2594	PT49	0.33	3	0.99	133
D04	2.4	3	0.925	1565	PT50	163.78	5	0.53	8562
PT9	6.02	3	0.895	3901	D11B	0.99	3	0.975	932
D08	11.91	4	0.85	3522	PT51	164.76	5	0.53	8562
PT6	17.93	5	0.804	4564					

* ADOPTED FLOW, UPSTREAM FLOW CONTROLS AREA IN SQUARE MILES / FLOW IN CFS

SEE FIGURE 6A

NOTE: DATA SOURCE CLARK COUNTY, NEVADA GISMO

DUCK CREEK / BLUE DIAMOND WASHES FIS RESTUDY

Existing Condition Drainage Map

FIGURE 6B

LEGEND

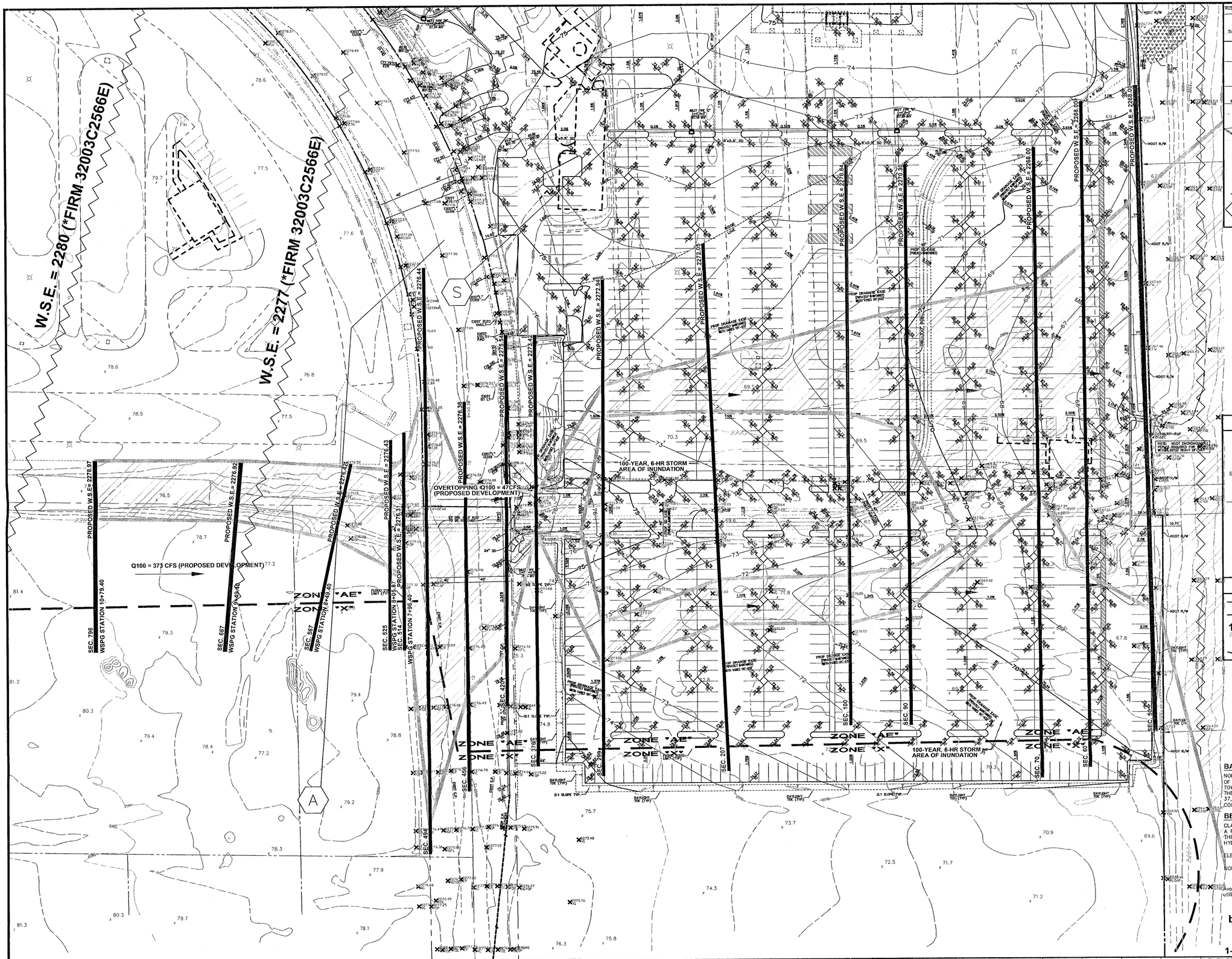
- D010 — Basin Name
- BD2 — Bridge / Culvert ID
- P13 — HEC-1 Combination Point
- DVBD2 — Diversion / Inflow Hydrograph
- MAIN — Street Name
- HEC-1 Combination Point
- Bridge / Culvert Location
- Inflow Hydrograph
- Flow Direction
- Wash / Channel Centerline
- Streets
- Contour Line
- Index Contour
- Detention Basin
- HEC-1 Drainage Basin Boundry

N W E S

0 1,000 2,000 4,000 Feet

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

F:\550-039\GIS\FIGURE6B.MXD KJG 3/37/2002


W.S.E. = 2280 (*FIRM 32003C2566E)
W.S.E. = 2277 (*FIRM 32003C2566E)
PROPOSED W.S.E. = 2276.44
PROPOSED W.S.E. = 2276.36
PROPOSED W.S.E. = 2275.54
PROPOSED W.S.E. = 2273.42
PROPOSED W.S.E. = 2272.94
PROPOSED W.S.E. = 2270.58
PROPOSED W.S.E. = 2272.05
PROPOSED W.S.E. = 2268.00
PROPOSED W.S.E. = 2276.97
PROPOSED W.S.E. = 2276.92
PROPOSED W.S.E. = 2276.43
PROPOSED W.S.E. = 2276.31
OVERTOPPING Q100 = 47CFS (PROPOSED DEVELOPMENT)
Q100 = 373 CFS (PROPOSED DEVELOPMENT)
100-YEAR, 6-HR STORM AREA OF INUNDATION
ZONE "AE"
ZONE "X"
SEC. 796 WSPG STATION 10+79.40
SEC. 667 WSPG STATION 9+49.40
SEC. 567 WSPG STATION 8+49.40
SEC. 525 WSPG STATION 8+05.87
SEC. 514 WSPG STATION 7+96.40
SEC. 494
SEC. 456
SEC. 420
SEC. 376
SEC. 299
SEC. 207
SEC. 100
SEC. 90
SEC. 70
SEC. 60
SEC. 50
PROP. 70' DRAINAGE EASEMENT (PUBLIC FACILITIES)
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615 INST.01422
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615 INST.01423
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615 INST.01424
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615 INST.01425
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615 INST.01426
PROP. DRAINAGE EASE (PRIVATE MAINTENANCE) BOOK 20060615

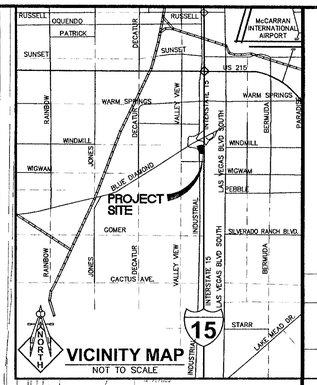
* WSE FROM HEC-RAS MODEL "FLOW SPLIT"
** WSE FROM HEC-RAS MODEL "EXISTING-NORTH-PARKING"
*** WSE FROM HEC-RAS MODEL "EXISTING-SOUTH-PARKING"

W.S.E. = 2288 (*FIRM 32003C2566E)
W.S.E. = 2283 (*FIRM 32003C2566E)
W.S.E. = 2280 (*FIRM 32003C2566E)
W.S.E. = 2268 (*FIRM 32003C2566E)
W.S.E. = 2285 (*FIRM 32003C2566E)
W.S.E. = 2279 (*FIRM 32003C2566E)
W.S.E. = 2278 (*FIRM 32003C2566E)
W.S.E. = 2274 (*FIRM 32003C2566E)
W.S.E. = 2273 (*FIRM 32003C2566E)
W.S.E. = 2270 (*FIRM 32003C2566E)
W.S.E. = 2280 (*FIRM 32003C2566E)
W.S.E. = 2277 (*FIRM 32003C2566E)

*SEC. 100 WSE=2285.41
*SEC. 200 WSE=2282.78
*SEC. 300 WSE=2280.36
*SEC. 400 WSE=2278.72
*SEC. 500 WSE=2277.25
*SEC. 600 WSE=2276.15
*SEC. 650 WSE=2275.16
*SEC. 700 WSE=2274.79
*SEC. 750 WSE=2274.52
*SEC. 850 WSE=2274.27
*SEC. 950 WSE=2274.15
*SEC. 1050 WSE=2273.71
**SEC. 1150 WSE=2272.87
**SEC. 1250 WSE=2272.52
**SEC. 1350 WSE=2271.97
**SEC. 1450 WSE=2271.50
**SEC. 1550 WSE=2270.96
**SEC. 1650 WSE=2270.59
**SEC. 1780 WSE=2270.00
**SEC. 1960 WSE=2268.78
**SEC. 2020 WSE=2268.48
**SEC. 2110 WSE=2268.04
**SEC. 2200 WSE=2268.03
**SEC. 2250 WSE=2268.03
**SEC. 2300 WSE=2268.03

***SEC. 820 W.S.E.= 2274.38
***SEC. 700 W.S.E.= 2273.84
***SEC. 600 W.S.E.= 2273.43
***SEC. 500 W.S.E.= 2272.40
***SEC. 400 W.S.E.= 2270.78
***SEC. 300 W.S.E.= 2270.32
***SEC. 200 W.S.E.= 2269.35
***SEC. 100 W.S.E.= 2269.07
***SEC. 25 W.S.E.= 2268.40

EX. CASINO (FF=2275.12)
EX. HOTEL (FF=2275.12)
INDUSTRIAL RD.
CROSS-SECTION STATION X=0
CROSS-SECTION STATION X=0
4: 12'X4' RCB



NORTH

GRAPHIC SCALE
80 0 40 80 160
(IN FEET)
1 inch = 80 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT / COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:
NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:
CLARK COUNTY VERTICAL CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.
ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC		S
PROPOSED:	2210								12.34 BC		S

MANHOLE DESCRIPTIONS
(S) = SANITARY SEWER
(D) = STORM DRAIN
(E) = ELECTRICAL
(T) = TELEPHONE

FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.:	DATE:	BY:	DESCRIPTION:

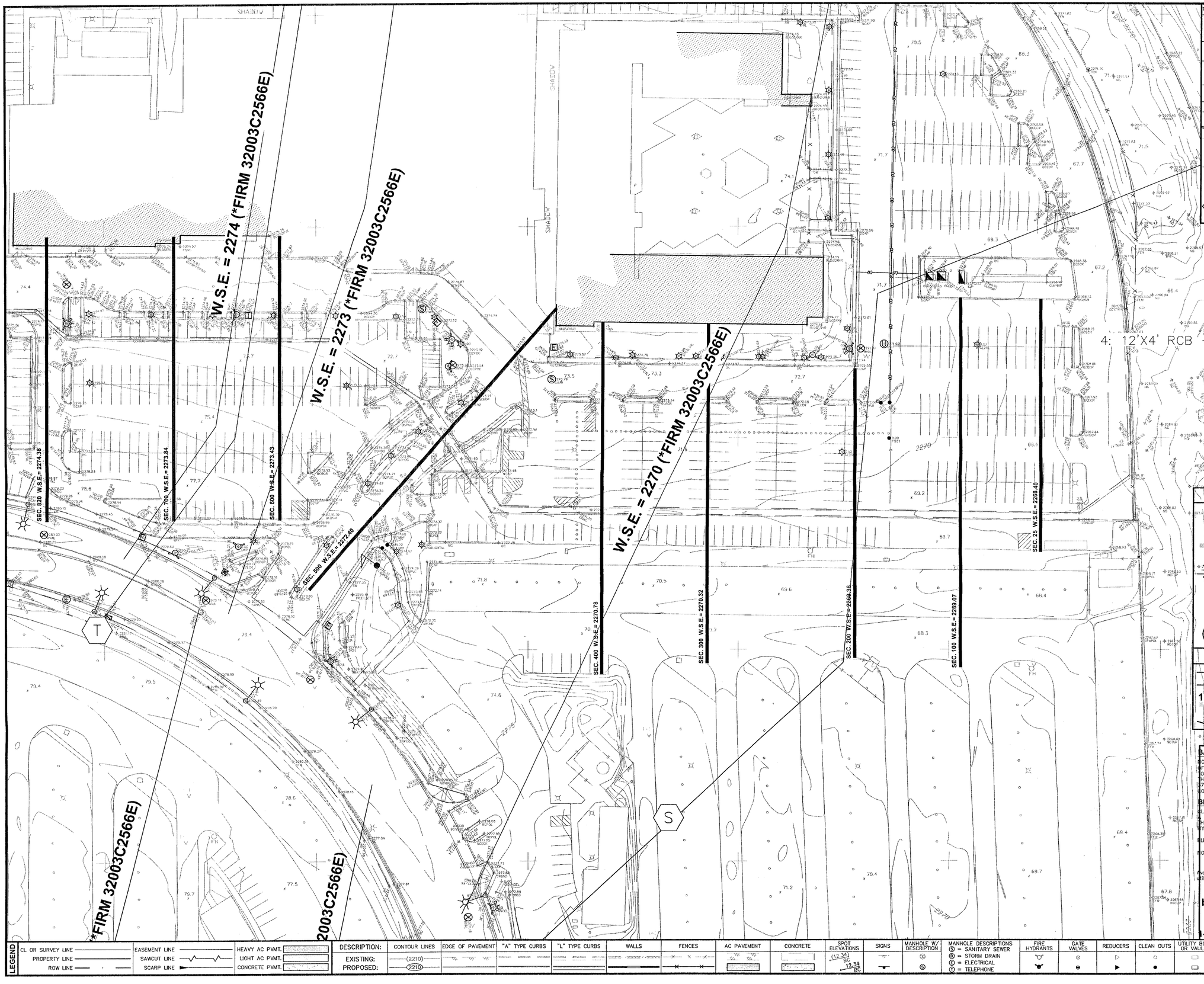
SILVERTON HECRAS SECTION MAP (EXISTING CONDITION)

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

SHEET	DATE:	TITLE
DRAWN BY: WSB	10/10/03	
DESIGNED BY: HMN	10/10/03	
CHECKED BY: HMN	10/10/03	
SEAL	PROJECT No.: 6923.2	SCALE: 1"=80'

SHEET No.
HR1
SHEET 1 OF 1
DRAWING No.

J:\CAD\6923.2\dwg\drainage\FEMA-CLOMR\c-6964-101-hr.dwg, 10/10/03 01:18:59 PM, william, 180, Lochsa Civil



DRAINAGE LEGEND

- ND1 — DRAINAGE BASIN LABEL
- CMD1 — CONCENTRATION POINT
- COMBINATION POINT
- BASIN BOUNDARY LINE
- SUMP-1 — STORAGE POINT
- 1 (1.0)(1.2) — Q10 (V10)(D10)
- 1 (1.0)(1.2) — Q100 (V100)(D100)
- 2 — Q10 FLOW IN CFS (10 YR.)
- 3 — Q100 FLOW IN CFS (100 YR.)
- FLOW DIRECTION
- 1D — HYDRAULIC CROSS-SECTION

HEC-RAS

- HEC-RAS CONTROL LINE
- LIMITS OF FEMA ZONE "A"
- 100 — HEC-RAS CROSS-SECTION AND STATION NUMBER
- 100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 17, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig 1-800-227-2600

SAFETY ALERT Call Before You Overhead 1-702-593-6111

REV:	DATE:	BY:	DESCRIPTION:

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

HEC RAS SECTION MAP (EXISTING CONDITION)

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.	SCALE
WSB	HMN	HMN	6923.2	1"=40'
DATE: 10-10-03	DATE: 10-10-03	DATE: 10-10-03		

SEAL

SHEET No. HR3
SHEET 3 OF 3
DRAWING No.

LEGEND

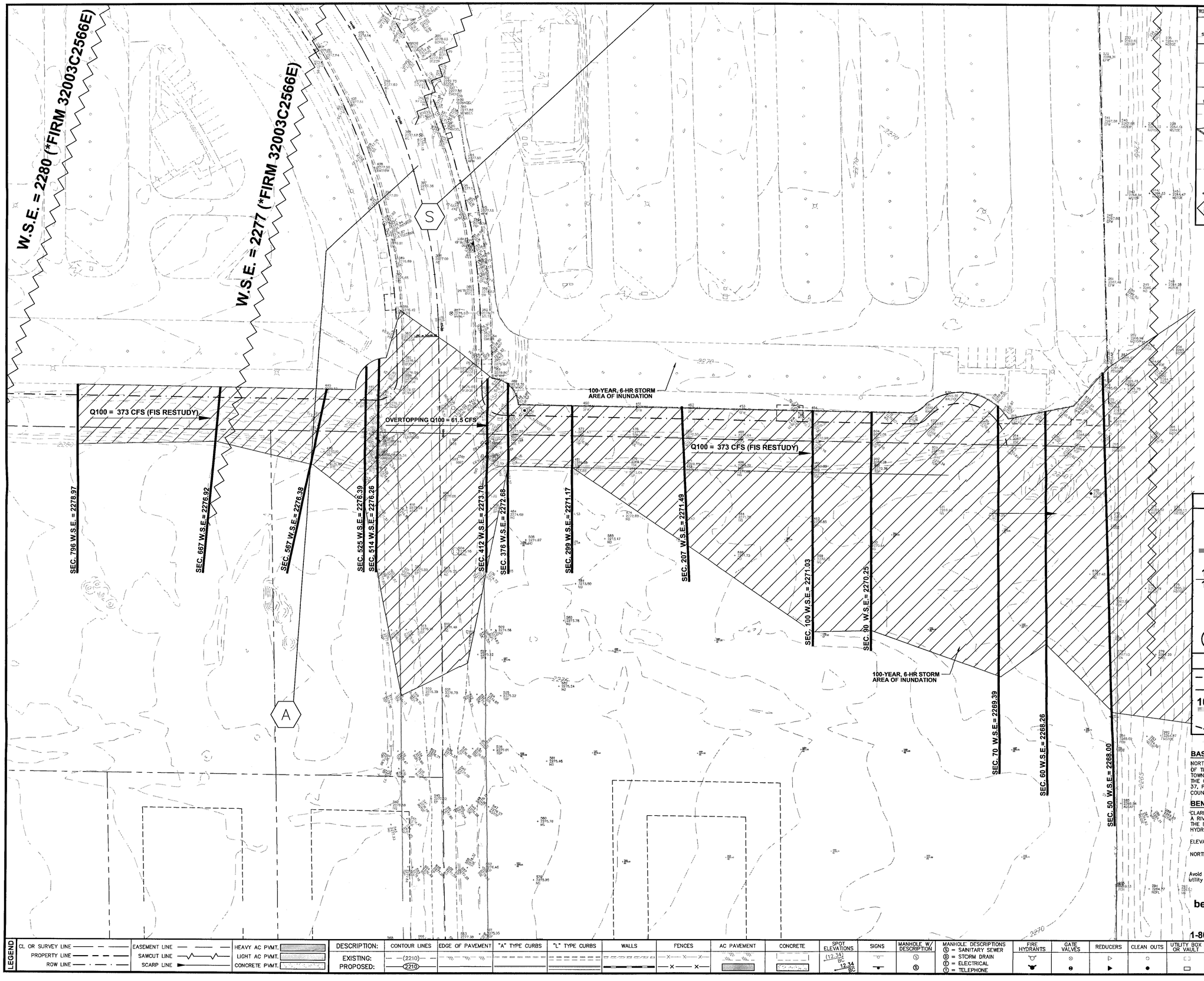
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.
ROW LINE	SCARP LINE	CONCRETE PVMT.

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC		Ⓢ
PROPOSED:	2210								12.34 BC		Ⓢ

MANHOLE DESCRIPTIONS
Ⓢ = SANITARY SEWER
Ⓓ = STORM DRAIN
Ⓔ = ELECTRICAL
Ⓣ = TELEPHONE

FIRE HYDRANTS | GATE VALVES | REDUCERS | CLEAN OUTS | UTILITY BOX OR VAULT | 100w HPS STREETLIGHTS | 150w HPS STREETLIGHTS | 200w HPS STREETLIGHTS | 250w HPS STREETLIGHTS

J:\CAD\6923.2\dwg\drainage\FEMA-CLOMR\C-6923-203-HR.dwg, 10/10/03 01:25:14 PM, williams, 1-40, Lochsa Civil



DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
•	CONCENTRATION POINT
CMD1	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2)	Q10 (V10)(D10)
1 (1.0)(1.2)	Q100 (V100)(D100)
2	Q10 FLOW IN CFS (10 YR.)
3	Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 57, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

"CLARK COUNTY VERTICAL CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	(2210)								(12.34) BC		Ⓢ	Ⓢ = SANITARY SEWER									
PROPOSED:	2210								12.34 BC		Ⓢ	Ⓓ = STORM DRAIN Ⓔ = ELECTRICAL Ⓣ = TELEPHONE									

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.:	DATE:	BY:	DESCRIPTION:

SHEET: SHELBORNE AVE. HEC-RAS SECTION MAP (EXISITNG CONDITION)
DATE: 9-2-03
DRAWN BY: WSB

DATE: 9-2-03
DESIGNED BY: JF

TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS
DATE: 9-2-03
CHECKED BY: HMN

SCALE: 1"=40'
PROJECT No.: 6923.2

SEAL

SHEET No. HR4
SHEET 1 OF 3
DRAWING No.

J:\CAD\6923.2\dwg\drainage\FEMA-CLOMR\C-6923-201-HR.dwg, 10/13/03 11:23:00 AM, william, 1:40, Lochsa Civil

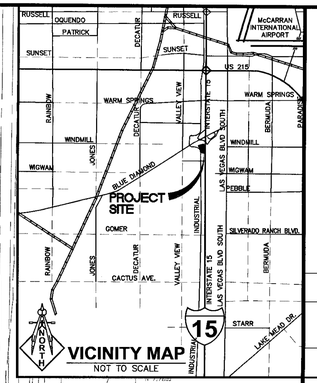
* WSE FROM HEC-RAS MODEL "FLOW SPLIT"
** WSE FROM HEC-RAS MODEL "PROPOSED-NORTH-PARKING"
*** WSE FROM HEC-RAS MODEL "EXISTING-SOUTH-PARKING"

W.S.E. = 2288 (*FIRM 32003C2566E)
W.S.E. = 2283 (*FIRM 32003C2566E)
W.S.E. = 2280 (*FIRM 32003C2566E)
W.S.E. = 2268 (*FIRM 32003C2566E)

*SEC. 100 WSE=2285.41
*SEC. 200 WSE=2282.78
*SEC. 300 WSE=2280.35
*SEC. 400 WSE=2278.72
*SEC. 500 WSE=2277.25
*SEC. 600 WSE=2276.15
*SEC. 650 WSE=2275.16
*SEC. 700 WSE=2274.79
*SEC. 750 WSE=2274.52
*SEC. 850 WSE=2274.27
**SEC. 950 WSE=2274.15
**SEC. 1050 WSE=2273.71
**SEC. 1150 WSE=2272.87
**SEC. 1250 WSE=2272.52
**SEC. 1350 WSE=2271.97
**SEC. 1450 WSE=2271.50
**SEC. 1550 WSE=2270.96
**SEC. 1650 WSE=2270.59
**SEC. 1780 WSE=2270.00
**SEC. 1960 WSE=2268.78
**SEC. 2020 WSE=2268.48
**SEC. 2110 WSE=2268.07
**SEC. 2200 WSE=2268.03
**SEC. 2250 WSE=2268.03
**SEC. 2300 WSE=2268.00

W.S.E. = 2285 (*FIRM 32003C2566E)
W.S.E. = 2279 (*FIRM 32003C2566E)
W.S.E. = 2278 (*FIRM 32003C2566E)
W.S.E. = 2274.38
SEC. 820 W.S.E. = 2274.04
SEC. 700 W.S.E. = 2273.84
W.S.E. = 2274 (*FIRM 32003C2566E)
W.S.E. = 2273 (*FIRM 32003C2566E)
FLOWMASTER (SECTION BB) WSE = 2273.22
W.S.E. = 2270 (*FIRM 32003C2566E)
W.S.E. = 2268 (*FIRM 32003C2566E)
W.S.E. = 2280 (*FIRM 32003C2566E)
W.S.E. = 2277 (*FIRM 32003C2566E)

EX. CASINO (FF=2275.12)
EX. HOTEL (FF=2275.12)
INDUSTRIAL RD.
CROSS-SECTION STATION X=0
CROSS-SECTION STATION X=0



VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE
80 0 40 80 160
(IN FEET)
1 inch = 80 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
•	CONCENTRATION POINT
CMD1	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:
NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:
CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	(2210)								(12.34) BC		Ⓢ	Ⓢ = SANITARY SEWER Ⓓ = STORM DRAIN Ⓔ = ELECTRICAL Ⓣ = TELEPHONE									
PROPOSED:	2210								12.34 BC		Ⓢ										

REV.:	
DATE:	
BY:	
DESCRIPTION:	

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV. 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

SHEET: SILVERTON HECRAS SECTION MAP (PROPOSED CONDITION)
TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.:	SCALE:
WSB	HMN	HMN	6923.2	1"=80'
DATE: 9/2/03	DATE: 9/2/03	DATE: 9/2/03		

SEAL

SHEET No. HR5
SHEET 1 OF 1
DRAWING No.

J:\CAD\6923.2\dwg\drainage\FEMA-CLOMR\6-6923-205-ltr.dwg, 10/13/03 11:57:34 AM, william, 1:80, Lochsa Civil

EX. CASINO
(FF=2275.12)

EX. HOTEL
(FF=2275.12)

W.S.E. = 2274 (*FIRM 32003C2566E)

W.S.E. = 2278 (*FIRM 32003C2566E)

W.S.E. = 2270 (*FIRM 32003C2566E)

W.S.E. = 2280 (*FIRM 32003C2566E)

W.S.E. = 2277 (*FIRM 32003C2566E)

DI-1
0.83 ACRES
2
3

DI-2
1.06 ACRES
2
4

DI-3
2.39 ACRES
5
9

DI-4
1.32 ACRES
3
5

4: 12'X4' RCB

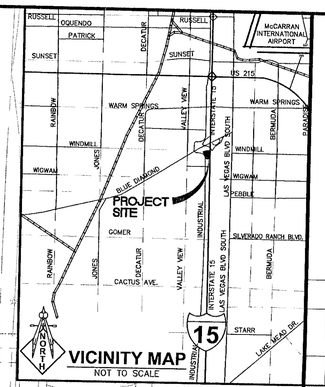
4: 12'X4' RCB

INTERSTATE 15

INDUSTRIAL RD

SHELBOURNE AVE

ZONE "AE"
ZONE "X"



VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT / COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2)	Q10 (V10)(D10)
1 (1.0)(1.2)	Q100 (V100)(D100)
2	Q10 FLOW IN CFS (10 YR.)
3	Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:
NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:
CLARK COUNTY VERTICAL CONTROL POINT "0C21 85SW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD, IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 2289.33 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	(2210)								+12.34 BC		Ⓢ	Ⓢ = SANITARY SEWER									
PROPOSED:	2210								12.34 BC		Ⓢ	Ⓓ = STORM DRAIN Ⓔ = ELECTRICAL Ⓣ = TELEPHONE									

DRAWN BY:	WSB
DESIGNED BY:	HMN
CHECKED BY:	HMN
DATE:	9/2/03
DATE:	9/2/03
DATE:	9/2/03
PROJECT No.:	6923.2
SCALE:	1"=60'

SEAL

REV.:	DATE	BY:	DESCRIPTION:

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

SHEET: DETAILED DRAINAGE BASIN MAP (INTERIM CONDITION)

TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

SHEET No.
DR4
SHEET 4 OF 4
DRAWING No.

STORM DRAIN IMPROVEMENT PLANS
FOR
BASS PRO SHOPS
AT SILVERTON HOTEL AND CASINO

CLARK COUNTY FIRE DEPARTMENT

GENERAL NOTES

A. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE 1997 EDITION OF THE UNIFORM FIRE CODE, AND THE 1995 EDITION OF THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET, #24.
B. ON ANY BUILDING CONSTRUCTION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMBUSTIBLE MATERIALS ARE DELIVERED TO THE SITE AND CONSTRUCTION COMMENCES. SAID FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH THE REQUIRED WATER SUPPLY.
C. IF DURING CONSTRUCTION IT BECOMES NECESSARY TO CLOSE ANY CONTROL VALVE OR PLACE A HYDRANT OUT OF SERVICE, THE CLARK COUNTY FIRE DEPARTMENT MUST BE CONTACTED.
D. PAINTING OF CURBS AND/OR STRIPING OF ASPHALT AREAS AND PROTECTION OF HYDRANTS FROM PHYSICAL INJURY PER FIRE HYDRANT INSTALLATION SPECIFICATIONS OF THE FIRE PREVENTION BUREAU.
E. NO FIRE HYDRANT SHALL BE LOCATED WITHIN 25 FEET OF ANY STRUCTURE, OR 5 FEET OF: A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION. FOR WALL, FENCE AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 5 FEET FROM ITS EXTERIOR SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.
F. AT ALL TIMES DURING CONSTRUCTION SUITABLE EMERGENCY VEHICLE ACCESS ROADS MUST BE MAINTAINED. ROADWAYS MUST BE SMOOTH, COMPACTED AND CAPABLE OF SUPPORTING THE IMPOSED LOADS OF ALL EMERGENCY VEHICLES.
G. PRIOR TO ACCEPTANCE OF ANY FIRE SERVICE MAIN A SATISFACTORY HYDROSTATIC TEST WITH PIPING JOINTS UNCOVERED MUST BE CONDUCTED. APPROVED PLANS AND A CONTRACTOR'S, MATERIALS AND TEST CERTIFICATE MUST BE PROVIDED AT TIME OF INSPECTION.
H. BLUE REFLECTIVE MARKERS MUST BE INSTALLED BEFORE FINAL HYDRANT ACCEPTANCE CAN BE ATTAINED (97 UFC SEC. 901.4.3).

C.C.P.W. GENERAL NOTES

EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
CURB AND GUTTER WITH A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT IN AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY CLARK COUNTY PUBLIC WORKS INSPECTOR.
CLARK COUNTY SANITATION DISTRICT SEWER NOTES:
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPES AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS.
ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 311 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS.
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START.
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.
NOTE: ALL SANITARY SEWER TO BE ABANDONED SHALL BE IN ACCORDANCE WITH SECTION 3.14.

LAS VEGAS VALLEY WATER DISTRICT

STANDARD NOTES:

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO THE LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
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 IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
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. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATERLINE AND SANITARY STORM SEWER LINE CROSS:
A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:
A. POTABLE WATER SUPPLY QUALITY MATERIAL
B. ENCASEMENT WITH FOUR (4) INCH CONCRETE (MINIMUM)
C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE
EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10-FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

PUBLIC WORKS UTILITY NOTES

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610.
2. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS PUBLISHED BY THE U.S. DEPARTMENT OF COMMERCE.
3. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
4. TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST OBTAINING PERMISSION FROM THE DEPARTMENT OF PUBLIC WORKS, TRAFFIC MANAGEMENT DIVISION.
5. ALL WORK AUTHORIZED IBY THIS PLAN SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA, NEVADA" AND "CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS," LATEST REVISION.
6. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN FEET (10') OF ANY TRAVEL WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATES ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH PERMITTED IIN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICHEVER IS GREATER.
7. A TEMPORARY PATCH IS: TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENICH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO THE TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
8. COMPACTION TESTS ARE REQUIRED.
9. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
10. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
PUBLIC WORKS UTILITY NOTES:

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 LOCATION.
ALL DISCREPANCIES MUST BE IMMEDIATELY REPORTED TO THE ENGINEER. CALL BEFORE YOU DIG: 1-800-227-2600.

NOTICE:
THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA. STREET LIGHTING, TRAFFIC SIGNALS, INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG, (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO: THE IMPROVEMENT STANDARDS, DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA, AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS & CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW AT (702) 862-3444 AT LEAST 48-HOURS PRIOR TO CONSTRUCTION ACTIVITY.

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE EINGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMIATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT AINY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

DEVELOPER

MAJESTIC REALTY CO.
4155 WEST RUSSELL ROAD
SUITE "C"
LAS VEGAS, NV 89118
(702) 896-5564

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

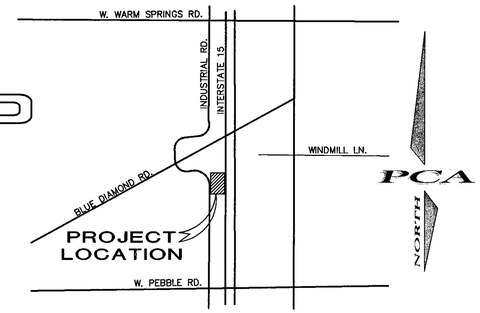
Underground Service Alert
CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- PROPOSED FIRE HYDRANT
- PROPOSED MH
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
L	LENGTH
MH	MANHOLE
MAX	MAXIMUM
NDOT	NEVADA DEPT OF TRANSPORTATION
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	PLAN AND PROFILE - LINE A
3	PLAN AND PROFILE - LINE A & LINE B
4	PLAN AND PROFILE - LINE B & LATERALS A-1 - A-3
5	PLAN AND PROFILE - LATERALS A-4, A-5, B-1 & DETAILS
6	DETAILS
7	SECTIONS AND DETAILS
8	SECTIONS AND DETAILS
9	GENERAL NOTES

CONSTRUCTION NOTES AND QUANTITIES

No.	ITEM	UNIT	TOTAL
	~ STORM DRAIN IMPROVEMENT ~		
(31)	NOT USED		
(32)	INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)	LF	214
(33)	INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)	LF	412
(34)	NOT USED		
(35)	NOT USED		
(36)	CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.	LF	812
(37)	CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.	LF	1,779
(38)	NOT USED		
(39)	CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.	LF	185
(40)	CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413	EA	6
(41)	CONST. MANHOLE PER DETAILS - SHEET 7	EA	3
(42)	CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6	EA	5
(43)	CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)	EA	2
(44)	INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)	SF	1,350
(45)	NOT USED		
(46)	CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)	EA	4
(47)	CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8	EA	1
(48)	CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5	EA	1

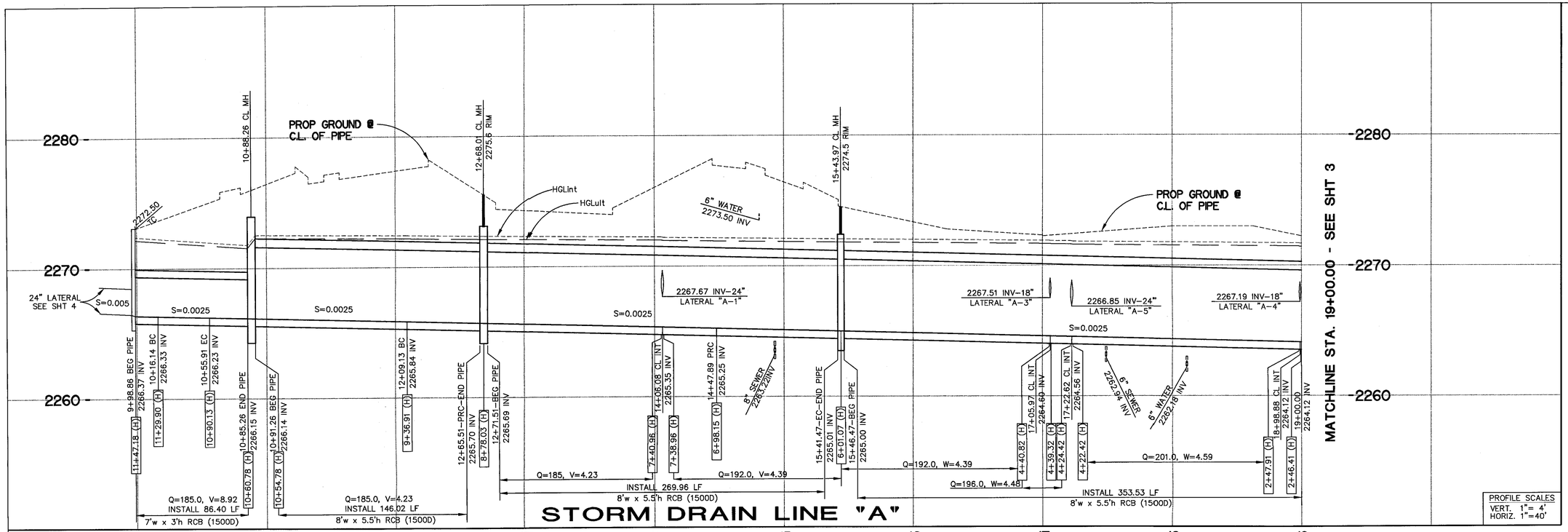
PCA
SEP 2 2 2003

EXPIRES: 12-31-04
PROFESSIONAL ENGINEER
No. 7261
STATE OF NEVADA
DATE: 9/22/03

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 • 241-3402 FAX

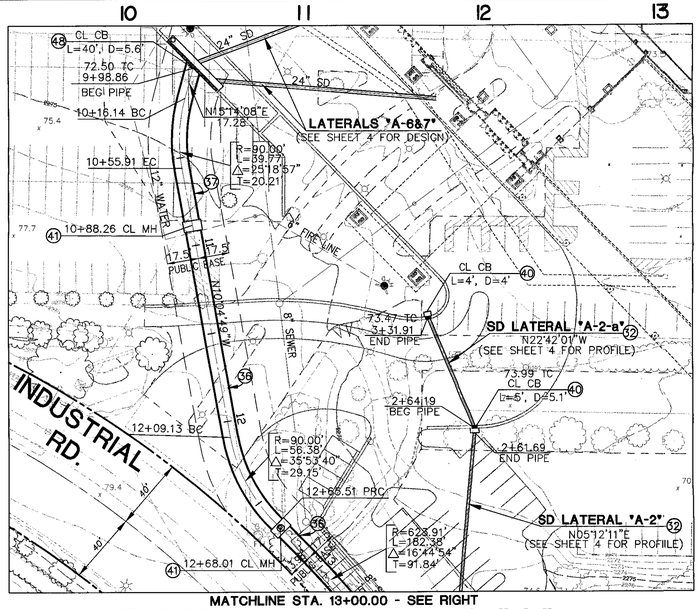
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
TITLE SHEET

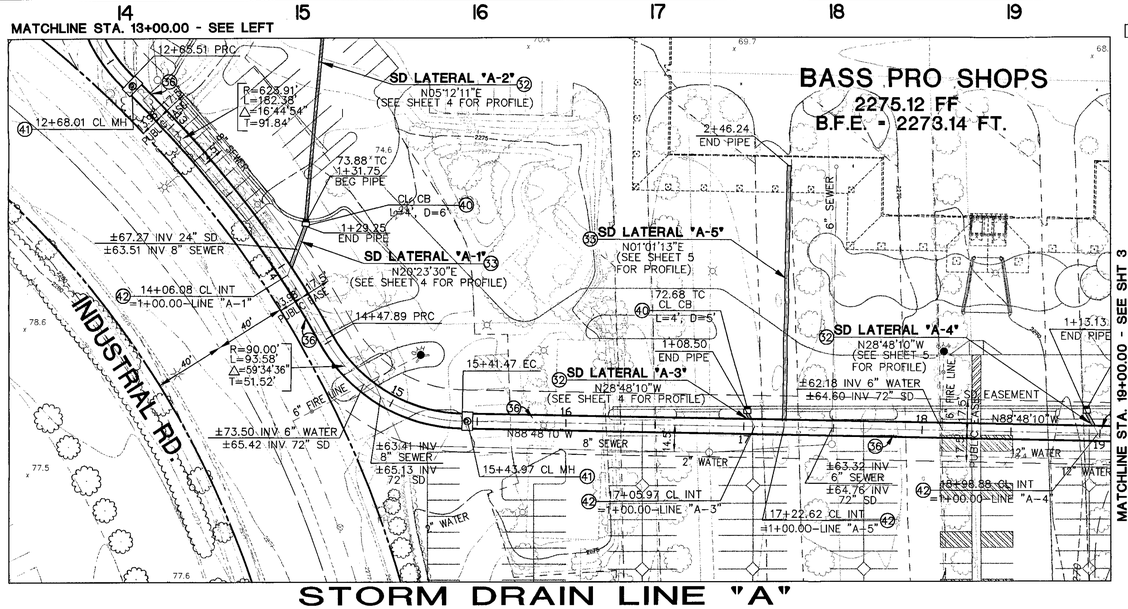
JOB #
SHEET NO.:
SD-1
1 OF 9 SHEETS
HTE #



STORM DRAIN LINE "A"

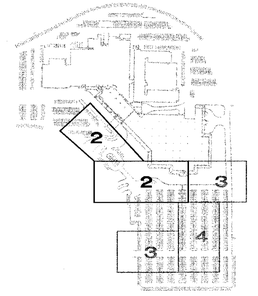
PROFILE SCALES
VERT. 1"= 4'
HORIZ. 1"=40'





STORM DRAIN LINE "A"

0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS



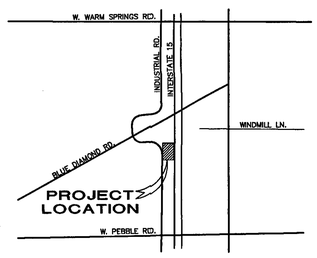
KEY MAP

NO SCALE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

51 NOT USED
52 INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
53 INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
54 NOT USED
55 NOT USED
56 CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
57 CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
58 NOT USED
59 CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
40 CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
41 CONST. MANHOLE PER DETAILS - SHEET 7
42 CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
43 CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
44 INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
45 NOT USED
46 CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
47 CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
48 CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5



VICINITY MAP

NO SCALE

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
L	LENGTH
MH	MANHOLE
MAX	MAXIMUM
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PCA
NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

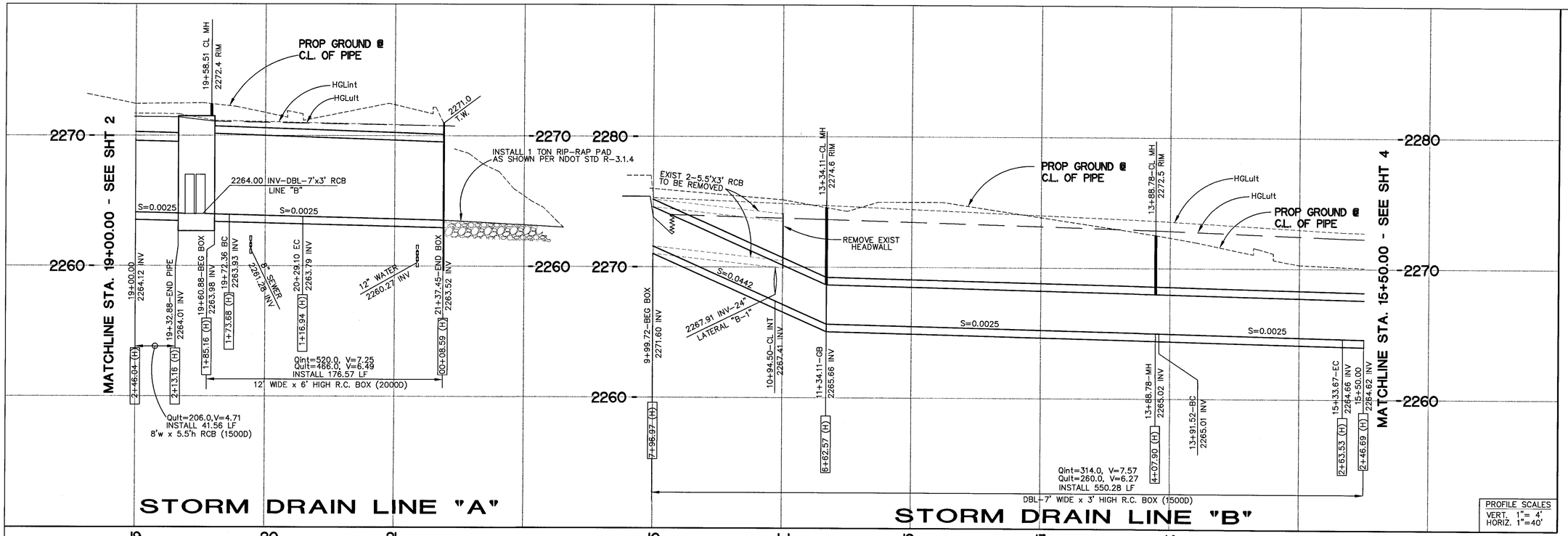
REGISTERED ENGINEER - STATE OF NEVADA
DONALD R. CORNWELL
No. 10537
CIVIL
EXP. 12-31-04
9/22/03

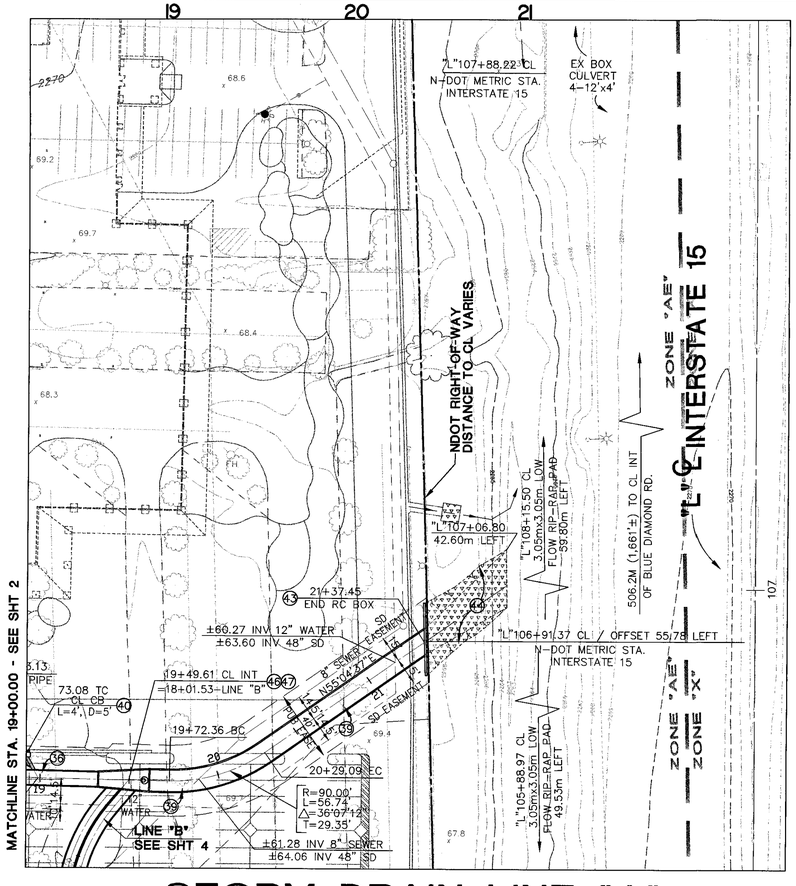
REV.	DATE	DESCRIPTION	DATE	APPROVAL

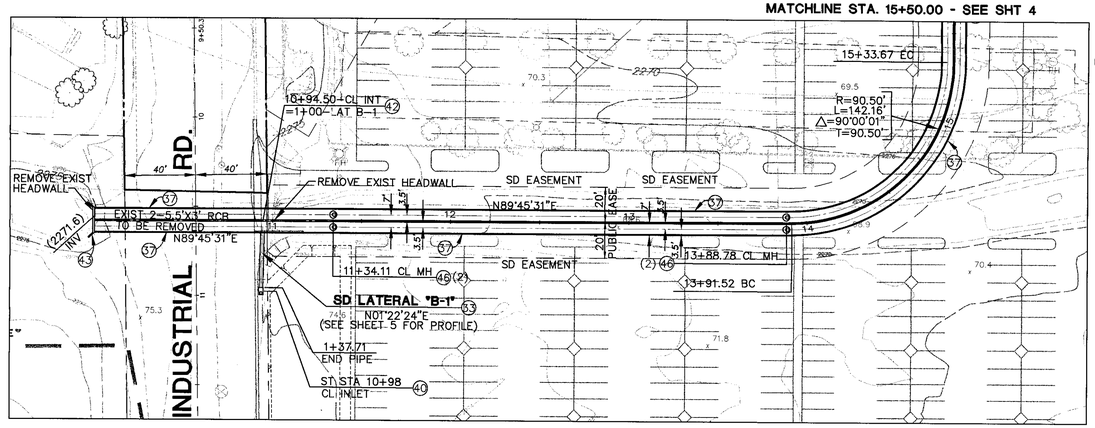
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-A
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINE "A"

JOB #
SHEET NO.:
SD-2
2 OF 9 SHEETS
HTE #



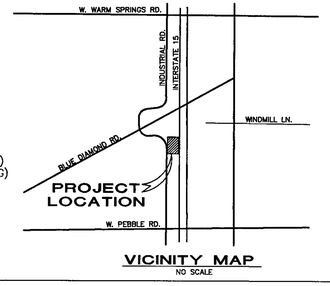




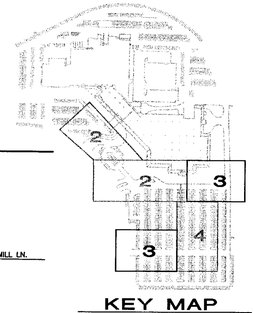
THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 3200020256E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

(51) NOT USED
(52) INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(53) INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(54) NOT USED
(55) NOT USED
(56) CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
(57) CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
(58) NOT USED
(59) CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
(40) CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
(41) CONST. MANHOLE PER DETAILS - SHEET 7
(42) CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
(43) CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
(44) INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
(45) NOT USED
(46) CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
(47) CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
(48) CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- 330.00 FS — FUTURE BUILDING
- PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21_BSSWS", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

NORTH

PCA

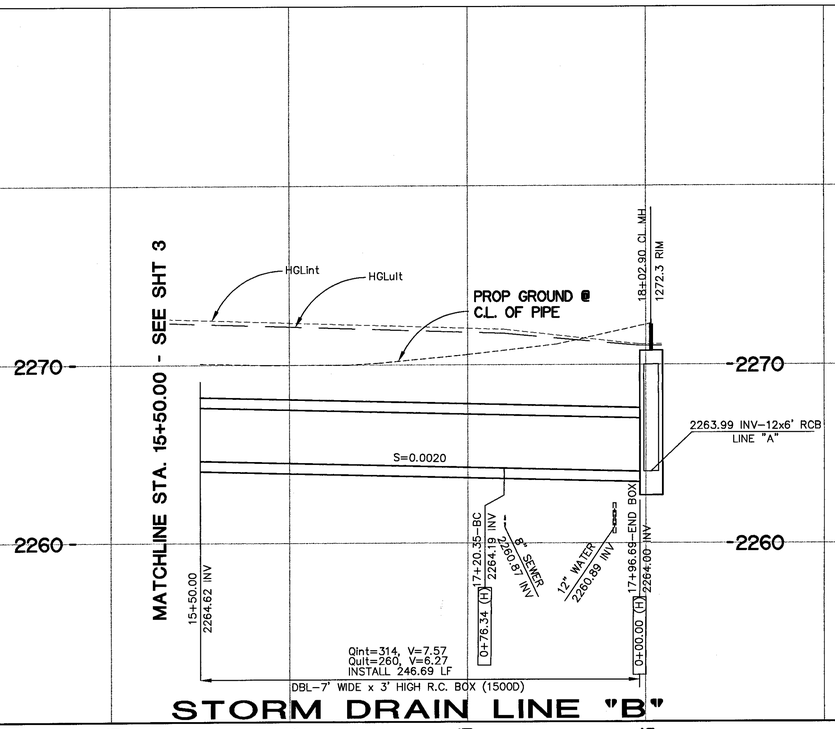
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PROFESSIONAL ENGINEER - STATE OF NEVADA
CHRISTOPHER J. CORNWELL
No. 7257
EXP. 12/31/04
EXP. 12-31-04
9/22/03

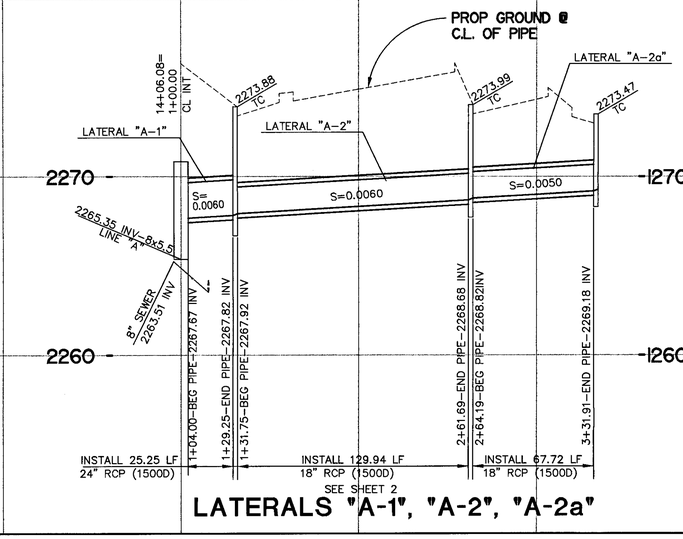
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE E
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINES "A" + "B"

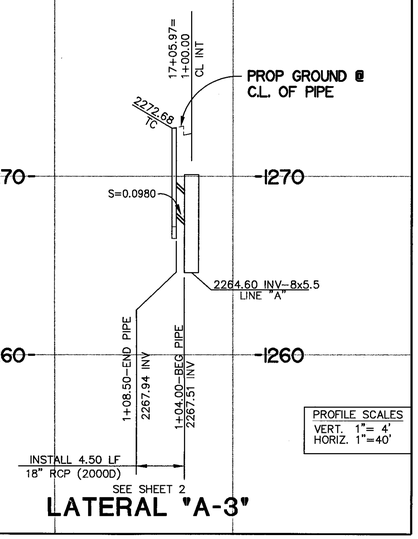
JOB #
SHEET NO.:
SD-3
3 OF 9 SHEETS
HTE #



STORM DRAIN LINE "B"

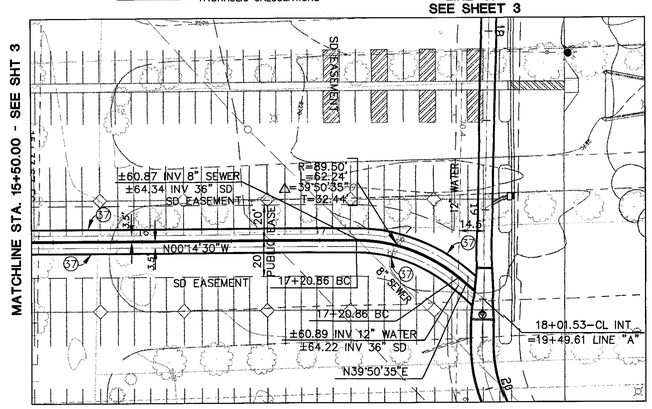


LATERALS "A-1", "A-2", "A-2a"

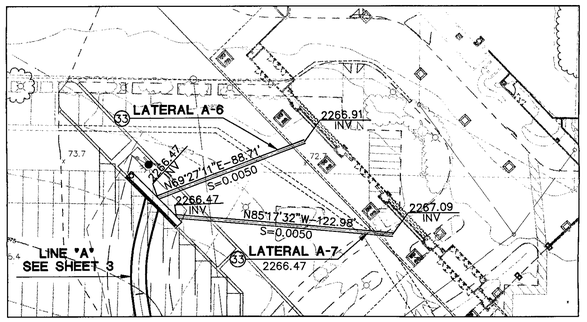


LATERAL "A-3"

0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS



STORM DRAIN LINE "B"



STORM DRAIN LATERALS 6 & 7

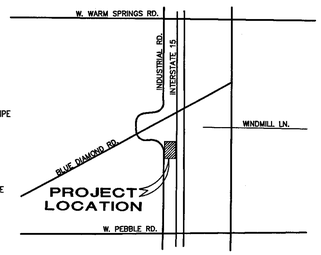
FOR ROOF DRAIN CONNECTIONS

ABBREVIATIONS

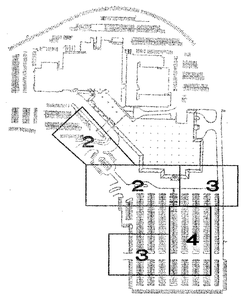
BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FIL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

CONSTRUCTION NOTES

(51) NOT USED
(52) INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(53) INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(54) NOT USED
(55) NOT USED
(56) CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
(57) CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
(58) NOT USED
(59) CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
(40) CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
(41) CONST. MANHOLE PER DETAILS - SHEET 7
(42) CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
(43) CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
(44) INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
(45) NOT USED
(46) CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
(47) CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
(48) CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSWB", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

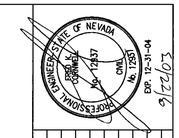
ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

GRAPHIC SCALE

40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.



REV.	DATE	DESCRIPTION	DATE	APPROVAL

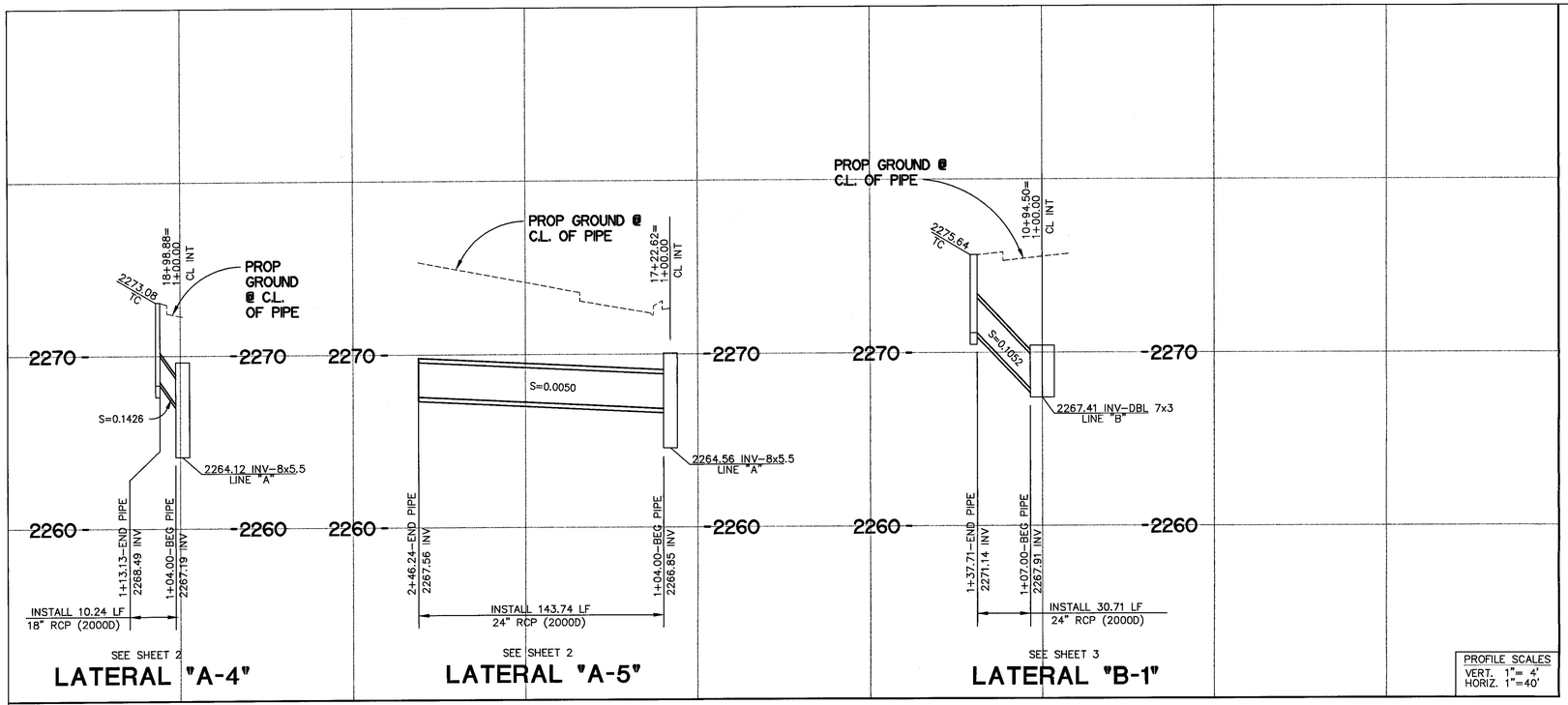
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINE "B" + LATERALS "A-1"-"A-3"

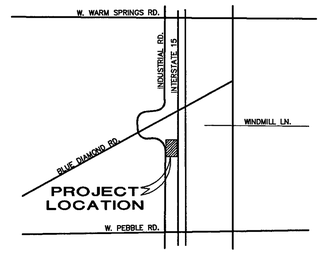
JOB #

SHEET NO.:
SD-4
4 OF 9 SHEETS

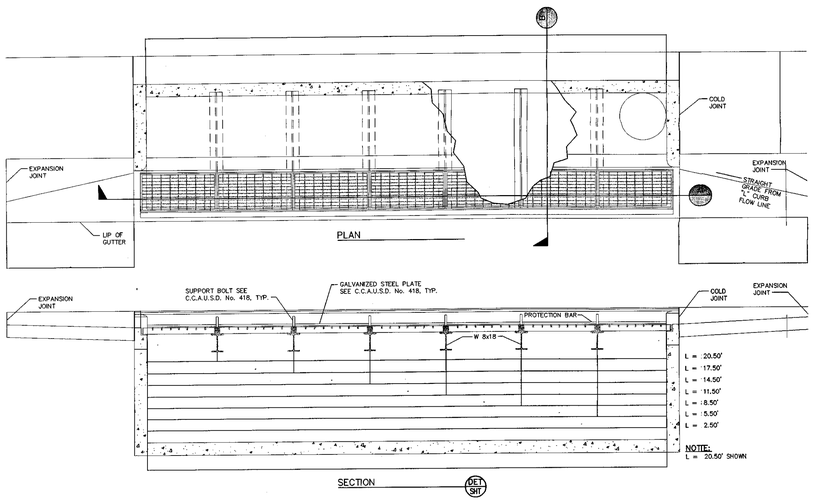
HTE #

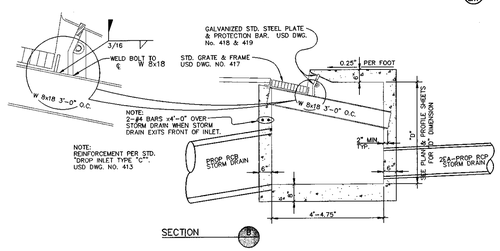


PROFILE SCALES
VERT. 1"= 4'
HORIZ. 1"=40'



VICINITY MAP
NO SCALE





MODIFIED TYPE "C" DROP INLET

NOT TO SCALE

48

DROP INLET SIZING CHART

DROP INLET No.	DEPTH (feet)	LENGTH (feet)	No. OF GRATES
1	5.5	114.50'	5
2	4.5	68.50'	3
3	4.5	114.50'	5
4	5.0	210.50'	7

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
L	LENGTH
MH	MANHOLE
MAX	MAXIMUM
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH ○ EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

51 NOT USED
52 INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
53 INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
54 NOT USED
55 NOT USED
56 CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
57 CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
58 NOT USED
59 CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
60 CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
61 CONST. MANHOLE PER DETAILS - SHEET 7
62 CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
63 CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
64 INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
65 NOT USED
66 CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
67 CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
68 CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5

* PIPE ALTERNATE

HANCOR HI-Q CORRUGATED EXTERIOR SMOOTH INTERIOR PLASTIC PIPE OR APP'D EQ.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

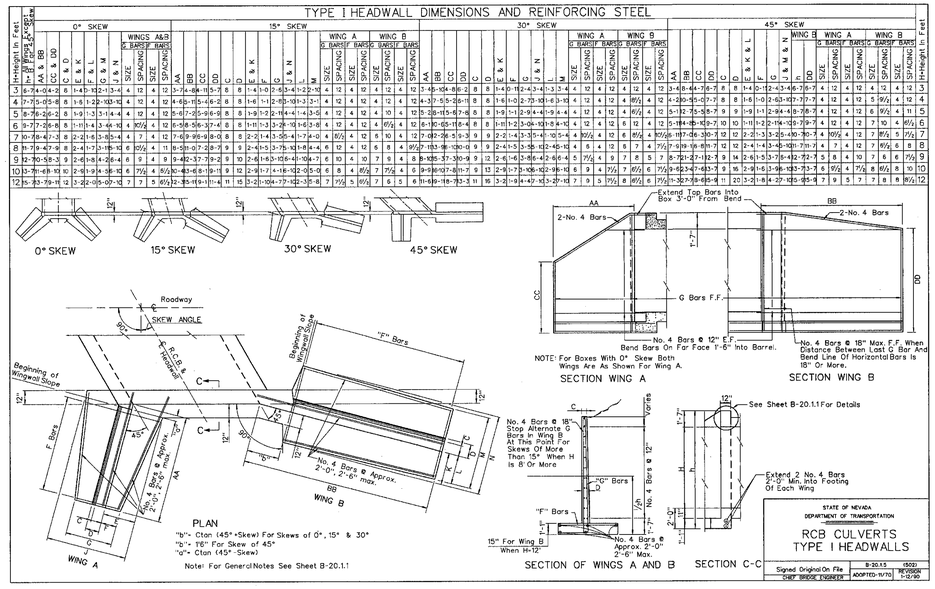
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PROFESSIONAL ENGINEER STATE OF NEVADA — JAMES R. PARDUE — No. 12537 — EXP. 12-31-04 — 9/22/05

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-A
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

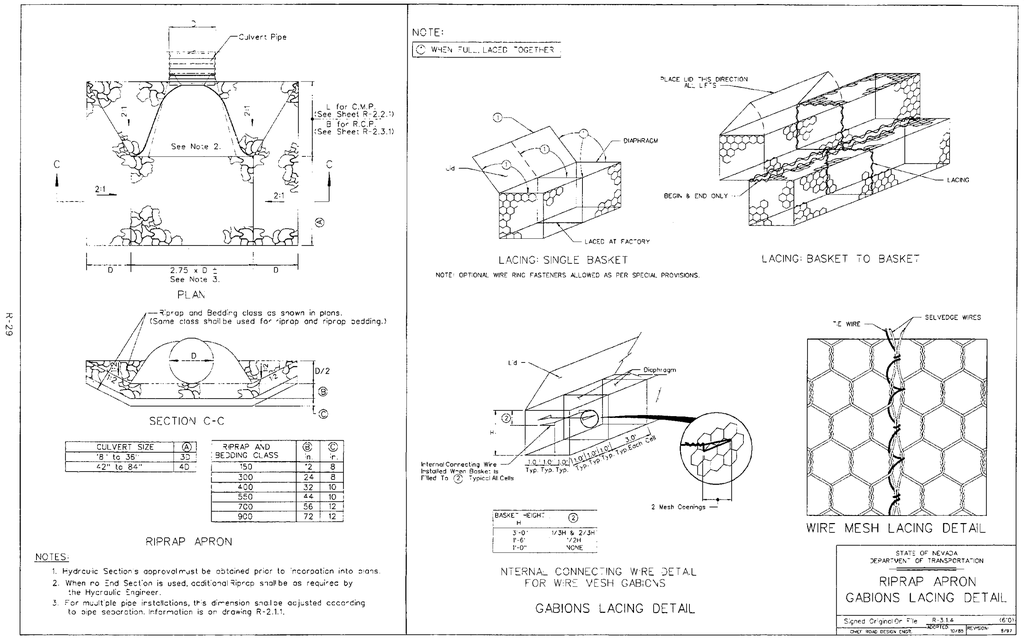
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LATERALS "A-4", "A-5", "B-1" AND DETAILS

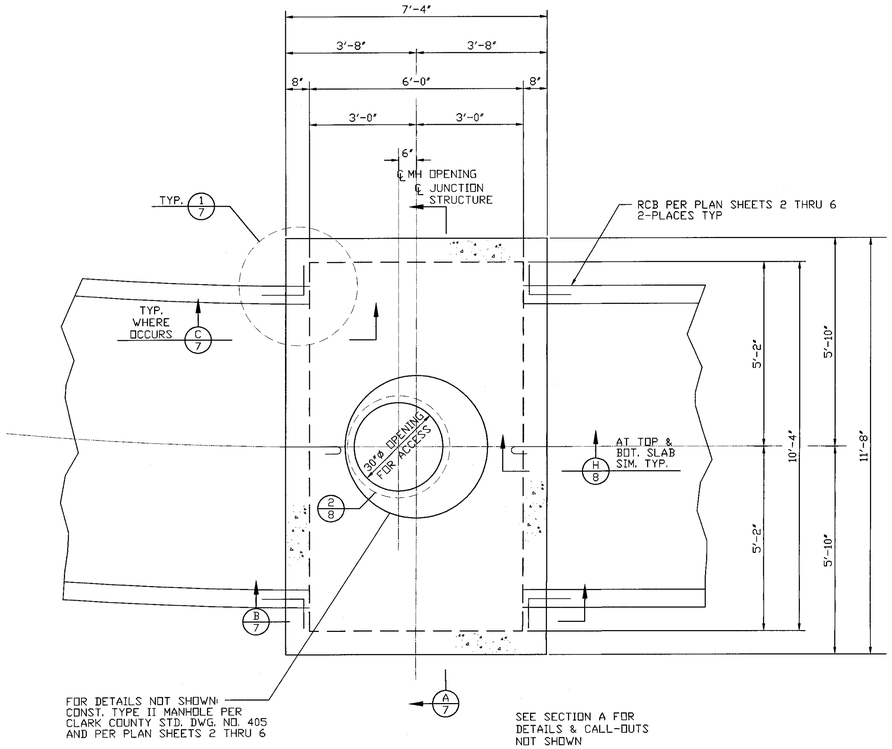
JOB #
SHEET NO.:
SD-5
5 OF 9 SHEETS
HTE #



43 NDOT HEADWALL STANDARD DETAIL

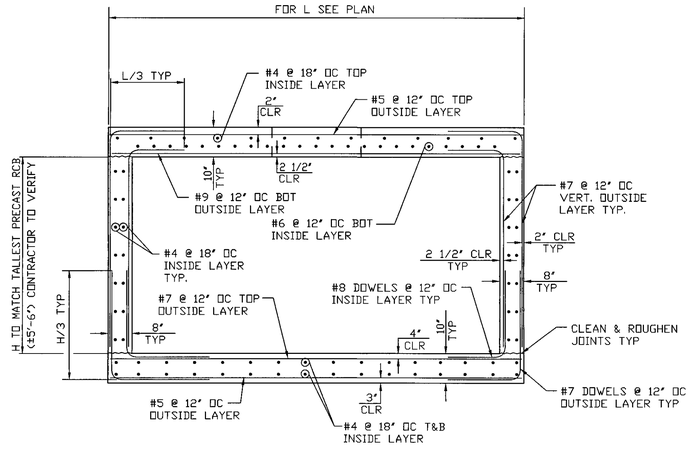
NOT TO SCALE


Culvert Pipe
See Note 2.
2:1
L for C.M.P. (See Sheet R-2.2.1)
B for R.C.P. (See Sheet R-2.3.1)
2.75 x D ± See Note 3.
PLAN
Riprap and Bedding class as shown in plans. (Same class shall be used for riprap and riprap bedding.)
SECTION C-C
CULVERT SIZE | A
18" to 36" | 35
42" to 84" | 40
RIPRAP AND BEDDING CLASS | B in | C in
150 | 72 | 8
300 | 24 | 8
400 | 32 | 10
560 | 44 | 10
700 | 56 | 12
900 | 72 | 12
RIPRAP APRON
NOTES:
1. Hydraulic Section's approval must be obtained prior to incorporation into plans.
2. When no End Section is used, additional Riprap shall be as required by the Hydraulic Engineer.
3. For multiple pipe installations, this dimension shall be adjusted according to pipe separation. Information is on drawing R-2.1.1.
NOTE:
Ⓒ WHEN FULL, LACED TOGETHER
PLACE LID THIS DIRECTION ALL LIFTS
DIAPHRAGM
LACED AT FACTORY
LACING: SINGLE BASKET
BEGIN & END ONLY
LACING
LACING: BASKET TO BASKET
NOTE: OPTIONAL WIRE RNG FASTENERS ALLOWED AS PER SPECIAL PROVISIONS.
Lid
Diaphragm
Internal Connecting Wire Installed When Basket is Filled To Ⓒ Typical All Cells
Typ. Typ. Typ.



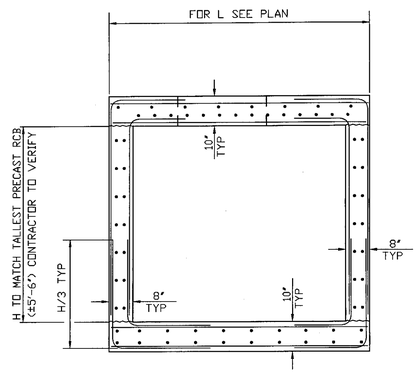
41 JUNCTION STRUCTURE PLAN

1/2"=1'-0"



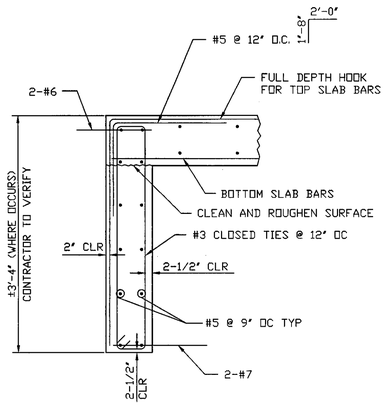
A/7 SECTION

NTS



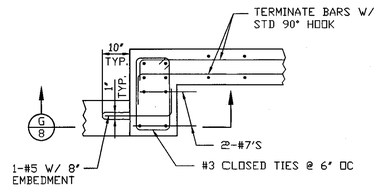
B/7 SECTION

NTS



C/7 SECTION

NTS



PLAN

SEE SECTION 1A FOR DETAILS & CAILL-OUTS NOT SHOWN

1/7 DETAIL

NTS

STRUCTURAL NOTES:

1. JUNCTION STRUCTURES REQUIRE SPECIAL INSPECTION FOR BOTH CONCRETE AND REINFORCEMENT PLACEMENT PER CITY REQUIREMENTS.
2. EPOXY GROUT TO MEET THE FOLLOWING SPECIFICATIONS:
   A. TENSILE STRENGTH (ASTM C-307) = 2,000-2,500 psi
   B. COMPRESSIVE STRENGTH (ASTM C-579) = 15,000 psi
   C. FLEXURAL STRENGTH (ASTM C-580) = 3,800-4,100 psi

   NOTE: "EPOXY SYSTEMS" PRODUCT NO. 224 MEETS THE ABOVE SPECIFICATION OR APPROVED EQUAL:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO # 4945

   CONTRACTOR SHALL COMPLY WITH ALL SPECIFICATIONS FOR INSTALLATION OF EPOXY GROUT MATERIAL PROVIDED BY THE MANUFACTURER.

   EPOXY INSTALLATION REQUIRES SPECIAL INSPECTION PER CITY REQUIREMENTS. SEE SECTIONS FOR DOWEL DRILL HOLE DIMENSIONS.
3. CONCRETE SHALL BE "MINIMUM COMPRESSIVE STRENGTH fc' = 4500 psi AT 28 DAYS ASTM C150 TYPE II PORTLAND CEMENT. REINFORCING SHALL BE DEFORMED BARS ASTM A615, GRADE 60 OR ASTM A706 MIN YIELD STRESS 60,000 psi.
4. CONTRACTOR SHALL REFER TO SITE SOILS REPORT FOR ALL PERTINENT SOILS RELATED DATA REQUIRED FOR CONSTRUCTION OF STORM DRAIN STRUCTURES.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

PROFESSIONAL ENGINEER - STATE OF NEVADA
REED A. CORNWELL No. 7937 COMM. No. 12581
EXP. 12-31-04
9/22/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
SECTIONS AND DETAILS

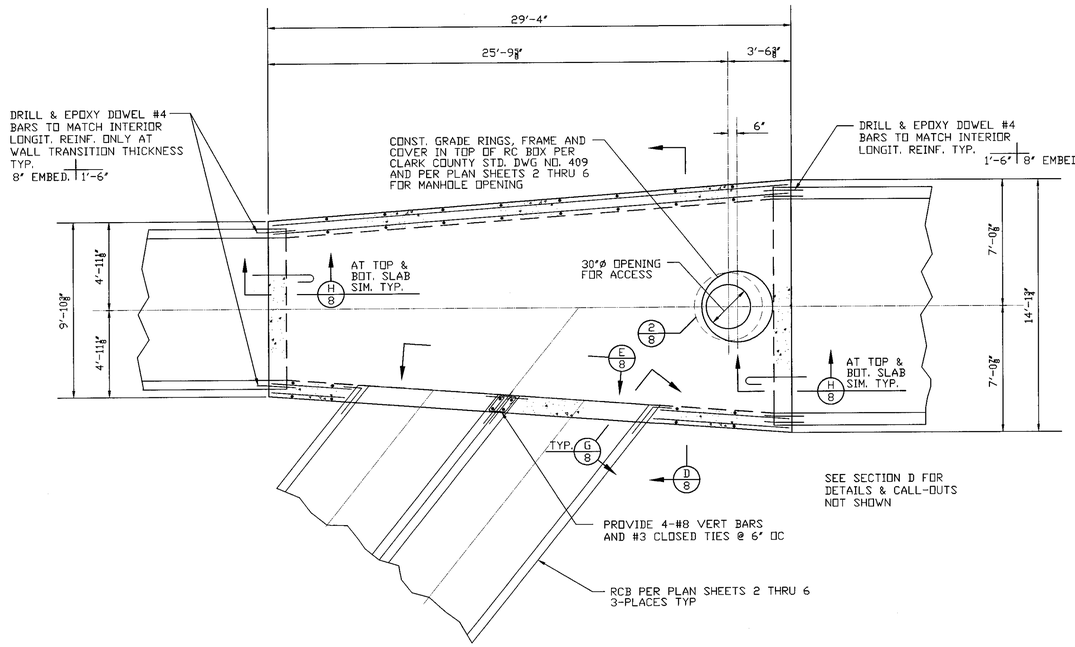
JOB #

SHEET NO.:

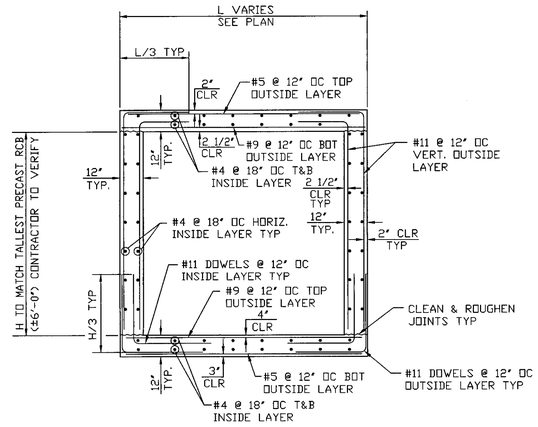
SD-7

7 OF 9 SHEETS

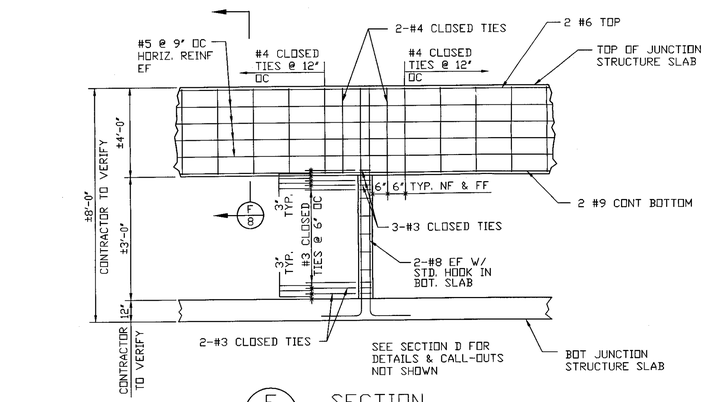
HTE #



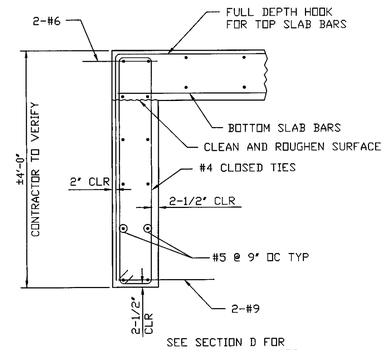
47 JUNCTION STRUCTURE PLAN
1/4"=1'-0"



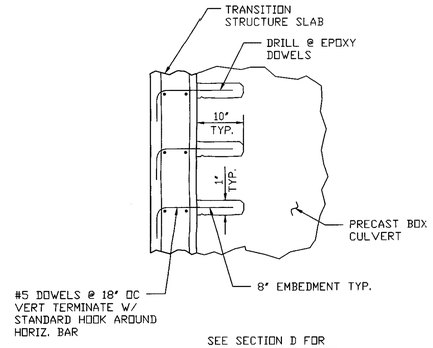
D/8 SECTION
NTS



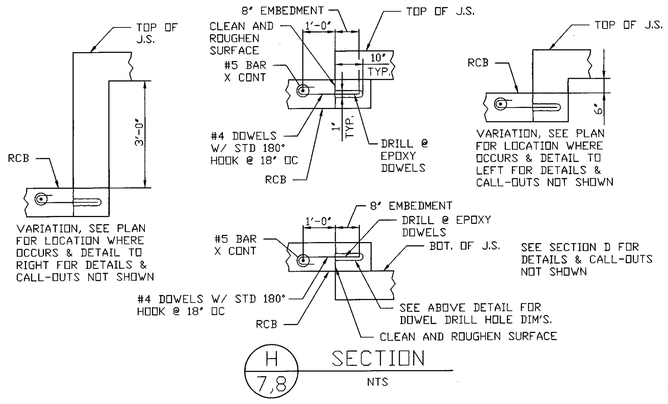
E/8 SECTION
NTS



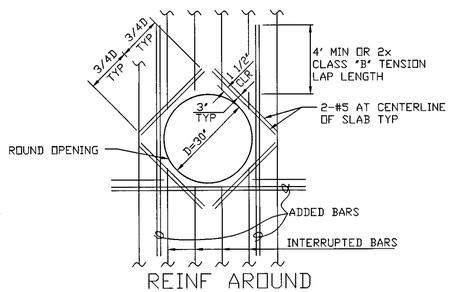
F/8 SECTION
NTS



G/8 SECTION
NTS



H/7,8 SECTION
NTS



REINF AROUND STRUCTURAL SLAB OPENING

2/7,8 DETAIL
NTS

SLAB OPENING NOTES:

1. ALL TOP AND BOT. SLAB BARS INTERRUPTED BY THE OPENING SHALL BE COMPENSATED FOR WITH ADDITIONAL REINF. EQUAL TO THAT INTERRUPTED. PLACE THE ADDITIONAL REINF. EQUALLY ON EACH SIDE OF OPENING, EXTENDED SAME LENGTH AS REQ'D. FOR THE UNINTERRUPTED REINF.
2. WHERE THE NUMBER OF BARS INTERRUPTED IS UNEVEN, THE NUMBER OF BARS ADDED SHALL BE THE NEXT HIGHEST EVEN NUMBER.

SEE SECTION D FOR DETAILS & CALL-OUTS NOT SHOWN

STRUCTURAL NOTES:

1. JUNCTION STRUCTURES REQUIRE SPECIAL INSPECTION FOR BOTH CONCRETE AND REINFORCEMENT PLACEMENT PER CITY REQUIREMENTS.
2. EPOXY GROUT TO MEET THE FOLLOWING SPECIFICATIONS:
   A. TENSILE STRENGTH (ASTM C-307) = 2,000-2,500 psi
   B. COMPRESSIVE STRENGTH (ASTM C-579) = 15,000 psi
   C. FLEXURAL STRENGTH (ASTM C-580) = 3,800-4,100 psi

   NOTE: "EPOXY SYSTEMS" PRODUCT NO. 224 MEETS THE ABOVE SPECIFICATION OR APPROVED EQUAL:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO # 4945

   CONTRACTOR SHALL COMPLY WITH ALL SPECIFICATIONS FOR INSTALLATION OF EPOXY GROUT MATERIAL PROVIDED BY THE MANUFACTURER.

   EPOXY INSTALLATION REQUIRES SPECIAL INSPECTION PER CITY REQUIREMENTS. SEE SECTIONS FOR DOWEL DRILL HOLE DIMENSIONS.
3. CONCRETE SHALL BE "MINIMUM COMPRESSIVE STRENGTH f'c" = 4500 psi AT 28 DAYS ASTM C150 TYPE II PORTLAND CEMENT. REINFORCING SHALL BE DEFORMED BARS ASTM A615, GRADE 60 OR ASTM A706 MIN YIELD STRESS 60,000 psi.
4. CONTRACTOR SHALL REFER TO SITE SOILS REPORT FOR ALL PERTINENT SOILS RELATED DATA REQUIRED FOR CONSTRUCTION OF STORM DRAIN STRUCTURES.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE E
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
No. 12537
EXP. DATE 12-31-04
9/22/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
SECTIONS AND DETAILS

JOB #
SHEET NO.:
SD-8
8 OF 9 SHEETS
HTE #

GENERAL

1. The Contractor shall verify all dimensions prior to starting construction.
2. Structure noted in the drawings as existing shall be field verified by the contractor and any discrepancies noted shall be reported to the Architect/ Structural Engineer.
3. Do not scale the drawings.
4. Notes and details on the drawings shall take precedence over these general notes, typical details, and the project specifications.
5. Typical details and schedules indicated may not be specifically referenced on the drawings. The contractor is responsible to determine where each typical detail or schedule applies. If locations are found where no typical detail, typical schedule, or specific detail applies, notify the Architect/Structural Engineer.
6. All work shall conform to the minimum standards of following codes:

   The 2000 edition of the International Building Code and other regulating agencies which have authority over any portion of the work, and those codes and standard listed in these notes and in the project specifications.
7. The contract Structural drawings and specifications represent the finished structure. They do not indicate the method of construction. Contractor to provide construction means, methods, techniques, sequences and procedures as required. Contractor to provide adequate excavation procedures, shoring, bracing and erection procedures complying with national, state and local safety ordinances. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to: bracing and shoring for loads due to hydrostatic, earth, wind or seismic forces, construction equipment, etc.
8. Observation visits (site visits) by representatives of Architect/Structural Engineer do not include inspection of construction means and methods. Site visits during construction are not continuous and detailed inspection services which are to be performed by others. Observations are performed soley for the purpose of determining if the Contractor understands design intent shown in the contract drawings. Observations do not guarantee Contractor's performance and are not to be construed as supervision or verification of construction.
9. All specifications and codes noted shall be the latest approved editions and revisions by the governmental agency having jurisdiction over this project.
10. Contractor shall investigate the site during clearing and earth work operations for filled excavations or buried structures such as cesspools, cisterns, foundations, utilities, etc. If any such structures are found, the Structural Engineer shall be notified immediately.
11. Shop drawings submitted to the Structural Engineer for review shall consist of (1) blueline set and (1) sepia set. No modifications or substitution of drawings and specifications will be accepted via shop drawing review.
    - Contractor shall review and stamp shop drawings prior to submission to the Architect/Structural Engineer. Contractor shall review for completeness and compliance with contract documents.
    - Submit shop drawings to the Architect/Structural Engineer as indicated or specified for review prior to fabrication. Review will be for general conformance with design intent conveyed in contract documents.
    - When an engineer is required to sign and stamp shop drawings and calculations, ensure seal indicates engineer as registered in state where project site occurs.
    - Shop drawings are not a part of contract documents. Therefore, Architect's/Structural Engineer's review does not constitute an authorization to deviate from terms and conditions of the contract.
    - Shop drawings will be rejected for incompleteness, lack of coordination with other portions of contract documents, lack of calculations (if required), or where modifications or substitutions are indicated without prior review per paragraph above.
    - Submit shop drawings and calculations to governing code authority when specifically indicated or requested.
    - Maintain a copy of all shop drawings accepted by the Architect/ Structural Engineer at site during construction period.
    - Structural Engineer requires 10 working days after receipt of shop drawings and calculations for processing.
12. Design Loads:

    A. Live Loads: HS 20-44
13. UBC Table 19-A-4 Sulfate Exposure (See General Notes - Concrete Item #3 for concrete water cement ratio limits):

    Severe

QUALITY ASSURANCE AND SPECIAL INSPECTION

Testing Laboratory: Retained by owner and satisfactory to Architect/ Structural Engineer and governing code authority to perform required tests and inspections of this contract and applicable code.

Material Certification: Submit laboratory test reports certifying materials are of identifiable tested stock to owner, testing laboratory, Architect/Structural Engineer and, upon request, to governing code authority. If laboratory test reports cannot be made available, testing laboratory will perform tests as directed by Architect/Structural Engineer. Contractor shall pay testing laboratory for costs related to tests and inspections of unidentifiable materials or materials furnished without laboratory test reports, materials found deficient after initial tests and inspections, or materials replacing deficient materials.

1. Concrete.

   Testing laboratory will review concrete mix design data and will perform the following concrete tests at frequency indicated in UBC section 1905.6:
   (a) Slump tests in compliance with ASTM C143.
   (b) Prepare four test cylinders for compressive strength testing in compliance with ASTM C39, ACI 318 and UBC section 1905.6. Test one cylinder at 7 days, two cylinders at 28 days and retain remaining cylinder for tests until completion of project. Determine concrete compressive strength at 28 days based on average of two cylinders tested.
   (c) Entrained air content in compliance with ASTM C231 for air entrained concrete.
2. Reinforcing
   (a) During placement
3. Special cases:
   (a) Epoxy and grout set bolts and reinforcing bars
4. Ten percent of drilled-in, epoxy, or grout set anchors shall be proof tested to 2 times allowable tension. Notify Architect/Structural Engineer of any failures so additional testing of adjacent anchors can be directed.
5. Insulating concrete per appropriate ICBO evaluation report as indicated on Architectural/Structural drawings.
6. Excavation and back-filling.

   All special inspection shall be performed in accordance with the requirements of UBC section 1701.

REINFORCING STEEL (FOR CONCRETE AND MASONRY)

1. All reinforcing steel shall be detailed and placed in accordance with the 'Building Code Requirements for Reinforced Concrete' (ACI 318-99) and the 'Manual of Standard Practice for Reinforced Concrete Construction' by CRSI and WCRSI as modified by the project drawings and specifications.
2. Deformed reinforcing bars shall conform to the requirements of ASTM A615 grade 60.
3. Welding of reinforcing is not permitted.
4. All reinforcing bar bends shall be made cold.
5. Lap splices shall be made only where shown on the structural drawings.
6. Reinforcing dowels between footings and walls or columns shall be the same number, size, spacing and grade as the specified vertical reinforcing, u.n.o.
7. All reinforcing bars shall be marked so their identification can be made when the final in-place inspection occurs.

FOUNDATION

1. The design of the foundation system is based on the geotechnical report (and any addenda) prepared by the following company: OWENS GEOTECHNICAL, INC.

   Report no: E-02-288
   Dated: March 19, 2003

   Copies are available for review at the Engineer's office and Contractor shall have a copy at the jobsite.
2. The foundation system is designed based on the following:

   Allowable Soil Bearing Pressure = 2500 psf
   Equivalent Fluid Pressure Unconstrained = 35
   Passive Pressure = 250 pcf
   Friction Coefficient = 0.4

   A 1/3 increase is allowed for seismic or wind loading, unless noted otherwise where asterisk (*) is indicated.
3. The Contractor shall provide for proper dewatering of excavations from surface water, ground water, seepage, etc.
4. The Contractor shall provide for the installation and design of all cribbing, sheathing and shoring required to safely and adequately retain the earth banks and support any existing structures in accordance with all national, state and local safety ordinances.
5. All abandoned utilities, footings, etc., that interfere with the new construction shall be removed. Notify the Structural Engineer should any foundations for existing structures be encountered that are not shown on the structural drawings.
6. Footings shall be placed and estimated according to depths shown on the drawings. Excavations for footings shall be approved by the Geotechnical Engineer prior to placing the concrete and reinforcing. The Contractor shall notify the Geotechnical Engineer when the excavations are ready for inspection. The Geotechnical Engineer shall submit a letter of compliance to the Owner. Should soil encountered at these depths not be approved by the Geotechnical Engineer, footing elevations or footing designs will be altered by change order.
7. All excavations shall be properly backfilled. Footing backfill and utility trench backfill within the building perimeter shall be mechanically compacted in layers, to the approval of the Geotechnical Engineer. See geotechnical report for requirements. Flooding will not be permitted.
8. The Contractor shall not backfill behind retaining walls before the concrete or masonry walls have reached full design strength. The Contractor shall brace or protect all building and pit walls below grade from lateral loads until attaching floors are completely in place and have reached full design strength. The Contractor shall provide for the design, any required permits and the installation of such bracing and protection.
9. Sub-base below slabs on grade shall be supported on natural grade or structural fill as directed in the geotechnical report. See typical details and geotechnical report for vapor barrier and sub-base requirements.

EPOXY INSTRUCTIONS FOR ANCHORING REBAR AND BOLTS

1. Epoxy may not be used unless specifically detailed on the drawings or without prior approval of the Structural Engineer.
2. Bars must be deformed or threaded for the full embedment depth in epoxy.
3. Over-drill bar diameter by 1/4 in., unless indicated otherwise by the Epoxy Manufacturer, and to the depth indicated on the structural drawings.
4. Remove all dirt, dust, water, and ice by vacuum from the drilled holes.
5. Any dirt, rust, and oil on the bars shall be removed.
6. During the epoxy mixing and application process, follow the Epoxy Manufacturer's specifications exactly.
7. Fill the holes drilled for the bars partially with epoxy and then insert the bars. Work the bars in and out to compact the epoxy, then fill the remainder of the holes.
8. Vertical holes to be filled from the bottom are to use an epoxy gel.
9. The following epoxy systems are acceptable:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO# 4945

   The use of any other epoxy system must be submitted for approval to the Structural Engineer.

CONCRETE

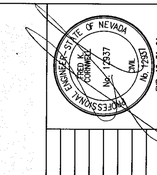
1. All aspects of work pertaining to the concrete construction shall be in accordance with ACI 318-95, 'Building Code Requirements for Reinforced Concrete' and the latest edition of 'Specifications for Structural Concrete for Buildings', ACI 301, with modifications as noted on the project drawings and\or specifications.
2. Concrete mix designs shall be submitted to the Structural Engineer for review. All mix designs shall be designed by a qualified testing laboratory and shall be wet stamped by a Civil Engineer licensed in the State of Nevada.
3. Portland cement shall conform to ASTM C150 Type V where the concrete is in contact with soil. For UBC Table 19-A-4 Severe & Very Severe sulfate exposures as identified in the project geotechnical report, the water cement ratio shall not exceed 0.45 and shall not exceed 0.50 for Moderate sulfate exposure. Type II cement shall be used at all other locations in the structure.
4. Fly ash may be used in concrete mixes. The fly ash shall conform to ASTM C618 Class F. The loss of ignition shall be limited to 2%. The addition rate for fly ash shall be limited to 15% of the cement weight. The contractor shall submit all certificates showing the fly ash is in accordance with the above criteria.
5. Hard rock concrete aggregate shall conform to all requirements and tests of ASTM C33 and project specifications. Exceptions may be used only with approval of the Structural Engineer.
6. Structural concrete 28-day strengths & types are as follows:

LOCATION OF CONCRETE	STRENGTH, PSI	TYPE
FOOTINGS	4500	HARD ROCK
CULVERT WALLS	4500	HARD ROCK
FRAMED SLABS	4500	HARD ROCK

7. The modulus of elasticity of concrete, when tested in accordance with ASTM C469, shall be at least the value given by the equations in section 8.5.1 of ACI 318 for the specified concrete 28-day strength.
8. Concrete mixing operations, etc., shall be in accordance with ASTM C94.
9. Concrete placement shall be in accordance with ACI standard 304 and project specifications. All concrete surfaces against which concrete is to be placed shall be sandblasted.
10. If columns and walls are placed with a floor, two hours must elapse between end of column or wall placement and beginning of the floor placement.
11. Clear coverage of concrete over reinforcing bars shall be as follows, U.N.O.:

		MINIMUM COVER INCHES
A)	Concrete cast against and permanently exposed to earth	3
B)	Concrete exposed to earth or weather:	
	No. 6 through No. 18 bar	2
	No. 5 bar and smaller	2
C)	Concrete not exposed to weather or in contact with ground, U.N.O.:	
	Slabs, walls, joists:	
	No. 14 and No. 18 bar	1 1/2
	No. 11 bar and smaller	3/4
	Beams, columns:	
	Primary reinforcement, ties	
	Stirrups, spirals	1 1/2
D)	Slab on grade, 2 inches clear from top	

12. Prior to concrete placement, all reinforcing bars, anchor bolts and other concrete inserts shall be well secured in position.
13. Mechanical pipes or electrical conduit shall not pass through concrete columns or beams unless specifically detailed.



REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
GENERAL NOTES

JOB #

SHEET NO.:
SD-9

9 OF 9 SHEETS

HTE #

PRECISE GRADING PLANS
FOR
BASS PRO SHOPS
AT SILVERTON HOTEL AND CASINO

CLARK COUNTY FIRE DEPARTMENT

GENERAL NOTES

A. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE 1997 EDITION OF THE UNIFORM FIRE CODE, AND THE 1995 EDITION OF THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET, #24.
B. ON ANY BUILDING CONSTRUCTION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMBUSTIBLE MATERIALS ARE DELIVERED TO THE SITE AND CONSTRUCTION COMMENCES. SAID FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH THE REQUIRED WATER SUPPLY.
C. IF DURING CONSTRUCTION IT BECOMES NECESSARY TO CLOSE ANY CONTROL VALVE OR PLACE A HYDRANT OUT OF SERVICE, THE CLARK COUNTY FIRE DEPARTMENT MUST BE CONTACTED.
D. PAINTING OF CURBS AND/OR STRIPING OF ASPHALT AREAS AND PROTECTION OF HYDRANTS FROM PHYSICAL INJURY PER FIRE HYDRANT INSTALLATION SPEC OF THE FIRE PREVENTION BUREAU.
E. NO FIRE HYDRANT SHALL BE LOCATED WITHIN 25 FEET OF ANY STRUCTURE, OR 5 FEET OF: A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION. FOR WALL, FENCE AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 5 FEET FROM ITS EXTERIOR SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.
F. AT ALL TIMES DURING CONSTRUCTION SUITABLE EMERGENCY VEHICLE ACCESS ROADS MUST BE MAINTAINED. ROADWAYS MUST BE SMOOTH, COMPACTED AND CAPABLE OF SUPPORTING THE IMPOSED LOADS OF ALL EMERGENCY VEHICLES.
G. PRIOR TO ACCEPTANCE OF ANY FIRE SERVICE MAIN A SATISFACTORY HYDROSTATIC TEST WITH PIPING JOINTS UNCOVERED MUST BE CONDUCTED. APPROVED PLANS AND A CONTRACTOR'S MATERIALS AND TEST CERTIFICATE MUST BE PROVIDED AT TIME OF INSPECTION.
H. BLUE REFLECTIVE MARKERS MUST BE INSTALLED BEFORE FINAL HYDRANT ACCEPTANCE CAN BE ATTAINED (97 UFC SEC. 901.4.3).

C.C.P.W. GENERAL NOTES

EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
CURB AND GUTTER WITH A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT IN AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY CLARK COUNTY PUBLIC WORKS INSPECTOR.
CLARK COUNTY SANITATION DISTRICT SEWER NOTES:
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPES AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS.
ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 311 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS 'A' CONTRACTORS.
NOTE: ALL SANITARY SEWER TO BE ABANDONED SHALL BE IN ACCORDANCE WITH SECTION 3.14.

LAS VEGAS VALLEY WATER DISTRICT

STANDARD NOTES:

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO THE LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
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 IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
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. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATERLINE AND SANITARY STORM SEWER LINE CROSS:
A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:
A. POTABLE WATER SUPPLY QUALITY MATERIAL
B. ENCASEMENT WITH FOUR (4) INCH CONCRETE (MINIMUM)
C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE
EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10-FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

PUBLIC WORKS UTILITY NOTES

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610.
2. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS PUBLISHED BY THE U.S. DEPARTMENT OF COMMERCE.
3. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
4. TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST OBTAINING PERMISSION FROM THE DEPARTMENT OF PUBLIC WORKS, TRAFFIC MANAGEMENT DIVISION.
5. ALL WORK AUTHORIZED BY THIS PLAN SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA, NEVADA" AND "CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS," LATEST REVISION.
6. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN FEET (10') OF ANY TRAVEL WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATES ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH PERMITTED IN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICHEVER IS GREATER.
7. A TEMPORARY PATCH IS TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENCH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO THE TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
8. COMPACTION TESTS ARE REQUIRED.
9. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
10. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
PUBLIC WORKS UTILITY NOTES:

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 LOCATION.
ALL DISCREPANCIES MUST BE IMMEDIATELY REPORTED TO THE ENGINEER. CALL BEFORE YOU DIG: 1-800-227-2600.

NOTICE:
THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA. STREET LIGHTING, TRAFFIC SIGNALS, INTERCONNECT CABLE, YOU MUST CONTACT CLARK COUNTY TRAFFIC AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG, (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE IMPROVEMENT STANDARDS, DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA, AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE EINGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

DEVELOPER

MAJESTIC REALTY CO.
4155 WEST RUSSELL ROAD
SUITE "C"
LAS VEGAS, NV 89118
(702) 896-5564

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

TRAFFIC AND ELECTRICAL NOTES

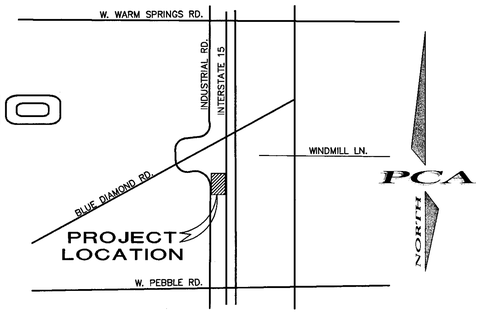
1. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
2. 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 GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. ALL CONSTRUCTION SIGNING, BARRICADING, AND PAVEMENT MARKINGS SHALL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK - 1986 AND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
4. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PERMANENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS.
ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.
6. IF PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN SHOWN HEREON TO BE MOUNTED ON A SIGN POST, THEN CHANGE SIGN MOUNTING TO ONE ON THE STREETLIGHT STANDARD.
7. PRIOR TO CONSTRUCTION, THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE CURRENT PLANNING DIVISION OF THE DEPARTMENT OF COMPREHENSIVE PLANNING.
8. ALL TRAFFIC SIGNAL POLE ASSEMBLIES, STEEL PEDESTALS FOR CABINETS, AND STREET LIGHT POLES SHALL BE GALVANIZED PER ASTM A123.
9. ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION OF EACH.
10. THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA: STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LVACTS) INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT), AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
11. LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE, WHILE PERMANENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO LVACTS. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS, CITY OF LAS VEGAS,
12. ALL NEW OR REPLACEMENT TRAFFIC SIGNAL LOOPS SHALL BE INSTALLED USING CABLE-IN-DUCT WIRING. SHALL HAVE INDEPENDENT LEAD-IN WIRES FOR EACH LOOP FROM THE CONTROLLER TO THE PULL BOX, AND EACH LEAD-IN SHALL BE INDIVIDUALLY TAGGED.
13. TRAFFIC SIGNAL PEDESTRIAN HEADS SHALL BE THE L.E.D. TYPE.
14. ELECTRICAL POWER SERVICE POINT LOCATION(S) FOR STREET LIGHTING AND TRAFFIC SIGNALS MUST BE INDICATED ON THE PLANS IF CONNECTING TO AN EXISTING CIRCUIT. INDICATE POINT FOR EXISTING SERVICE POINT FOR EACH CIRCUIT.
15. WHEN STREET LIGHTS ARE CONNECTED TO AN EXISTING CIRCUIT, THE ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD.
16. CLARK COUNTY RESERVES THE RIGHT TO REJECT STREET LIGHT AND TRAFFIC SIGNAL POLES AND ASSEMBLIES WHICH HAVE A "STRIPED" APPEARANCE.
17. PRIOR TO BEGINNING OF CONSTRUCTION, MODIFICATION, OR RELOCATION OF ANY TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OF THE DATE THAT WORK WILL BEGIN.
18. THREE (3) NORMAL WORKING DAYS PRIOR TO TURN-ON OR COMPLETION OF MODIFICATIONS) TO A TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION THAT WORK IS BEING COMPLETED AND THE PROPOSED DATE OF COMPLETION.

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

EARTHWORK QUANTITIES

RAW VOLUMES IN CUBIC YARDS
CUT = 11,000, FILL = 44,200
TOTAL IMPORT 33,200

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	PRECISE GRADING INDEX PLAN
3	PRECISE GRADING PLAN
4	PRECISE GRADING PLAN
5	PRECISE GRADING PLAN
6	PRECISE GRADING PLAN
7	PRECISE GRADING PLAN
8	PRECISE GRADING PLAN
9	PRECISE GRADING PLAN
10	PRECISE GRADING PLAN
11	PRECISE GRADING SECTIONS AND DETAILS
12	HORIZONTAL CONTROL PLAN
13	HORIZONTAL CONTROL PLAN
14	EROSION CONTROL PLAN
15	EROSION CONTROL PLAN
16	DEMOLITION PLAN
17	DEMOLITION PLAN

CONSTRUCTION NOTES AND QUANTITIES

No.	ITEM	UNIT	TOTAL
	~ PRECISE GRADING ~		
(1)	CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)	SF	317,483
(2)	CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)	SF	85,810
(3)	CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11	LF	8,510
(4)	CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216	LF	2,115
(5)	CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11	LF	438
(6)	CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11	EA	15
(7)	CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11	LF	15
(8)	CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II	EA	2
(9)	CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11	LF	74
(10)	INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4	SF	1,550
(11)	INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11	SF	3,278

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY:_____ DATE:_____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

PCA
SEP 2 2 2003

GRADING PLAN CERTIFICATION

I, Kennard F. Mize II, P.E. No. 10935 DATE:_____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

FLOOD ZONE NOTE

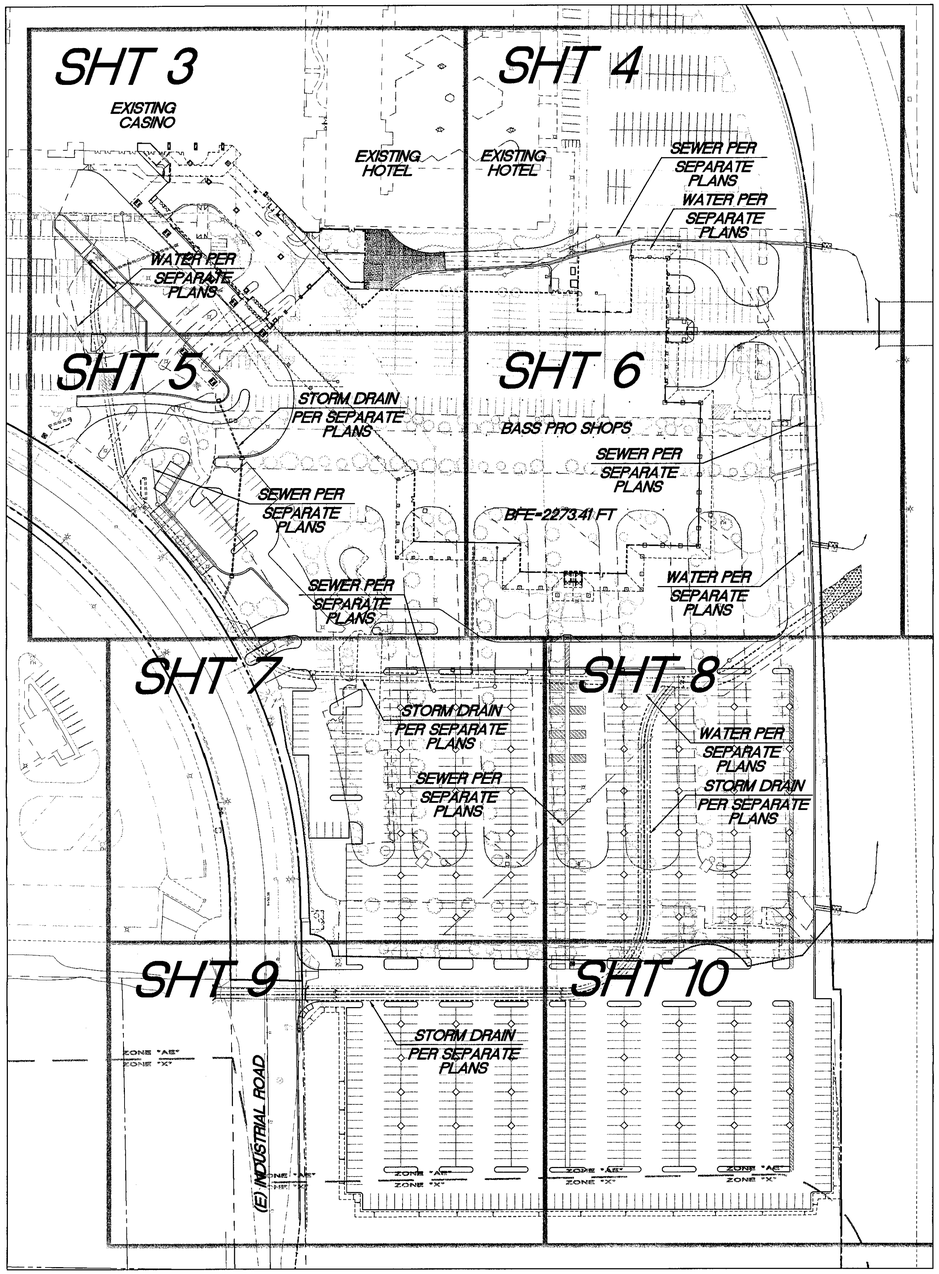
THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE E
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLANS
TITLE SHEET

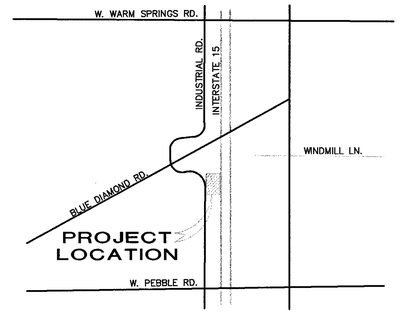
JOB #
SHEET NO.:
PG-1
1 OF 17 SHEETS
HTE #

D:\343-1\WORK\Sht_TITLE.dwg Last Modified: 22 Sep 2003 - 11:52am
Plotted on 22 Sep 2003 - 11:52am by Jackie



INDEX PLAN

SCALE: 1"=80'



VICINITY MAP

NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PROFESSIONAL ENGINEER STATE OF NEVADA
No. 7250
DP 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

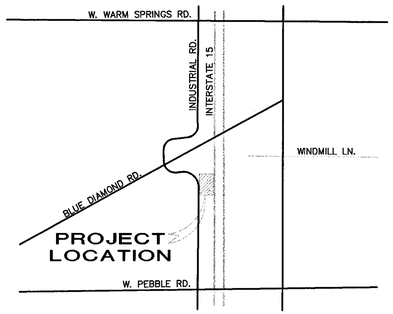
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING INDEX PLAN

JOB #

SHEET NO.:
PG-2
2 OF 17 SHEETS

HTE #

S:\143-1\PCV\P202.dwg Last Modified: 22 Sep 2003 - 10:57am
Plotted on: 22 Sep 2003 - 11:36am by rquintos



VICINITY MAP
NO SCALE

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

ABBREVIATIONS

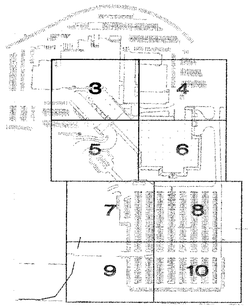
BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

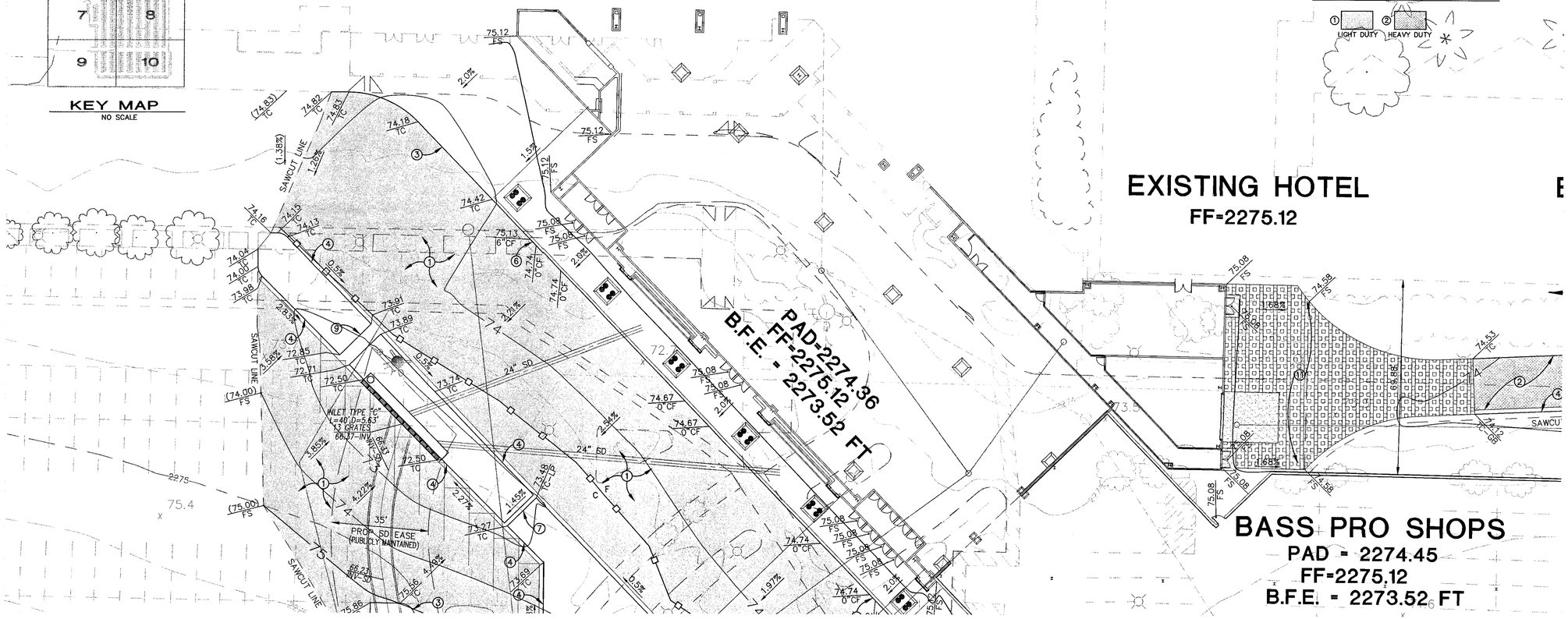
PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY



KEY MAP
NO SCALE

# EXISTING CASINO
FF=2275.12



# EXISTING HOTEL
FF=2275.12

# BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT

FOR CONTINUATION SEE SHEET 5

FOR CONTINUATION SEE SHEET 4

CONSTRUCTION NOTES

① CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
② CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
③ CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
④ CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
⑤ CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
⑥ CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
⑦ CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
⑧ CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
⑨ CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
⑩ INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
⑪ INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CALL BEFORE YOU DIG
CALL-TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
KENNARD F. MIZE II
No. 12937
EXP. 12-31-04
6/12/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.:
PG-3
3 OF 17 SHEETS
HTE #

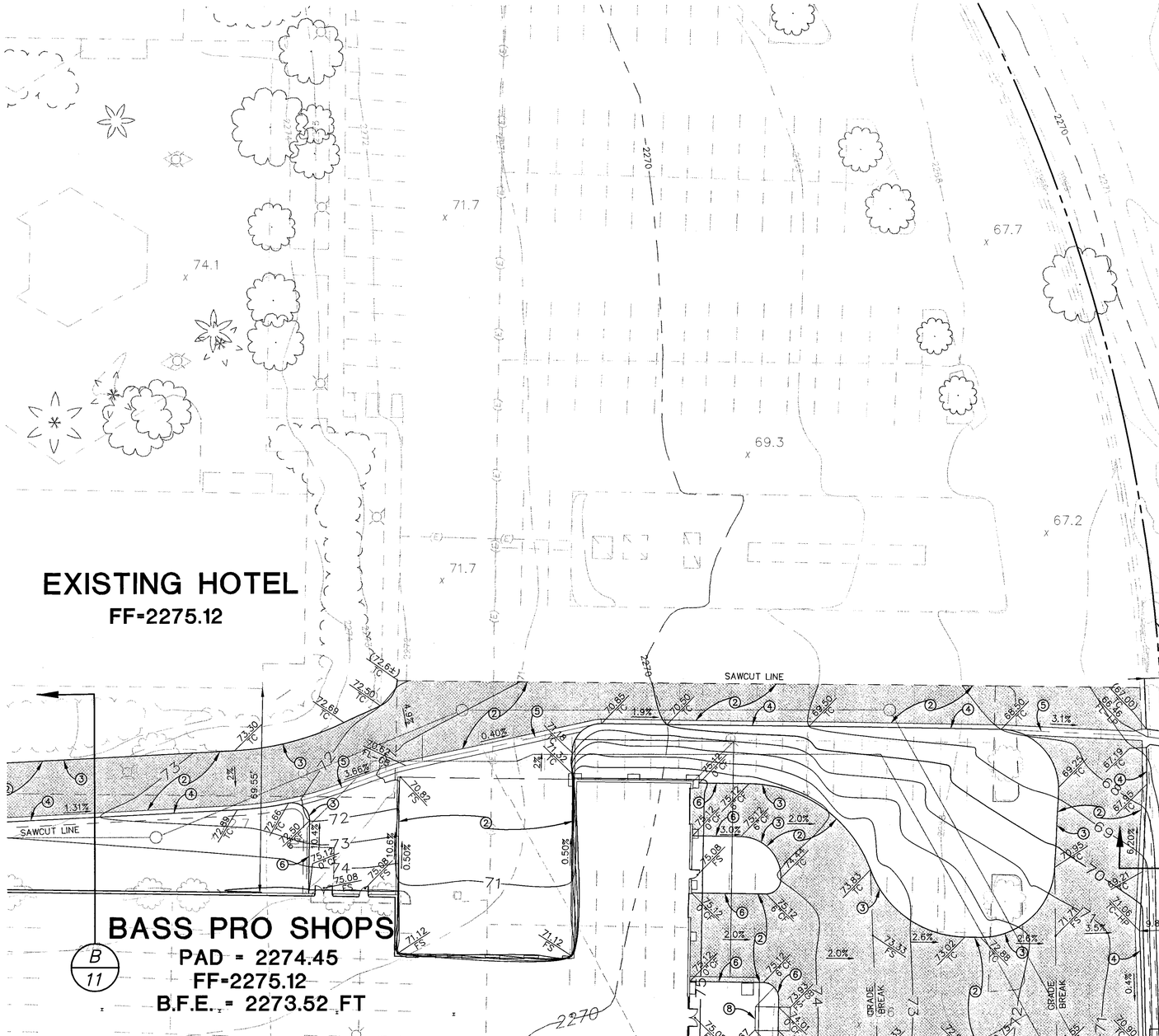
S:\143-1\PG\PG03-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 11:58am by kjohnson

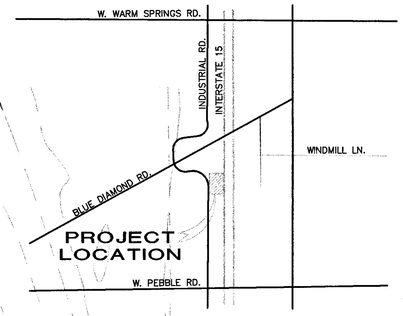
FOR CONTINUATION SEE SHEET 3

# EXISTING HOTEL
FF=2275.12

# BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT

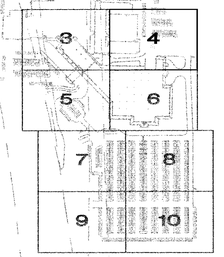
B / 11





VICINITY MAP
NO SCALE

A.P. NUMBERS
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
LF	LENGTH
MH	MANHOLE
MAX	MAXIMUM
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

LEGEND

- FUTURE BUILDING
- PROPOSED ELEVATION
- PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- CUT/FILL DAYLIGHT LINE

FLOOD ZONE LIMIT (TYP)

PAVING LEGEND
1 LIGHT DUTY 2 HEAVY DUTY

CALL BEFORE YOU DIG
CALL TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

CONSTRUCTION NOTES
1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11

FLOOD ZONE NOTE
THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

FOR CONTINUATION SEE SHEET 6

BASIS OF BEARINGS
NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THIE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OIFFICE.

BENCHMARK
CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE AILUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

GRADING NOTES
1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

GRADING PLAN CERTIFICATION
I, _____ DATE: _____
Kennard F. Milze II, P.E. No. 10935
CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MILZE II — No. 10935 — EXP. 12-31-04
9/02/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE E
COSTA MESA, CALIF. 92626
(714) 241-3400 ext 3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-4
4 OF 17 SHEETS
HTE #

S:\343-1\PG\PG3-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 11:59am by lauralan

FOR CONTINUATION SEE SHEET 3

FOR CONTINUATION SEE SHEET 6

B.F.E. = 2273.52 FT

BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT

(E) INDUSTRIAL ROAD

SAWCUT LINE

PROP. SD EASE (PUBLICLY MAINTAINED)

EXIST F.H.

EXIST "L" CURB

EXIST ST LT

INLET TYPE "C" L=4',D=4' 68.97-INV

INLET TYPE "C" L=4',D=5.1' 68.38-INV

INLET TYPE "C" L=4',D=6.04 67.34-INV

W. WARM SPRINGS RD.

INDUSTRIAL RD.

INTERSTATE 15

WINDMILL LN.

BLUE DIAMOND RD.

W. PEBBLE RD.

PROJECT LOCATION

FOR CONTINUATION SEE SHEET 7

VICINITY MAP
NO SCALE

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

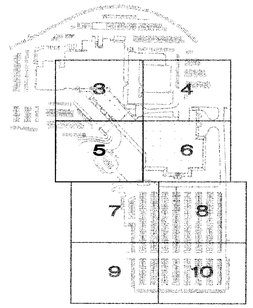
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — CIVIL — EXP. 12-31-04 — 9/10/03

REV.	DATE	DESCRIPTION	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE E
COSTA MESA, CALIF. 92626
(714) 241-3100 FAX 241-3432

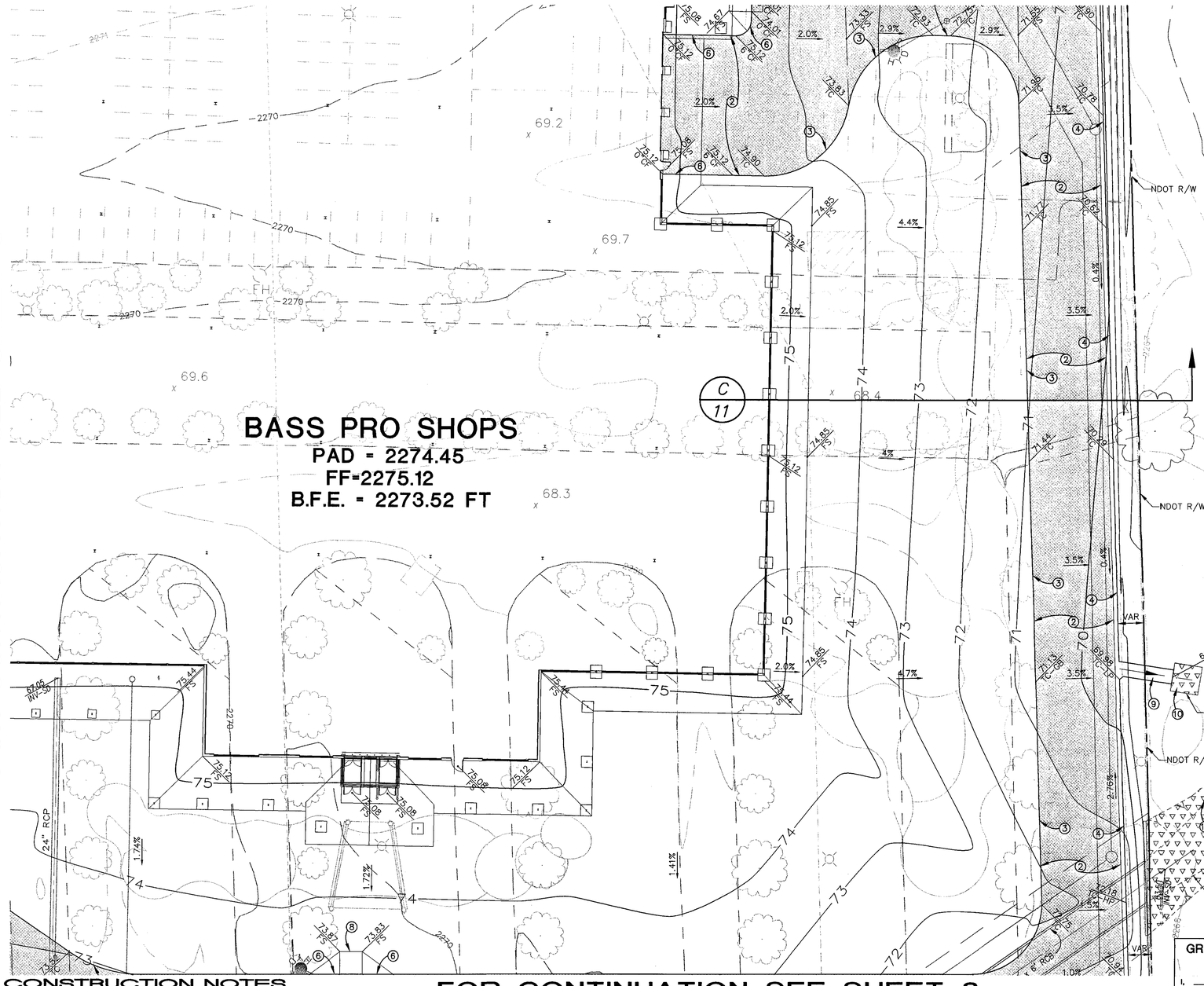
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.:
PG-5
5 OF 17 SHEETS
HTE #

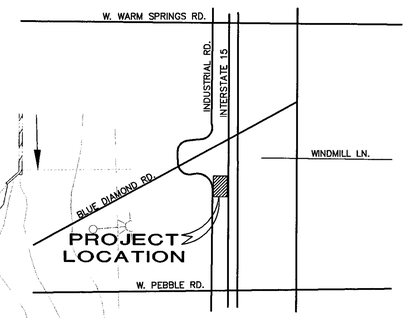
S:\JAS-1\PCP\PG01-10.dwg Last Modified: 23 Sep 2003 - 11:57am
Plotted on: 23 Sep 2003 - 12:00pm by lauriem

FOR CONTINUATION SEE SHEET 4

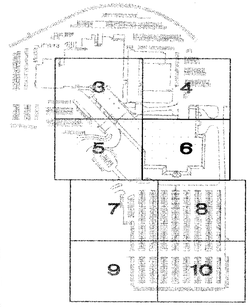
FOR CONTINUATION SEE SHEET 5



FOR CONTINUATION SEE SHEET 8



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

NOTE: NDOT ENCROACHMENT PERMIT REQUIRED FOR WORK WITHIN NDOT RIGHT OF WAY

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

CALL BEFORE YOU DIG
CALL-TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THIE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER IEXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PCA NORTH

PROFESSIONAL ENGINEER STATE OF NEVADA — No. 12937 — CHRISTOPHER J. CORNWELL — EXP. 12-31-04

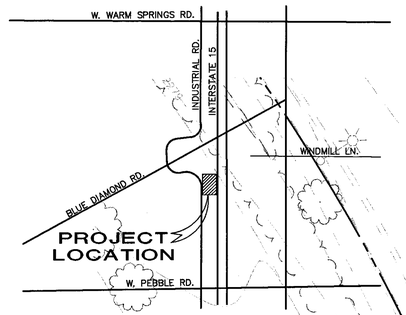
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Surveying • Engineering
151 KALMUS DRIVE, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3406 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-6
6 OF 17 SHEETS
HTE #

S:\LAND DEVELOPMENT\2003-10.dwg, 11x17 Modified, 12/5/2003 - 11:57am
Plotted on: 12/5/2003 - 11:57am by Kennard



VICINITY MAP
NO SCALE

KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 57 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- 77.5 — PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

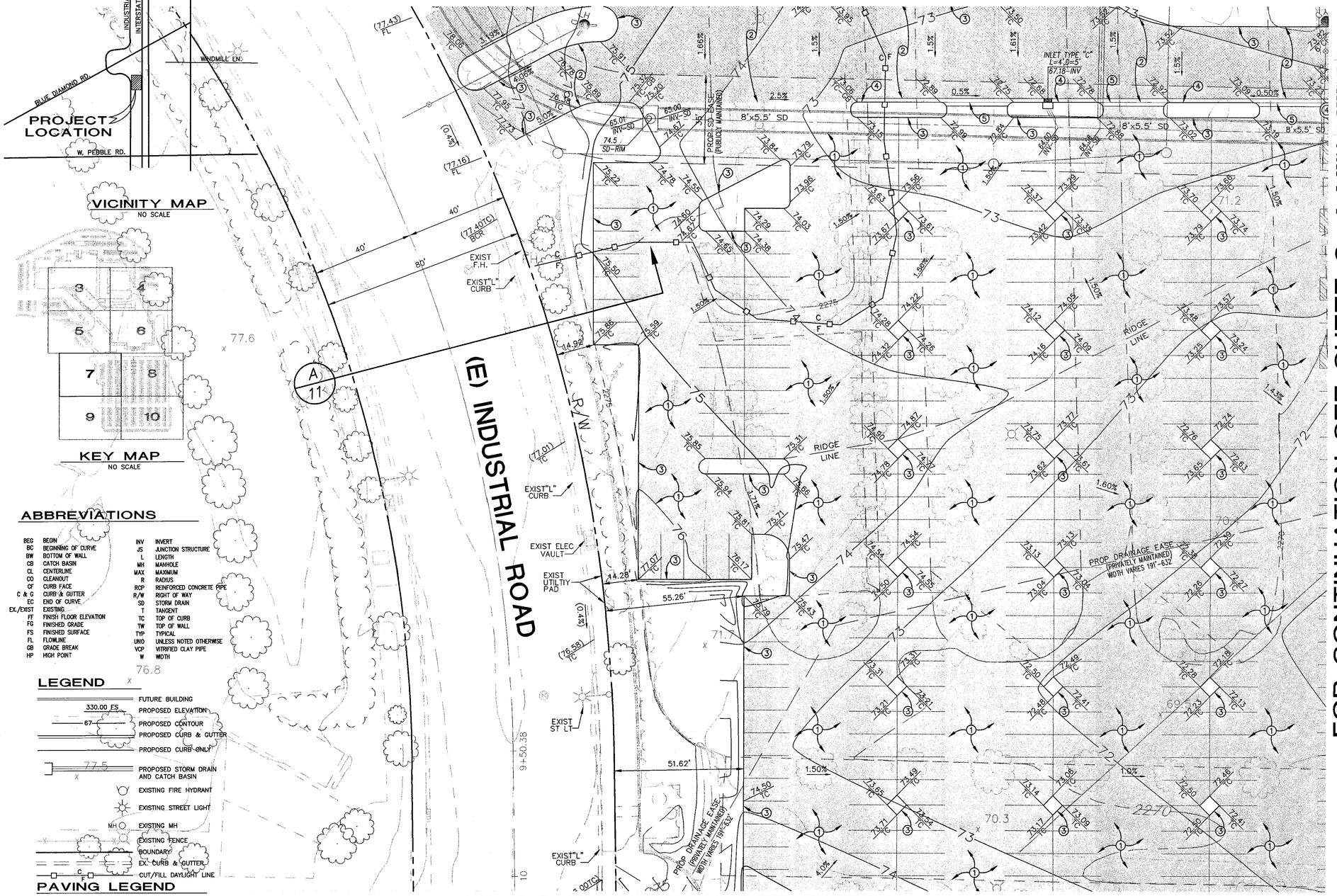
CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

FOR CONTINUATION SEE SHEET 5



FOR CONTINUATION SEE SHEET 9

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize III, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 3200020566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

STATE OF NEVADA — KENNARD F. MIZE III — No. 10935 — PROFESSIONAL ENGINEER — EXP. 12-31-04
9/12/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

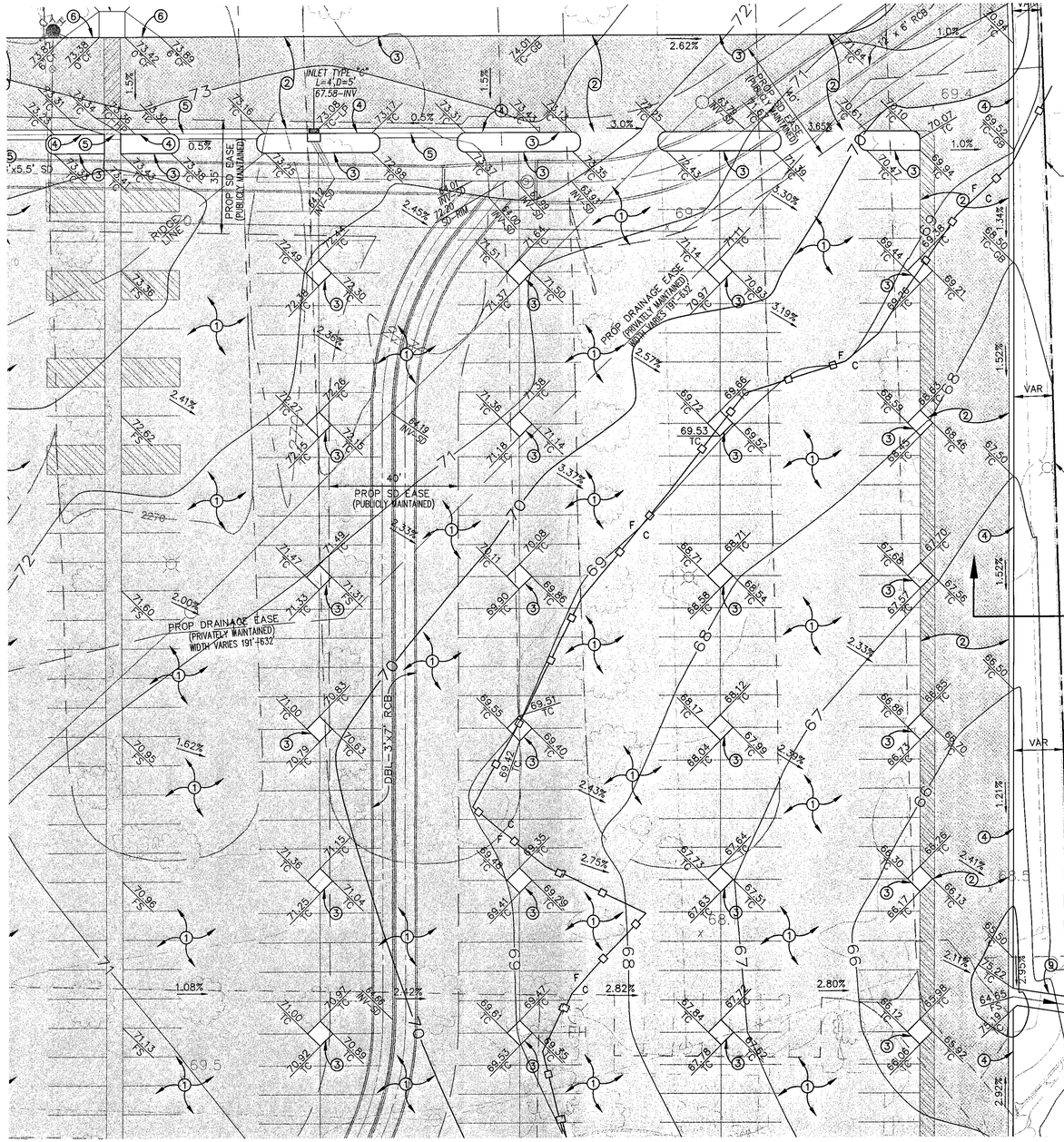
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-7
7 OF 17 SHEETS
HTE #

S:\143-1\PCV\PG03-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 12:01pm by rquinton

FOR CONTINUATION SEE SHEET 6

FOR CONTINUATION SEE SHEET 7



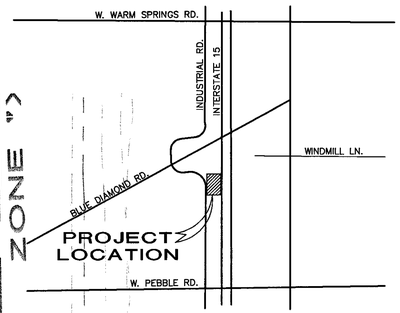
GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

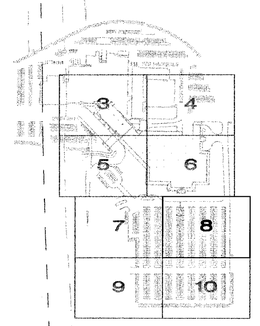
2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING, BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX/EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, Kennard F. Mize II, P.E. No. 10935 DATE: _____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PCA
NORTH

FOR CONTINUATION SEE SHEET 10

STATE OF NEVADA — REGISTERED ENGINEER — KENNARD F. MIZE II — No. 10935 — EXPIRES: 12-31-04 — DATE: 9/12/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

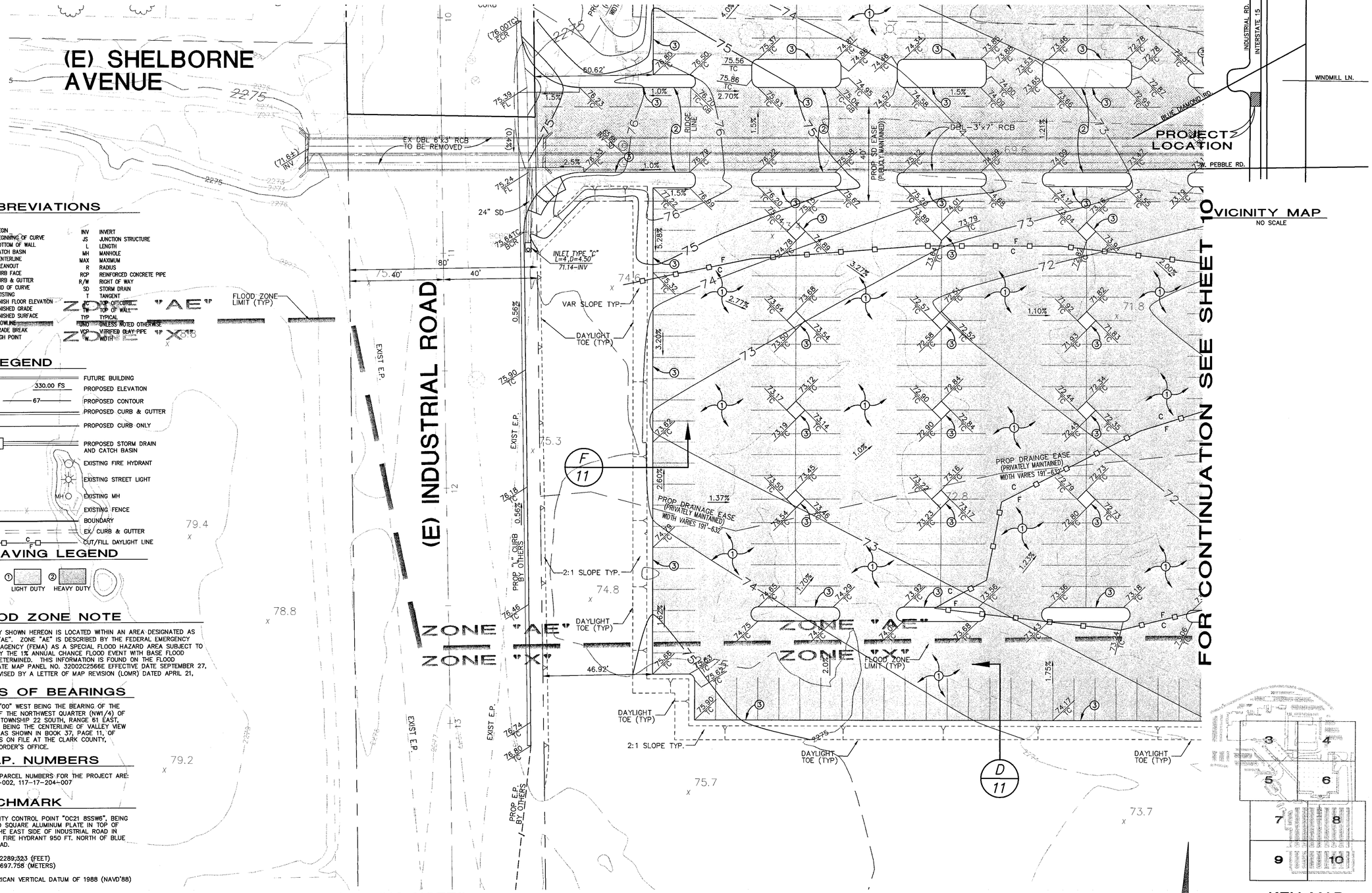
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE C
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-8
8 OF 17 SHEETS
HTE #

S:\345-1\PG\PG8-1.dwg Last Modified: 23 Sep 2003 - 11:57am
Plotted on: 23 Sep 2003 - 12:07pm by Kennard

FOR CONTINUATION SEE SHEET 7



VICINITY MAP
NO SCALE

KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	(UNO)	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

FOR CONTINUATION SEE SHEET 10

STATE OF NEVADA — PROFESSIONAL ENGINEER — DANIEL M. SIMON — No. 12537 — EXP. 12-31-04 — 9/12/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE C
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

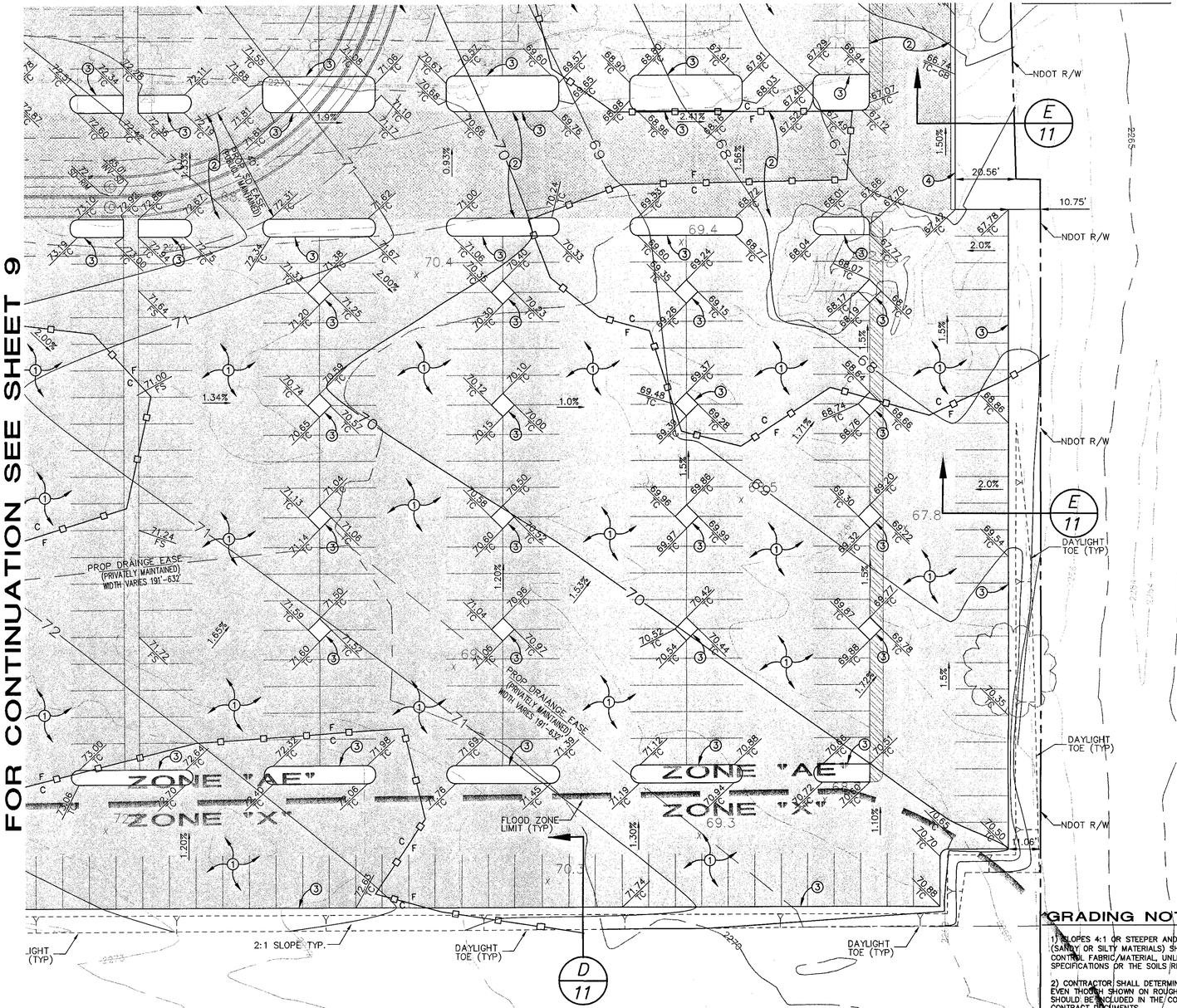
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

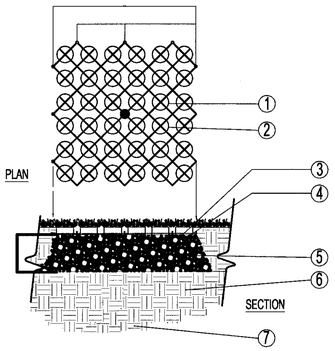
JOB #
SHEET NO.: PG-9
9 OF 17 SHEETS
HTE #

S:\143-1\PG\PG03-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 12:02pm by rjohnson

FOR CONTINUATION SEE SHEET 8

FOR CONTINUATION SEE SHEET 9





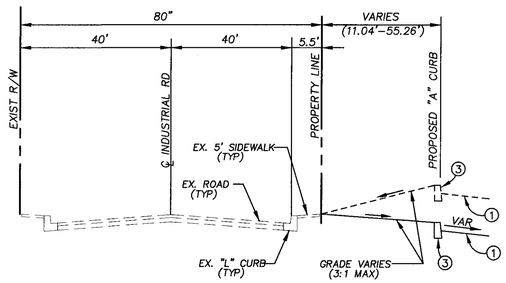
LEGEND:

1. Grass filled Grasspave² units
2. Trim individual rings to conform to irrigation head contour.
3. Hydrogrow mix below rings only, supplied free by manufacturer.
4. Concrete sand (clean, sharp sand).
5. Compacted sandy gravel inset base under Grasspave ² only taper base to support edge of Grasspave² square.
6. Compacted subgrade, 95% modified proctor density.
7. Excavate compacted to permit irrigation head installation.

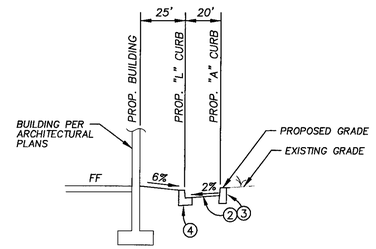
SPECIFICATION

Unit Size- 20" X 20" X 1", available in 9 standard roll sizes.
Unit Weight - 510 grams (18oz.) or 2.0 KG (4.5 pounds)
Strength - 402 KG/CM (5720 PSI)
Color - Black (standard)
Resin - 100% post-consumer recycled HDPE/LDPE.
NOTE:
Compacted subgrade, 95% modified proctor density grass/plant types shall be specified by geotechnical report.

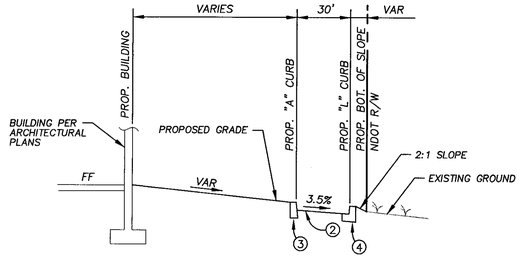
11 GRASSPAVE² LAYOUT DETAIL
N.T.S.



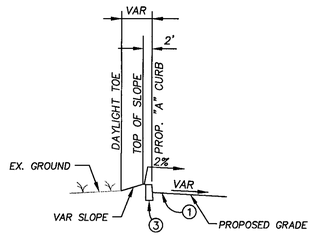
SECTION "A"
NOT TO SCALE
SEE SHTS. 5 & 7



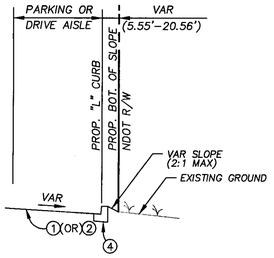
SECTION "B"
NOT TO SCALE



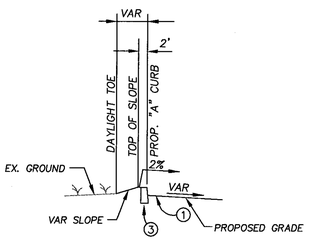
SECTION "C"
NOT TO SCALE
SEE SHT. 6 SEE SHT. 4



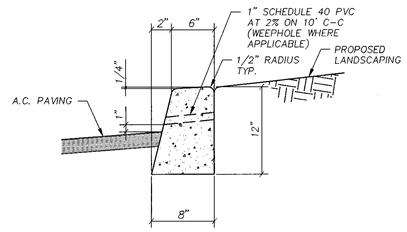
SECTION "D"
NOT TO SCALE
SEE SHT. 9 & 10



SECTION "E"
NOT TO SCALE
SEE SHT. 4, 8 & 106

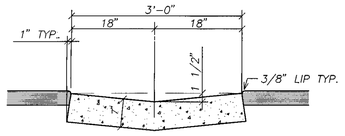


SECTION "F"
NOT TO SCALE
SEE SHT. 9

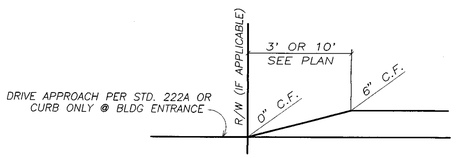


3 MODIFIED "A" CURB DETAIL
N.T.S.

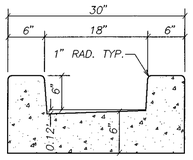
NOTE: WEEPHOLES ARE TO BE INSTALLED IN CURB FOR ALL CURB INSTALLED ADJACENT TO PLANTER AREAS



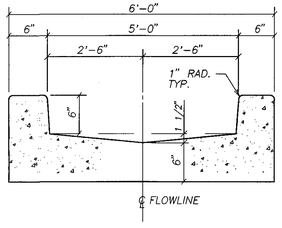
5 VALLEY GUTTER DETAIL
N.T.S.



6 CURB TRANSITION DETAIL
0" TO 6" CURB TRANSITION N.T.S.



7 18" "U" CHANNEL DETAIL
N.T.S.



9 5' "U" CHANNEL DETAIL
N.T.S.

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN AIPPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE IFROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 12937 — EXP. 12-31-04 — 9/22/04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING SECTIONS AND DETAILS

JOB #
SHEET NO.:
PG-11
11 OF 17 SHEETS
HTE #

EXISTING CASINO

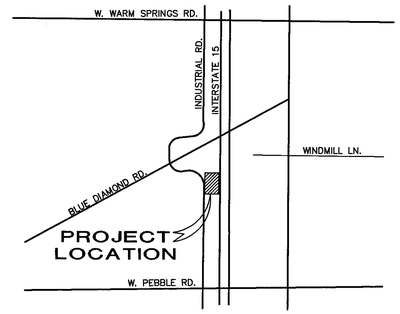
EXISTING HOTEL

BASS PRO SHOPS

FOR ALL BUILDING RELATED DIMENSIONS NOT SHOWN, SEE ARCHITECTURAL DWGS

(E) INDUSTRIAL ROAD

FOR CONTINUATION SEE SHEET 13



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

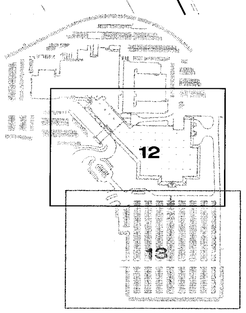
PCA

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



KEY MAP
NO SCALE

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BIY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DIETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "'0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 IFT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUIM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES

ACCEPTANCE OF PLANS FOR FILING

BIY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PIERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RIELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — EXP. 12-31-04 — 9/12/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

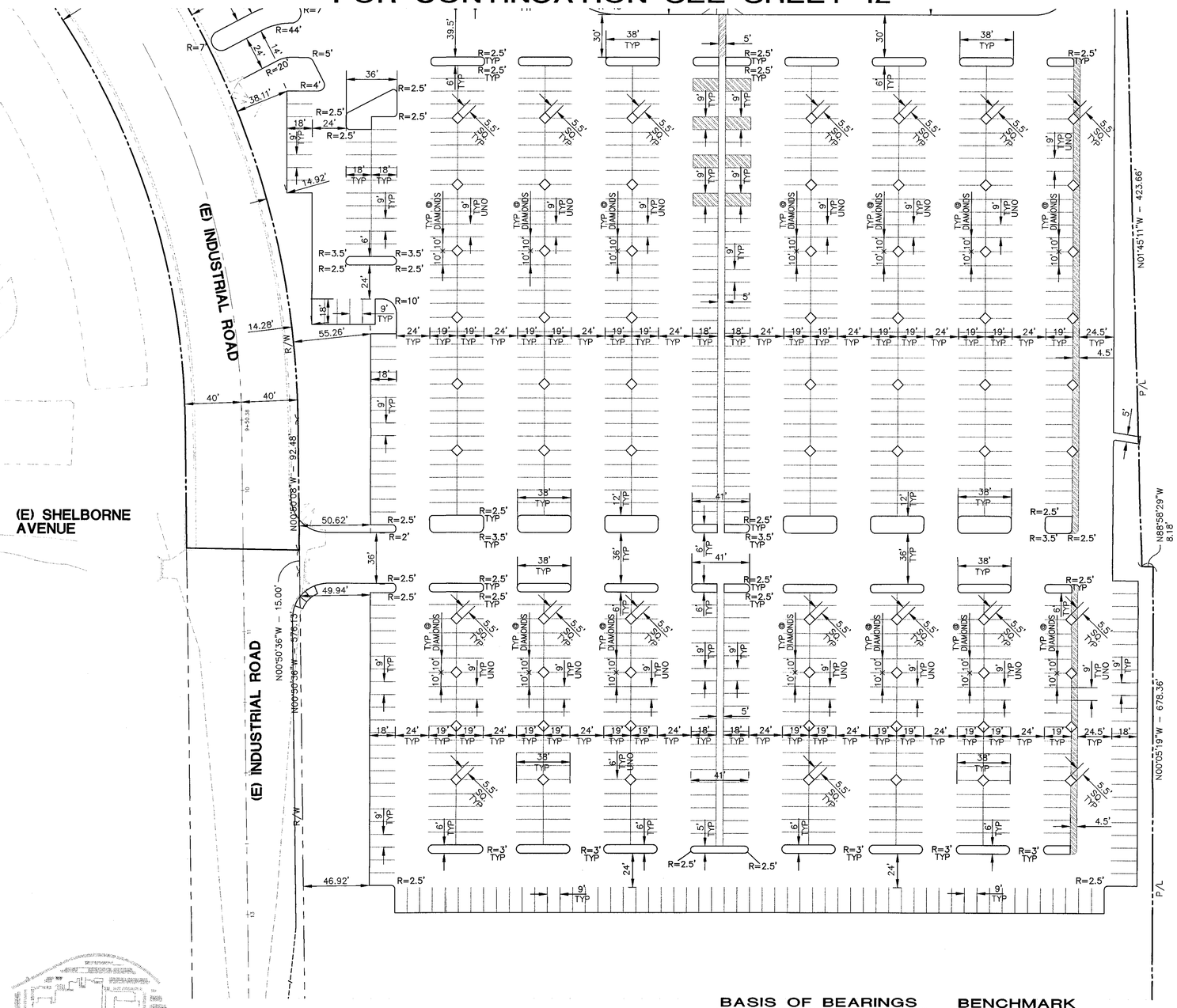
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

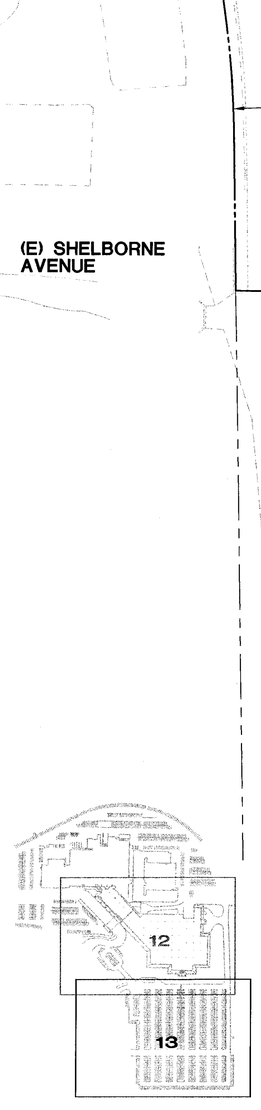
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
HORIZONTAL CONTROL PLAN

JOB #
SHEET NO.:
PG-12
12 OF 17 SHEETS
HTE #

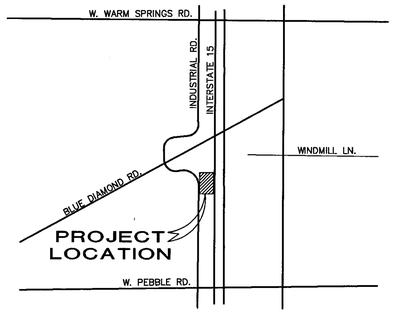
S:\142-1\PG\Pt12-13HC.dwg Last Modified: 22 Sep 2003 - 11:42am
Plotted on: 22 Sep 2003 - 12:10pm by Norman

FOR CONTINUATION SEE SHEET 12





KEY MAP
NO SCALE



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

PCA
NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREONI IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES

ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

STATE OF NEVADA — KENNARD F. MIZE II — No. 10935 — PROFESSIONAL ENGINEER — EXP. 12-31-04
9/22/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
HORIZONTAL CONTROL PLAN

JOB #
SHEET NO.:
PG-13
13 OF 17 SHEETS
HTE #

S:\343-1\PO\PG2-1HC.dwg Last Modified: 22 Sep 2003 - 11:42am
Plotted on: 22 Sep 2003 - 12:10pm by Hanson

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

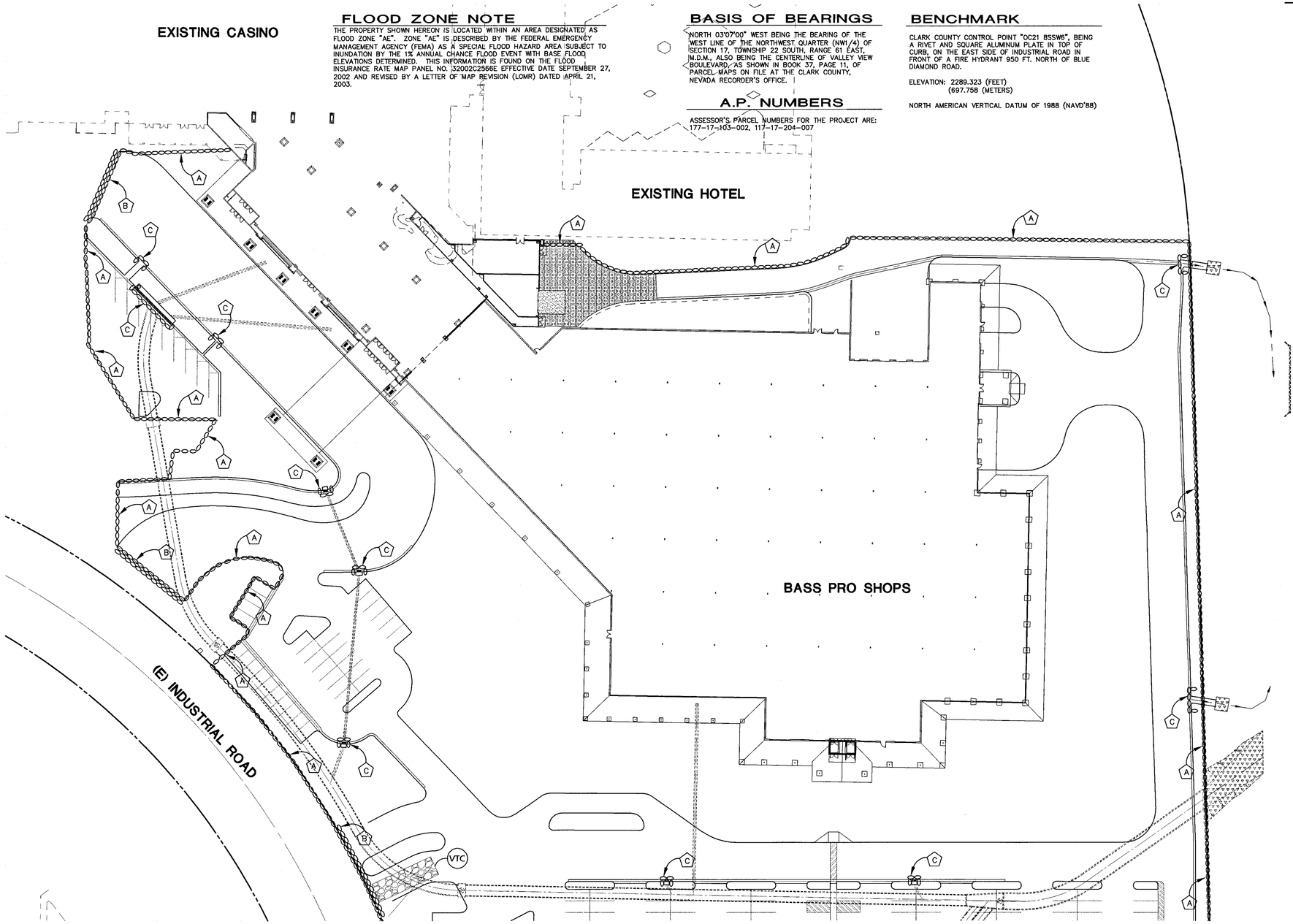
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 177-17-204-007

BENCHMARK

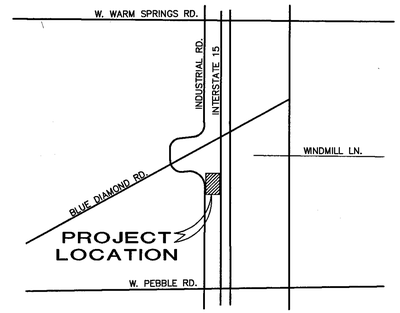
CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

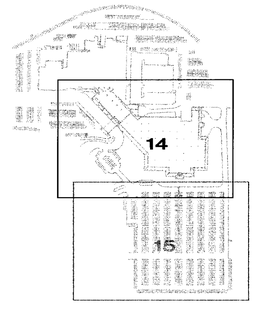
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)



FOR CONTINUATION SEE SHEET 15



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

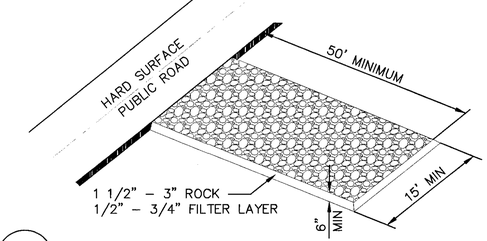
1 LIGHT DUTY 2 HEAVY DUTY

EROSION CONTROL NOTES:

(A) SINGLE ROW, SINGLE HEIGHT SANDBAGS SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS

(B) SINGLE ROW, DOUBLE HEIGHT SANDBAGS; BASE COURSE SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS. TOP COURSE BAGS SHALL BE CENTERED OVER THE ENDS OF THE BASE COURSE WITH NO GAPS BETWEEN THE BAGS.

(C) BAGS AROUND CATCH BASINS SHALL BE DOUBLE ROW, DOUBLE HEIGHT. BASE COURSE: SAME AS ABOVE; TOP COURSE TO BE PLACED WITH APPROXIMATELY 3" WIDE GAPS.



VTC VEHICLE TRACKING CONTROL
N.T.S.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

REGISTERED ENGINEER - STATE OF NEVADA - PROFESSIONAL - KENNARD F. MIZE II - No. 10935 - EXP. 12-31-04 - 9/22/03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
151 KALMUS DRIVE BLDG. M, SUITE-E
COSTA MESA, CALIF. 92626
(714) 241-3400 ext 3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
EROSION CONTROL PLAN

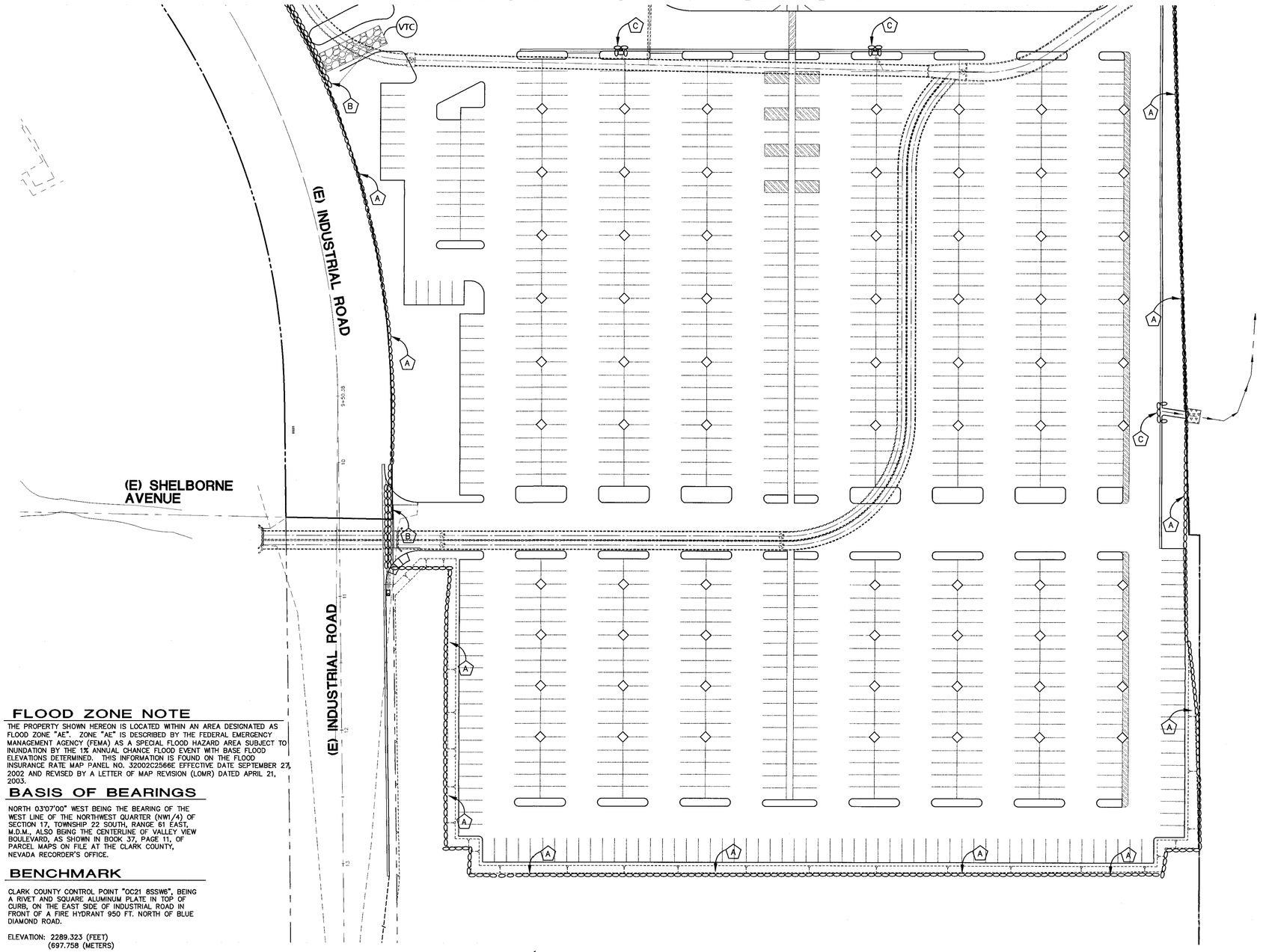
JOB #

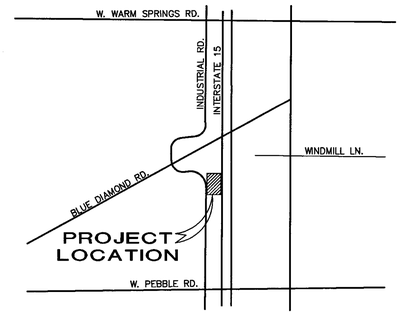
SHEET NO.:
PG-14
14 OF 17 SHEETS

HTE #

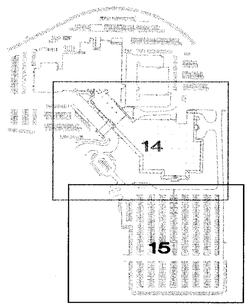
S:\343-1\PCP\DWG\14-15Ero.dwg Last Modified: 22 Sep 2003 - 11:46am
Plotted on: 22 Sep 2003 - 12:11pm by laurieb

FOR CONTINUATION SEE SHEET 14





VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

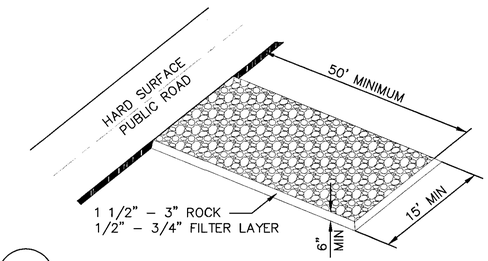
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

EROSION CONTROL NOTES:

(A) SINGLE ROW, SINGLE HEIGHT SANDBAGS SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS

(B) SINGLE ROW, DOUBLE HEIGHT SANDBAGS; BASE COURSE SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS. TOP COURSE BAGS SHALL BE CENTERED OVER THE ENDS OF THE BASE COURSE WITH NO GAPS BETWEEN THE BAGS.

(C) BAGS AROUND CATCH BASINS SHALL BE DOUBLE ROW, DOUBLE HEIGHT. BASE COURSE: SAME AS ABOVE; TOP COURSE TO BE PLACED WITH APPROXIMATELY 3" WIDE GAPS.



VTC VEHICLE TRACKING CONTROL
N.T.S.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

REV.	DATE	DESCRIPTION	DATE	APPROVAL

KENNARD F. MIZE II — STATE OF NEVADA — PROFESSIONAL ENGINEER — No. 10935 — EXP. DATE: 12-31-04 — 9/22/03

PARDUE, CORNWELL & ASSOCIATES, INC.
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
EROSION CONTROL PLAN

JOB #
SHEET NO.: PG-15
15 OF 17 SHEETS
HTE #

S:\Job-1\PG\Civil\PG-Civil Last Modified: 22 Sep 2003 - 11:48am
Printed on: 22 Sep 2003 - by Lou Nowakowski

EXISTING CASINO

EXISTING HOTEL

CONSTRUCTION LIMITS

SAWCUT LINE

TYPICAL

PROPOSED BUILDING OUTLINE, TYPICAL

REMOVE EX SEWER

EX. SEWER TO REMAIN

R/W

(E) INDUSTRIAL ROAD

FOR CONTINUATION SEE SHEET 17

LEGEND

- EXIST. PARCEL LINE
- EXIST. CURB AND GUTTER
- EXIST. CURB ONLY
- EXIST. STORM DRAIN
- EXIST. CATCH BASIN
- EXIST. SEWER
- EXIST. WATER LINE
- EXIST. FIRE LINE
- EXIST. CROSS GUTTER
- EXIST. FENCE
- EXIST. BUILDING WALL
- EXIST. SCREEN WALL
- EXIST. RETAINING WALL
- SAWCUT LINE
- EXIST. HYDRANT
- EXIST. TREE
- EXIST. BOLLARD
- EXIST. GRATED INLET
- EXIST. MANHOLE
- EXIST. POWER POLE
- EXIST. PILASTER
- EXIST. STREET LIGHT
- EXIST. VAULT
- CONSTRUCTION LIMITS

DEMOLITION NOTES

(70) — PROTECT IN PLACE
(71) — REMOVE EXISTING CURB
(72) — REMOVE EXISTING CURB & GUTTER
(73) — REMOVE EXISTING TREES
(74) — REMOVE EXISTING AC PAVEMENT
(75) — REMOVE EXISTING CONCRETE PAVEMENT
(76) — REMOVE EXISTING SIDEWALK
(77) — REMOVE EXISTING WALL
(78) — REMOVE EXISTING STRUCTURE
(79) — REMOVE EXISTING CHAIN LINK FENCE
(80) — REMOVE EXISTING RIBBON GUTTER
(81) — REMOVE/ABANDON EXISTING UTILITY (CONTRACTOR'S CHOICE)*

* NOTE: REMOVE ALL EXISTING UTILITIES UNDER PROPOSED BUILDING OUTLINE. DO NOT ABANDON.

PCA
NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

STATE OF NEVADA — PROFESSIONAL ENGINEER — CHRISTOPHER M. PARDUE — No. 12857 — DEC. 12-31-04 — 9/22/05

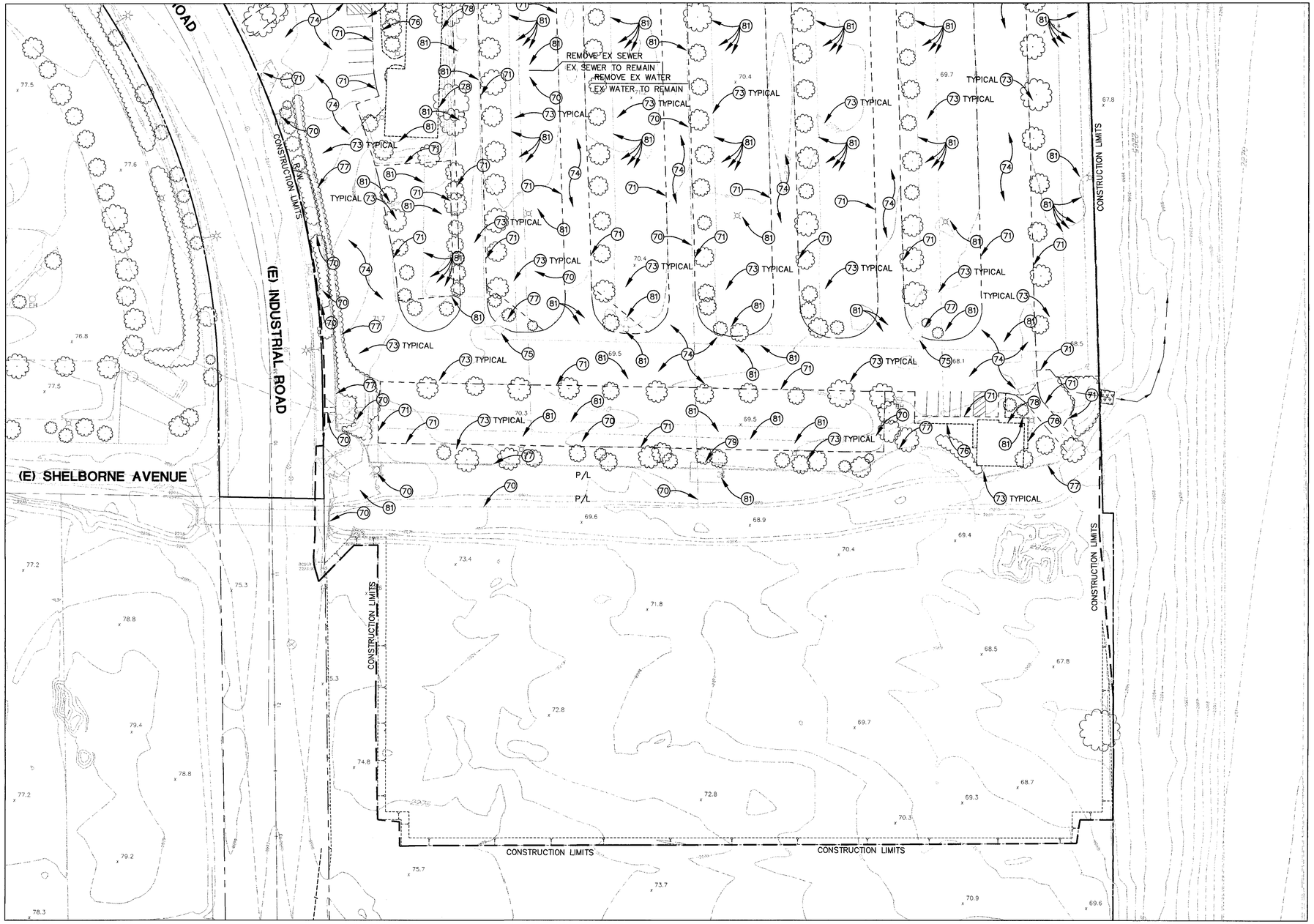
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
DEMOLITION PLAN

JOB #
SHEET NO.:
PG-16
16 OF 17 SHEETS
HTE #

FOR CONTINUATION SEE SHEET 16



LEGEND

- EXIST. PARCEL LINE
- EXIST. CURB AND GUTTER
- EXIST. CURB ONLY
- EXIST. STORM DRAIN
- EXIST. CATCH BASIN
- EXIST. SEWER
- EXIST. WATER LINE
- EXIST. FIRE LINE
- EXIST. CROSS GUTTER
- EXIST. FENCE
- EXIST. BUILDING WALL
- EXIST. SCREEN WALL
- EXIST. RETAINING WALL
- SAWCUT LINE
- EXIST. HYDRANT
- EXIST. TREE
- EXIST. BOLLARD
- EXIST. GRATED INLET
- EXIST. MANHOLE
- EXIST. POWER POLE
- EXIST. PILASTER
- EXIST. STREET LIGHT
- EXIST. VAULT
- CONSTRUCTION LIMITS

DEMOLITION NOTES

(70) PROTECT IN PLACE
(71) REMOVE EXISTING CURB
(72) REMOVE EXISTING CURB & GUTTER
(73) REMOVE EXISTING TREES
(74) REMOVE EXISTING AC PAVEMENT
(75) REMOVE EXISTING CONCRETE PAVEMENT
(76) REMOVE EXISTING SIDEWALK
(77) REMOVE EXISTING WALL
(78) REMOVE EXISTING STRUCTURE
(79) REMOVE EXISTING CHAIN LINK FENCE
(80) REMOVE EXISTING RIBBON GUTTER
(81) REMOVE/ABANDON EXISTING UTILITY (CONTRACTOR'S CHOICE) *

* NOTE: REMOVE ALL EXISTING UTILITIES UNDER PROPOSED BUILDING OUTLINE. DO NOT ABANDON.

PCA
NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

STATE OF NEVADA — PROFESSIONAL ENGINEER — CHRISTOPHER J. PARDUE — No. 12537 — EXP. 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-A
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
DEMOLITION PLAN

JOB #
SHEET NO.:
PG-17
17 OF 17 SHEETS
HTE #

NOTES

FLOODING SOURCE: NORTH AND MIDDLE BRANCHES OF BLUE DIAMOND WASH; DUCK CREEK
CLARK COUNTY, NEVADA

MAP BASED ON 1-INCH = 400 FEET TOPOGRAPHIC MAPPING
CONTOUR INTERVAL = 4 FEET
FLIGHT DATE: JULY 18, 2000 AND APRIL 18, 2001
BY KENNEY AERIAL MAPPING, INC.

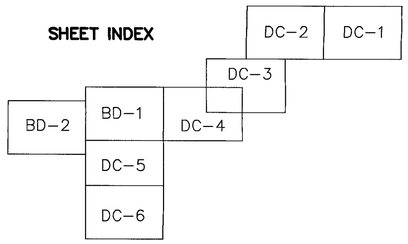
FIRM PANEL(S) AFFECTED: 32003C2566 D, DATED AUGUST 16, 1995
32003C2567 D, DATED AUGUST 16, 1995

ELEVATION REFERENCE MARKERS (ERM)

REFERENCE NUMBER	ELEVATION REFERIENCE MARKER ID	ELEVATION (FT, NGVD 29)	LOCATION DESCRIPTION
215	CCBM OC21 9SWS	2240.64	RIVET AND SQUARE ALUMINUM PLATE, IN TOP OF CURB NEAR 1/2 DELTA, WEST PORTION OF PLANTER, NORTHEAST CORNER OF LAS VEGAS BOULEVARD AND WINDMILL LANE.

NAVD 88 = NGVD 29 + 2.37 FT

SHEET INDEX



NORTH

SCALE 1" = 400'

400 0 400 800
SCALE FEET

LEGEND

- 206 — ELEVATION REFERENCE MARKER
- EFFECTIVE 100-YR FLOODPLAIN AND FLOODWAY BOUNDARY
- REVISED 100-YR FLOODPLAIN BOUNDARY
- REVISED 100-YR FLOODWAY BOUNDARY
- SHADED ZONE X
- ZONE AE — REVISED FLOOD ZONE DESIGNATION
- (16100) — HEC-2 CROSS SECTION
- 2058 — BASE FLOOD ELEVATION
- 8562 — 100-YEAR FLOW (CFS, FLOODPLAIN ONLY)

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 02-17-02
PLOT TIME: 16:48:26

REV	DATE	DESCRIPTION	DATE AGEN. APP.	DATE CCW. APP.	DATE

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX: (702) 804-2299

F:\3500-099\dwg\dsp\xmsp\dc1-1.dwg

DUCK CREEK/ BLUE DIAMOND WASHES FIS RESTUDY
BLUE DIAMOND WASHES FROM INDUSTRIAL ROAD TO PARADISE ROAD

CROSS SECTION EXHIBIT

SHEET
BD-1
7 OF 8 SHTS

G:\3500-099\dwg\dsp\xmsp\bd1-1.dwg, Model, 02/27/02 03:37:37 PM, william, 1:1, Lochas Civil

ELEVATION REFERENCE MARKERS (ERM)

REFERENCE NUMBER	ELEVATION REFERENCE MARKER ID	ELEVATION (FT, NGVD 29)	LOCATION DESCRIPTION
217	CCBM OC21 8SSW6	2286.91	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950'± NORTH OF BLUE DIAMOND ROAD.
222	SNWA BRASS CAP	2412.57	FOUND 3" BRASS CAP AT NORTHWEST CORNER OF VAULT (UNMARKED) 200'± WEST OF RAILROAD TRACKS AT BRIDGE OVER WASH "SOUTHERN NEVADA WATER SYSTEM".

NAVD 88 = NGVD 29 + 2.37 FT

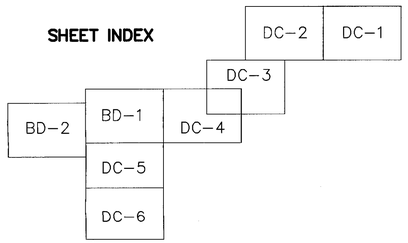
NOTES

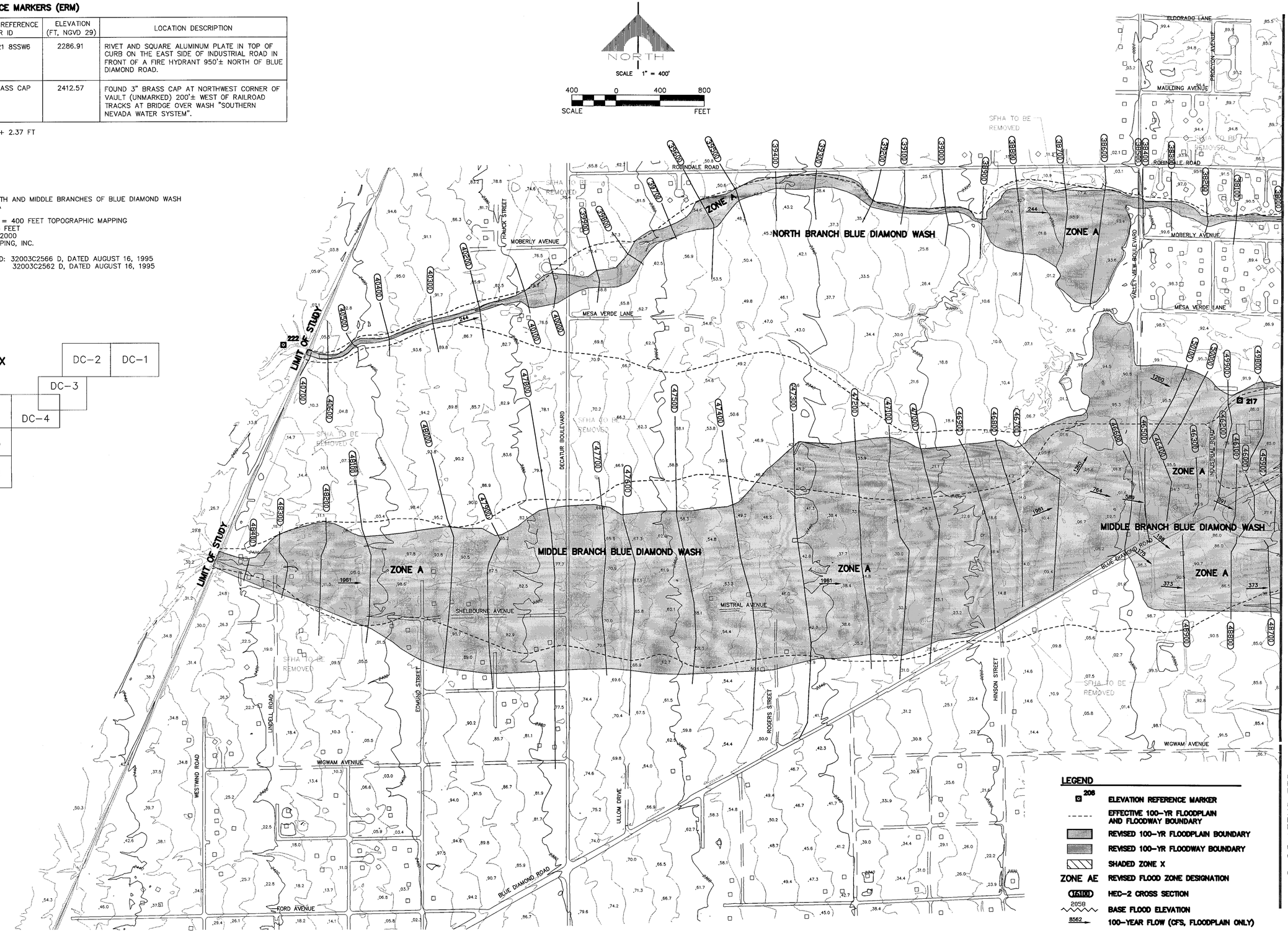
FLOODING SOURCE: NORTH AND MIDDLE BRANCHES OF BLUE DIAMOND WASH
CLARK COUNTY, NEVADA

MAP BASED ON 1-INCH = 400 FEET TOPOGRAPHIC MAPPING
CONTOUR INTERVAL = 4 FEET
FLIGHT DATE: JULY 18, 2000
BY KENNEY AERIAL MAPPING, INC.

FIRM PANEL(S) AFFECTED: 32003C2566 D, DATED AUGUST 16, 1995
32003C2562 D, DATED AUGUST 16, 1995

SHEET INDEX





SEE SHEET DC-5

SEE SHEET BD-1

DATE:
DESCRIPTION
REV | DATE | DRAWN | CHECK | APP. | DATE | AGEN. APP. | DATE | GOV. APP.

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 03-17-02
PLOT TIME: 17:01:03
Mludwig

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
F:\550-039\dwg\map\xsmap\bd-2.dwg

DUCK CREEK/ BLUE DIAMOND WASHES FIS RESTUDY
BLUE DIAMOND WASHES FROM UPRR TO INDUSTRIAL ROAD

CROSS SECTION EXHIBIT

SHEET
BD-2
8 OF **8** SHTS

G:\550-039\drawing\map\xsmap\bd-2.dwg, 17:01:03 03-17-02
G:\550-039\drawing\map\xsmap\bd-2.dwg, Mludwig 02:38:34 PM, william, 1:1, Lochsa Civil

SEC. 2020 WSE=2270.69*

SEC. 2110 WSE=2270.76*

SEC. 2200 WSE=2270.76*

SEC. 2250 WSE=2270.75*

SEC. 2300 WSE=2270.75*

* REFERENCED FROM APPROVED CONCEPTUAL DRAINAGE STUDY FOR THE SILVERTON, BY LOCHSA ENGINEERING

BASS PRO SHOPS
PAD = 2274.45
FF=2276.12
B.F.E. = 2273.62 FT

ZONE "AE"
ZONE "X"

AA

N 737000
N 736800
N 736600
N 736400
N 736200
N 736000
N 735800

100-YEAR, 6-HR STORM AREA OF INUNDATION

Q100 = 332 CFS (INTERIM)
Q100 = 0 CFS (FUTURE)

Q100 = 646 CFS (INTERIM)
Q100 = 228 CFS (FUTURE)

INTERIM W.S.E.= 2276.9

INTERIM W.S.E.= 2276.8

INTERIM W.S.E.= 2276.7

INTERIM W.S.E.= 2276.6

INTERIM W.S.E.= 2276.5

INTERIM W.S.E.= 2276.4

INTERIM W.S.E.= 2276.3

INTERIM W.S.E.= 2276.2

INTERIM W.S.E.= 2276.1

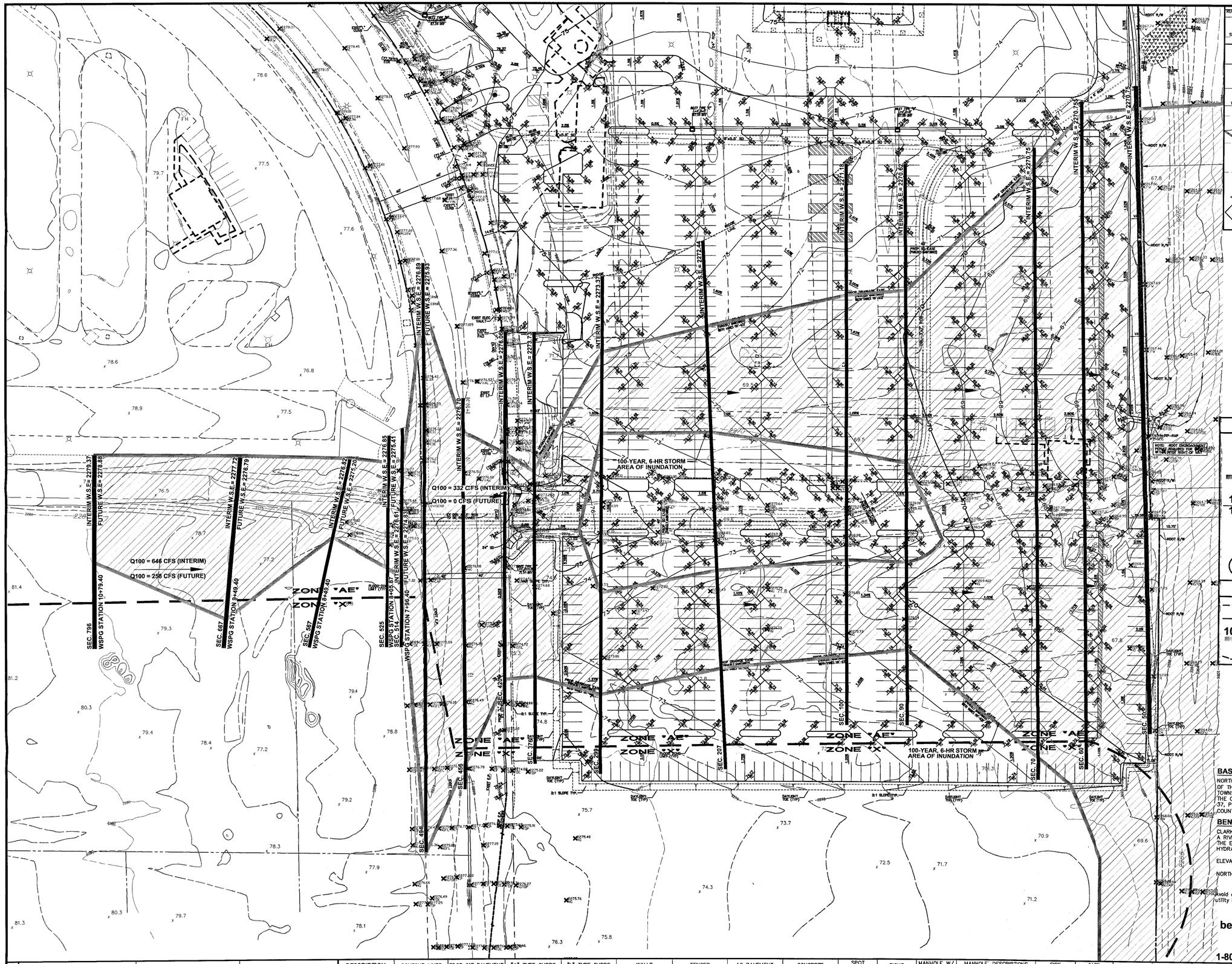
INTERIM W.S.E.= 2276.0

INTERIM W.S.E.= 2275.9

INTERIM W.S.E.= 2275.8

INTERIM W.S.E.= 2275.7

INTERIM W.S.E.=


INTERIM W.S.E.= 2276.89
FUTURE W.S.E.= 2275.93
INTERIM W.S.E.= 2276.85
FUTURE W.S.E.= 2275.41
INTERIM W.S.E.= 2276.82
FUTURE W.S.E.= 2275.20
INTERIM W.S.E.= 2276.61
FUTURE W.S.E.= 2274.83
INTERIM W.S.E.= 2276.10
INTERIM W.S.E.= 2273.37
INTERIM W.S.E.= 2272.44
INTERIM W.S.E.= 2271.18
INTERIM W.S.E.= 2270.67
INTERIM W.S.E.= 2270.75
FUTURE W.S.E.= 2279.37
FUTURE W.S.E.= 2278.88
INTERIM W.S.E.= 2277.72
FUTURE W.S.E.= 2278.79
Q100 = 332 CFS (INTERIM)
Q100 = 0 CFS (FUTURE)
Q100 = 646 CFS (INTERIM)
Q100 = 258 CFS (FUTURE)
100-YEAR, 6-HR STORM AREA OF INUNDATION
ZONE "AE"
ZONE "X"
WSPG STATION 10+79.40
WSPG STATION 9+49.40
WSPG STATION 8+49.40
WSPG STATION 7+96.40
SEC. 796
SEC. 667
SEC. 557
SEC. 525
SEC. 514
SEC. 494
SEC. 466
SEC. 376
SEC. 299
SEC. 207
SEC. 100
SEC. 90
SEC. 80
SEC. 70
PROP. DRAINAGE EASEMENT
PROP. 50' R.O.E. (PACKED EARTHWORK)
EXIST. ELEC. VAULT
DAYLIGHT TOE (TYP.)
2:1 SLOPE TYP.
HOOT R/W
HOOT DRAINAGE EASEMENT
PROP. 30' R.O.E. (FOR SOUND WALL)
PROP. DRAINAGE EASEMENT
PROP. 24" RCP
PROP. 30" RCP
PROP. 36" RCP
PROP. 42" RCP
PROP. 48" RCP
PROP. 54" RCP
PROP. 60" RCP
PROP. 66" RCP
PROP. 72" RCP
PROP. 78" RCP
PROP. 84" RCP
PROP. 90" RCP
PROP. 96" RCP
PROP.

NORTH

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)
1 inch = 400 ft.

* ADOPTED FROM 2002 DUCK CREEK/BLUE DIAMOND FIS RESTUDY BY G.C. WALLACE,INC.

40-FT X 7-FT BRIDGE
(ADOPTED FROM 2002 FIS FIG. 6B)

PT4 *
1961 CFS

2 : 36-INCH RCP
(ADOPTED FROM 2002 FIS FIG. 6B)

** ADOPTED FROM BLUE DIAMOND/I-15 INTERCHANGE NDOT DRAINAGE REPORT

NORTH BRANCH BLUE DIAMOND WASH

MIDDLE BRANCH BLUE DIAMOND WASH

ROBINDALE ROAD

MOBERLY AVENUE

MESA VERDE LANE

SHELBORNE AVENUE

MISTRAL AVENUE

WIGWAM AVENUE

FORD AVENUE

BLUE DIAMOND ROAD

CAMERO AVE

COUGAR AVENUE

TRUCK STREET

DECATUR BOULEVARD

VALLEY VIEW BOULEVARD

INDUSTRIAL ROAD

LINDELL ROAD

TOMMY STREET

ROGERS STREET

HINSON STREET

ULLOM DRIVE

OFX1
236 ACRES

OFX2
270 ACRES

OFX3
24.03 ACRES

OFX4
34.11 ACRES

NX1 11.23 ACRES SILVERTON CASINO
NX2 12.91 ACRES
NX3 13.13 ACRES
NX4 9.87 ACRES
NX5 13.37 ACRES
NX6 3.91 ACRES
NX7 4.44 ACRES
NX8 4.21 ACRES
NX9 11.25 ACRES
NX10 3.78 ACRES

CMX1 CMX2 CMX3 CMX4 CMX5 CMX6 DCMX1

12' X 4' RCB
5.5' X 3' RCB
43" X 76" CMP

COMB**

VICINITY MAP
NOT TO SCALE

PROJECT SITE

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
CMD1	CONCENTRATION POINT
	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2)	Q10 (V10)(D10)
1 (1.0)(1.2)	Q100 (V100)(D100)
2	Q10 FLOW IN CFS (10 YR.)
3	Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTIONI

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. AREA OF INNUNDATION

BASIS OF BEARINGS:

"NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.
ROW LINE	SCARP LINE	CONCRETE PVMT.

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	15 1w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	(2210)								(1234) BC		S	S = SANITARY SEWER D = STORM DRAIN E = ELECTRICAL T = TELEPHONE									
PROPOSED:	2210								1234 BC		S										

REV:	
DATE:	
BY:	
DESCRIPTION:	

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

CONCEPTUAL DRAINAGE STUDY
SILVERTON HOTEL AND CASINO

OFFSITE BASIN MAP

DRAWN BY:	WSB
DESIGNED BY:	HMN
CHECKED BY:	HMN
PROJECT No.:	6904
SCALE	1"=400'
DATE:	3/18/03
DATE:	3/18/03
DATE:	3/18/03
SEAL	

SHEET No.
OFF1
SHEET 1 OF 1
DRAWING No.
Reference

J:\CAD\6904\dwg\Drainage\ALL-BASINS.dwg, 03/18/03 03:25:12 PM, hani, 1:400, Lochsa Civil

TABLE 2: SUMMARY OF DIVERSION OUTPUT

TABLE 2: SUMMARY OF DIVERSION OUTPUT						
DIVERSION	FACILITY	FACILITY	DIVERSION		BYPASS	
ID	ID	DESCRIPTION	Q100 (CFS)	DIRECTION	Q100 (CFS)	DIRECTION
DVBD2	BD2	2- 35" RCP	466	EAST	786	NORTH
DVBD3	BD3	7' x 4' RCB	280	EAST	1261	NORTH
DVBD4	BD4	2- 36" RCP	227	EAST	1022	NORTH
DVBD7	NA	NA	1260	NORTH	630	EAST
DVI151	I151	3- 12' x 4' RCB	1328	EAST	1301	NORTH
DVI152	I152	2- 12' x 4' RCB	482	EAST	816	NORTH
DVI153	I153	3- 12' x 5' RCB	5068	EAST	4422	NORTH
DVI154	I154	2- 12' x 4' RCB	1232	EAST	3549	NORTH
DVI155	I155	3- 12' x 5' RCB	2277	EAST	1444	NORTH
DVPITT	NA	NA	3160	EAST	3282	NORTH
DVROSE	NA	NA	644	NORTHEAST	2683	NORTH
TORAW	NA	NA	611	SOUTH	2605	EAST

TABLE 1: SUMMARY OF HEC-1 MODEL

TABLE 1: SUMMARY OF HEC-1 MODEL								
BASIN/ POINT	AREA (SQ MI)	SDN	DARF	FLOW (CFS)	BASIN/ POINT	AREA (SQ MI)	SDN	DARF	FLOW (CFS)
B13A	1.29	3	0.95	933	D010	10.43	4	0.837	3620
B13B	0.54	3	0.975	223	D07	4.28	3	0.938	1804
PT1	1.83	3	0.95	1020	PT7	32.65	5	0.725	6413
B17	0.82	3	0.975	415	D012B	0.57	3	0.975	291
PT2	2.64	3	0.925	1262	PT8	33.21	5	0.725	6442
DVBD2	2.64	3	0.925	466	DVPITT	33.21	5	0.725	3160
DVBD2	2.64	3	0.925	786	DVPITT	33.21	5	0.725	3282
B13C	2.01	3	0.925	1432	DVROSE	33.21	5	0.725	644
PT3	4.65	3	0.908	1550	DVROSE	33.21	5	0.725	2638
DVBD3	4.65	3	0.908	280	D4A	1.87	3	0.95	1634
DVBD3	4.65	3	0.908	1261	PT25	117.75	5	0.58	6470
DVBD4	4.65	3	0.908	227	D4B	2.03	3	0.925	1804
DVBD4	4.65	3	0.908	1022	PT26	119.76	5	0.58	6470*
B11S	1.12	3	0.95	459	PT27	94.15	5	0.64	3808
HYDRO1	0.63	3	0.975	623	B16C	1.28	3	0.95	782
PT4	6.4	3	0.895	1861	PT28	132.53	5	0.58	6693
DVBD7	6.4	3	0.895	1260	LDCDB	132.53	5	0.58	7261
DVBD7	6.4	3	0.895	630	D9A	1.33	3	0.95	1261
B14B	0.99	3	0.975	440	PT29	133.86	5	0.58	7484
PT22W	7.39	3	0.885	764	B16B	0.7	3	0.975	614
D012A	10.21	4	0.857	2630	PT30	134.56	5	0.58	7484*
DVI151	10.21	4	0.857	1326	B16A	0.91	3	0.975	411
DVI151	10.21	4	0.857	1301	D9B	0.6	3	0.975	398
DVI152	10.21	4	0.857	482	PT31	136.07	5	0.58	7484
DVI152	10.21	4	0.857	816	PT32	143.12	5	0.58	8477
D01	9.84	4	0.865	3793	HYDRO2	0.38	3	0.99	30
D005	2.73	3	0.925	1464	B12	0.87	3	0.975	262
PT9	12.27	5	0.832	3580	PT33W	1.33	3	0.95	244
D02	5.91	3	0.903	2776	PT33	7.75	3	0.885	1266
D03	11.99	4	0.85	4758	B14A	0.99	3	0.975	506
D04	6.95	3	0.885	3193	PT34W	8.71	4	0.875	1290
PT10	18.94	5	0.804	5920	PT34	145.42	5	0.58	8551
D005	8.82	4	0.875	3520	MNWE	0.44	3	0.95	236
PT11	33.37	5	0.725	7588	MNWC	0.6	3	0.975	322
D2A	0.99	3	0.975	1028	PT35	1.04	3	0.95	509
PT12	40.03	5	0.695	9057	MNWB	0.08	3	0.99	72
D2B	7.5	3	0.885	3189	PT36	1.12	3	0.95	549
PT13	54.13	5	0.64	8471	MC2	0.92	3	0.975	387
D06	11.69	4	0.85	3519	PT37	2.03	3	0.925	845
D3	6.64	3	0.885	1518	B16A	1.6	3	0.95	1361
PT14	62.66	5	0.64	8510	PT38	3.64	3	0.915	1426
DVI153	62.66	5	0.64	5068	PT39	149.06	5	0.58	8562
DVI153	62.66	5	0.64	4422	D8	1.56	3	0.95	1099
D1A	2.29	3	0.925	1185	PT40	150.62	5	0.53	8562*
D1B	0.32	3	0.99	149	D7	0.85	3	0.975	399
PT15	2.61	3	0.925	1299	PT41	151.47	5	0.53	8562*
D1C	0.56	3	0.975	203	D8	1.28	3	0.95	1169
PT16	3.17	3	0.915	1420	PT42	152.73	5	0.53	8562*
D1D	1.23	3	0.95	764	B10B	0.85	3	0.975	476
D1E	0.22	3	0.99	81	D9A	0.89	3	0.975	227
D1F	0.81	3	0.975	182	PT43	1.71	3	0.95	646
PT17	5.43	3	0.903	1820	PT44	154.44	5	0.53	8562*
B18A	1.5	3	0.95	284	D9B	1.54	3	0.95	915
PT18	89.59	5	0.64	4781	PT45	155.99	5	0.53	8562*
DVI154	89.59	5	0.64	1232	D10	2.51	3	0.925	1683
DVI154	89.59	5	0.64	3549	PT46	158.49	5	0.53	8562*
B18B	1.92	3	0.95	1121	MC	2.8	3	0.923	3216
PT19	94.15	5	0.64	3721	TORAW	2.8	3	0.925	611
DVI155	94.15	5	0.64	2277	TORAW	2.8	3	0.925	2605
DVI155	94.15	5	0.64	1444	MC02	2.8	3	0.925	82
B18C	1.35	3	0.95	1145	PT47	2.8	3	0.923	658
PT20	4.65	3	0.908	516	RH	1.36	3	0.95	551
PT21	97.51	5	0.64	1402	PT45W	4.16	3	0.908	1158
PT22	100.25	5	0.58	1463*	B20	0.79	3	0.975	393
B15S	0.55	3	0.975	356	PT46	163.44	5	0.53	8562*
PT23	101.2	5	0.58	1402*	D12	0.16	3	0.99	72
PT24	10.21	4	0.857	1835	D11A	0.16	3	0.99	131
D009	3.62	3	0.915	2594	PT48	0.33	3	0.99	133
D004	2.4	3	0.925	1505	PT50	163.78	5	0.53	8562*
PT5	6.02	3	0.895	3501	D11B	0.99	3	0.975	932
D08	11.91	4	0.85	3622	PT51	164.76	5	0.53	8562*
PT6	17.93	5	0.804	4564					

* ADOPTED FLOW, UPSTREAM FLOW CONTROLS
AREA IN SQUARE MILES / FLOW IN CFS

NOTE: DATA SOURCE CLARK COUNTY, NEVADA GISMO

DUCK CREEK / BLUE DIAMOND WASHES FIS RESTUDY

Existing Condition Drainage Map

FIGURE 6B

LEGEND

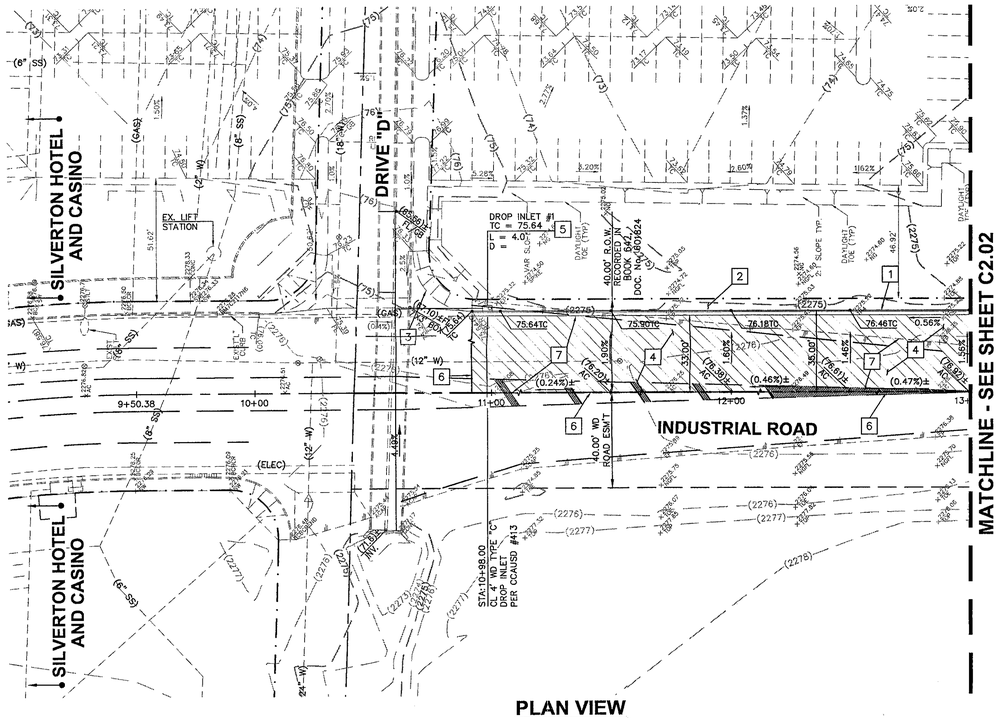
- D010 — Basin Name
- BD2 — Bridge / Culvert ID
- P13 — HEC-1 Combination Point
- DVBD2 — Diversion / Inflow Hydrograph
- MAIN — Street Name
- HEC-1 Combination Point
- Bridge / Culvert Location
- Inflow Hydrograph
- Flow Direction
- Wash / Channel Centerline
- Streets
- Contour Line
- Index Contour
- Detention Basin
- HEC-1 Drainage Basin Boundry

N W E S

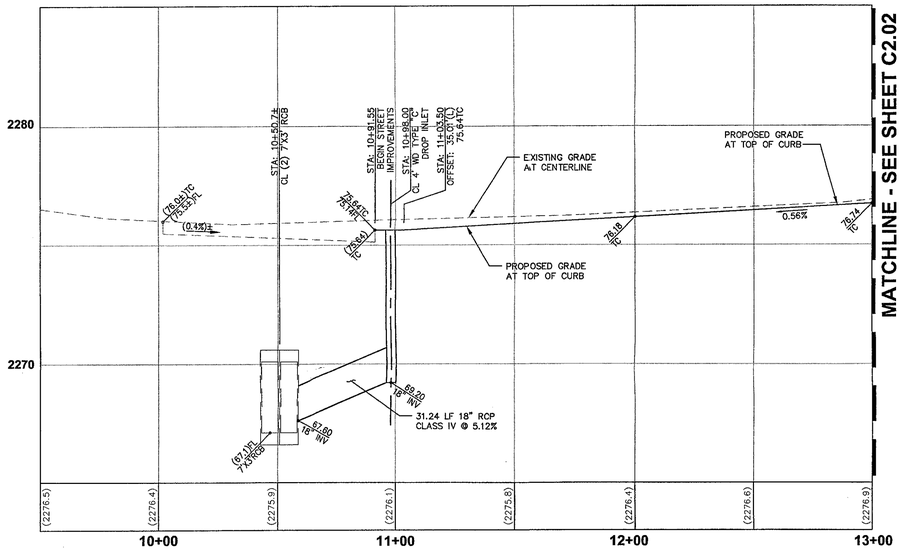
0 1,000 2,000 4,000 Feet

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

F:\650-039\GIS\FIGURE6B.MXD KJG 3/37/2002



PLAN VIEW
SCALE: 1"=30'



PROFILE VIEW
HORIZ. SCALE: 1"=30'
VERT. SCALE: 1"=3'

GRADING NOTES:

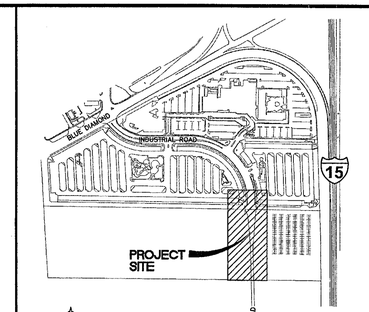
1. SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY AND SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2. CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

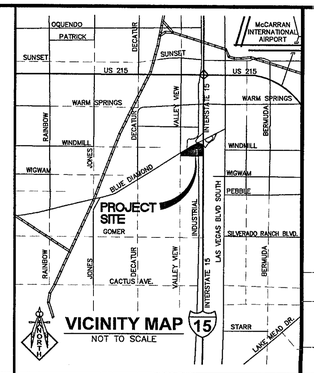
3. CONTRACTOR SHALL NOTIFY LOCHSA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. LOCHSA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4. CONTRACTOR TO ENSURE POSITIVE DRAINAGE. NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY: ???

5. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM ALL EXISTING RESIDENCES ADJACENT TO THE PROPOSED GOLF COURSE. NO DRAINAGE SHALL BE DIRECTED TO THESE RESIDENCES. ADDITIONALLY, ANY INSTANCE IN WHICH EXISTING RESIDENCES DRAIN ONTO THE GOLF COURSE SHALL BE MAINTAINED. MATCH EXISTING GRADES AT LIMITS OF CONSTRUCTION, PROTECT EXISTING LANDSCAPING AND IRRIGATION IMPROVEMENTS. EXTENT OF GRADING SHALL BE FIELD DETERMINED TO MEET DESIGN CRITERIA.



KEY MAP
NOT TO SCALE



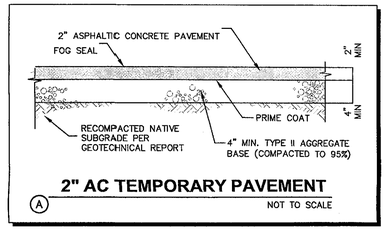
VICINITY MAP
NOT TO SCALE

CONSTRUCTION NOTES:

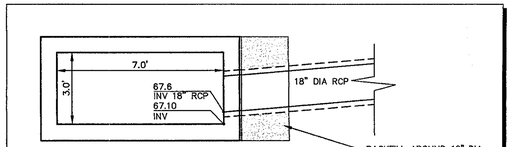
1. INSTALL 2' "L" CURB AND GUTTER PER CCAUSD No.216
2. INSTALL CONCRETE SIDEWALK PER CCAUSD No.234
3. INSTALL SIDEWALK RAMP CASE I W/TRUNCATED DOMES PER CCAUSD No.235
4. INSTALL AC PAVEMENT INDUSTRIAL ROAD (SEE SECTION THIS SHEET)
5. INSTALL DROP INLET TYPE "C" PER CCAUSD No.413
6. SAWCUT & MATCH EXISTING AC PAVEMENT
7. REMOVE EXISTING AC PAVEMENT
8. INSTALL 2" AC TEMPORARY PAVEMENT (SEE DETAIL "A" SHEET C2.02)

ZOOM

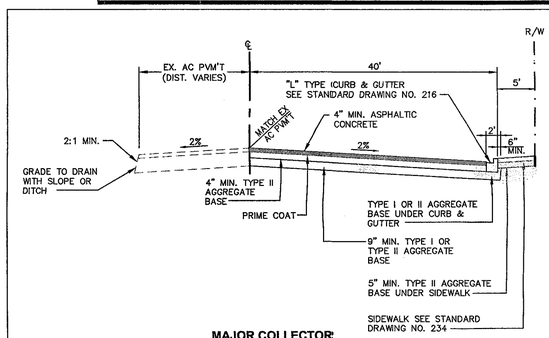
GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.



2" AC TEMPORARY PAVEMENT
(A) NOT TO SCALE



18" STORM DRAIN CONNECTION
(B) NOT TO SCALE



MAJOR COLLECTOR

NOTES:
1. A.C. PAVEMENT TO BE ½" MAXIMUM ABOVE LIP OF GUTTER AFTER COMPACTION.
2. THE GRADE BREAK OCCURRING IN THE CROSS SECTION SHALL FALL BETWEEN DRIVING LANES.
3. STRUCTURAL SECTION SHOWN IS BASED ON A SUBGRADE "R" VALUE OR 20. OTHER STRUCTURAL SECTIONS MAY BE REQUIRED BASED ON ENGINEERING ANALYSIS OF "R" OR "CBR" VALUES DETERMINED BY SOIL TESTING.

HALF STREET IMPROVEMENTS - INDUSTRIAL ROAD

CLARK COUNTY DEPARTMENT OF PUBLIC WORKS

ACCEPTANCE OF PLANS FOR FILING:

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF, ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

COMPLETION OF SECTION II OF DRAINAGE COMPLIANCE REPORT REQUIRED

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON RECORD WITH NEVADA. REF. HTE #03 – 23295

TED T. EGERTON, P.E., No. 11286 DATE

NOTE:

LOCHSA ENGINEERING ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS AND ELEVATIONS. THE UTILITIES SHOWN ON THIS PLAN ARE FROM THE BEST AVAILABLE INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO, THE WATER, FIRE, SANITARY SEWER, STORM SEWER, TELEPHONE, POWER, GAS, AND IRRIGATION LINES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. IF CONFLICT EXISTS IN THE FIELD, THE CONTRACTOR IS TO NOTIFY THE PROJECT ARCHITECT, OWNER'S REPRESENTATIVE AND THE PROJECT ENGINEER IMMEDIATELY.

A.P.N.:

AS INDICATED ON PLANS

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "OC21 8SSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-227-2929

REV.:	DATE:	BY:	DESCRIPTION:

DEVELOPER:
COMMERCE CONSTRUCTION

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312. FAX: (702) 365-9317

PLAN & PROFILE 1 of 2 (INDUSTRIAL ROAD)

INDUSTRIAL ROAD IMPROVEMENTS FOR THE SILVERTON CONNECTOR BUILDING

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SEAL
C.H.	E.A.Z.	M.L.H.	

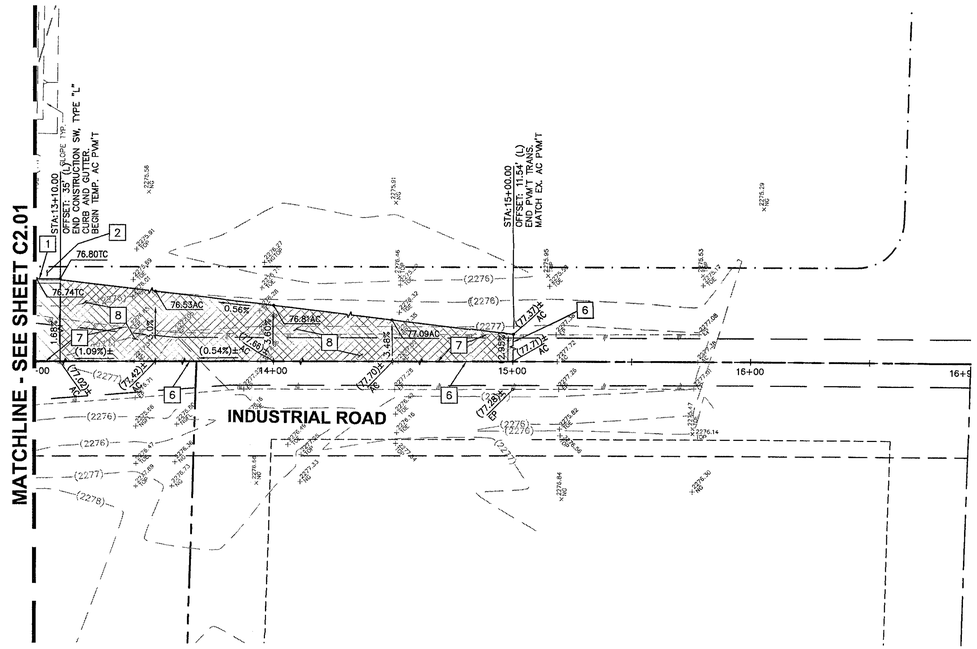
DATE:	DATE:	DATE:	SCALE:	PROJECT No.:
August 27, 2003	August 27, 2003	August 27, 2003	1"=30'	7088

PROFESSIONAL ENGINEER-STATE OF NEVADA
MARK L. HEMBREE
DATE 8-27-03
CIVIL
No. 9445

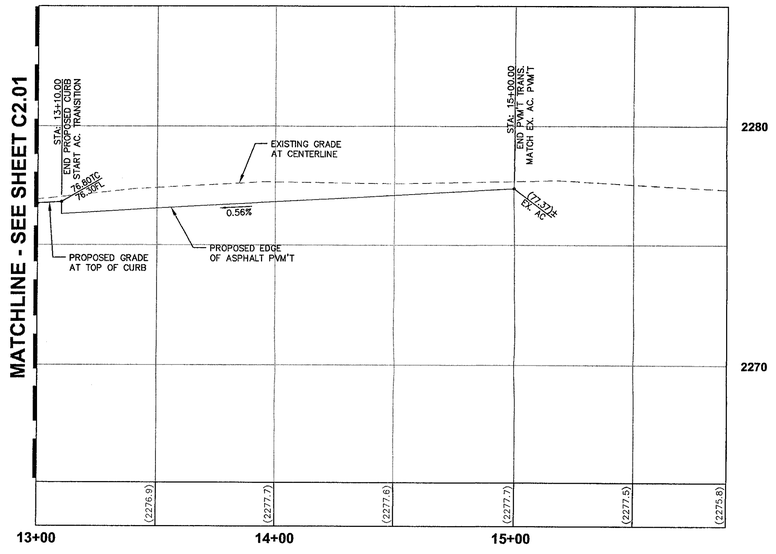
SHEET No.
C2.01
SHEET 4 OF 5
DRAWING No.

LEGEND				DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.		EXISTING:	(2210)								(12.34) BC		(S)	(S) = SANITARY SEWER									
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.											12.34 BC		(D)	(D) = STORM DRAIN									
ROW LINE	SCARP LINE	CONCRETE PVMT.		PROPOSED:	2210										(E)	(E) = ELECTRICAL									
															(T)	(T) = TELEPHONE									

J:\CAD\7088dwg\C-7088-201-PP.dwg, 09/03/03 04:50:23 PM, lynn, 1:30, Lochsa Civil



PLAN VIEW
SCALE: 1"=30'



PROFILE VIEW
HORIZ. SCALE: 1"=30'
VERT. SCALE: 1"=3'

GRADING NOTES:

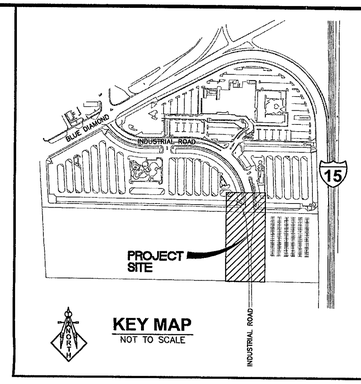
1. SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY AND SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2. CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

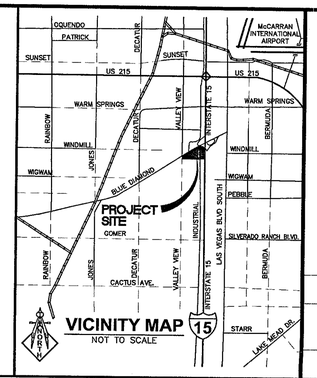
3. CONTRACTOR SHALL NOTIFY LOCHSA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND ERRORS DISCOVERED ON PLANS. LOCHSA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4. CONTRACTOR TO ENSURE POSITIVE DRAINAGE. NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY: ???

5. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM ALL EXISTING RESIDENCES ADJACENT TO THE PROPOSED GOLF COURSE. NO DRAINAGE SHALL BE DIRECTED TO THESE RESIDENCES. ADDITIONALLY, ANY INSTANCE IN WHICH EXISTING RESIDENCES DRAIN ONTO THE GOLF COURSE SHALL BE MAINTAINED. MATCH EXISTING GRADES AT LIMITS OF CONSTRUCTION, PROTECT EXISTING LANDSCAPING AND IRRIGATION IMPROVEMENTS. EXTENT OF GRADING SHALL BE FIELD DETERMINED TO MEET DESIGN CRITERIA.



KEY MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

CONSTRUCTION NOTES:

1. INSTALL 2' "L" CURB AND GUTTER PER CCAUSD No.216
2. INSTALL CONCRETE SIDEWALK PER CCAUSD No.234
3. INSTALL SIDEWALK RAMP CASE I W/TRUNCATED DOMES PER CCAUSD No.235
4. INSTALL AC PAVEMENT INDUSTRIAL ROAD (SEE SECTION THIS SHEET)
5. INSTALL DROP INLET TYPE "C" PER CCAUSD No.413
6. SAWCUT & MATCH EXISTING AC PAVEMENT
7. REMOVE EXISTING AC PAVEMENT
8. INSTALL 2" AC TEMPORARY PAVEMENT (SEE DETAIL "A" SHEET C2.02)

ZOOM

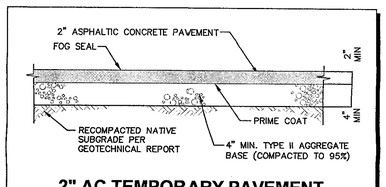
GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

CLARK COUNTY DEPARTMENT OF PUBLIC WORKS

ACCEPTANCE OF PLANS FOR FILING:

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF, ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

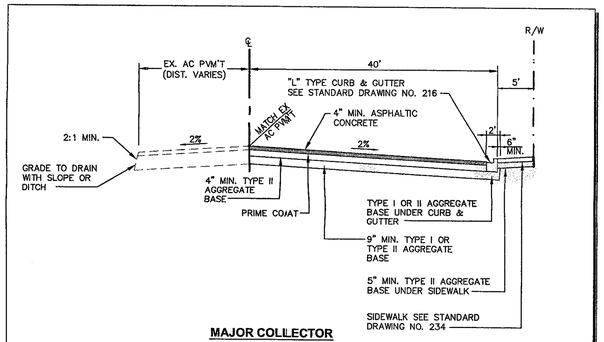


Ⓐ **2" AC TEMPORARY PAVEMENT**
NOT TO SCALE

COMPLETION OF SECTION II OF DRAINAGE COMPLIANCE REPORT REQUIRED

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON RECORD WITH NEVADA. REF. HTE #03 – 23295

TED T. EGERTON, P.E., No. 11286 DATE



MAJOR COLLECTOR

NOTES:
1. A.C. PAVEMENT TO BE ½" MAXIMUM ABOVE LIP OF GUTTER AFTER COMPACTION.
2. THE GRADE BREAK OCCURRING IN THE CROSS SECTION SHALL FALL BETWEEN DRIVING LANES.
3. STRUCTURAL SECTION SHOWN IS BASED ON A SUBGRADE "R" VALUE OR 20. OTHER STRUCTURAL SECTIONS MAY BE REQUIRED BASED ON ENGINEERING ANALYSIS OF "R" OR "CBR" VALUES DETERMINED BY SOIL TESTING.

HALF STREET IMPROVEMENTS - INDUSTRIAL ROAD

NOTE:
LOCHSA ENGINEERING ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS AND ELEVATIONS. THE UTILITIES SHOWN ON THIS PLAN ARE FROM THE BEST AVAILABLE INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO, THE WATER, FIRE, SANITARY SEWER, STORM SEWER, TELEPHONE, POWER, GAS, AND IRRIGATION LINES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. IF CONFLICT EXISTS IN THE FIELD, THE CONTRACTOR IS TO NOTIFY THE PROJECT ARCHITECT, OWNER'S REPRESENTATIVE AND THE PROJECT ENGINEER IMMEDIATELY.

A.P.N.:
AS INDICATED ON PLANS

BASIS OF BEARINGS:
NORTH 0°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:
CLARK COUNTY VERTICAL CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-227-2929

REV.:	DATE:	BY:	DESCRIPTION:

DEVELOPER:
COMMERCE CONSTRUCTION

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

SHEET: **PLAN & PROFILE 2 of 2 (INDUSTRIAL ROAD)**

TITLE: **INDUSTRIAL ROAD IMPROVEMENTS FOR THE SILVERTON CONNECTOR BUILDING**

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.:	SCALE:
C.H.	E.A.Z.	M.L.H.	7088	1"=30'
DATE: August 27, 2003	DATE: August 27, 2003	DATE: August 27, 2003		

SEAL

PROFESSIONAL ENGINEER – STATE OF NEVADA – MARK L. HUGHES – DATE OF SIGNATURE 8-30-03 – CIVIL – No. 8445

SHEET No.
C2.02
SHEET 5 OF 5
DRAWING No.

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	—(2210)—								(12.34) BC		Ⓢ	Ⓢ = SANITARY SEWER									
PROPOSED:	(2210)								12.34 BC			Ⓓ = STORM DRAIN Ⓔ = ELECTRICAL Ⓣ = TELEPHONE									

J:\CAD\7088\dwg\C-7088-202-PP.dwg, 09/03/03 04:48:53 PM, lynn, 1:30, Lochsa Civil

NORTH

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

SEC. 100 WSE=2286.36
SEC. 200 WSE=2283.29
SEC. 300 WSE=2281.00
SEC. 400 WSE=2279.38
SEC. 500 WSE=2277.72
SEC. 600 WSE=2276.62
SEC. 650 WSE=2275.61
SEC. 700 WSE=2275.16
SEC. 750 WSE=2275.54
SEC. 850 WSE=2275.94
SEC. 950 WSE=2275.49
SEC. 1050 WSE=2274.91
SEC. 1150 WSE=2274.25
SEC. 1250 WSE=2273.57
SEC. 1350 WSE=2273.09
SEC. 1450 WSE=2272.83
SEC. 1550 WSE=2272.16
SEC. 1650 WSE=2271.81
SEC. 1780 WSE=2271.26
SEC. 1960 WSE=2270.78
SEC. 2020 WSE=2270.69
SEC. 2110 WSE=2270.76
SEC. 2200 WSE=2270.76
SEC. 2250 WSE=2270.75
SEC. 2300 WSE=2270.75

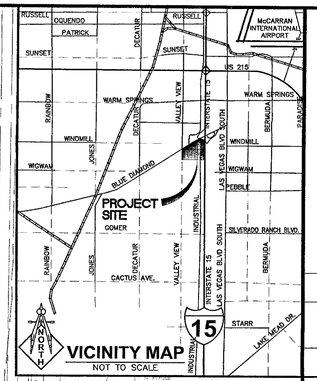
CROSS-SECTION STATION X=0

CROSS-SECTION STATION X=0

EX. CASINO (FF=2275.12)

EX. HOTEL (FF=2275.12)

INDUSTRIAL RD



VICINITY MAP
NOT TO SCALE

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
CMD1	CONCENTRATION POINT / COMBINATION POINT
	BASIN BOUNDARY LINE
6 SUMP-1	STORAGE POINT
1 (1.0)(1.2)	Q10 (V10)(D10)
1 (1.0)(1.2)	Q100 (V100)(D100)
2	Q10 FLOW IN CFS (10 YR.)
3	Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC		S
PROPOSED:	2210								12.34 BC		S

MANHOLE DESCRIPTIONS
(S) = SANITARY SEWER
(D) = STORM DRAIN
(E) = ELECTRICAL
(T) = TELEPHONE

FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS

NO.	DESCRIPTION	REV.:	DATE:	BY:

LOCHSA ENGINEERING
5928 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

HEC RAS SECTION MAP

CONCEPTUAL DRAINAGE STUDY SILVERTON HOTEL AND CASINO

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.:	SCALE:
WSB	HMN	HMN	6904	1"=80'
DATE: 1/24/03	DATE: 1/24/03	DATE: 1/24/03		

SEAL

SHEET No.
HR1
SHEET 1 OF 1

DRAWING No.
Ref.

HTE #03-8397

J:\CAD\6904\dwg\Drainage\dc-6904-101-hr.dwg, 01/29/03 04:06:17 PM, william, 1:80, Lochsa Civil

PEAK FLOW SUMMARY
INTERIM CONDITION

HEC-1 ID	AREA (AC)	10-YR Q	100-YR Q
PT4	–	1961	1961
OFX1	236	19	106
CMX1	–	–	2045
BLUE	–	100	100
DCMX1	–	–	1945
NX1	11.23	18	33
ND2	7.06	12	22
DI-1	0.83	2	3
DI-2	1.06	2	4
LAT-A1	–	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	–	23	41
ND8	5.38	10	18
CMD2	–	–	1943
NX3	13.13	18	35
NX4	9.87	14	27
CMX3	–	32	62
OFX2	270	52	189
COMB	–	220	451
SHELB	–	259	609
OFX3	24.03	16	39
NX5	13.37	2	10
CMX4	–	274	646
PARK	–	104	476
LINE-B	–	170	170
CMD7	–	–	2256
PARK	–	14	332
INDUST	4.46	7	12
ND6	3.69	7	13
ND7	4.21	15	15
CMD5	–	39	339
NX9	11.25	3	11
NX10	3.78	1	4
OFX4	34.11	16	44
CMX6	–	19	58

OFX1
236.00 ACRES

CMX1
19
106
2045

BLUE
100
BLUE DIAMOND ROAD

DCMX1
1945

18
33
NX1
11.23 ACRES

ONEAMM LAS SOUTH

EX. CASINO
(FF=2275.12)

EX. HOTEL
(FF=2275.12)

ND8
5.38 ACRES

CMD7

ND2
7.06 ACRES
12
22

10
18
CMD2
1943
2256

DI-1
0.83 ACRES

7(1.84)(0.41)
12(2.02)(0.48)

4- 12'X4' RCB

BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT.

DI-2
1.06 ACRES

DI-3
2.39 ACRES

DI-4
1.32 ACRES

NX3
13.13 ACRES

AA
4.46 ACRES
INDUST
18
35

5
9
5

ND7
4.21 ACRES
CMD5
29
339

OFX2
270.00 ACRES

NX4
9.87 ACRES
14
27

CMX3
32
62

8
15
PARK
14
332

52
189

SHELBOURNE AVE
274
646
CMX4

ND6
3.69 ACRES
13

NX5
13.37 ACRES
2
10

NX9
11.25 ACRES
3
11

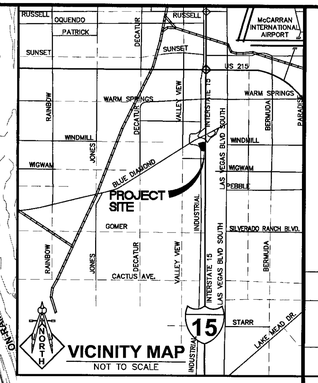
NX10
3.78 ACRES
1
4

CAMERO AVE

OFX3
24.03 ACRES
16
39

OFX4
34.11 ACRES
16
44

19
58
CMX6



VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT
	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	EXISTING:	(2210)								(12.34) BC		(S)	(S) = SANITARY SEWER									
ROW LINE	SCARP LINE	CONCRETE PVMT.	PROPOSED:	2210								12.34 BC			(D) = STORM DRAIN (E) = ELECTRICAL (T) = TELEPHONE									

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV. 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.:	DATE:	BY:	DESCRIPTION:

DRAINAGE BASIN MAP
(INTERIM CONDITION)

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.:	SCALE:
WSB	HMN	HMN	6923.2	1"=100'
DATE: 9/2/03	DATE: 9/2/03	DATE: 9/2/03		

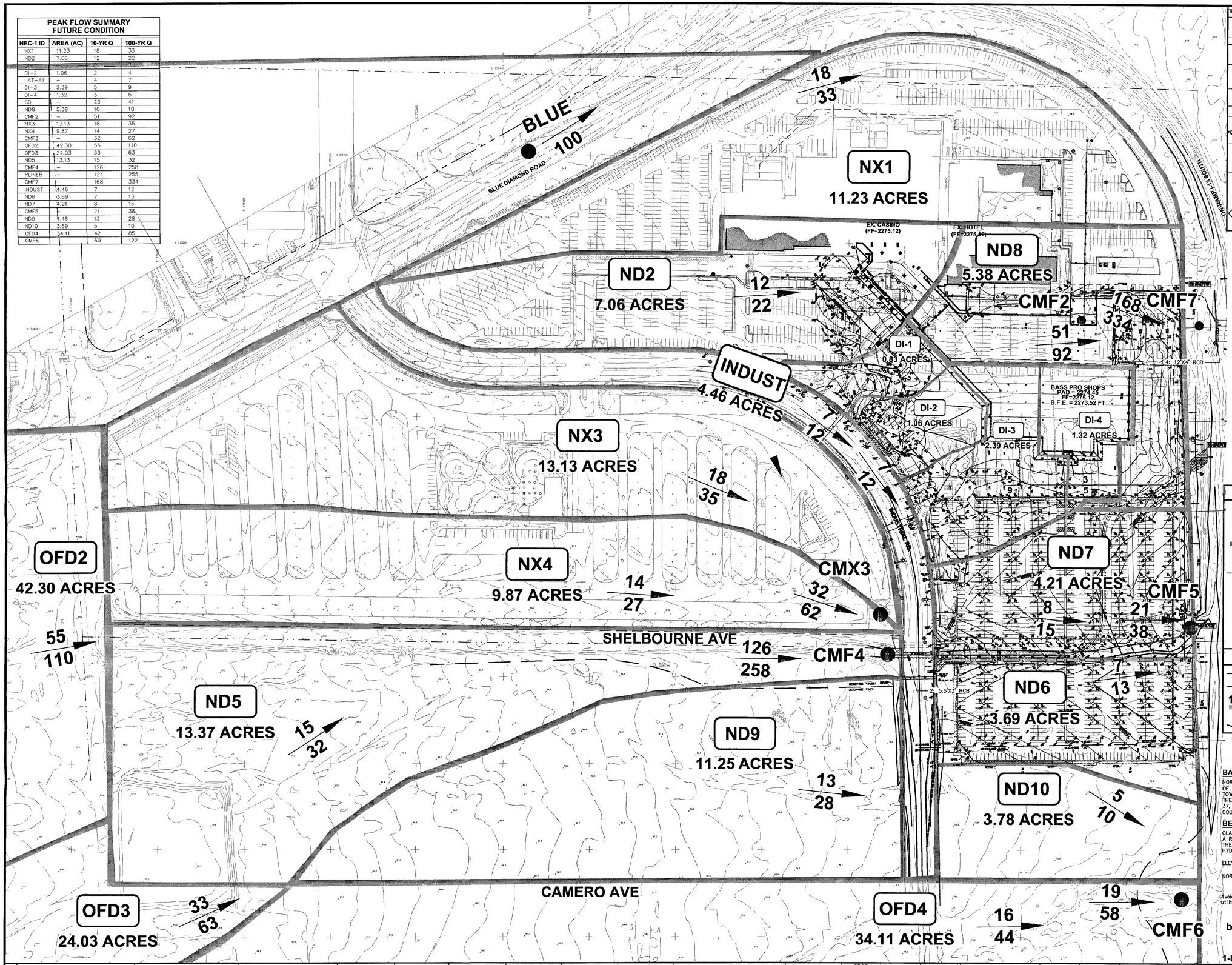
SEAL

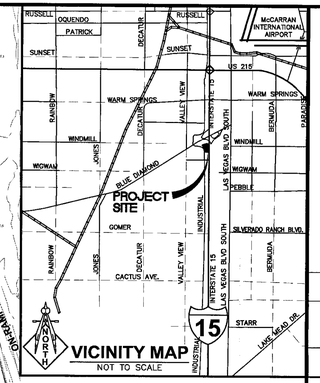
SHEET No.
DR2
SHEET 2 OF 4
DRAWING No.

J:\CAD\6923.2\dwg\drainage\C-6923-102-DR.dwg, 09/03/03 02:20:48 PM, william, 1:100, Lochsa Civil

PEAK FLOW SUMMARY FUTURE CONDITION

HEC-1 ID	AREA (AC)	10-YR Q	100-YR Q
NX1	11.23	18	33
ND2	7.06	12	22
DI-1	0.83	2	4
DI-2	1.06	2	4
LAT-A1	–	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	–	23	41
ND8	5.38	10	18
CMF2	–	51	92
NX3	13.13	18	35
NX4	9.87	14	27
CMF3	–	32	62
OFD2	42.30	55	110
OFD3	24.03	33	63
ND5	13.13	15	32
CMF4	–	126	258
RLINEB	–	124	255
CMF7	–	168	334
INDUST	4.46	7	12
ND6	3.69	7	13
ND7	4.21	8	15
CMF5	–	21	38
ND9	4.46	13	28
ND10	3.69	5	10
OFD4	34.11	42	85
CMF6	–	60	122





VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT / COMBINATION POINT
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

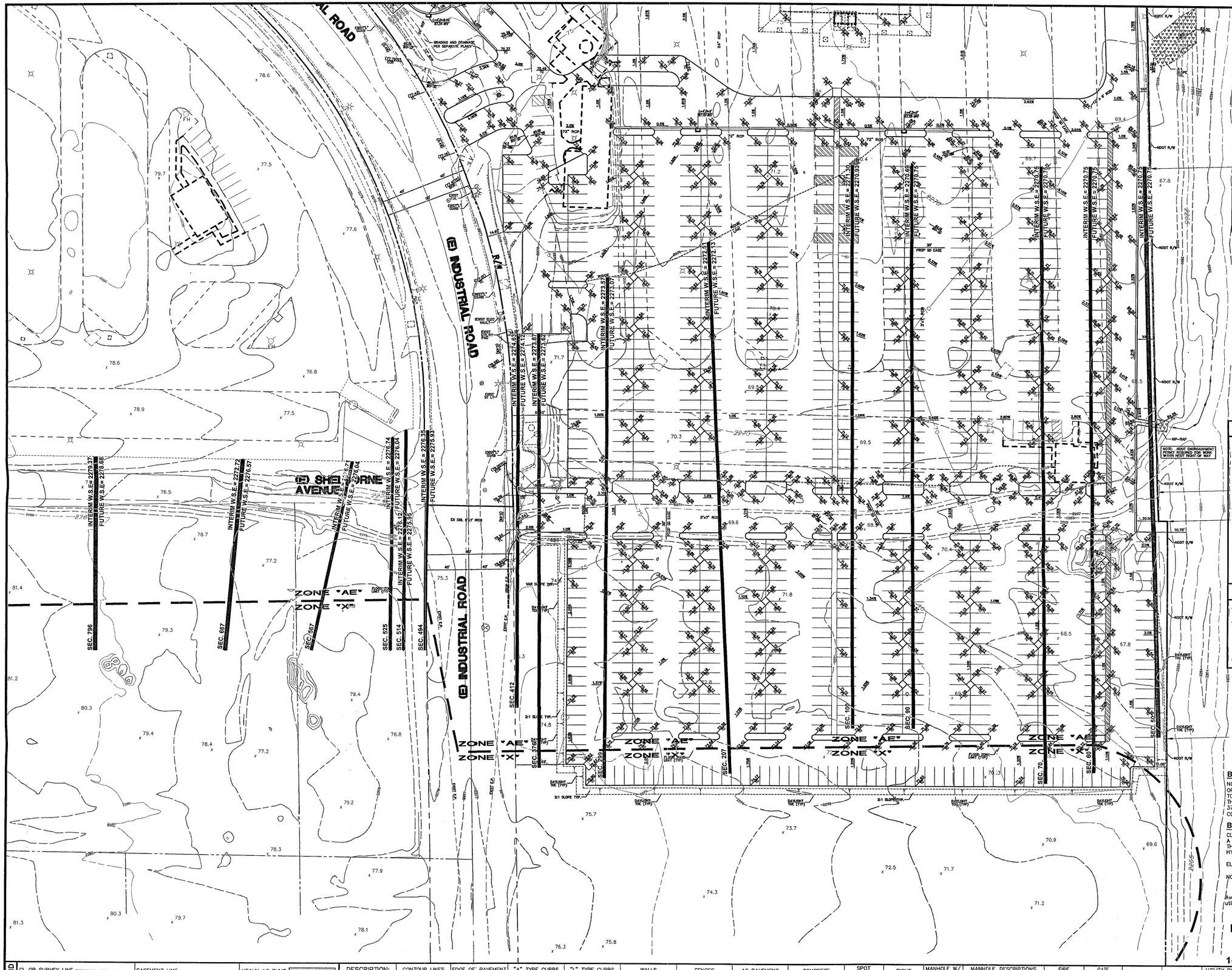
ELEVATION: 2289.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

| | | |


(E) INDUSTRIAL ROAD
(E) SHELBORNE AVENUE
GRADING AND DRAINAGE PER SEPARATE PLANS
72" RCP
54" RCP
3'x7' RCS
ZONE "AE"
ZONE "X"
FLOOD ZONE LIMIT (TYP)
DAYLIGHT TOE (TYP)
2:1 SLOPE TYP.
EDGE EA.
VA 1364
INTERIM W.S.E.= 2276.74
FUTURE W.S.E.= 2276.04
INTERIM W.S.E.= 2276.35
FUTURE W.S.E.= 2275.95
INTERIM W.S.E.= 2276.12
FUTURE W.S.E.= 2275.95
INTERIM W.S.E.= 2276.33
FUTURE W.S.E.= 2275.93
INTERIM W.S.E.= 2278.37
FUTURE W.S.E.= 2278.68
INTERIM W.S.E.= 2276.72
FUTURE W.S.E.= 2276.57
INTERIM W.S.E.= 2274.63
FUTURE W.S.E.= 2274.12
INTERIM W.S.E.= 2273.97
FUTURE W.S.E.= 2273.62
INTERIM W.S.E.= 2273.97
FUTURE W.S.E.= 2273.07
INTERIM W.S.E.= 2272.51
FUTURE W.S.E.= 2272.13
INTERIM W.S.E.= 2271.39
FUTURE W.S.E.= 2270.99
INTERIM W.S.E.= 2270.68
FUTURE W.S.E.= 2270.07
INTERIM W.S.E.= 2270.75
FUTURE W.S.E.= 2270.75
INTERIM W.S.E.= 2270.75
FUTURE W.S.E.= 2270.75
INTERIM W.S.E.= 2270.75
FUTURE W.S.E.= 2270.75
INTERIM W.S.E.= 2270.75
FUTURE W.S.E.= 2270.75
SEC. 796
SEC. 667
SEC. 657
SEC. 525
SEC. 514
SEC. 484
SEC. 412
SEC. 299
SEC. 276
SEC. 207
SEC. 109
SEC. 90
SEC. 50
SEC. 70
NDOT R/W
NOTE: NDOT ENCROACHMENT PERMIT REQUIRED FOR WORK WITHIN NDOT RIGHT-OF-WAY
RIP-RAP
30' PROP SD ESE
EX DBL 6'LT RCB
EX 24" RCP
EX 18" RCP
EX 12" RCP
EX 8" RCP
EX 6" RCP
EX 4" RCP
EX 3" RCP
EX 2" RCP
EX 1" RCP
EX 24" CMP
EX 18" CMP
EX 12" CMP
EX 8" CMP
EX 6" CMP
EX 4" CMP
EX 3" CMP
EX 2" CMP
EX 1" CMP
EX 24" CPP
EX 18" CPP
EX 12" CPP
EX 8" CPP
EX 6" CPP
EX 4" CPP
EX 3" CPP
EX 2" CPP
EX 1" CPP
EX 24" HDPE
EX 18" HDPE
EX 12" HDPE
EX 8" HDPE
EX 6" HDPE
EX 4" HDPE
EX 3" HDPE
EX 2" HDPE
EX 1" HDPE
EX 24" PVC
EX 18" PVC
EX 12" PVC
EX 8" PVC
EX 6" PVC
EX 4" PVC
EX 3" PVC
EX 2" PVC
EX 1" PVC

SEC. 820 W.S.E.= 2274.72

SEC. 700 W.S.E.= 2274.45

SEC. 600 W.S.E.= 2274.02

SEC. 500 W.S.E.= 2272.88

SEC. 400 W.S.E.= 2271.08

SEC. 300 W.S.E.= 2270.66

SEC. 200 W.S.E.= 2270.75

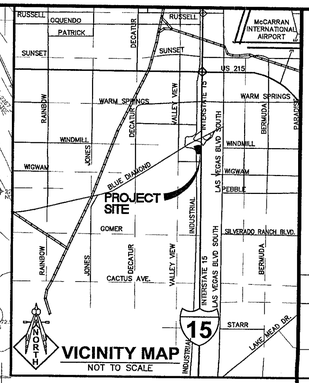
SEC. 100 W.S.E.= 2270.75

SEC. 25 W.S.E.= 2270.75

SHADOW

VICINITY MAP

NOT TO SCALE



NORTH

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
CMD1	CONCENTRATION POINT
SUMP-1	COMBINATION POINT
1 (1.0)(1.2)	BASIN BOUNDARY LINE
1 (1.0)(1.2)	STORAGE POINT
2	Q10 (V10)(D10)
3	Q100 (V100)(D100)
	Q10 FLOW IN CFS (10 YR.)
	Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND			
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC		Ⓢ
PROPOSED:	2210								12.34 BC		Ⓢ

MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
Ⓢ = SANITARY SEWER									
Ⓓ = STORM DRAIN									
Ⓔ = ELECTRICAL									
Ⓣ = TELEPHONE									

REV.:	DATE:	BY:	DESCRIPTION:

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

HEC RAS SECTION MAP
(EXISTING CONDITION)

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

SHEET	DATE:	DRAWN BY:
	8/1/03	WSB

	DATE:	DESIGNED BY:
	8/1/03	HMN

	DATE:	CHECKED BY:
TITLE	8/1/03	HMN

SEAL

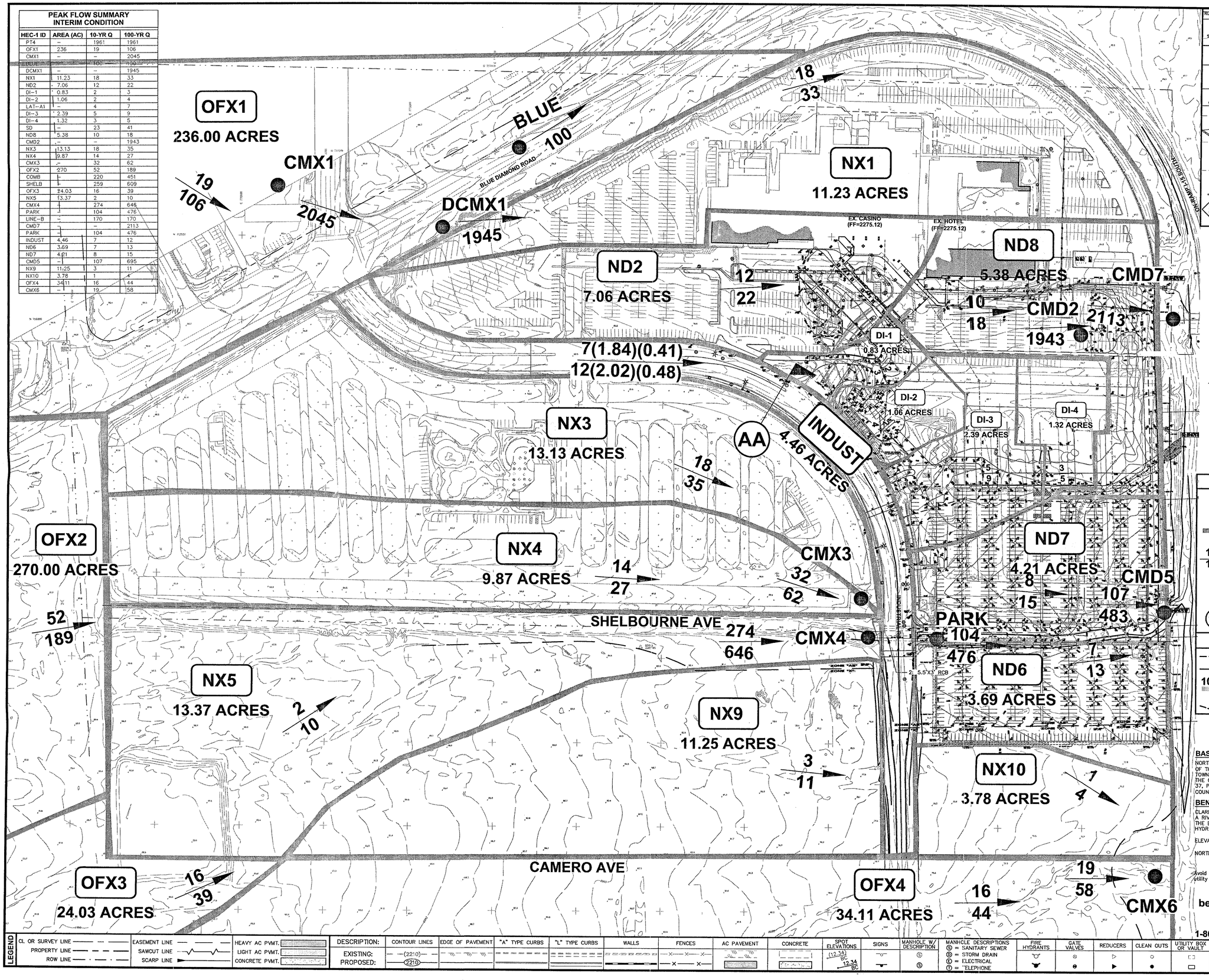
SCALE:	PROJECT No.:
1"=40'	6923.2

SHEET No.
HR3
SHEET 3 OF 3
DRAWING No.

J:\CAD\6923.2\dwg\drainage\C-6923-203-HR.dwg, 08/05/03 02:58:13 PM, william, 1:40, Lochsa Civil

PEAK FLOW SUMMARY
INTERIM CONDITION

HEC-1 ID	AREA (AC)	10-YR Q	100-YR Q
PT4	–	1961	1961
OFX1	236	19	106
CMX1	–	–	2045
BLUE		100	100
DCMX1	–	–	1945
NX1	11.23	18	33
ND2	7.06	12	22
DI–1	0.83	2	3
DI–2	1.06	2	4
LAT–A1	–	4	7
DI–3	2.39	5	9
DI–4	1.32	3	5
SD	–	23	41
ND8	5.38	10	18
CMD2	–	–	1943
NX3	13.13	18	35
NX4	9.87	14	27
CMX3	–	32	62
OFX2	270	52	189
COMB	–	220	451
SHELB	–	259	609
OFX3	24.03	16	39
NX5	13.37	2	10
CMX4	–	274	646
PARK	–	104	476
LINE–B	–	170	170
CMD7	–	–	2113
PARK	–	104	476
INDUST	4.46	7	12
ND6	3.69	7	13
ND7	4.21	8	15
CMD5	–	107	695
NX9	11.25	3	11
NX10	3.78	1	4
OFX4	34.11	16	44
CMX6	–	19	58



DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT
	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS–SECTION

HEC-RAS

	HEC–RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC–RAS CROSS–SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 2289.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	EXISTING:	(22'10)								12.34 BC		Ⓒ	Ⓢ = SANITARY SEWER									
ROW LINE	SCARP LINE	CONCRETE PVMT.	PROPOSED:	22'10								12.34 BC		Ⓢ	Ⓓ = STORM DRAIN									
															Ⓔ = ELECTRICAL									
															Ⓣ = TELEPHONE									

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365–9312 FAX: (702) 365–9317

REV.:	DATE:	BY:	DESCRIPTION:

DRAWN BY: WSB DATE: 8/1/03
DESIGNED BY: HMN DATE: 8/1/03
CHECKED BY: HMN DATE: 8/1/03
PROJECT No.: 6923.2 SCALE: 1"=100'
SEAL

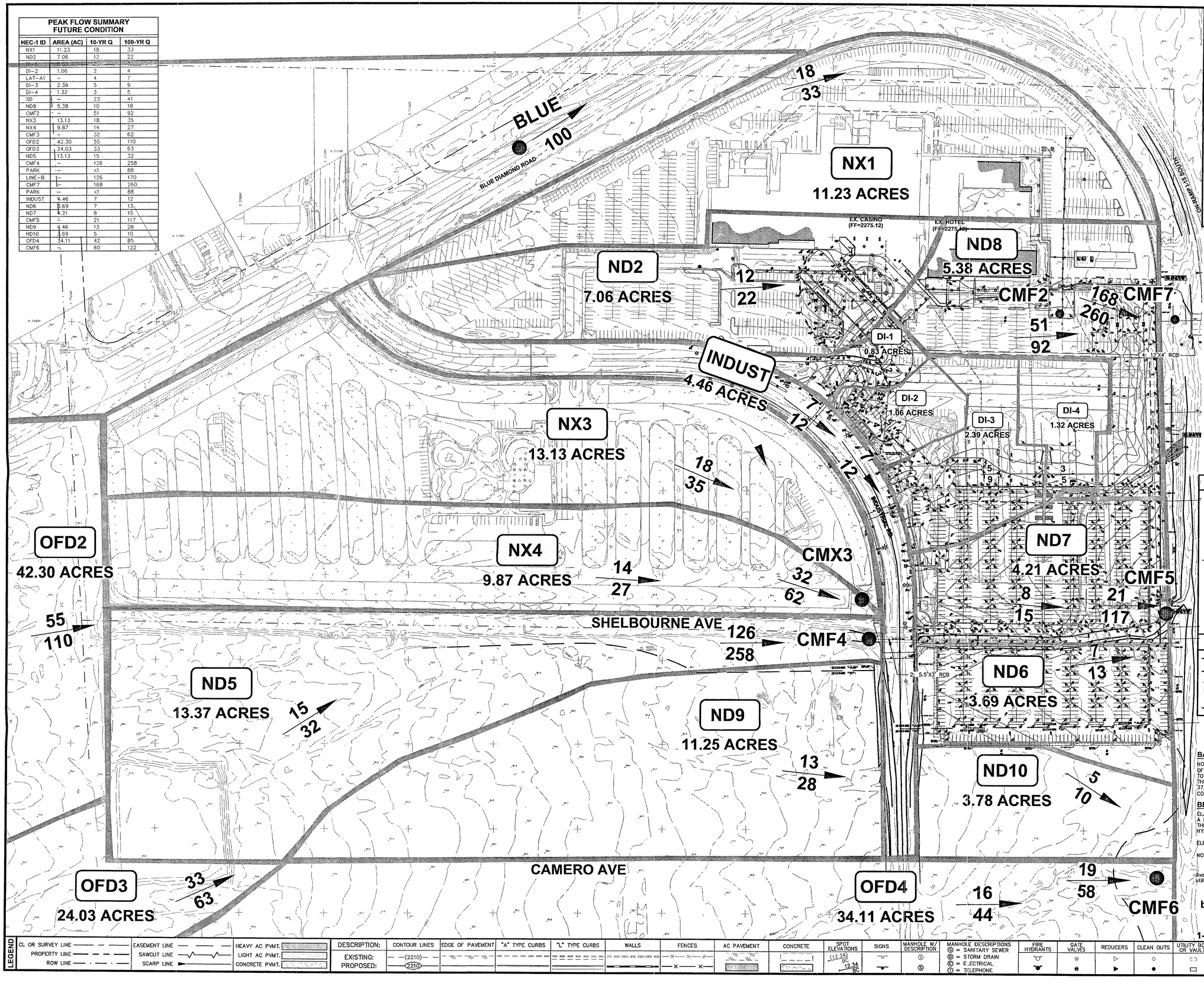
SHEET: DRAINAGE BASIN MAP (INTERIM CONDITION)
TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

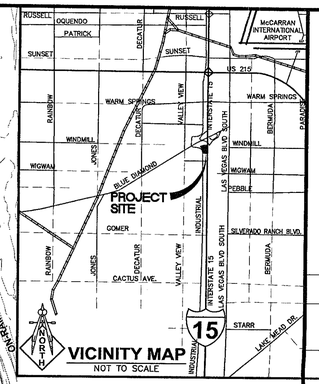
SHEET No.
DR2
SHEET 2 OF 4
DRAWING No.

J:\CAD\6923.2\dwg\drainage\C-6923-102-DIR.dwg, 08/05/03 02:04:33 PM, william, 1:100, Lochsa Civil

PEAK FLOW SUMMARY FUTURE CONDITION

HEC-1 ID	AREA (AC)	10-YR Q	100-YR Q
NX1	11.23	18	33
ND2	7.06	12	22
DI-1	0.83	–	–
DI-2	1.06	2	4
LAT-A1	–	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	–	23	41
ND8	5.38	10	18
CMF2	–	51	92
NX3	13.13	18	35
NX4	9.87	14	27
CMF3	–	32	62
OFD2	42.30	55	110
OFD3	24.03	33	63
ND5	13.13	15	32
CMF4	–	126	258
PARK	–	<1	88
LINE-B	–	126	170
CMF7	–	168	260
PARK	–	<1	88
INDUST	4.46	7	12
ND6	3.69	7	13
ND7	4.21	8	15
CMF5	–	21	117
ND9	4.46	13	28
ND10	3.69	5	10
OFD4	34.11	42	85
CMF6	–	60	122





GRAPHIC SCALE

100 0 50 100 200

(IN FEET)

1 inch = 100 ft.

DRAINAGE LEGEND

ND1 • CMD1	DRAINAGE BASIN LABEL CONCENTRATION POINT COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW8", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 2289.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND																								
CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	EXISTING:	(2210)								(12.34) BC		(S)	(S) = SANITARY SEWER									
ROW LINE	SCARP LINE	CONCRETE PVMT.	PROPOSED:	2210								12.34 BC		(D)	(D) = STORM DRAIN									
														(E)	(E) = ELECTRICAL									
														(T)	(T) = TELEPHONE									

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.:	DATE:	BY:	DESCRIPTION:

DRAINAGE BASIN MAP (FUTURE CONDITION)

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

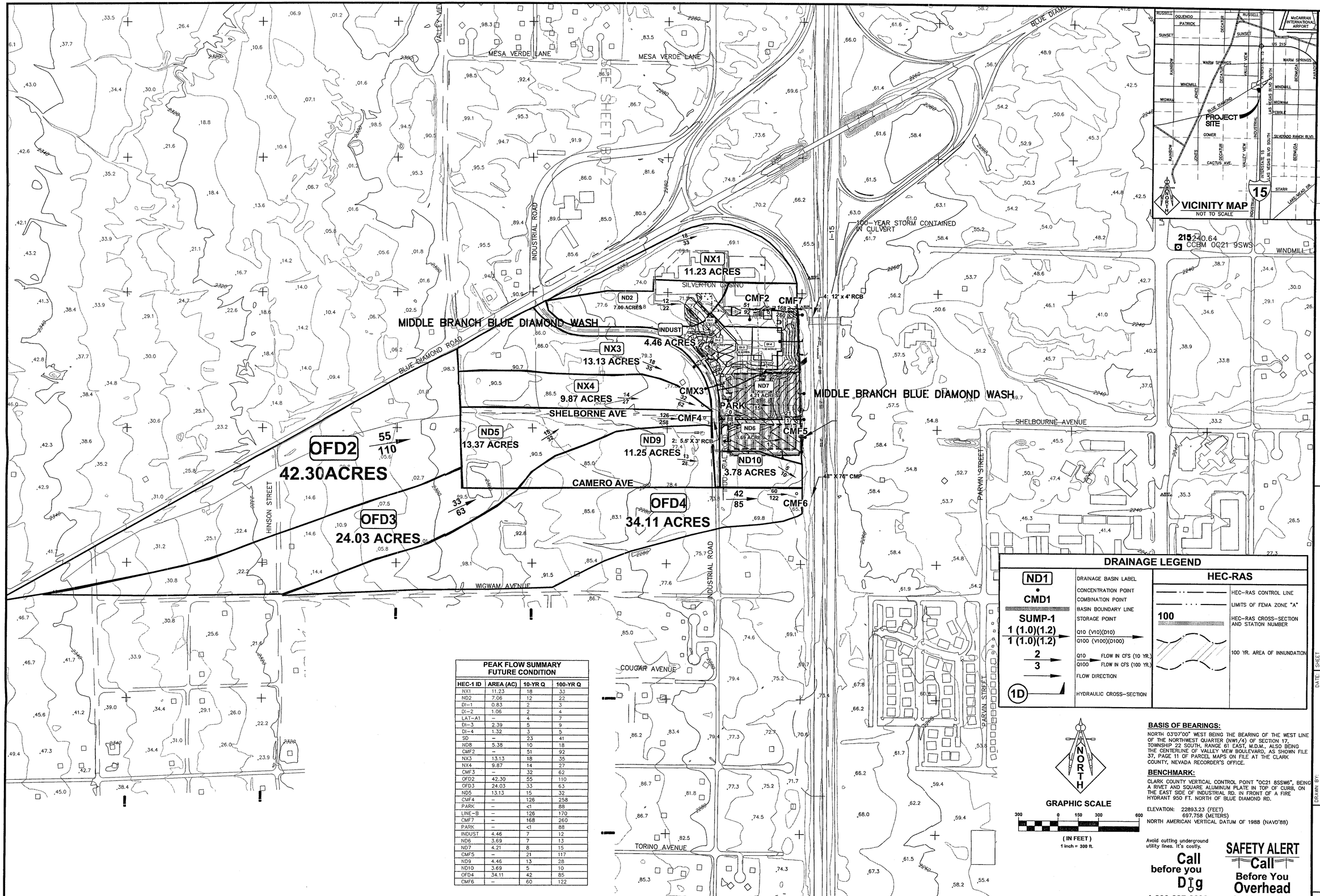
DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No.:
WSB	HMN	HMN	6923.2

SHEET	DATE:	SCALE:
	8/1/03	1"=100'

SEAL

SHEET No.
DR3
SHEET 3 OF 4
DRAWING No.

J:\CAD\6923.2\dwg\drainage\C-6923-103-DR.dwg, 08/05/03 02:14:04 PM, william, 1:100, Lochsa Civil



PEAK FLOW SUMMARY FUTURE CONDITION

HEC-1 ID	AREA (AC)	10-YR Q	100-YR Q
NX1	11.23	18	33
ND2	7.06	12	22
DI-1	0.83	2	3
DI-2	1.06	2	4
LAT-A1	–	4	7
DI-3	2.39	5	9
DI-4	1.32	3	5
SD	–	23	41
ND8	5.38	10	18
CMF2	–	51	92
NX3	13.13	18	35
NX4	9.87	14	27
CMF3	–	32	62
OFD2	42.30	55	110
OFD3	24.03	33	63
ND5	13.13	15	32
CMF4	–	126	258
PARK	–	<1	88
LINE-B	–	126	170
CMF7	–	168	260
PARK	–	<1	88
INDUST	4.46	7	12
ND6	3.69	7	13
ND7	4.21	8	15
CMF5	–	21	117
ND9	4.46	13	28
ND10	3.69	5	10
OFD4	34.11	42	85
CMF6	–	60	122

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT
	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. AREA OF INNUNDATION

NORTH

GRAPHIC SCALE

300 0 150 300 600

(IN FEET)
1 inch = 300 ft.

BASIS OF BEARINGS:
NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:
CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC		Ⓢ
PROPOSED:	2210								12.34 BC		Ⓢ

MANHOLE DESCRIPTIONS
Ⓢ = SANITARY SEWER
Ⓓ = STORM DRAIN
Ⓔ = ELECTRICAL
Ⓣ = TELEPHONE

FIRE HYDRANTS | GATE VALVES | REDUCERS | CLEAN OUTS | UTILITY BOX OR VAULT | 100w HPS STREETLIGHTS | 150w HPS STREETLIGHTS | 200w HPS STREETLIGHTS | 250w HPS STREETLIGHTS

REV.:	DATE:	BY:	DESCRIPTION:

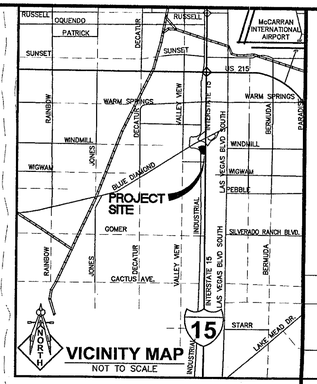
LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312 FAX: (702) 365-9317

DRAWN BY: WSB
DESIGNED BY: HMN
CHECKED BY: HMN
SEAL
DATE: 8/1/03
SCALE: 1"=400'
PROJECT No.: 6923.2

SHEET: OFFSITE BASIN MAP (FUTURE CONDITION)
TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

SHEET No. OFF2
SHEET 2 OF 2
DRAWING No.

J:\CAD\6923.2\dwg\drainage\ALL-BASINS.dwg, 08/05/03 02:06:20 PM, william, 1:300, Lochsa Civil



VICINITY MAP
NOT TO SCALE

NORTH

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)
1 inch = 40 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT / COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

"CLARK COUNTY VERTICAL CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 22893.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.

Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

REV.:	DATE:	BY:	DESCRIPTION:

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

SHEET: SHELBORNE AVE. HEC-RAS SECTION MAP (EXISITNG CONDITION)
TITLE: SILVERTON EXPANSION PHASE 1 BASS PRO SHOPS

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT No:	SCALE:
WSB	JF	HMN	6923.2	1"=40'
DATE: 8/1/03	DATE: 8/1/03	DATE: 8/1/03		

SEAL

SHEET No. HR1
SHEET 1 OF 3
DRAWING No.

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	
ROW LINE	SCARP LINE	CONCRETE PVMT.	

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION
EXISTING:	(2210)								(12.34) BC / 12.34 BC		Ⓢ
PROPOSED:	2210										Ⓢ

MANHOLE DESCRIPTIONS
Ⓢ = SANITARY SEWER
Ⓓ = STORM DRAIN
Ⓔ = ELECTRICAL
Ⓣ = TELEPHONE

FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS

J:\CAD\6923.2\dwg\drainage\C-6923-201-HR.dwg, 08/05/03 02:23:57 PM, william, 1:40, Lochsa Civil

OFX1
236.00 ACRES
19
106
CMX1
2045
DCMX1
1945
BLUE DIAMOND ROAD
BLUE
ZONE X
100
18
33
NX1
11.23 ACRES
EX. CASINO (FF=2275.12)
EX. HOTEL (FF=2275.12)
OVERLAND TRAIL SOUTH
ZONE AE
NX2
12.91 ACRES
CMX2
1943
21
37
4-12'X4' RCB
INDUST
4.46 ACRES
NX3
13.13 ACRES
18
35
NX8
4.21 ACRES
13
7
7
12
INDUSTRIAL RD.
NX7
4.44 ACRES
OFX2
270.00 ACRES
NX4
9.87 ACRES
14
27
CMX3
32
62
8
14
ZONE AE
52
189
ZONE AO
68
225
CMX4
274
662
2-5.5'X3' RCB
1
5
SHELBOURNE
71
232
CMX5
NX6
3.91 ACRES
NX5
13.37 ACRES
2
10
NX9
11.25 ACRES
3
11
ZONE X
NX10
3.78 ACRES
7
4
OFX3
24.03 ACRES
16
39
OFX4
34.11 ACRES
16
44
19
58
CMX6

NORTH

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

DRAINAGE LEGEND

ND1	DRAINAGE BASIN LABEL
• CMD1	CONCENTRATION POINT
	COMBINATION POINT
	BASIN BOUNDARY LINE
SUMP-1	STORAGE POINT
1 (1.0)(1.2) / 1 (1.0)(1.2)	Q10 (V10)(D10) / Q100 (V100)(D100)
2 / 3	Q10 FLOW IN CFS (10 YR.) / Q100 FLOW IN CFS (100 YR.)
	FLOW DIRECTION
1D	HYDRAULIC CROSS-SECTION

HEC-RAS

	HEC-RAS CONTROL LINE
	LIMITS OF FEMA ZONE "A"
100	HEC-RAS CROSS-SECTION AND STATION NUMBER
	100 YR. WATER SURFACE ELEV.

BASIS OF BEARINGS:

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN FILE 37, PAGE 11 OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK:

CLARK COUNTY VERTICAL CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL RD. IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND RD.

ELEVATION: 2289.23 (FEET)
697.758 (METERS)
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

Avoid cutting underground utility lines. It's costly.
Call before you Dig
1-800-227-2600

SAFETY ALERT
Call Before You Overhead
1-702-593-6111

VICINITY MAP
NOT TO SCALE
PROJECT SITE
RUSSELL, QUENDO, PATRICK, DECATUR, SUNSET, McCARRAN INTERNATIONAL AIRPORT, US 215, WARM SPRINGS, RAINBOW, VALLEY VIEW, INTERSTATE 15, WINDMILL, JONES, WIGWAM, BLUE DIAMOND, LAS VEGAS BLVD SOUTH, PEBBLE, INDUSTRIAL, CACTUS AVE., SILVERADO RANCH BLVD., BERMUDA, STARR, LAKE MEAD DR.

REV.:	DATE:	BY:	DESCRIPTION:

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

DRAINAGE BASIN MAP (EXISTING CONDITION)

CONCEPTUAL DRAINAGE STUDY
SILVERTON HOTEL AND CASINO

SHEET	TITLE	SCALE:
DATE: 1/24/03	DATE: 1/24/03	DATE: 1/24/03	1"=100'
DRAWN BY: WSB	DESIGNED BY: HMN	CHECKED BY: HMN	PROJECT No.: 6904

SEAL

SHEET No.
DR1
SHEET 1 OF 1

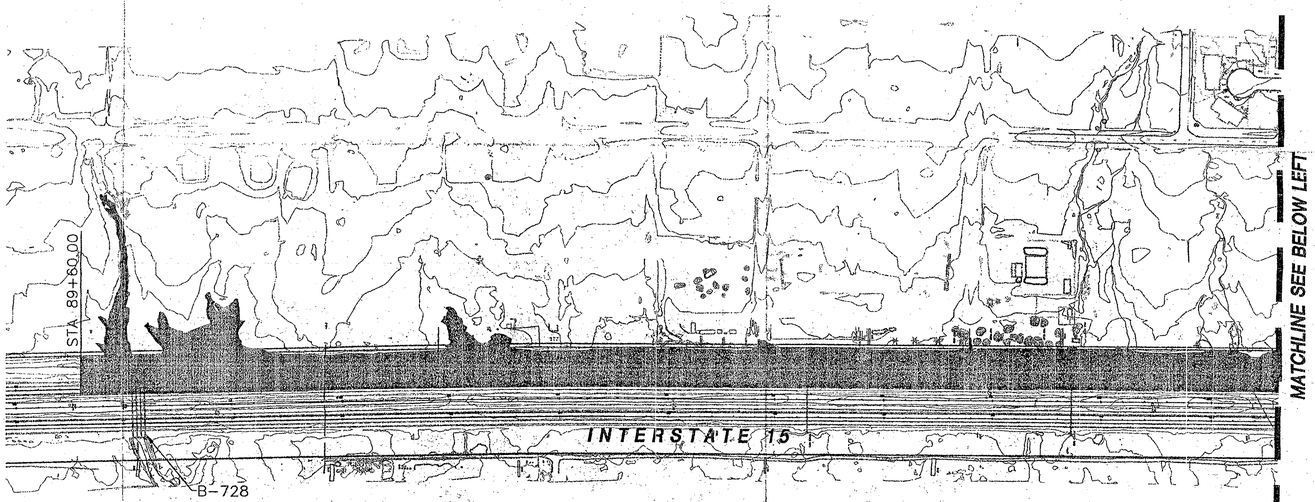
DRAWING No.
Reference

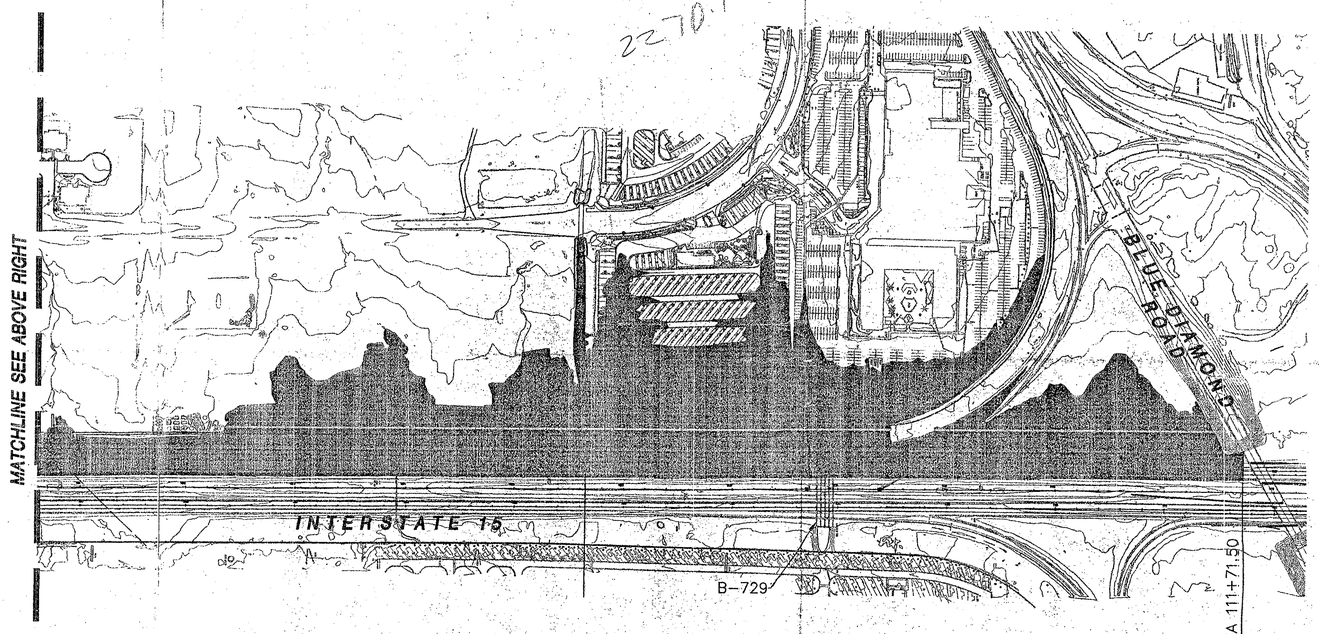
LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.
ROW LINE	SCARP LINE	CONCRETE PVMT.

DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	UTILITY BOX OR VAULT	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
EXISTING:	(2210)								(12.34) BC		Ⓢ	Ⓢ = SANITARY SEWER									
PROPOSED:	2210								12.34 BC		Ⓢ	Ⓓ = STORM DRAIN Ⓔ = ELECTRICAL Ⓣ = TELEPHONE									

J:\CAD\6904\dwg\Drainage\6-6904-101-dr.dwg, 01/29/03 03:56:59 PM, william, 1:100, Lochsa Civil





BLUE DIAMOND INTERCHANGE
WATER SURFACE

METRIC
NDOT

N.T.S.

NOTE:
EXISTING WSEL = 692.09
FUTURE WSEL = 692.10

LEGEND

WATER SURFACE

FIGURE 10A

PBSJ
901 North Green Valley Pkwy.
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200

LEGEND

- EXISTING DETENTION BASIN
- PROPOSED DETENTION BASIN
- EXISTING FLOOD CONTROL FACILITY
- PROPOSED FLOOD CONTROL FACILITY
- STREETS
- ZONE 1
- ZONE 2

A1A - BASIN I.D.

✱ DESIGN/ROW & CONSTRUCTION DATES OBTAINED FROM THE CCRFCD TEN-YEAR CONSTRUCTION PROGRAM, UPDATED JUNE 10, 1999

N

4000 0 4000

Feet

gis0056 e:/projects/miranda/basins.apr

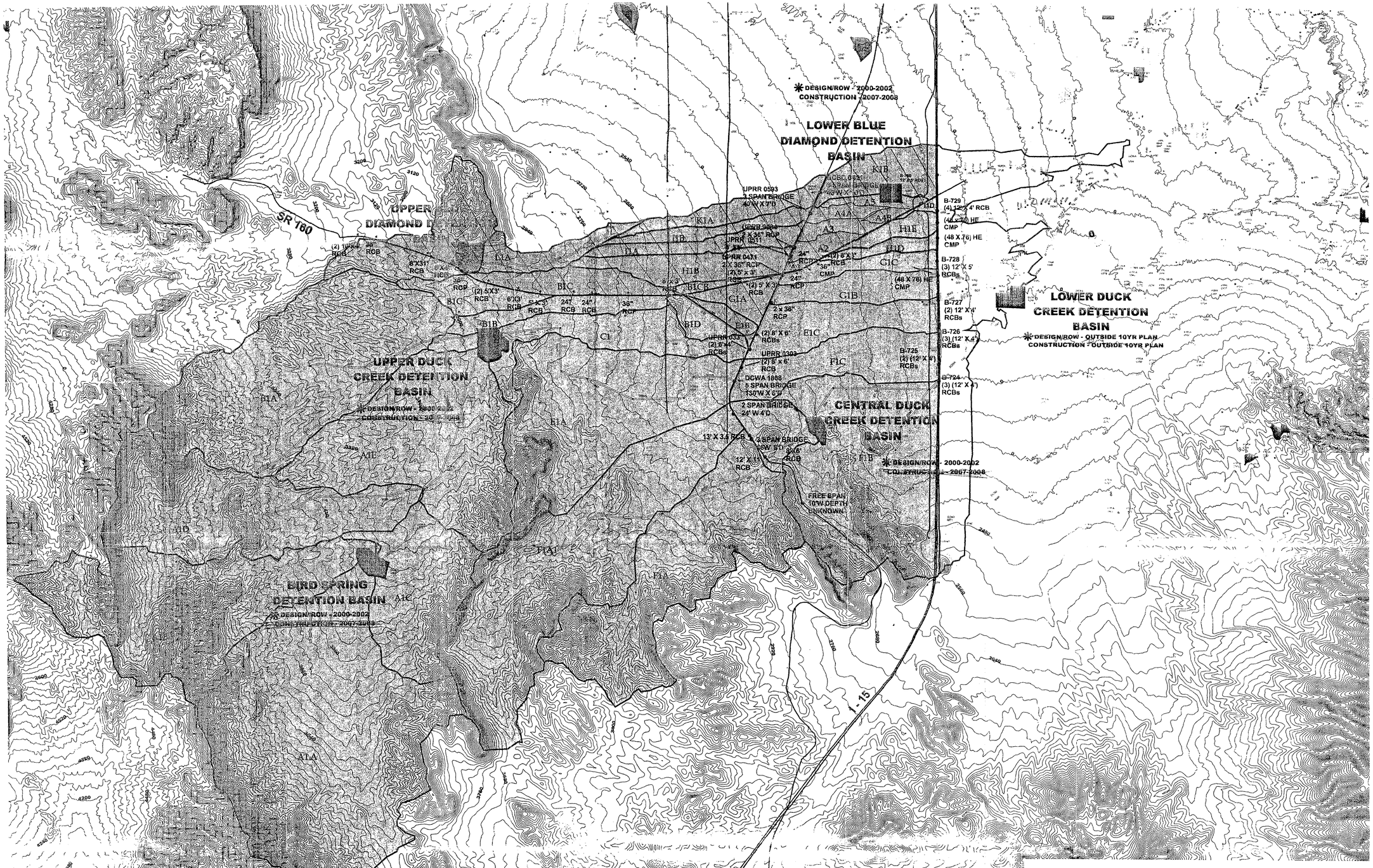


FIGURE 3
TOPOGRAPHICAL ZONES

PBS&J
901 North Green Valley Parkway, Suite 100
Henderson, Nevada 89014-6139
Phone: 702/263-7275
Fax: 702/263-7200
ENGINEERING PLANNING GIS SURVEYING

STORM DRAIN IMPROVEMENT PLANS
FOR
BASS PRO SHOPS
AT SILVERTON HOTEL AND CASINO

CLARK COUNTY FIRE DEPARTMENT

GENERAL NOTES

A. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE 1997 EDITION OF THE UNIFORM FIRE CODE, AND THE 1995 EDITION OF THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET, #24.
B. ON ANY BUILDING CONSTRUCTION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMBUSTIBLE MATERIALS ARE DELIVERED TO THE SITE AND CONSTRUCTION COMMENCES. SAID FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH THE REQUIRED WATER SUPPLY.
C. IF DURING CONSTRUCTION IT BECOMES NECESSARY TO CLOSE ANY CONTROL VALVE OR PLACE A HYDRANT OUT OF SERVICE, THE CLARK COUNTY FIRE DEPARTMENT MUST BE CONTACTED.
D. PAINTING OF CURBS AND/OR STRIPING OF ASPHALT AREAS AND PROTECTION OF HYDRANTS FROM PHYSICAL INJURY PER FIRE HYDRANT INSTALLATION SPECIFICATIONS OF THE FIRE PREVENTION BUREAU.
E. NO FIRE HYDRANT SHALL BE LOCATED WITHIN 25 FEET OF ANY STRUCTURE, OR 5 FEET OF: A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION. FOR WALL, FENCE AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 5 FEET FROM ITS EXTERIOR SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.
F. AT ALL TIMES DURING CONSTRUCTION SUITABLE EMERGENCY VEHICLE ACCESS ROADS MUST BE MAINTAINED. ROADWAYS MUST BE SMOOTH, COMPACTED AND CAPABLE OF SUPPORTING THE IMPOSED LOADS OF ALL EMERGENCY VEHICLES.
G. PRIOR TO ACCEPTANCE OF ANY FIRE SERVICE MAIN A SATISFACTORY HYDROSTATIC TEST WITH PIPING JOINTS UNCOVERED MUST BE CONDUCTED. APPROVED PLANS AND A CONTRACTOR'S, MATERIALS AND TEST CERTIFICATE MUST BE PROVIDED AT TIME OF INSPECTION.
H. BLUE REFLECTIVE MARKERS MUST BE INSTALLED BEFORE FINAL HYDRANT ACCEPTANCE CAN BE ATTAINED (97 UFC SEC. 901.4.3).

C.C.P.W. GENERAL NOTES

EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
CURB AND GUTTER WITH A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT IN AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY CLARK COUNTY PUBLIC WORKS INSPECTOR.
CLARK COUNTY SANITATION DISTRICT SEWER NOTES:
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPES AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS.
ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 311 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS.
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START.
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.
NOTE: ALL SANITARY SEWER TO BE ABANDONED SHALL BE IN ACCORDANCE WITH SECTION 3.14.

LAS VEGAS VALLEY WATER DISTRICT

STANDARD NOTES:

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION, WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO THE LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
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 IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
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. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATERLINE AND SANITARY STORM SEWER LINE CROSS:
A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:
A. POTABLE WATER SUPPLY QUALITY MATERIAL
B. ENCASEMENT WITH FOUR (4) INCH CONCRETE (MINIMUM)
C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE
EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10-FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

PUBLIC WORKS UTILITY NOTES

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610.
2. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS PUBLISHED BY THE U.S. DEPARTMENT OF COMMERCE.
3. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
4. TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST OBTAINING PERMISSION FROM THE DEPARTMENT OF PUBLIC WORKS, TRAFFIC MANAGEMENT DIVISION.
5. ALL WORK AUTHORIZED BY THIS PLAN SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA, NEVADA" AND "CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS," LATEST REVISION.
6. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN FEET (10') OF ANY TRAVEL WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATES ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH PERMITTED IN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICHEVER IS GREATER.
7. A TEMPORARY PATCH IS TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENCH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO THE TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
8. COMPACTION TESTS ARE REQUIRED.
9. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
10. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
PUBLIC WORKS UTILITY NOTES:

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 LOCATION.
ALL DISCREPANCIES MUST BE IMMEDIATELY REPORTED TO THE ENGINEER. CALL BEFORE YOU DIG: 1-800-227-2600.

NOTICE:
THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA. STREET LIGHTING, TRAFFIC SIGNALS, INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG, (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE IMPROVEMENT STANDARDS, DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA, AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS & CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW AT (702) 862-3444 AT LEAST 48-HOURS PRIOR TO CONSTRUCTION ACTIVITY.

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 177-17-204-007

DEVELOPER

MAJESTIC REALTY CO.
4155 WEST RUSSELL ROAD
SUITE "C"
LAS VEGAS, NV 89118
(702) 896-5564

Underground Service Alert
CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

TRAFFIC AND ELECTRICAL NOTES

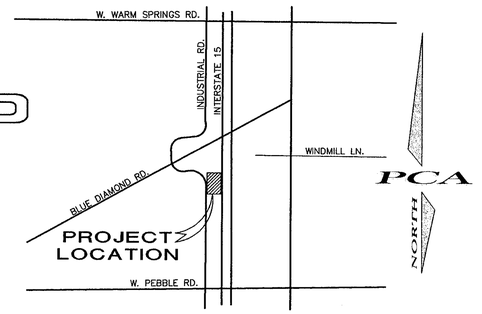
1. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
2. 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 GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. ALL CONSTRUCTION SIGNING, BARRICADING, AND PAVEMENT MARKINGS SHALL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK - 1986 AND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
4. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PERMANENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS.
ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.
6. IF PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN SHOWN HEREON TO BE MOUNTED ON A SIGN POST, THEN CHANGE SIGN MOUNTING TO ONE ON THE STREET LIGHT STANDARD.
7. PRIOR TO CONSTRUCTION, THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE CURRENT PLANNING DIVISION OF THE DEPARTMENT OF COMPREHENSIVE PLANNING.
8. ALL TRAFFIC SIGNAL POLE ASSEMBLIES, STEEL PEDESTALS FOR CABINETS, AND STREET LIGHT POLES SHALL BE GALVANIZED PER ASTM A 123.
9. ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION OF EACH.
10. THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA: STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LVACTS) INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT), AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
11. LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE, WHILE PERMANENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO LVACTS. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS, CITY OF LAS VEGAS.
12. ALL NEW OR REPLACEMENT TRAFFIC SIGNAL LOOPS SHALL BE INSTALLED USING CABLE-IN-DUCT WIRING, SHALL HAVE INDEPENDENT LEAD-IN WIRES FOR EACH LOOP FROM THE CONTROLLER TO THE PULL BOX, AND EACH LEAD-IN SHALL BE INDIVIDUALLY TAGGED.
13. TRAFFIC SIGNAL PEDESTRIAN HEADS SHALL BE THE L.E.D. TYPE.
14. ELECTRICAL POWER SERVICE POINT LOCATION(S) FOR STREET LIGHTING AND TRAFFIC SIGNALS MUST BE INDICATED ON THE PLANS IF CONNECTING TO AN EXISTING CIRCUIT. INDICATE LOCATION OF EXISTING SERVICE POINT FOR EACH CIRCUIT.
15. WHEN STREET LIGHTS ARE CONNECTED TO AN EXISTING CIRCUIT, THE ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD.
16. CLARK COUNTY RESERVES THE RIGHT TO REJECT STREET LIGHT AND TRAFFIC SIGNAL POLES AND ASSEMBLIES WHICH HAVE A "STRIPED" APPEARANCE.
17. PRIOR TO BEGINNING OF CONSTRUCTION, MODIFICATION, OR RELOCATION OF ANY TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OF THE DATE THAT WORK WILL BEGIN.
18. THREE (3) NORMAL WORKING DAYS PRIOR TO TURN-ON OR COMPLETION OF MODIFICATION(S) TO A TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION THAT WORK IS BEING COMPLETED AND THE PROPOSED DATE OF COMPLETION.

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- PROPOSED FIRE HYDRANT
- PROPOSED MH
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
L	LENGTH
MH	MANHOLE
MAX	MAXIMUM
NDOT	NEVADA DEPT OF TRANSPORTATION
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	PLAN AND PROFILE - LINE A
3	PLAN AND PROFILE - LINE A & LINE B
4	PLAN AND PROFILE - LINE B & LATERALS A-1 - A-3
5	PLAN AND PROFILE - LATERALS A-4, A-5, B-1 & DETAILS
6	DETAILS
7	SECTIONS AND DETAILS
8	SECTIONS AND DETAILS
9	GENERAL NOTES

CONSTRUCTION NOTES AND QUANTITIES

No.	ITEM	UNIT	TOTAL
	~ STORM DRAIN IMPROVEMENT ~		
31	NOT USED		
32	INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)	LF	214
33	INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)	LF	412
34	NOT USED		
35	NOT USED		
36	CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.	LF	812
37	CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.	LF	1,779
38	NOT USED		
39	CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.	LF	185
40	CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413	EA	6
41	CONST. MANHOLE PER DETAILS - SHEET 7	EA	3
42	CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6	EA	5
43	CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)	EA	2
44	INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)	SF	1,350
45	NOT USED		
46	CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)	EA	4
47	CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8	EA	1
48	CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5	EA	1

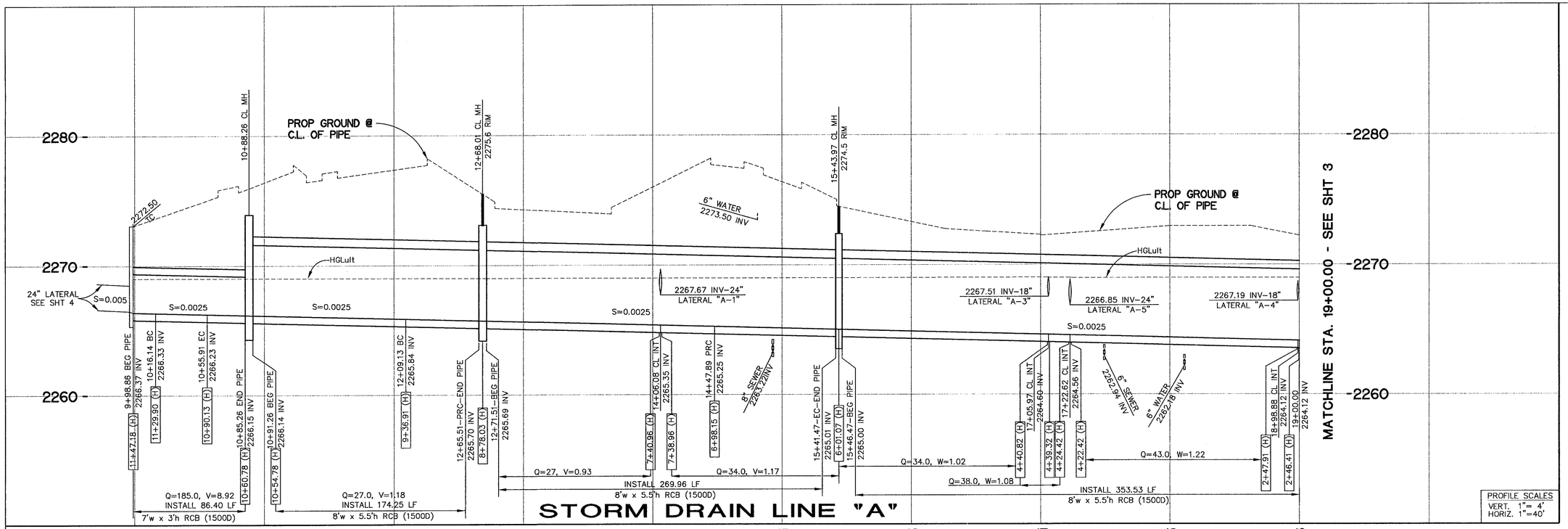
RECD
[illegible]

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEVADA
No. 12951
EXP. 12-31-04
10-6-03

PARDUE, CORNWELL & ASSOCIATES, INC.
Engineering • Surveying • Planning
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432-FAX

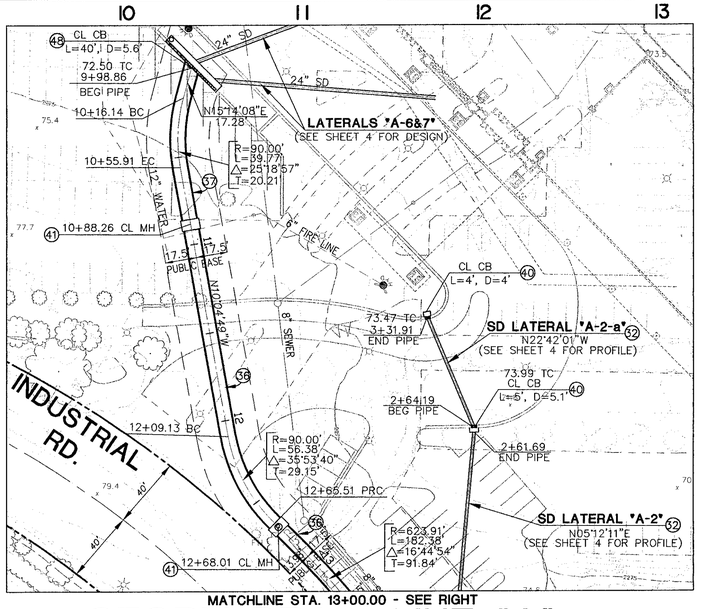
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
TITLE SHEET

JOB #
SHEET NO.:
SD-1
1 OF 9 SHEETS
HTE #



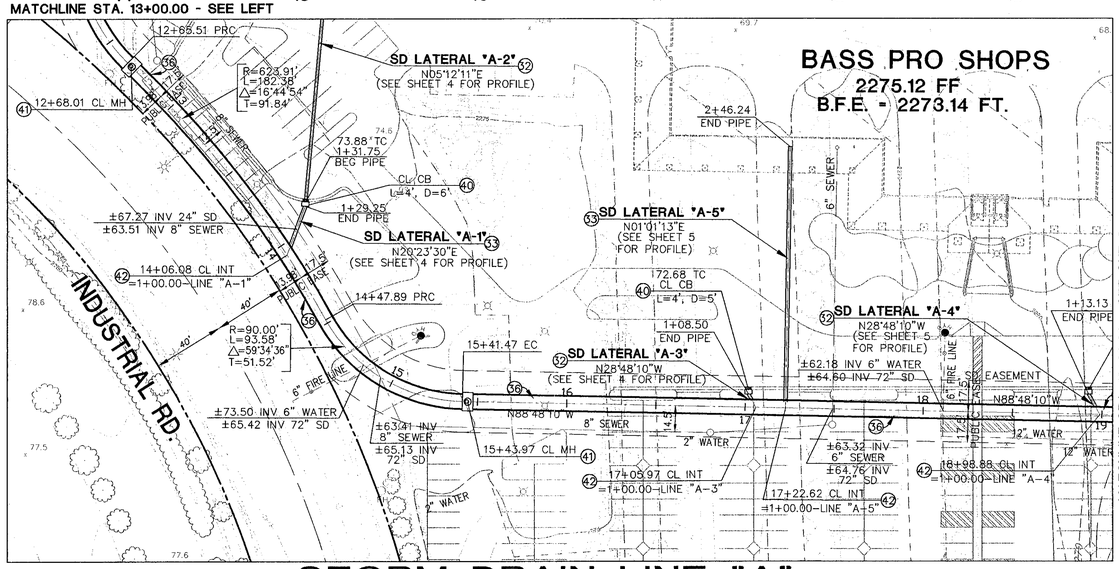
STORM DRAIN LINE "A"

PROFILE SCALES
VERT. 1"= 4'
HORIZ. 1"=40'



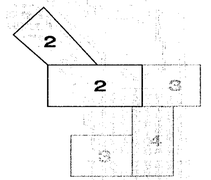
MATCHLINE STA. 13+00.00 - SEE RIGHT

STORM DRAIN LINE "A"



STORM DRAIN LINE "A"

0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS



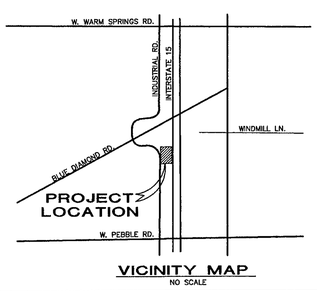
KEY MAP

NO SCALE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32003C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

(51) NOT USED
(52) INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(53) INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(54) NOT USED
(55) NOT USED
(56) CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
(57) CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
(58) NOT USED
(59) CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
(60) CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
(41) CONST. MANHOLE PER DETAILS – SHEET 7
(42) CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
(43) CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
(44) INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
(45) NOT USED
(46) CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
(47) CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
(48) CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5



VICINITY MAP
NO SCALE

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH ○ EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PCA

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

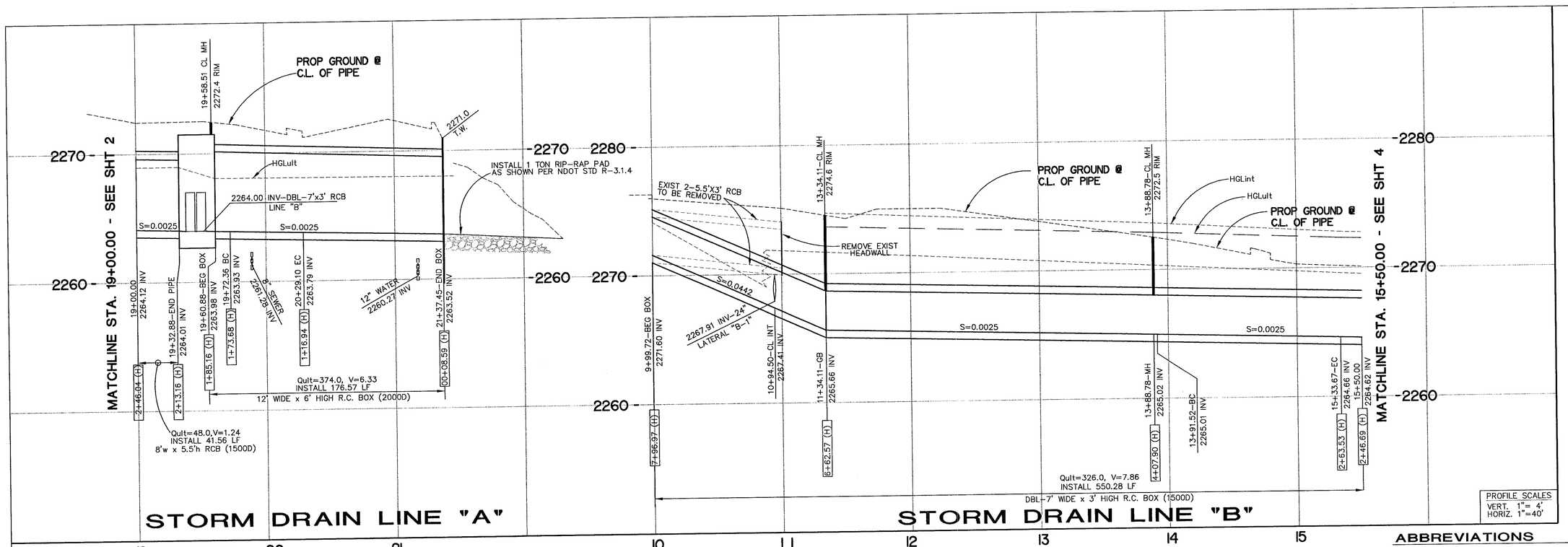
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

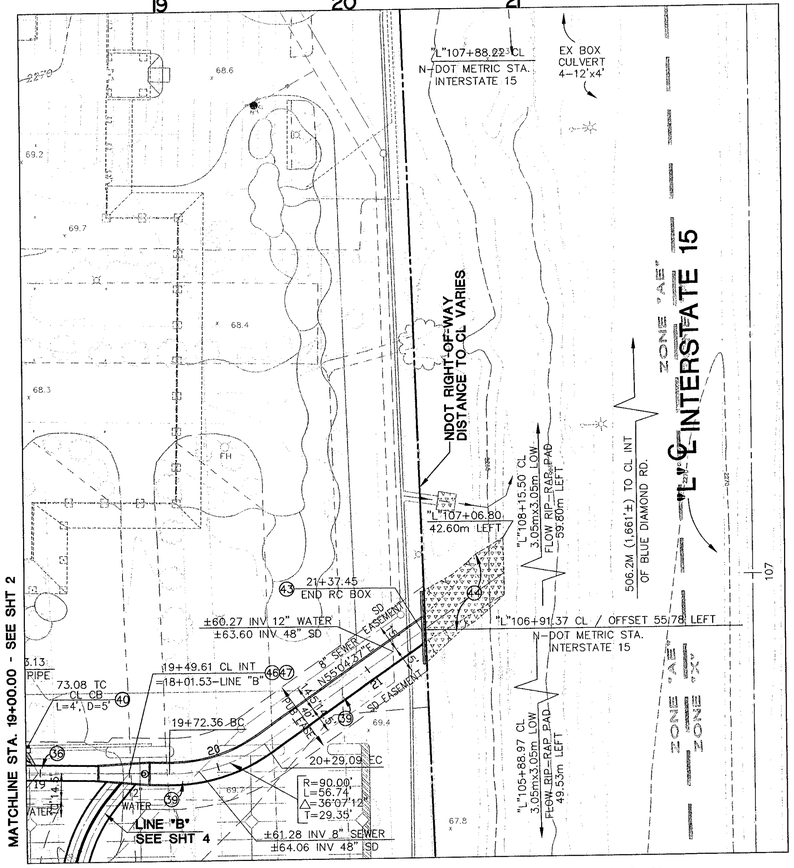
NEVADA PROFESSIONAL ENGINEER - STATE OF NEVADA
PRISCILLA CORNWELL No. 12837 EXP. 12-31-04
10-9-03

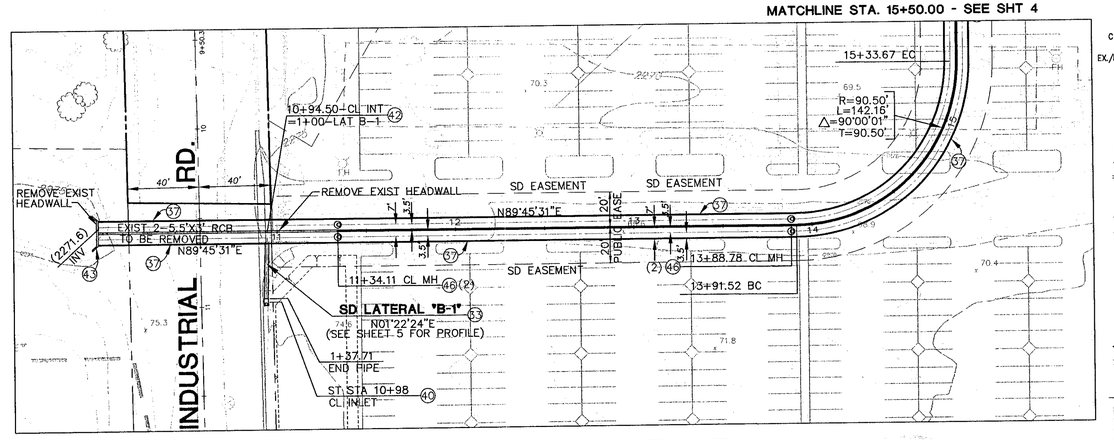
REV.	DATE	DESCRIPTION	DATE	APPROVAL

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINE "A"

JOB #
SHEET NO.:
SD-2
2 OF 9 SHEETS
HTE #



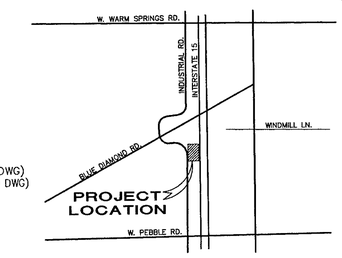




THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

51 — NOT USED
52 — INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
53 — INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
54 — NOT USED
55 — NOT USED
56 — CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
57 — CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
58 — NOT USED
59 — CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
40 — CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
41 — CONST. MANHOLE PER DETAILS – SHEET 7
42 — CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL–SHEET 6
43 — CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
44 — INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
45 — NOT USED
46 — CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
47 — CONST. JUNCTION STRUCTURE PER DETAIL–SHT 8
48 — CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL–SHT 5



VICINITY MAP
NO SCALE

0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

330.00 FS — FUTURE BUILDING
67 — PROPOSED ELEVATION
PROPOSED CONTOUR
PROPOSED CURB & GUTTER
PROPOSED CURB ONLY
PROPOSED STORM DRAIN AND CATCH BASIN
EXISTING FIRE HYDRANT
EXISTING STREET LIGHT
MH — EXISTING MH
EXISTING FENCE
BOUNDARY
EX. CURB & GUTTER

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

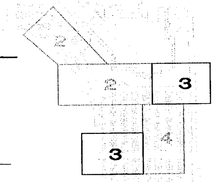
CLARK COUNTY CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007



KEY MAP
NO SCALE

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

NORTH

PCA

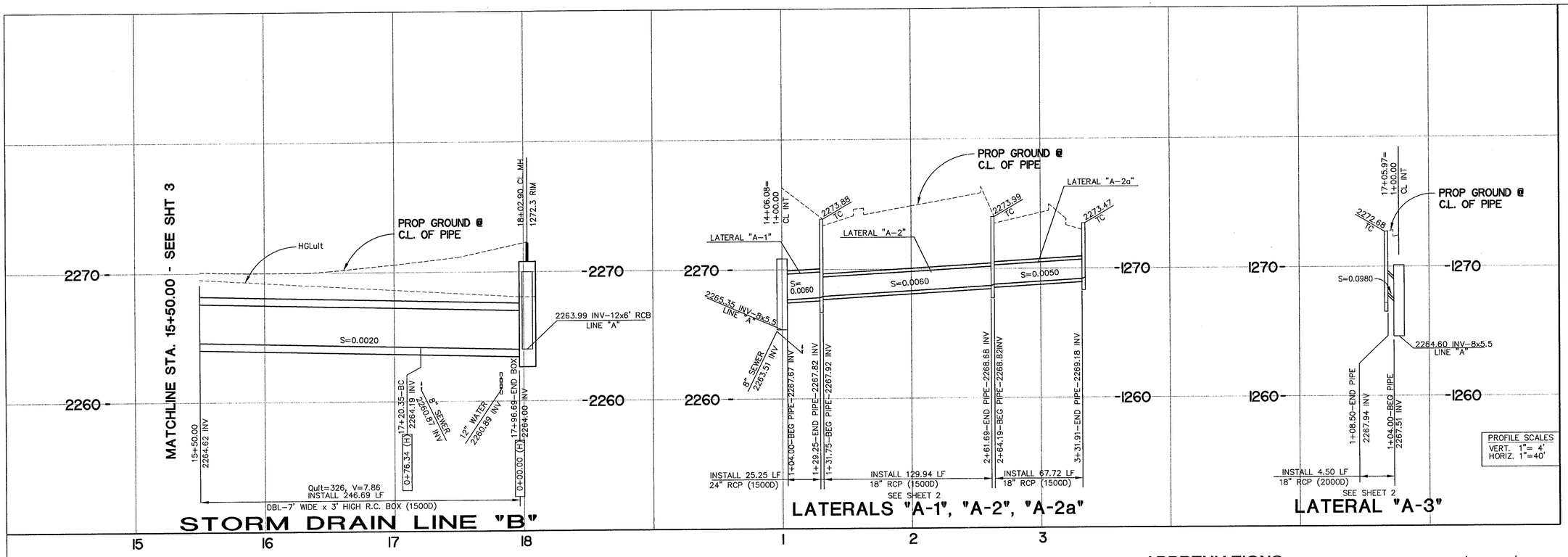
STATE OF NEVADA — REGISTERED ENGINEER — No. 12050 — CIVIL — EXPIRES 12-31-04 — 10-9-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

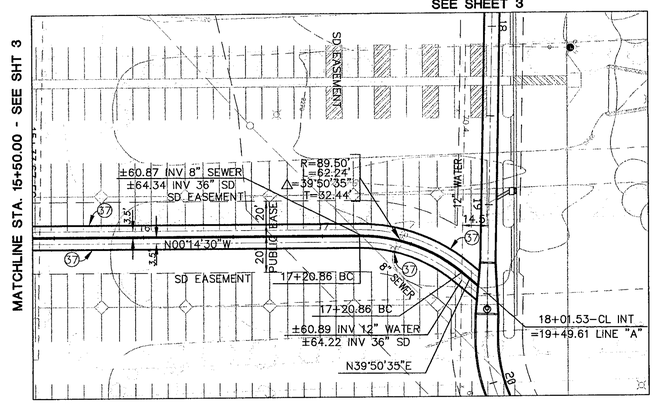
PARDUE, CORNWELL & ASSOCIATES, INC.
Engineering . Surveying
Planning . Engineering . LVG, M.S.
151 KALMUS AVE. SUITE 2
COSTA MESA, CALIF. 92626
(949) 241-3400-241-3432 FAX
(714) 241-3400-241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINES "A" + "B"

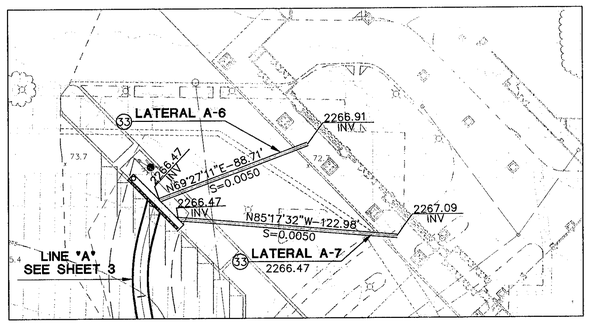
JOB #
SHEET NO.:
SD-3
3 OF 9 SHEETS
HTE #



0+00.00 (H) STATIONING PER WSPG HYDRAULIC CALCULATIONS



STORM DRAIN LINE "B"



STORM DRAIN LATERALS 6 & 7

FOR ROOF DRAIN CONNECTIONS

NORTH

CONSTRUCTION NOTES

(51) NOT USED
(52) INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(53) INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(54) NOT USED
(55) NOT USED
(56) CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
(57) CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
(58) NOT USED
(59) CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
(40) CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
(41) CONST. MANHOLE PER DETAILS - SHEET 7
(42) CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
(43) CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
(44) INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
(45) NOT USED
(46) CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
(47) CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
(48) CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

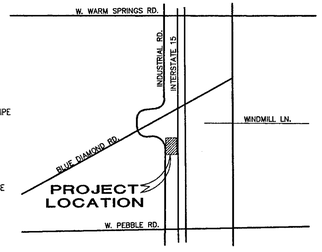
THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2568E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

ABBREVIATIONS

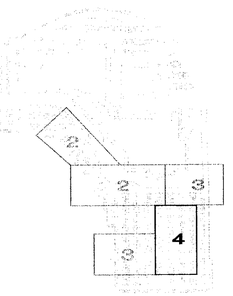
BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M. SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432-FAX

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA No. 12937 CIVIL
DR. 12-31-04
12-9-03

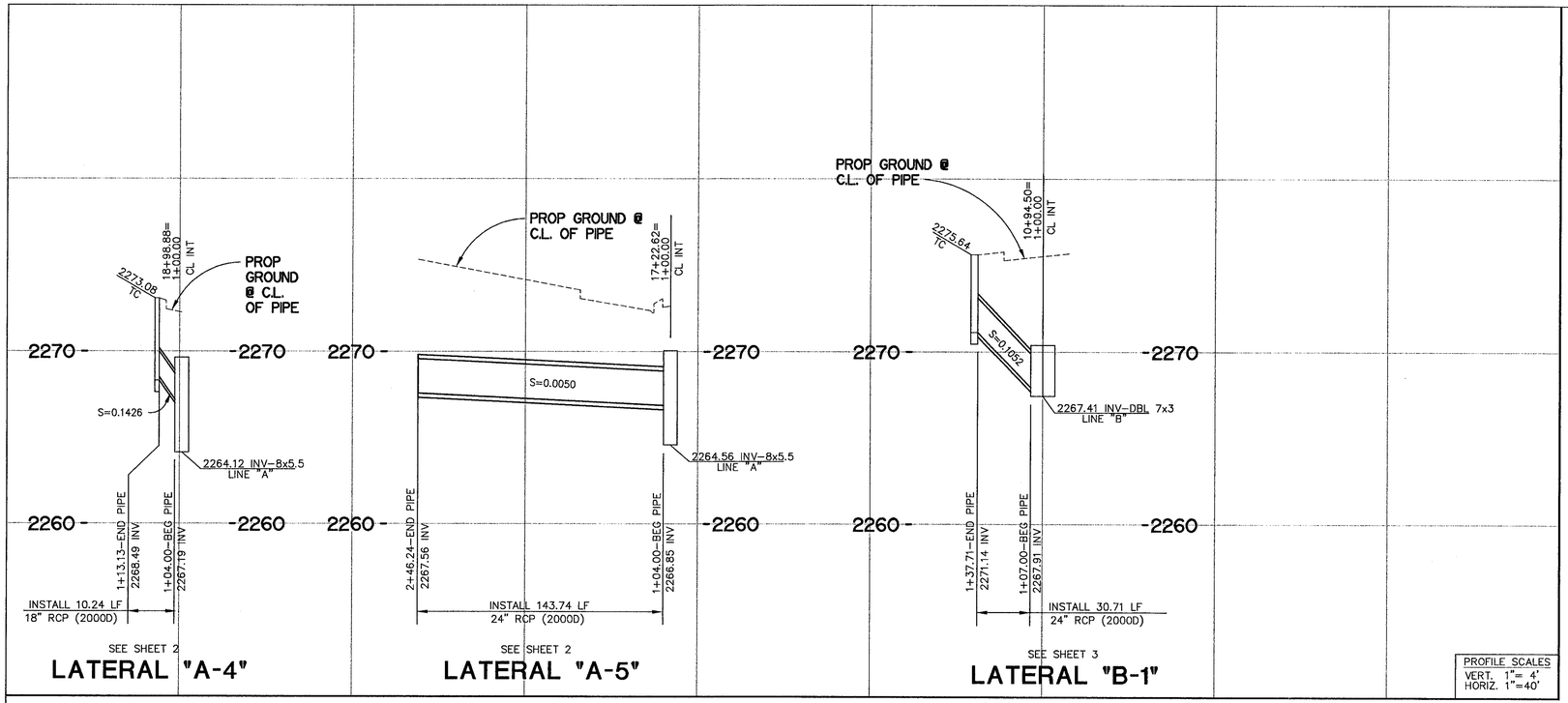
REV.	DATE	DESCRIPTION	DATE	APPROVAL

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LINE "B" + LATERALS "A-1"-"A-3"

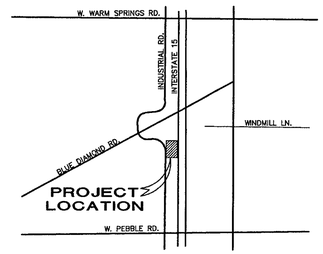
JOB #

SHEET NO.:
SD-4
4 OF 9 SHEETS

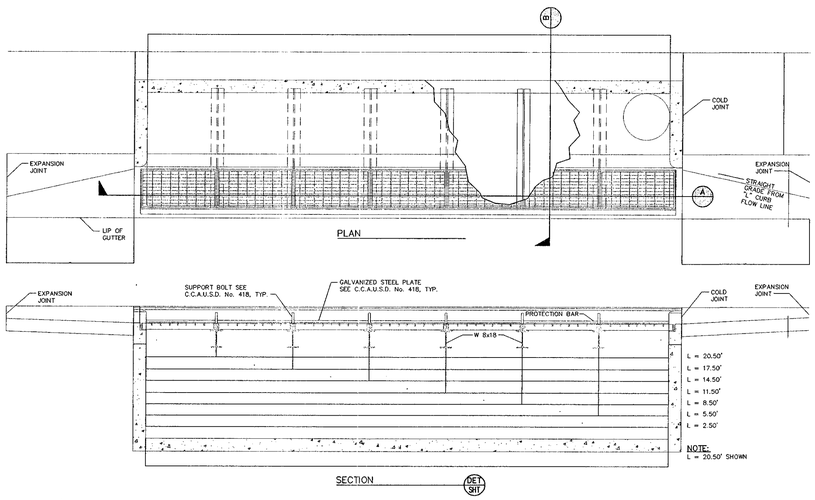
HTE #

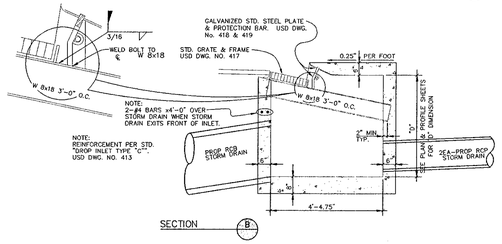


PROFILE SCALES
VERT. 1"= 4'
HORIZ. 1"=40'



VICINITY MAP
NO SCALE





DROP INLET SIZING CHART

DROP INLET No.	DEPTH (feet)	LENGTH (feet)	No. OF GRATES
1	5.5	14.50'	5
2	4.5	8.50'	3
3	4.5	14.50'	5
4	5.0	20.50'	7

48 **MODIFIED TYPE "C" DROP INLET**

NOT TO SCALE

ABBREVIATIONS

BEG	BEGIN
BC	BEGINNING OF CURVE
BW	BOTTOM OF WALL
CB	CATCH BASIN
CL	CENTERLINE
CO	CLEANOUT
CF	CURB FACE
C & G	CURB & GUTTER
EC	END OF CURVE
EX./EXIST	EXISTING
FF	FINISH FLOOR ELEVATION
FG	FINISHED GRADE
FS	FINISHED SURFACE
FL	FLOWLINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
JS	JUNCTION STRUCTURE
L	LENGTH
MH	MANHOLE
MAX	MAXIMUM
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT OF WAY
SD	STORM DRAIN
T	TANGENT
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCP	VITRIFIED CLAY PIPE
W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CONSTRUCTION NOTES

51 NOT USED
52 INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
53 INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
54 NOT USED
55 NOT USED
56 CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
57 CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
58 NOT USED
59 CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
60 CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
61 CONST. MANHOLE PER DETAILS - SHEET 7
62 CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL-SHEET 6
63 CONST. CONCRETE HEADWALL PER NDOT STD. B-20.1.5 (SEE SHT 6 FOR STD DWG)
64 INSTALL 1 TON RIP-RAP PAD AS SHOWN PER NDOT STD R-3.1.4 (SEE SHT 6 FOR STD DWG)
65 NOT USED
66 CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT-DOWN TYPE)
67 CONST. JUNCTION STRUCTURE PER DETAIL-SHT 8
68 CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL-SHT 5

*** PIPE ALTERNATE**

HANCOR HI-Q CORRUGATED EXTERIOR, SMOOTH INTERIOR PLASTIC PIPE OR APP'D EQ.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PROFESSIONAL ENGINEER - STATE OF NEVADA - JOHN P. CORNWELL - No. 12937 - CIVIL - EXP. 12-31-04 - 10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

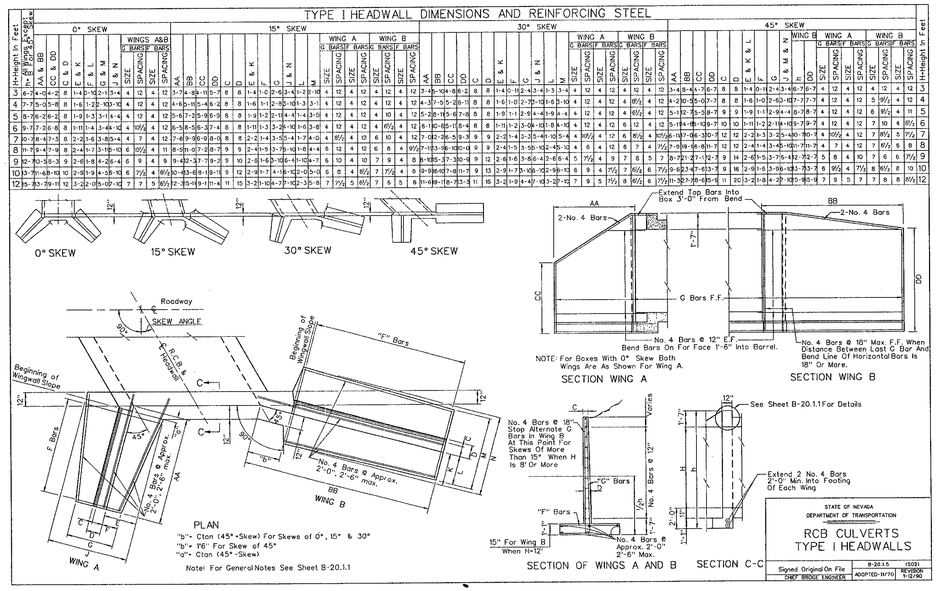
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE, SUITE E-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
LATERALS "A-4", "A-5", "B-1" AND DETAILS

JOB #

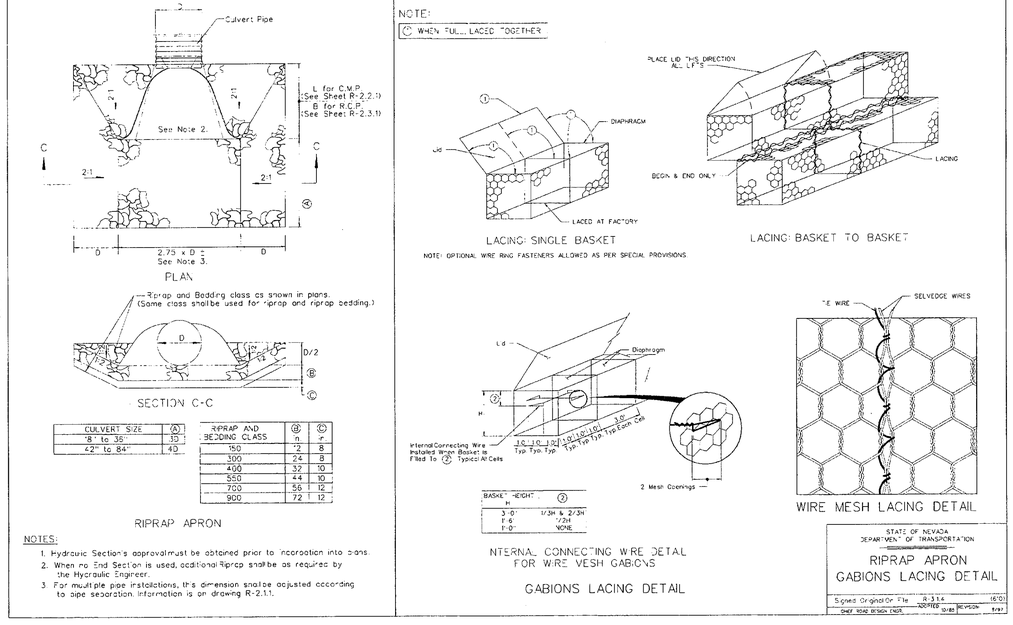
SHEET NO.:
SD-5
5 OF 9 SHEETS

HTE #



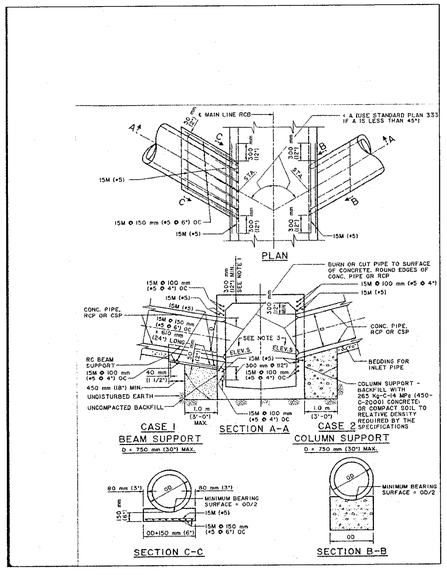
43 NDOT HEADWALL STANDARD DETAIL

NOT TO SCALE



44 NDOT RIP-RAP STANDARD DETAIL

NOT TO SCALE



42 PIPE TO BOX JUNCTION STRUCTURE DETAIL

NOT TO SCALE

CONSTRUCTION NOTES

(51) NOT USED
(52) INSTALL 18" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(53) INSTALL 24" RCP STORM DRAIN (SEE PROFILE FOR D-LOAD)
(54) NOT USED
(55) NOT USED
(56) CONST. 8' WIDE x 5.5' HIGH PRECAST R.C.B.
(57) CONST. 7' WIDE x 3' HIGH PRECAST R.C.B.
(58) NOT USED
(59) CONST. 12' WIDE x 6' HIGH PRECAST R.C.B.
(40) CONST. DROP INLET TYPE "C" PER CLARK COUNTY STD. DWG. NO. 413
(41) CONST. MANHOLE PER DETAILS – SHEET 7
(42) CONST PIPE TO BOX JUNCTION STRUCTURE PER DETAIL–SHEET 6
(43) CONST. CONCRETE HEADWALL PER NDOT STD. B–20.1.5 (SEE SHT 6 FOR STD DWG)
(44) INSTALL 1 TON RIP–RAP PAD AS SHOWN PER NDOT STD R–3.1.4 (SEE SHT 6 FOR STD DWG)
(45) NOT USED
(46) CONST. GRADE RINGS, FRAME AND COVER IN TOP OF RC BOX PER CLARK COUNTY STD. DWG NO. 409 (BOLT–DOWN TYPE)
(47) CONST. JUNCTION STRUCTURE PER DETAIL–SHT 8
(48) CONST. MODIFIED TYPE "C" DROP INLET PER DETAIL–SHT 5

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2556E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

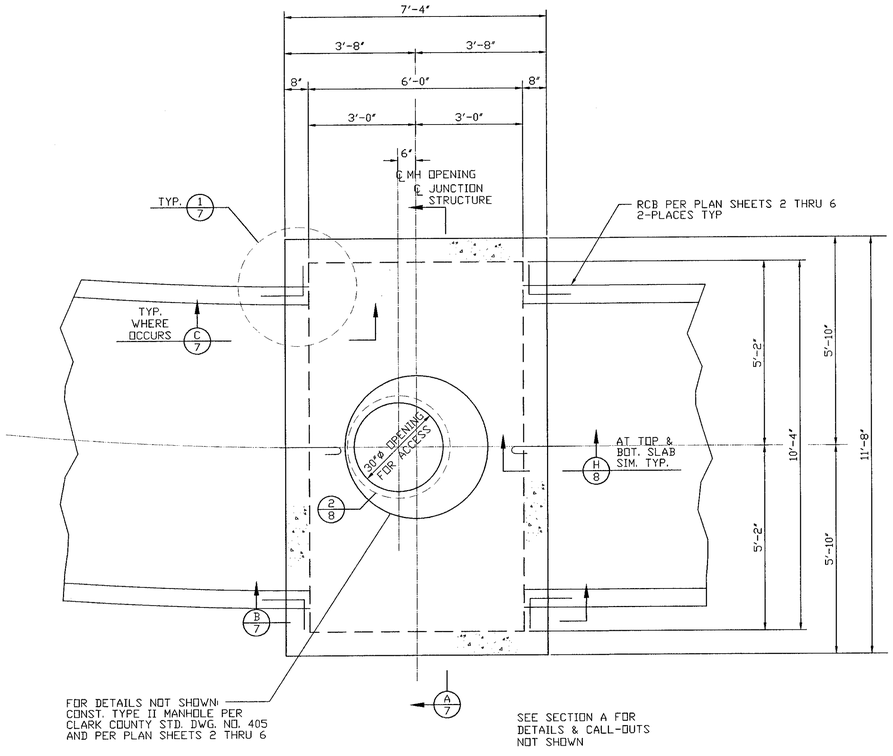
PROFESSIONAL ENGINEER - STATE OF NEVADA
FRED W. COMWELL
No. 12857
CIVIL
DEP. 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

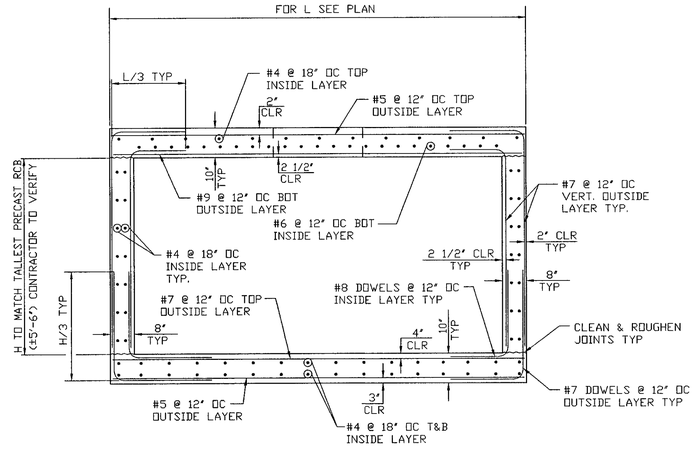
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
DETAILS

JOB #
SHEET NO.:
SD-6
6 OF 9 SHEETS
HTE #



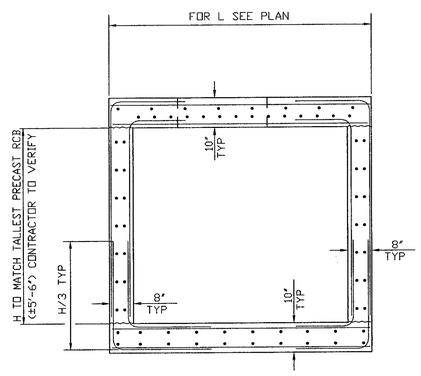
41 JUNCTION STRUCTURE PLAN

1/2"=1'-0"



A/7 SECTION

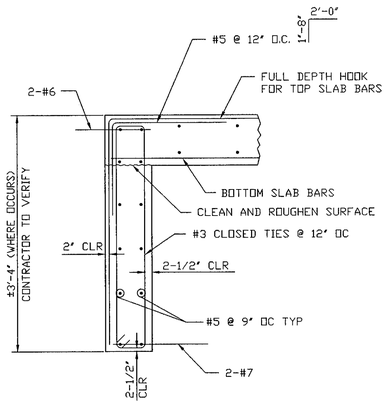
NTS



SEE SECTION A FOR DETAILS & CALL-OUTS NOT SHOWN

B/7 SECTION

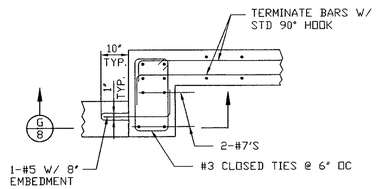
NTS



SEE SECTION A FOR DETAILS & CALL-OUTS NOT SHOWN

C/7 SECTION

NTS



PLAN

SEE SECTION A FOR DETAILS & CALL-OUTS NOT SHOWN

1/7 DETAIL

NTS

STRUCTURAL NOTES:

1. JUNCTION STRUCTURES REQUIRE SPECIAL INSPECTION FOR BOTH CONCRETE AND REINFORCEMENT PLACEMENT PER CITY REQUIREMENTS.
2. EPOXY GROUT TO MEET THE FOLLOWING SPECIFICATIONS:
   A. TENSILE STRENGTH (ASTM C-307) = 2,000-2,500 psi
   B. COMPRESSIVE STRENGTH (ASTM C-579) = 15,000 psi
   C. FLEXURAL STRENGTH (ASTM C-580) = 3,800-4,100 psi

   NOTE: "EPOXY SYSTEMS" PRODUCT NO. 224 MEETS THE ABOVE SPECIFICATION OR APPROVED EQUAL:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO # 4945

   CONTRACTOR SHALL COMPLY WITH ALL SPECIFICATIONS FOR INSTALLATION OF EPOXY GROUT MATERIAL PROVIDED BY THE MANUFACTURER.

   EPOXY INSTALLATION REQUIRES SPECIAL INSPECTION PER CITY REQUIREMENTS. SEE SECTIONS FOR DOWEL DRILL HOLE DIMENSIONS.
3. CONCRETE SHALL BE "MINIMUM COMPRESSIVE STRENGTH f'c" = 4500 psi AT 28 DAYS ASTM C150 TYPE II PORTLAND CEMENT. REINFORCING SHALL BE DEFORMED BARS ASTM A615, GRADE 60 OR ASTM A706 MIN YIELD STRESS 60,000 psi.
4. CONTRACTOR SHALL REFER TO SITE SOILS REPORT FOR ALL PERTINENT SOILS RELATED DATA REQUIRED FOR CONSTRUCTION OF STORM DRAIN STRUCTURES.

PROFESSIONAL ENGINEER STATE OF NEVADA — CIVIL — No. 12953 — EXP. 12-31-04

10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432-FAX

SILVERTON EXPANSION PHASE 1

BASS PRO SHOPS

STORM DRAIN IMPROVEMENT PLAN
SECTIONS AND DETAILS

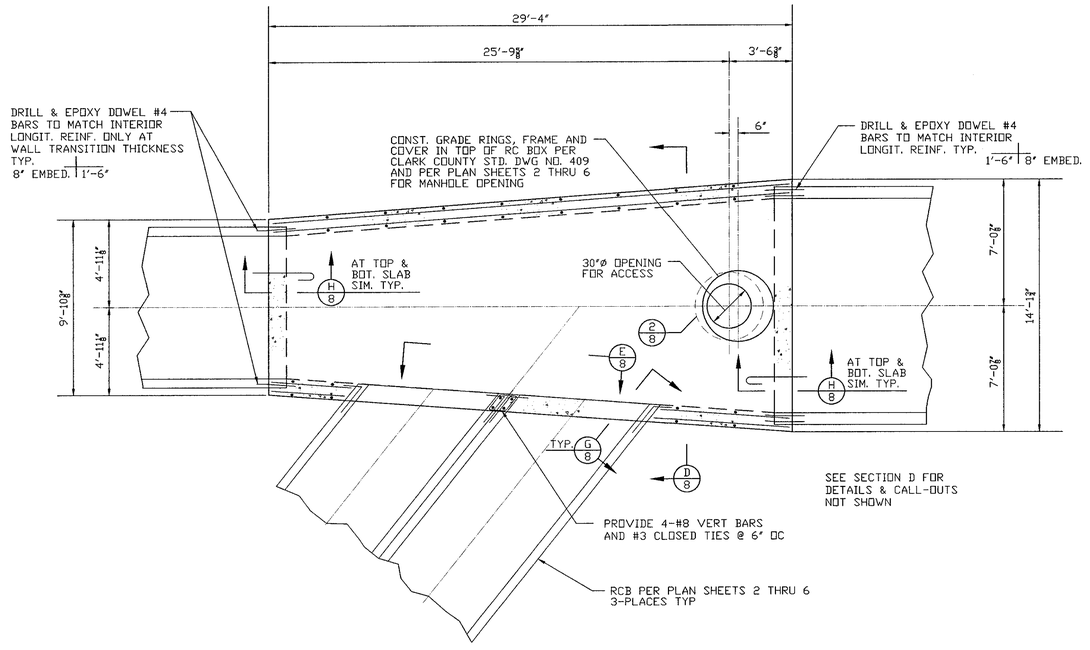
JOB #

SHEET NO.:

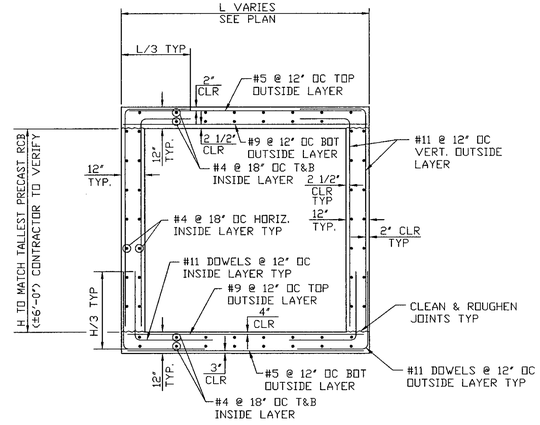
SD-7

7 OF 9 SHEETS

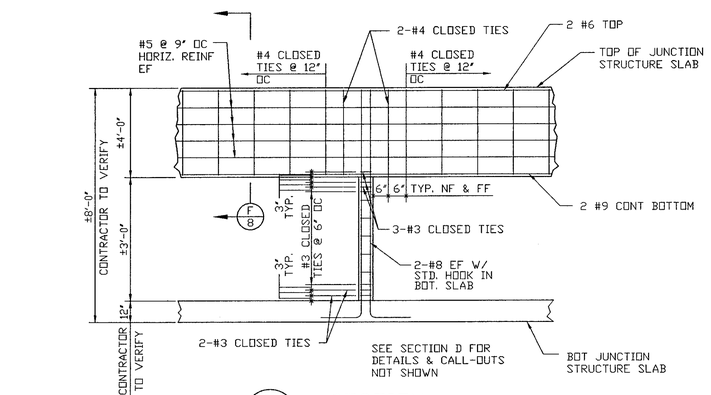
HTE #



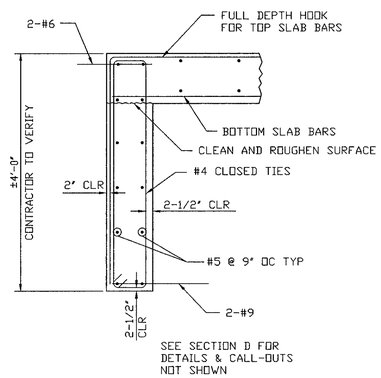
47 JUNCTION STRUCTURE PLAN
1/4"=1'-0"



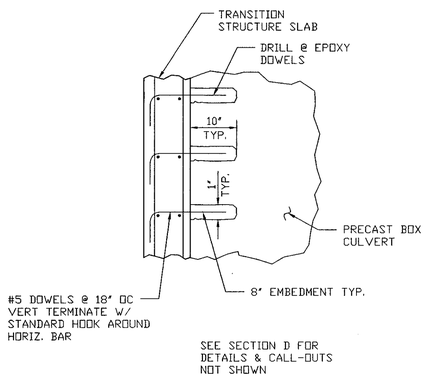
D/8 SECTION
NTS



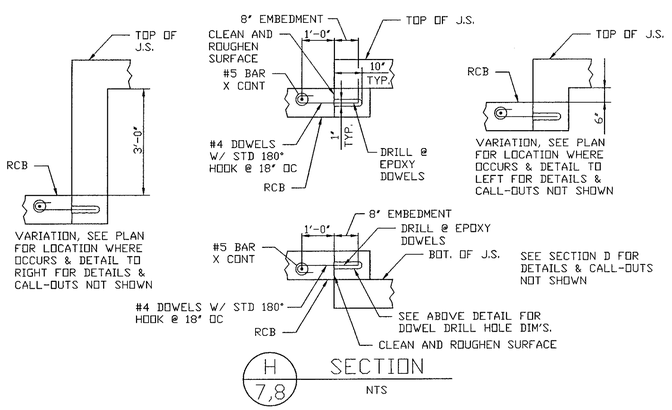
E/8 SECTION
NTS



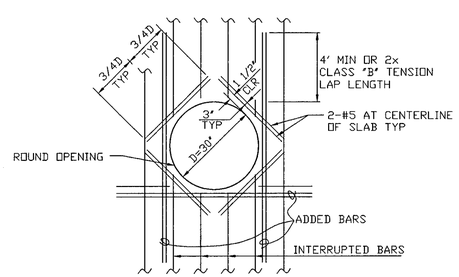
F/8 SECTION
NTS



G/8 SECTION
NTS



H/7,8 SECTION
NTS



REINF AROUND STRUCTURAL SLAB OPENING

2/7,8 DETAIL
NTS

SLAB OPENING NOTES:

1. ALL TOP AND BOT. SLAB BARS INTERRUPTED BY THE OPENING SHALL BE COMPENSATED FOR WITH ADDITIONAL REINF. EQUAL TO THAT INTERRUPTED. PLACE THE ADDITIONAL REINF. EQUALLY ON EACH SIDE OF OPENING, EXTENDED SAME LENGTH AS REQ'D. FOR THE UNINTERRUPTED REINF.
2. WHERE THE NUMBER OF BARS INTERRUPTED IS UNEVEN, THE NUMBER OF BARS ADDED SHALL BE THE NEXT HIGHEST EVEN NUMBER.

SEE SECTION D FOR DETAILS & CALL-OUTS NOT SHOWN

STRUCTURAL NOTES:

1. JUNCTION STRUCTURES REQUIRE SPECIAL INSPECTION FOR BOTH CONCRETE AND REINFORCEMENT PLACEMENT PER CITY REQUIREMENTS.
2. EPOXY GROUT TO MEET THE FOLLOWING SPECIFICATIONS:
   A. TENSILE STRENGTH (ASTM C-307) = 2,000-2,500 psi
   B. COMPRESSIVE STRENGTH (ASTM C-579) = 15,000 psi
   C. FLEXURAL STRENGTH (ASTM C-580) = 3,800-4,100 psi

   NOTE: "EPOXY SYSTEMS" PRODUCT NO. 224 MEETS THE ABOVE SPECIFICATION OR APPROVED EQUAL:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO # 4945

   CONTRACTOR SHALL COMPLY WITH ALL SPECIFICATIONS FOR INSTALLATION OF EPOXY GROUT MATERIAL PROVIDED BY THE MANUFACTURER.

   EPOXY INSTALLATION REQUIRES SPECIAL INSPECTION PER CITY REQUIREMENTS. SEE SECTIONS FOR DOWEL DRILL HOLE DIMENSIONS.
3. CONCRETE SHALL BE "MINIMUM COMPRESSIVE STRENGTH f'c" = 4500 psi AT 28 DAYS ASTM C150 TYPE II PORTLAND CEMENT. REINFORCING SHALL BE DEFORMED BARS ASTM A615, GRADE 60 OR ASTM A706 MIN YIELD STRESS 60,000 psi.
4. CONTRACTOR SHALL REFER TO SITE SOILS REPORT FOR ALL PERTINENT SOILS RELATED DATA REQUIRED FOR CONSTRUCTION OF STORM DRAIN STRUCTURES.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA FRED W. CORNWELL No. 12857 CIVIL EXP: 12-31-04

12-9-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
SECTIONS AND DETAILS

JOB #
SHEET NO.: SD-8
8 OF 9 SHEETS
HTE #

GENERAL

1. The Contractor shall verify all dimensions prior to starting construction.
2. Structure noted in the drawings as existing shall be field verified by the contractor and any discrepancies noted shall be reported to the Architect/ Structural Engineer.
3. Do not scale the drawings.
4. Notes and details on the drawings shall take precedence over these general notes, typical details, and the project specifications.
5. Typical details and schedules indicated may not be specifically referenced on the drawings. The contractor is responsible to determine where each typical detail or schedule applies. If locations are found where no typical detail, typical schedule, or specific detail applies, notify the Architect/Structural Engineer.
6. All work shall conform to the minimum standards of following codes:

   The 2000 edition of the International Building Code and other regulating agencies which have authority over any portion of the work, and those codes and standard listed in these notes and in the project specifications.
7. The contract Structural drawings and specifications represent the finished structure. They do not indicate the method of construction. Contractor to provide construction means, methods, techniques, sequences and procedures as required. Contractor to provide adequate excavation procedures, shoring, bracing and erection procedures complying with national, state and local safety ordinances. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to: bracing and shoring for loads due to hydrostatic, earth, wind or seismic forces, construction equipment, etc.
8. Observation visits (site visits) by representatives of Architect/Structural Engineer do not include inspection of construction means and methods. Site visits during construction are not continuous and detailed inspection services which are to be performed by others. Observations are performed soley for the purpose of determining if the Contractor understands design intent shown in the contract drawings. Observations do not guarantee Contractor's performance and are not to be construed as supervision or verification of construction.
9. All specifications and codes noted shall be the latest approved editions and revisions by the governmental agency having jurisdiction over this project.
10. Contractor shall investigate the site during clearing and earth work operations for filled excavations or buried structures such as cesspools, cisterns, foundations, utilities, etc. If any such structures are found, the Structural Engineer shall be notified immediately.
11. Shop drawings submitted to the Structural Engineer for review shall consist of (1) blueline set and (1) sepia set. No modifications or substitution of drawings and specifications will be accepted via shop drawing review.
    - Contractor shall review and stamp shop drawings prior to submission to the Architect/Structural Engineer. Contractor shall review for completeness and compliance with contract documents.
    - Submit shop drawings to the Architect/Structural Engineer as indicated or specified for review prior to fabrication. Review will be for general conformance with design intent conveyed in contract documents.
    - When an engineer is required to sign and stamp shop drawings and calculations, ensure seal indicates engineer as registered in state where project site occurs.
    - Shop drawings are not a part of contract documents. Therefore, Architect's/Structural Engineer's review does not constitute an authorization to deviate from terms and conditions of the contract.
    - Shop drawings will be rejected for incompleteness, lack of coordination with other portions of contract documents, lack of calculations (if required), or where modifications or substitutions are indicated without prior review per paragraph above.
    - Submit shop drawings and calculations to governing code authority when specifically indicated or requested.
    - Maintain a copy of all shop drawings accepted by the Architect/ Structural Engineer at site during construction period.
    - Structural Engineer requires 10 working days after receipt of shop drawings and calculations for processing.
12. Design Loads:

    A. Live Loads: HS 20-44
13. UBC Table 19-A-4 Sulfate Exposure (See General Notes - Concrete Item #3 for concrete water cement ratio limits):

    Severe

QUALITY ASSURANCE AND SPECIAL INSPECTION

Testing Laboratory: Retained by owner and satisfactory to Architect/ Structural Engineer and governing code authority to perform required tests and inspections of this contract and applicable code.

Material Certification: Submit labratory test reports certifying materials are of identifiable tested stock to owner, testing laboratory, Architect/Structural Engineer and, upon request, to governing code authority. If laboratory test reports cannot be made available, testing laboratory will perform tests as directed by Architect/Structural Engineer. Contractor shall pay testing laboratory for costs related to tests and inspections of unidentifiable materials or materials furnished without laboratory test reports, materials found deficient after initial tests and inspections, or materials replacing deficient materials.

1. Concrete.

   Testing laboratory will review concrete mix design data and will perform the following concrete tests at frequency indicated in UBC section 1905.6:
   (a) Slump tests in compliance with ASTM C143.
   (b) Prepare four test cylinders for compressive strength testing in compliance with ASTM C39, ACI 318 and UBC section 1905.6. Test one cylinder at 7 days, two cylinders at 28 days and retain remaining cylinder for tests until completion of project. Determine concrete compressive strength at 28 days based on average of two cylinders tested.
   (c) Entrained air content in compliance with ASTM C231 for air entrained concrete.
2. Reinforcing
   (a) During placement
3. Special cases:
   (a) Epoxy and grout set bolts and reinforcing bars
4. Ten percent of drilled-in, epoxy, or grout set anchors shall be proof tested to 2 times allowable tension. Notify Architect/Structural Engineer of any failures so additional testing of adjacent anchors can be directed.
5. Insulating concrete per appropriate ICBO evaluation report as indicated on Architectural/Structural drawings.
6. Excavation and back-filling.

   All special inspection shall be performed in accordance with the requirements of UBC section 1701.

REINFORCING STEEL (FOR CONCRETE AND MASONRY)

1. All reinforcing steel shall be detailed and placed in accordance with the 'Building Code Requirements for Reinforced Concrete' (ACI 318-99) and the 'Manual of Standard Practice for Reinforced Concrete Construction' by CRSI and WCRSI as modified by the project drawings and specifications.
2. Deformed reinforcing bars shall conform to the requirements of ASTM A615 grade 60.
3. Welding of reinforcing is not permitted.
4. All reinforcing bar bends shall be made cold.
5. Lap splices shall be made only where shown on the structural drawings.
6. Reinforcing dowels between footings and walls or columns shall be the same number, size, spacing and grade as the specified vertical reinforcing, u.n.o.
7. All reinforcing bars shall be marked so their identification can be made when the final in-place inspection occurs.

FOUNDATION

1. The design of the foundation system is based on the geotechnical report (and any addenda) prepared by the following company: OWENS GEOTECHNICAL, INC.

   Report no: E-02-288
   Dated: March 19, 2003

   Copies are available for review at the Engineer's office and Contractor shall have a copy at the jobsite.
2. The foundation system is designed based on the following:

   Allowable Soil Bearing Pressure = 2500 psf
   Equivalent Fluid Pressure Unconstrained = 35
   Passive Pressure = 250 pcf
   Friction Coefficient = 0.4

   A 1/3 increase is allowed for seismic or wind loading, unless noted otherwise where asterisk (*) is indicated.
3. The Contractor shall provide for proper dewatering of excavations from surface water, ground water, seepage, etc.
4. The Contractor shall provide for the installation and design of all cribbing, sheathing and shoring required to safely and adequately retain the earth banks and support any existing structures in accordance with all national, state and local safety ordinances.
5. All abandoned utilities, footings, etc., that interfere with the new construction shall be removed. Notify the Structural Engineer should any foundations for existing structures be encountered that are not shown on the structural drawings.
6. Footings shall be placed and estimated according to depths shown on the drawings. Excavations for footings shall be approved by the Geotechnical Engineer prior to placing the concrete and reinforcing. The Contractor shall notify the Geotechnical Engineer when the excavations are ready for inspection. The Geotechnical Engineer shall submit a letter of compliance to the Owner. Should soil encountered at these depths not be approved by the Geotechnical Engineer, footing elevations or footing designs will be altered by change order.
7. All excavations shall be properly backfilled. Footing backfill and utility trench backfill within the building perimeter shall be mechanically compacted in layers, to the approval of the Geotechnical Engineer. See geotechnical report for requirements. Flooding will not be permitted.
8. The Contractor shall not backfill behind retaining walls before the concrete or masonry walls have reached full design strength. The Contractor shall brace or protect all building and pit walls below grade from lateral loads until attaching floors are completely in place and have reached full design strength. The Contractor shall provide for the design, any required permits and the installation of such bracing and protection.
9. Sub-base below slabs on grade shall be supported on natural grade or structural fill as directed in the geotechnical report. See typical details and geotechnical report for vapor barrier and sub-base requirements.

EPOXY INSTRUCTIONS FOR ANCHORING REBAR AND BOLTS

1. Epoxy may not be used unless specifically detailed on the drawings or without prior approval of the Structural Engineer.
2. Bars must be deformed or threaded for the full embedment depth in epoxy.
3. Over-drill bar diameter by 1/4 in., unless indicated otherwise by the Epoxy Manufacturer, and to the depth indicated on the structural drawings.
4. Remove all dirt, dust, water, and ice by vacuum from the drilled holes.
5. Any dirt, rust, and oil on the bars shall be removed.
6. During the epoxy mixing and application process, follow the Epoxy Manufacturer's specifications exactly.
7. Fill the holes drilled for the bars partially with epoxy and then insert the bars. Work the bars in and out to compact the epoxy, then fill the remainder of the holes.
8. Vertical holes to be filled from the bottom are to use an epoxy gel.
9. The following epoxy systems are acceptable:

   RAWL POWER-FAST ICBO # 4514
   EPCON SYSTEM BY ITW RAMSET ICBO # 4285
   HILTI HIT HY-150 ICBO # 5193
   SIMPSON ET ICBO# 4945

   The use of any other epoxy system must be submitted for approval to the Structural Engineer.

CONCRETE

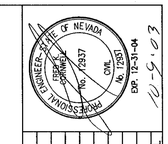
1. All aspects of work pertaining to the concrete construction shall be in accordance with ACI 318-95, 'Building Code Requirements for Reinforced Concrete' and the latest edition of 'Specifications for Structural Concrete for Buildings', ACI 301, with modifications as noted on the project drawings and\or specifications.
2. Concrete mix designs shall be submitted to the Structural Engineer for review. All mix designs shall be designed by a qualified testing laboratory and shall be wet stamped by a Civil Engineer licensed in the State of Nevada.
3. Portland cement shall conform to ASTM C150 Type V where the concrete is in contact with soil. For UBC Table 19-A-4 Severe & Very Severe sulfate exposures as identified in the project geotechnical report, the water cement ratio shall not exceed 0.45 and shall not exceed 0.50 for Moderate sulfate exposure. Type II cement shall be used at all other locations in the structure.
4. Fly ash may be used in concrete mixes. The fly ash shall conform to ASTM C618 Class F. The loss of ignition shall be limited to 2%. The addition rate for fly ash shall be limited to 15% of the cement weight. The contractor shall submit all certificates showing the fly ash is in accordance with the above criteria.
5. Hard rock concrete aggregate shall conform to all requirements and tests of ASTM C33 and project specifications. Exceptions may be used only with approval of the Structural Engineer.
6. Structural concrete 28-day strengths & types are as follows:

LOCATION OF CONCRETE	STRENGTH, PSI	TYPE
FOOTINGS	4500	HARD ROCK
CULVERT WALLS	4500	HARD ROCK
FRAMED SLABS	4500	HARD ROCK

7. The modulus of elasticity of concrete, when tested in accordance with ASTM C469, shall be at least the value given by the equations in section 8.5.1 of ACI 318 for the specified concrete 28-day strength.
8. Concrete mixing operations, etc., shall be in accordance with ASTM C94.
9. Concrete placement shall be in accordance with ACI standard 304 and project specifications. All concrete surfaces against which concrete is to be placed shall be sandblasted.
10. If columns and walls are placed with a floor, two hours must elapse between end of column or wall placement and beginning of the floor placement.
11. Clear coverage of concrete over reinforcing bars shall be as follows, U.N.O.:

	MINIMUM COVER INCHES
A) Concrete cast against and permanently exposed to earth	3
B) Concrete exposed to earth or weather:	
No. 6 through No. 18 bar	2
No. 5 bar and smaller	2
C) Concrete not exposed to weather or in contact with ground, U.N.O.:	
Slabs, walls, joists:	
No. 14 and No. 18 bar	1 1/2
No. 11 bar and smaller	3/4
Beams, columns:	
Primary reinforcement, ties	
Stirrups, spirals	1 1/2
D) Slab on grade, 2 inches clear from top	

12. Prior to concrete placement, all reinforcing bars, anchor bolts and other concrete inserts shall be well secured in position.
13. Mechanical pipes or electrical conduit shall not pass through concrete columns or beams unless specifically detailed.



11-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

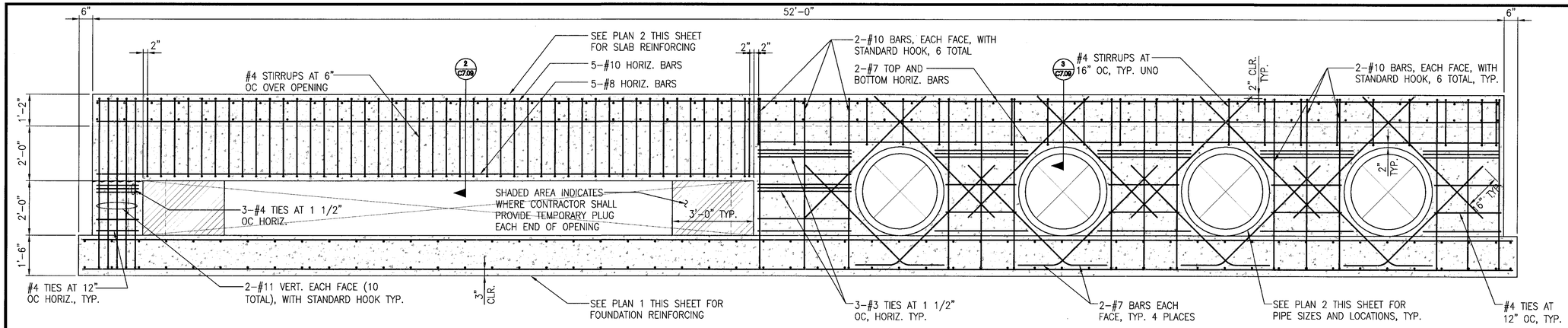
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432-FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
STORM DRAIN IMPROVEMENT PLAN
GENERAL NOTES

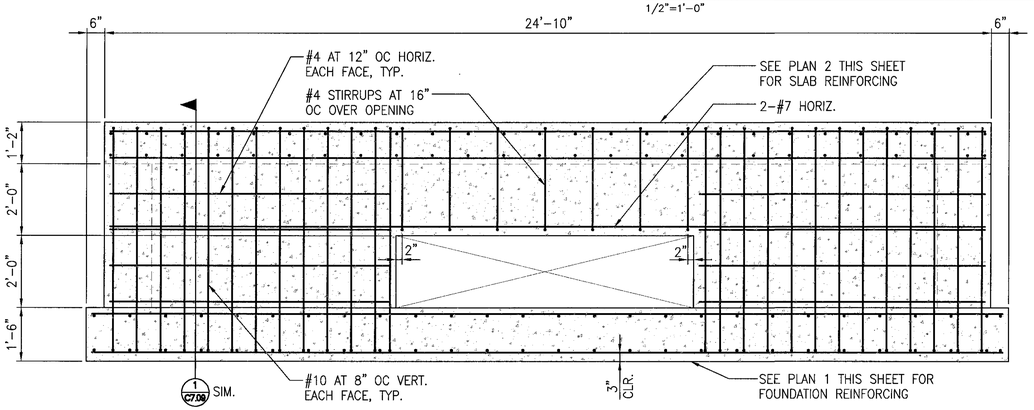
JOB #

SHEET NO.:
SD-9
9 OF 9 SHEETS

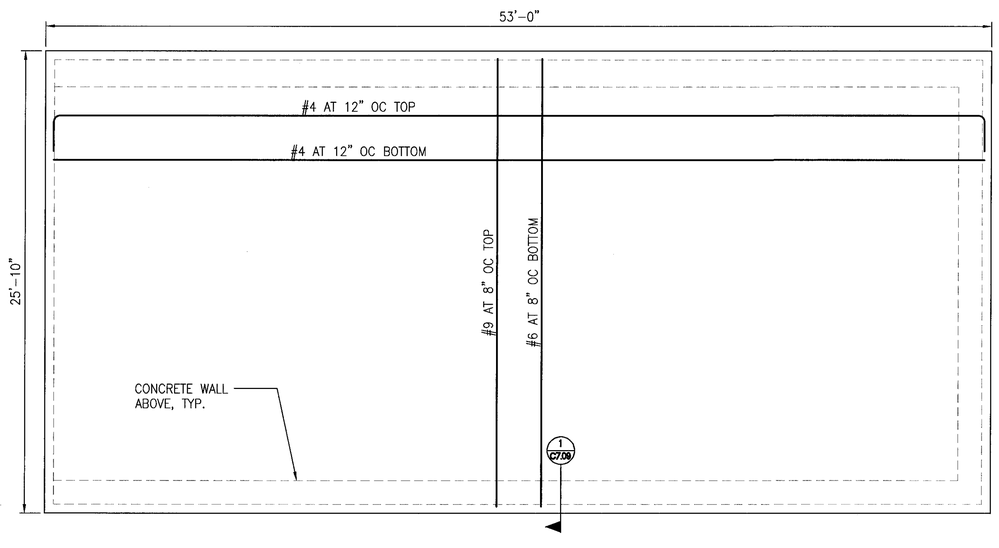
HTE #



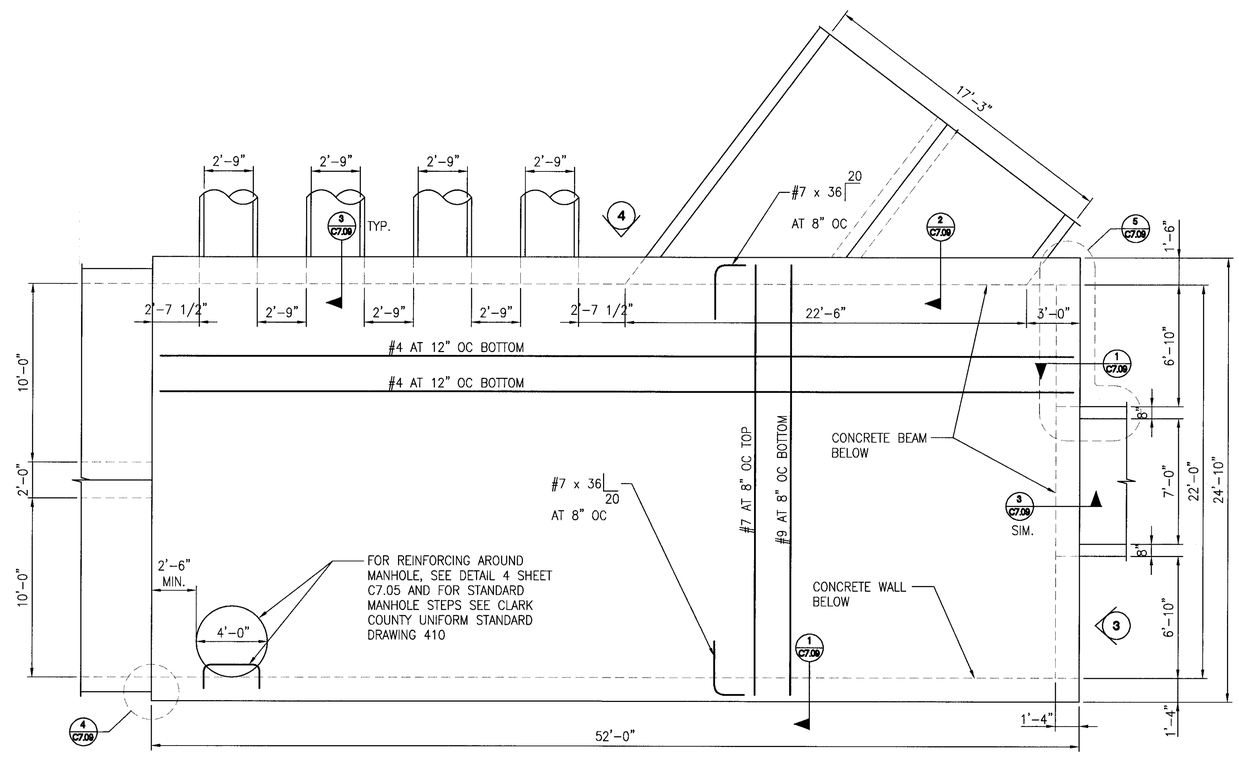
CULVERT WALL ELEVATION AND PIPE OPENINGS (4)
1/2"=1'-0"



WALL ELEVATION WITH OPENINGS (3)
1/2"=1'-0"



PLAN VIEW FOOTING (1)
1/4"=1'-0"



PLAN VIEW TOP SLAB (2)
1/4"=1'-0"

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS (S) = SANITARY SEWER (D) = STORM DRAIN (E) = ELECTRICAL (T) = TELEPHONE	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	PULL BOXES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	EXISTING:	(2210)								(12.34) BC		S									
ROW LINE	SCARP LINE	CONCRETE PVMT.	PROPOSED:	2210								12.34 BC		D									

COMMERCE CONSTRUCTION COMPANY, L.P.
4155 WEST RUSSELL ROAD, SUITE C
LAS VEGAS, NEVADA

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.:	DATE:	BY:	DESCRIPTION:

SHEET: 52'x22' JUNCTION STRUCTURE PLANS AND ELEVATIONS

TITLE: SUNSET PARKWAY BUSINESS CENTER

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
REF	JMB	KWKJ	NONE
DATE: 10/13/03	DATE: 10/13/03	DATE: 10/13/03	

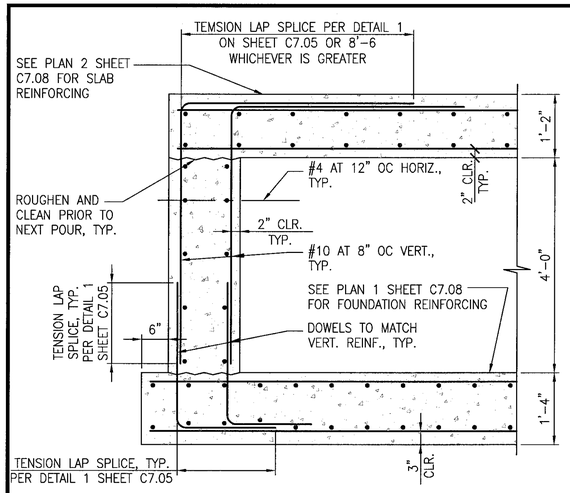
PROJECT No: 7067.13

SEAL

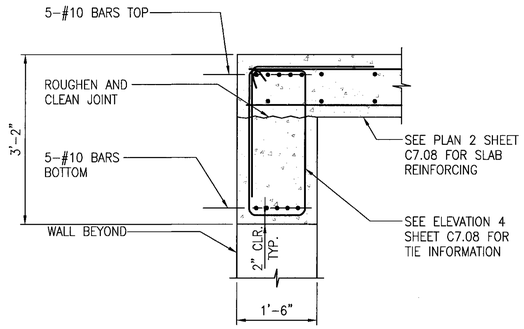
SHEET No. C7.08 SHEET 31 OF 35

DRAWING No.

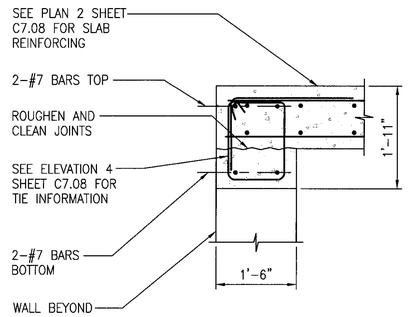
J:\CAD\7067\dwg\C-7067-708-DT.dwg, 10/13/03 12:17:57 PM, lynn, 1:1, Lochsa Civil



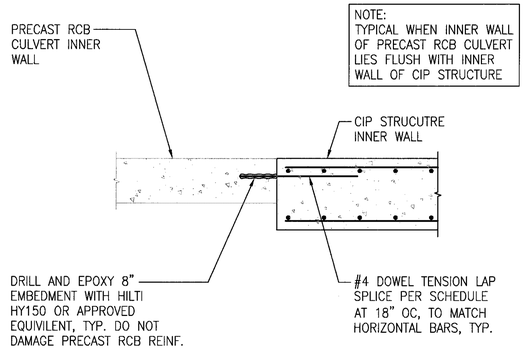
CULVERT SECTION (1)
3/4"=1'-0"



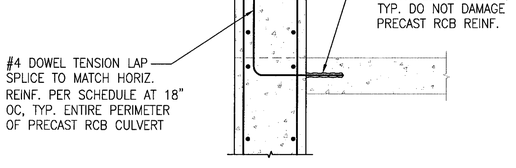
BEAM SECTION (2)
3/4"=1'-0"



BEAM SECTION (3)
3/4"=1'-0"



PLAN SECTION (4)
3/4"=1'-0"



PLAN SECTION (5)
3/4"=1'-0"

LEGEND

CL OR SURVEY LINE	EASEMENT LINE	HEAVY AC PVMT.	DESCRIPTION:	CONTOUR LINES	EDGE OF PAVEMENT	"A" TYPE CURBS	"L" TYPE CURBS	WALLS	FENCES	AC PAVEMENT	CONCRETE	SPOT ELEVATIONS	SIGNS	MANHOLE W/ DESCRIPTION	MANHOLE DESCRIPTIONS	FIRE HYDRANTS	GATE VALVES	REDUCERS	CLEAN OUTS	PULL BOXES	100w HPS STREETLIGHTS	150w HPS STREETLIGHTS	200w HPS STREETLIGHTS	250w HPS STREETLIGHTS
PROPERTY LINE	SAWCUT LINE	LIGHT AC PVMT.	EXISTING:	(2210)								(12.34) BC		(S)	(S) = SANITARY SEWER									
ROW LINE	SCARP LINE	CONCRETE PVMT.	PROPOSED:	2210								12.34 BC		(D)	(D) = STORM DRAIN									
															(E) = ELECTRICAL									
															(T) = TELEPHONE									

COMMERCE CONSTRUCTION COMPANY, L.P.
4155 WEST RUSSELL ROAD, SUITE C
LAS VEGAS, NEVADA

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

REV.	DATE:	BY:	DESCRIPTION:

SHEET: SECTIONS AND DETAILS

TITLE: SUNSET PARKWAY BUSINESS CENTER

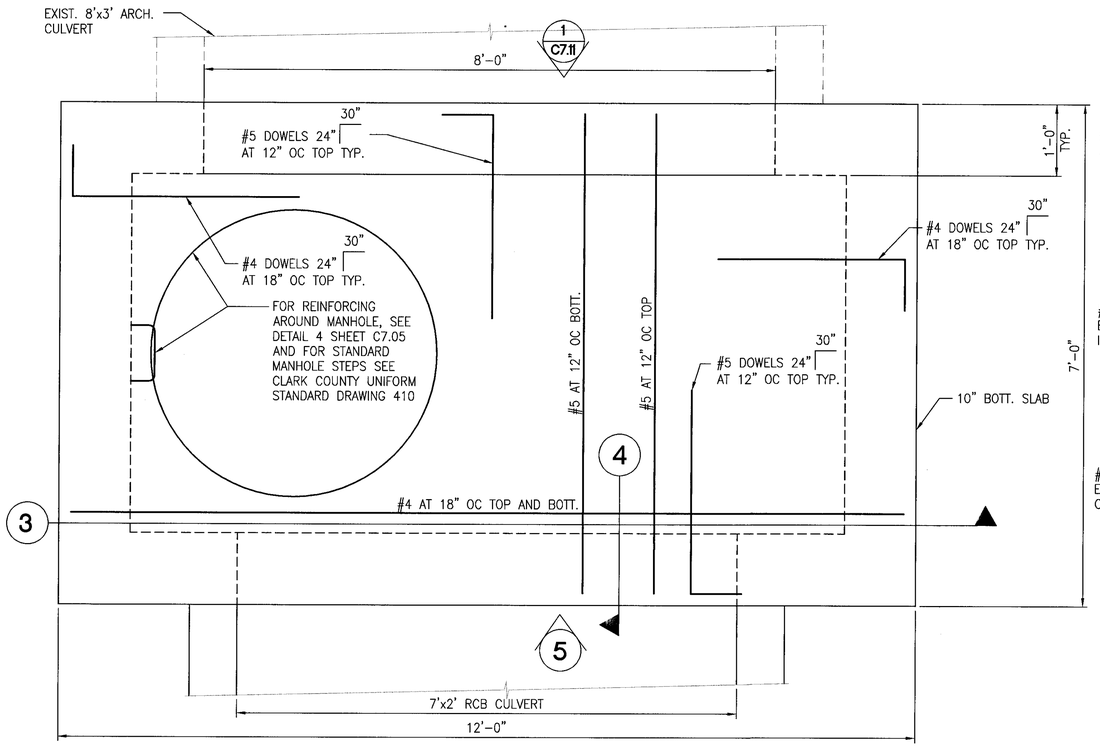
DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
REF	JMB	KWKJ	NONE
DATE: 10/13/03	DATE: 10/13/03	DATE: 10/13/03	

SEAL

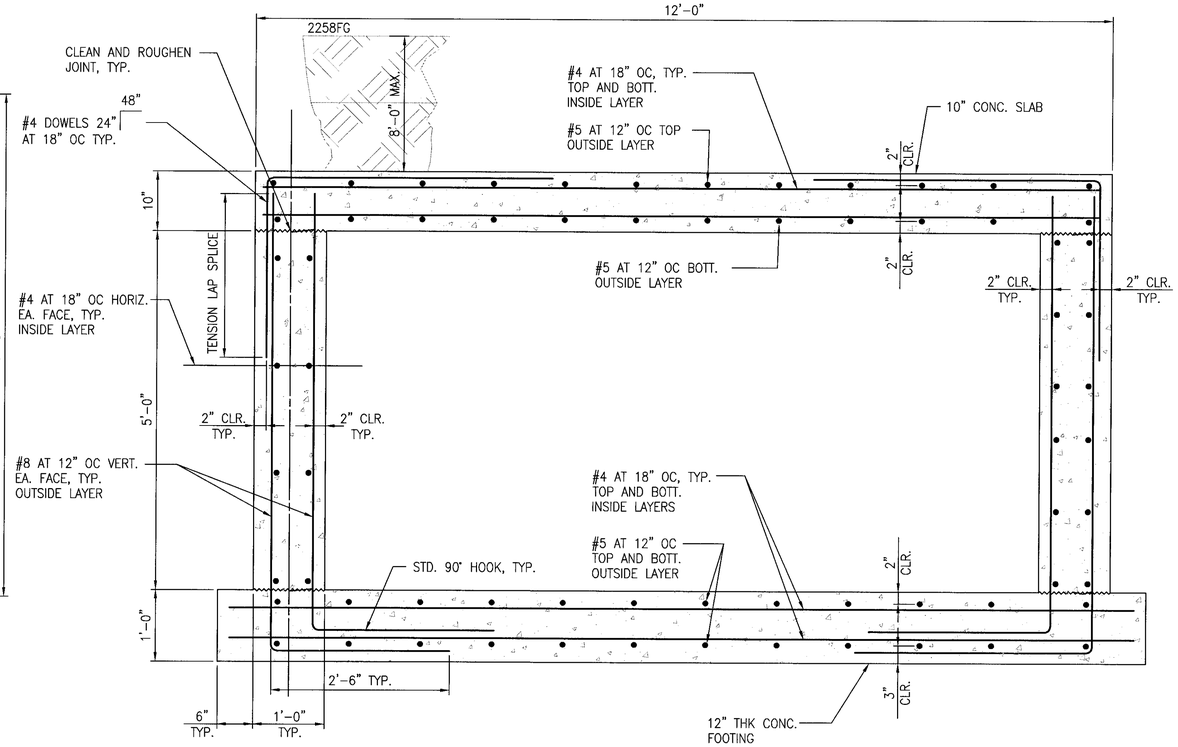
PROJECT No: 7067.13

SHEET No. C7.09
SHEET 33 OF 35
DRAWING No.

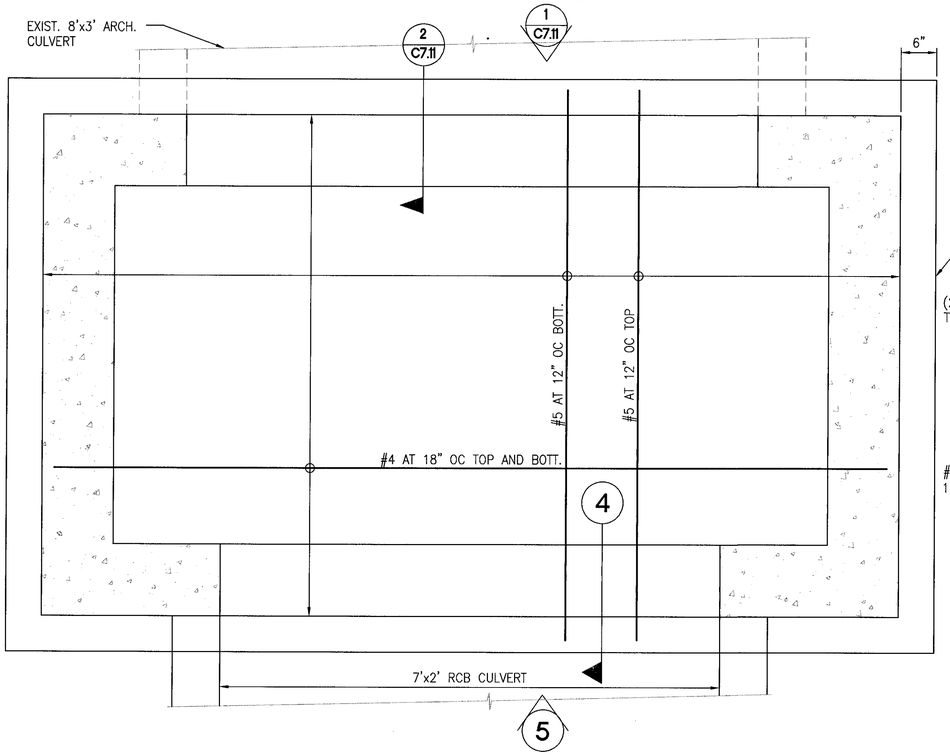
J:\CAD\7067\Dwg\C-7067-709-DT.dwg, 10/13/03 12:16:57 PM, lynn, 1:1, Lochsa Civil



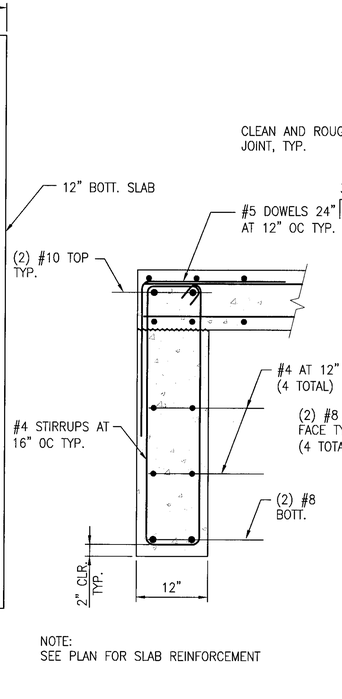
PLAN VIEW - TOP SLAB (1)
1"=1'-0"



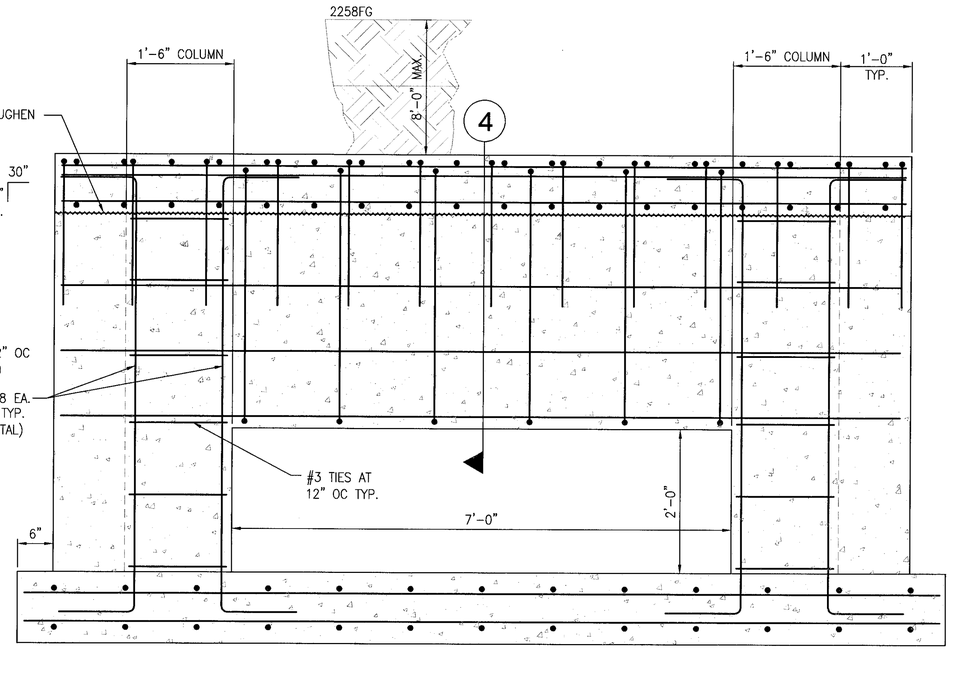
SECTION (3)
1"=1'-0"



PLAN VIEW - FOOTING (2)
1"=1'-0"



BEAM SECTION (4)
1"=1'-0"



CULVERT WALL WITH 7'x2' SQUARE OPENING (5)
1"=1'-0"

REV.:	DATE:	BY:	DESCRIPTION:

COMMERCE CONSTRUCTION COMPANY, L.P.
4155 WEST RUSSELL ROAD, SUITE C
LAS VEGAS, NEVADA

LOCHSA ENGINEERING
5828 SPRING MTN. RD. SUITE 308
LAS VEGAS, NV 89146
PHONE: (702) 365-9312, FAX: (702) 365-9317

SHEET: **5'x10' JUNCTION STRUCTURE PLANS AND SECTIONS**

TITLE: **SUNSET PARKWAY BUSINESS CENTER**

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
JAW	JMB	KWKJ	NONE
DATE: 10/13/03	DATE: 10/13/03	DATE: 10/13/03	

PROJECT No.: 7067.13

SEAL

SHEET No.
C7.10
SHEET 33 OF 35
DRAWING No.

J:\CAD\7067\dwg\C-7067-710-DT.dwg, 10/13/03 12:16:01 PM, lynn, 1:1, Lochsa Civil

PRECISE GRADING PLANS
FOR
BASS PRO SHOPS
AT SILVERTON HOTEL AND CASINO

CLARK COUNTY FIRE DEPARTMENT

GENERAL NOTES

A. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE 1997 EDITION OF THE UNIFORM FIRE CODE, AND THE 1995 EDITION OF THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET, #24.
B. ON ANY BUILDING CONSTRUCTION, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE COMBUSTIBLE MATERIALS ARE DELIVERED TO THE SITE AND CONSTRUCTION COMMENCES. SAID 'FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER WITH THE REQUIRED WATER SUPPLY.
C. IF DURING CONSTRUCTION IT BECOMES NECESSARY TO CLOSE ANY CONTROL VALVE OR PLACE A HYDRANT OUT OF SERVICE, THE CLARK COUNTY FIRE DEPARTMENT MUST BE CONTACTED.
D. PAINTING OF CURBS AND/OR STRIPING OF ASPHALT AREAS AND PROTECTION OF HYDRANTS FROM PHYSICAL INJURY PER FIRE HYDRANT INSTALLATION SPEC OF THE FIRE PREVENTION BUREAU.
E. NO FIRE HYDRANT SHALL BE LOCATED WITHIN 25 FEET OF ANY STRUCTURE, OR 5 FEET OF A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION. FOR WALL, FENCE AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 5 FEET FROM ITS EXTERIOR SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.
F. AT ALL TIMES DURING CONSTRUCTION SUITABLE EMERGENCY VEHICLE ACCESS ROADS MUST BE MAINTAINED. ROADWAYS MUST BE SMOOTH, COMPACTED AND CAPABLE OF SUPPORTING THE IMPOSED LOADS OF ALL EMERGENCY VEHICLES.
G. PRIOR TO ACCEPTANCE OF ANY FIRE SERVICE MAIN A SATISFACTORY HYDROSTATIC TEST WITH PIPING JOINTS UNCOVERED MUST BE CONDUCTED. APPROVED PLANS AND A CONTRACTOR'S MATERIALS AND TEST CERTIFICATE MUST BE PROVIDED AT TIME OF INSPECTION.
H. BLUE REFLECTIVE MARKERS MUST BE INSTALLED BEFORE FINAL HYDRANT ACCEPTANCE CAN BE ATTAINED (97 UFC SEC. 901.4.3).

C.C.P.W. GENERAL NOTES

EXACT LOCATION OF ALL SAW-CUT LINES SHALL BE DETERMINED IN THE FIELD BY A CLARK COUNTY INSPECTOR.
CURB AND GUTTER WITH A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
FINAL ASPHALTIC CONCRETE (AC) PAVEMENT SURFACES SHALL BE ONE-HALF (1/2") INCH ABOVE THE LIP OF THE GUTTER (INCLUDING OPEN GRADE).
ALL OFF-SITE IMPROVEMENT CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, CLARK COUNTY AREA NEVADA AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, LATEST REVISION.
PRIVATE STREETS, CURB & GUTTER AND VALLEY GUTTERS REFLECTED ON THESE PLANS ARE TO BE INSPECTED BY A CLARK COUNTY INSPECTOR.
WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT IN AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS SHALL BE DETERMINED IN THE FIELD BY CLARK COUNTY PUBLIC WORKS INSPECTOR.
CLARK COUNTY SANITATION DISTRICT SEWER NOTES:
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IN ALL CASES, THESE STANDARDS SHALL SUPERSEDE THE UNIFORM STANDARD SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPES AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS.
ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 311 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.
NOTE: ALL SANITARY SEWER TO BE ABANDONED SHALL BE IN ACCORDANCE WITH SECTION 3.14.

LAS VEGAS VALLEY WATER DISTRICT

STANDARD NOTES:

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO THE LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
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 IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
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. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATERLINE AND SANITARY STORM SEWER LINE CROSS:
A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:
A. POTABLE WATER SUPPLY QUALITY MATERIAL
B. ENCASEMENT WITH FOUR (4) INCH CONCRETE (MINIMUM)
C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE
EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10-FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

PUBLIC WORKS UTILITY NOTES

1. INSPECTIONS ARE REQUIRED. CALL 24 HOURS IN ADVANCE, 455-4610.
2. PROPER SIGNS, BARRIERS, BARRICADES AND LIGHTS SHALL BE PLACED AND MAINTAINED IN ACCORDANCE WITH THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS PUBLISHED BY THE U.S. DEPARTMENT OF COMMERCE.
3. THIS PLAN DOES NOT AUTHORIZE CLOSURE OF ANY ROAD OR STREET.
4. TRAFFIC, SCHOOL, OR STREET SIGNS OF ANY KIND ARE NOT TO BE MOVED FOR ANY REASON WITHOUT FIRST OBTAINING PERMISSION FROM THE DEPARTMENT OF PUBLIC WORKS, TRAFFIC MANAGEMENT DIVISION.
5. ALL WORK AUTHORIZED BY THIS PLAN SHALL CONFORM TO THE "UNIFORM STANDARD SPECIFICATIONS AND STANDARD DRAWINGS CLARK COUNTY AREA, NEVADA" AND "CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS," LATEST REVISION.
6. NO OPEN TRENCH SHALL BE ALLOWED ACROSS ANY STREET OR WITHIN TEN FEET (10') OF ANY TRAVEL WAY, EXCEPT WHEN WORK IS IN ACTUAL PROGRESS. AREAS COVERED BY ACCEPTABLE STEEL PLATES ARE NOT TO BE CONSTRUED AS A TRENCH. NO OPEN TRENCH PERMITTED IN EXCESS OF 500 FEET OR LENGTH NECESSARY TO ACCOMMODATE PIPE INSTALLATION IN A SINGLE DAY, WHICHEVER IS GREATER.
7. A TEMPORARY PATCH IS TO BE IN PLACE AT THE END OF EACH WORK DAY WHERE THE BACKFILL IN THE TRENCH HAS BEEN COMPLETED AND PRIOR TO OPENING THE WORK AREA BACK TO THE TRAFFIC AND IS TO BE MAINTAINED BY THE PERMITEE. A PERMANENT PATCH IS TO BE IN PLACE WITHIN THIRTY (30) DAYS AFTER THE INSTALLATION OF THE TEMPORARY PATCH.
8. COMPACTION TESTS ARE REQUIRED.
9. YOUR PERMIT, APPROVED PLANS, AND BARRICADE PLANS FOR THIS WORK MUST BE ON THE JOB SITE AT ALL TIMES.
10. ALL TRENCH CROSSINGS AND BACKFILL SHALL MEET THE STANDARD SPECIFICATION UNLESS OTHERWISE STATED.
PUBLIC WORKS UTILITY NOTES:

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 LOCATION.
ALL DISCREPANCIES MUST BE IMMEDIATELY REPORTED TO THE ENGINEER. CALL BEFORE YOU DIG 1-800-227-2600.

NOTICE:
THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA. STREET LIGHTING, TRAFFIC SIGNALS, INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG, (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE IMPROVEMENT STANDARDS, DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA, AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

NOTICE TO CONTRACTOR

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THESE LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

DEVELOPER

MAJESTIC REALTY CO.
4155 WEST RUSSELL ROAD
SUITE "C"
LAS VEGAS, NV 89118
(702) 896-5564

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

TRAFFIC AND ELECTRICAL NOTES

1. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HEREUNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
2. 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 GROUND MOUNTED STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING COUNTY STREETS IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
3. ALL CONSTRUCTION SIGNING, BARRICADING, AND PAVEMENT MARKINGS SHALL CONFORM TO THE NEVADA WORK ZONE TRAFFIC CONTROL HANDBOOK - 1986 AND TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION.
4. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PERMANENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
5. THE DEVELOPER SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL PERMANENT SIGNS SHOWN ON THE PLANS. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CLARK COUNTY AREA STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS.
ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH CLARK COUNTY AREA STANDARDS. ALL SIGNS SHALL USE TYPE III SHEETING.
6. IF PROPOSED STREET LIGHT STANDARD IS FIELD LOCATED TO WITHIN FIVE (5) FEET OF ANY SIGN SHOWN HEREON TO BE MOUNTED ON A SIGN POST, THEN CHANGE SIGN MOUNTING TO ONE ON THE STREETLIGHT STANDARD.
7. PRIOR TO CONSTRUCTION, THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE CURRENT PLANNING DIVISION OF THE DEPARTMENT OF COMPREHENSIVE PLANNING.
8. ALL TRAFFIC SIGNAL POLE ASSEMBLIES, STEEL PEDESTALS FOR CABINETS, AND STREET LIGHT POLES SHALL BE GALVANIZED PER ASTM A123.
9. ALL STREET LIGHTING INSTALLATIONS EXCEPT AS NOTED ON THE STREET LIGHTING PLANS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION OF EACH.
10. THE FOLLOWING CLARK COUNTY UNDERGROUND FACILITIES MAY BE LOCATED IN YOUR PROJECT AREA: STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LVACTS) INTERCONNECT CABLE. YOU MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT 455-7511 FOR LOCATIONS AT LEAST 48 HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT), AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE YOU OF LIABILITY FOR CLARK COUNTY FACILITIES.
11. LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. DEVELOPER/CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE, WHILE PERMANENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO LVACTS. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS, CITY OF LAS VEGAS.
12. ALL NEW OR REPLACEMENT TRAFFIC SIGNAL LOOPS SHALL BE INSTALLED USING CABLE-IN-DUCT WIRING, SHALL HAVE INDEPENDENT LEAD-IN WIRES FOR EACH LOOP FROM THE CONTROLLER TO THE PULL BOX, AND EACH LEAD-IN SHALL BE INDIVIDUALLY TAGGED.
13. TRAFFIC SIGNAL PEDESTRIAN HEADS SHALL BE THE L.E.D. TYPE.
14. ELECTRICAL POWER SERVICE POINT LOCATION(S) FOR STREET LIGHTING AND TRAFFIC SIGNALS MUST BE INDICATED ON THE PLANS IF CONNECTING TO AN EXISTING CIRCUIT. INDICATE LOCATION OF EXISTING SERVICE POINT FOR EACH CIRCUIT.
15. WHEN STREET LIGHTS ARE CONNECTED TO AN EXISTING CIRCUIT, THE ENGINEER MUST CERTIFY THAT THE EXISTING CIRCUIT IS CAPABLE OF HANDLING THE ADDITIONAL CIRCUIT LOAD.
16. CLARK COUNTY RESERVES THE RIGHT TO REJECT STREET LIGHT AND TRAFFIC SIGNAL POLES AND ASSEMBLIES WHICH HAVE A "STRIPED" APPEARANCE.
17. PRIOR TO BEGINNING OF CONSTRUCTION, MODIFICATION, OR RELOCATION OF ANY TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OF THE DATE THAT WORK WILL BEGIN.
18. THREE (3) NORMAL WORKING DAYS PRIOR TO TURN-ON OR COMPLETION OF MODIFICATION(S) TO A TRAFFIC SIGNAL SYSTEM, WRITTEN NOTICE SHALL BE SUBMITTED TO THE CLARK COUNTY TRAFFIC MANAGEMENT DIVISION THAT WORK IS BEING COMPLETED AND THE PROPOSED DATE OF COMPLETION.

LEGEND

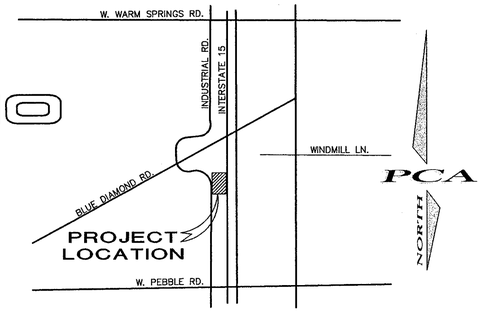
- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

EARTHWORK QUANTITIES

RAW VOLUMES IN CUBIC YARDS
CUT = 11,000, FILL = 44,200
TOTAL IMPORT 33,200

INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	PRECISE GRADING INDEX PLAN
3	PRECISE GRADING PLAN
4	PRECISE GRADING PLAN
5	PRECISE GRADING PLAN
6	PRECISE GRADING PLAN
7	PRECISE GRADING PLAN
8	PRECISE GRADING PLAN
9	PRECISE GRADING PLAN
10	PRECISE GRADING PLAN
11	PRECISE GRADING SECTIONS AND DETAILS
12	HORIZONTAL CONTROL PLAN
13	HORIZONTAL CONTROL PLAN
14	EROSION CONTROL PLAN
15	EROSION CONTROL PLAN
16	DEMOLITION PLAN
17	DEMOLITION PLAN

CONSTRUCTION NOTES AND QUANTITIES

No.	ITEM	UNIT	TOTAL
	~ PRECISE GRADING ~		
(1)	CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)	SF	317,483
(2)	CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)	SF	85,810
(3)	CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11	LF	8,510
(4)	CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216	LF	2,115
(5)	CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11	LF	438
(6)	CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11	EA	15
(7)	CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11	LF	15
(8)	CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II	EA	2
(9)	CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11	LF	74
(10)	INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4	SF	1,550
(11)	INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11	SF	3,278

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935
CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

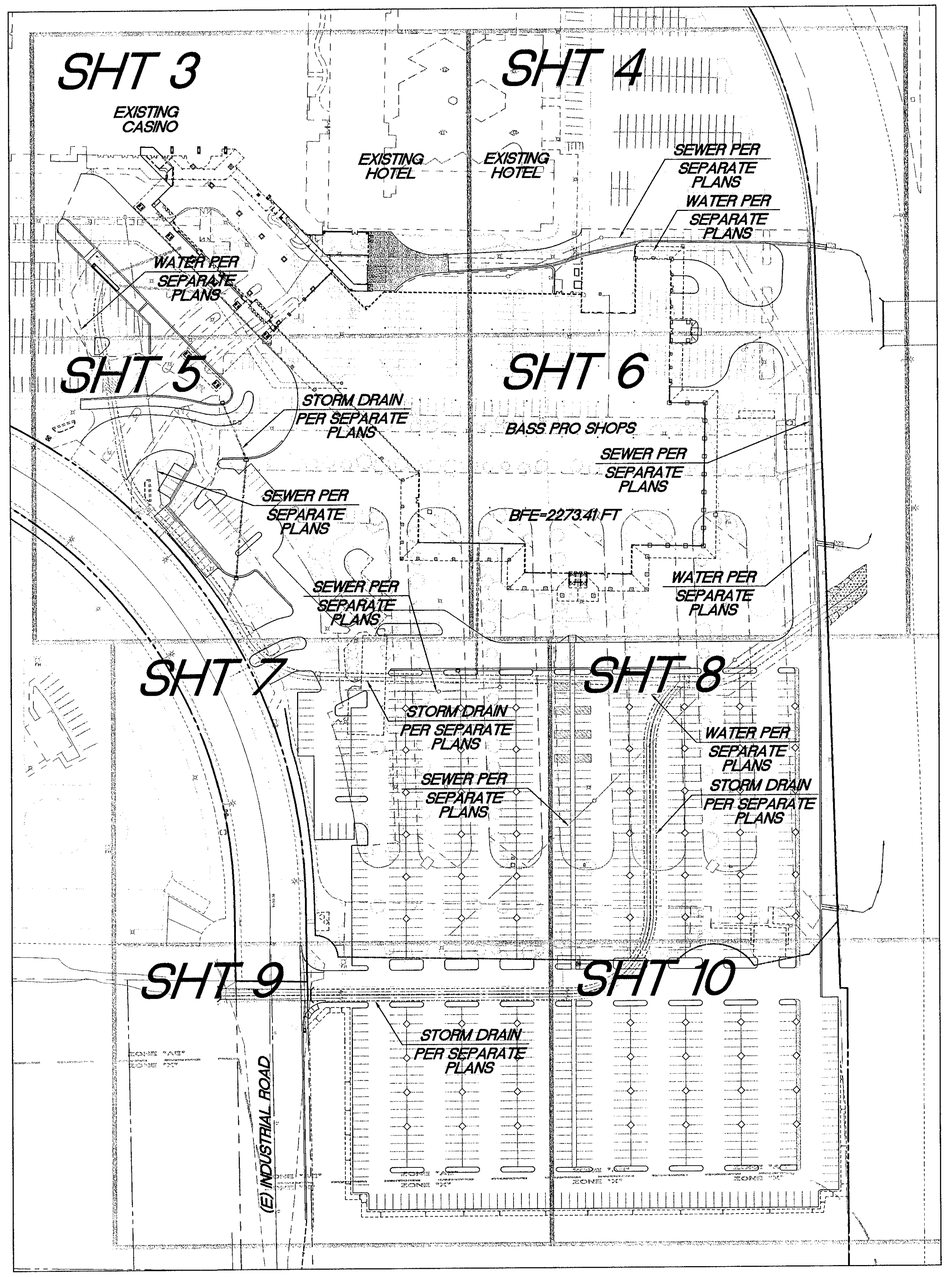
STATE OF NEVADA — KENNARD K. MIZE II — No. 12837 — CIVIL — No. 12837 — EXP. 12-31-04 — PROFESSIONAL ENGINEER — 12-5-03

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400-24FS432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLANS
TITLE SHEET

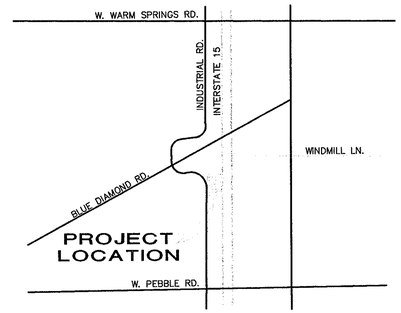
JOB #
SHEET NO.:
PG-1
1 OF 17 SHEETS
HTE #

S:\241-1\PG\PG01-TITLE.dwg Last Modified: 22 Sep 2003 - 11:52am
Plotted on: 22 Sep 2003 - 11:54am by davidsh



INDEX PLAN

SCALE: 1"=80'



VICINITY MAP

NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY

DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY:_____ DATE:_____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, Kennard F. Mize II, P.E. No. 10935 DATE:_____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

STATE OF NEVADA — PROFESSIONAL ENGINEER — No. 12951 — CIVIL — KENNARD F. MIZE II — EXP. 12-31-04 — 12-5-03

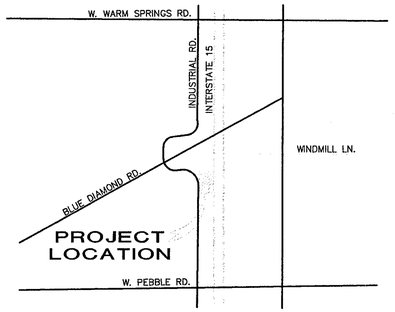
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING INDEX PLAN

JOB #
SHEET NO.:
PG-2
2 OF 17 SHEETS
HTE #

S:\343-1\PC\PG2.dwg Last Modified: 22 Sep 2003 - 10:57am
Plotted on: 22 Sep 2003 - 11:58am by kshelton



VICINITY MAP
NO SCALE

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

ABBREVIATIONS

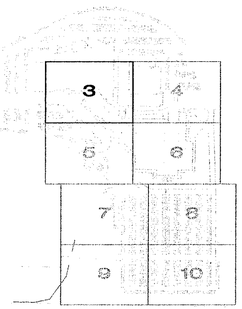
BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY



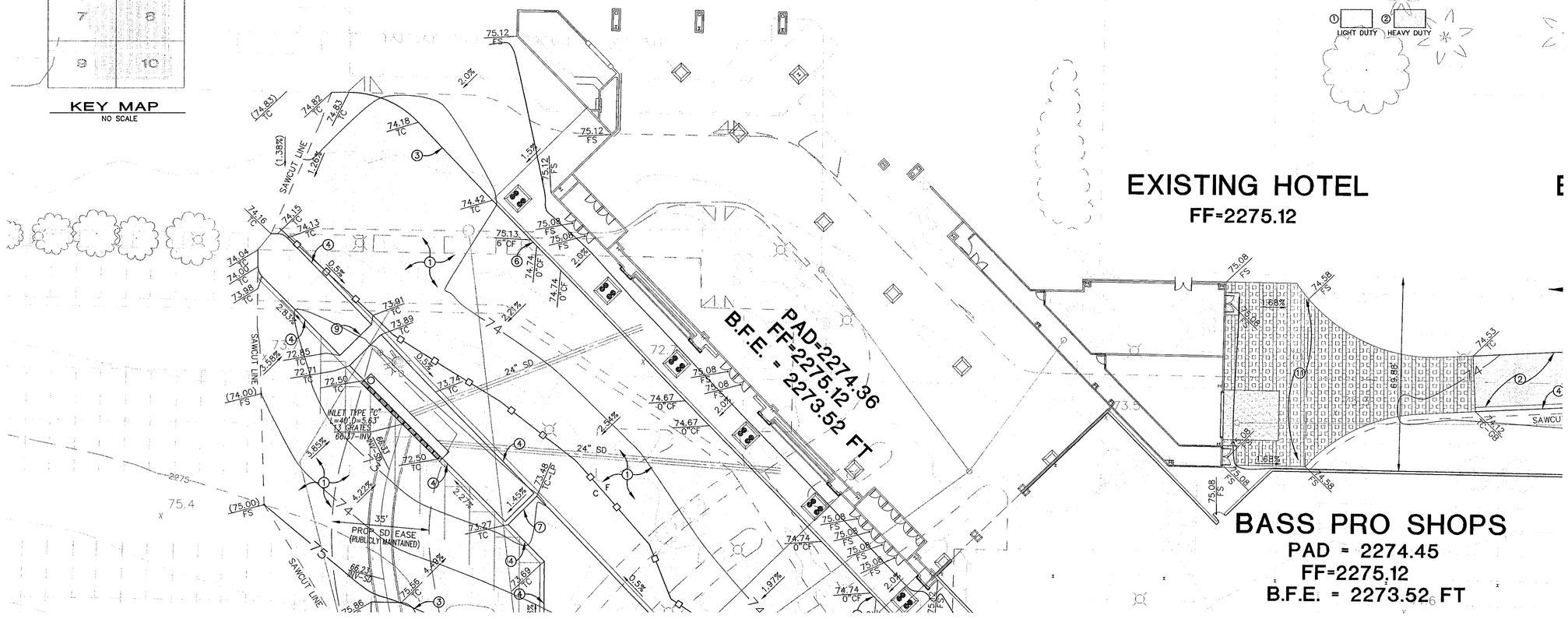
KEY MAP
NO SCALE

# EXISTING CASINO
FF=2275.12

# EXISTING HOTEL
FF=2275.12

PAD=2274.36
FF=2275.12
B.F.E. = 2273.52 FT

# BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT

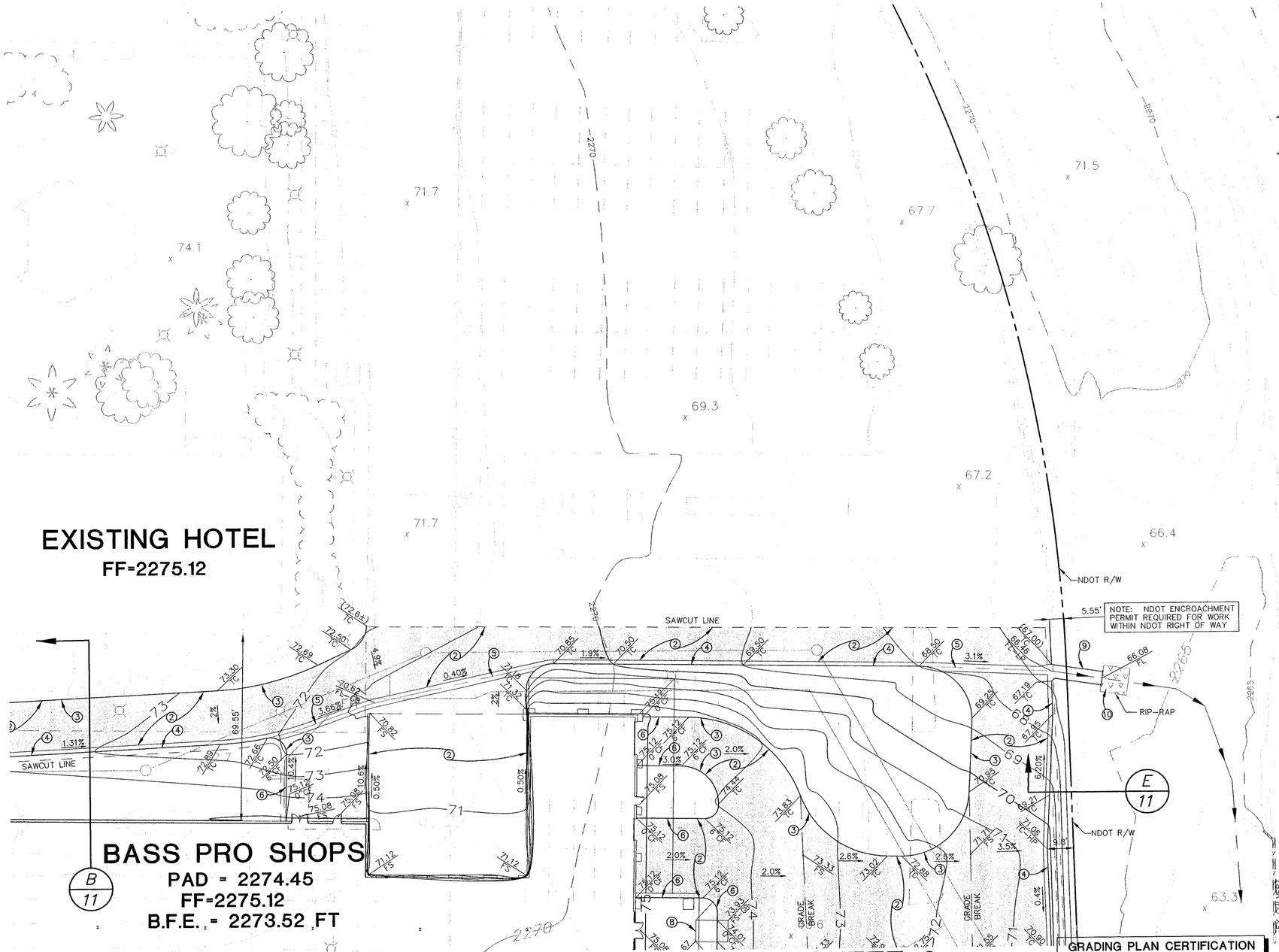


FOR CONTINUATION SEE SHEET 3

# EXISTING HOTEL
FF=2275.12

# BASS PRO SHOPS
PAD = 2274.45
FF=2275.12
B.F.E. = 2273.52 FT

B/11



FOR CONTINUATION SEE SHEET 6

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

GRADING PLAN CERTIFICATION

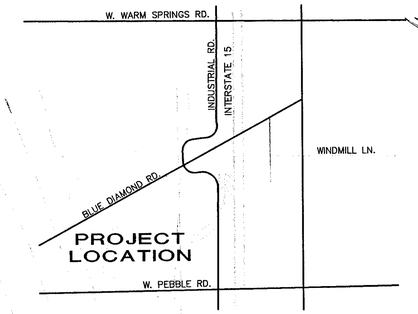
I, Kennard F. Mize II, P.E. No. 10935 DATE: _____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

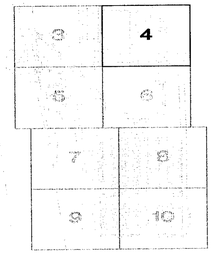
ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.



VICINITY MAP
NO SCALE

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	ST	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- FLOOD LIMIT (TYP) 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

CALL BEFORE YOU DIG
CALLTOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
FRED O'DONNELL No. 12337
EXP. 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

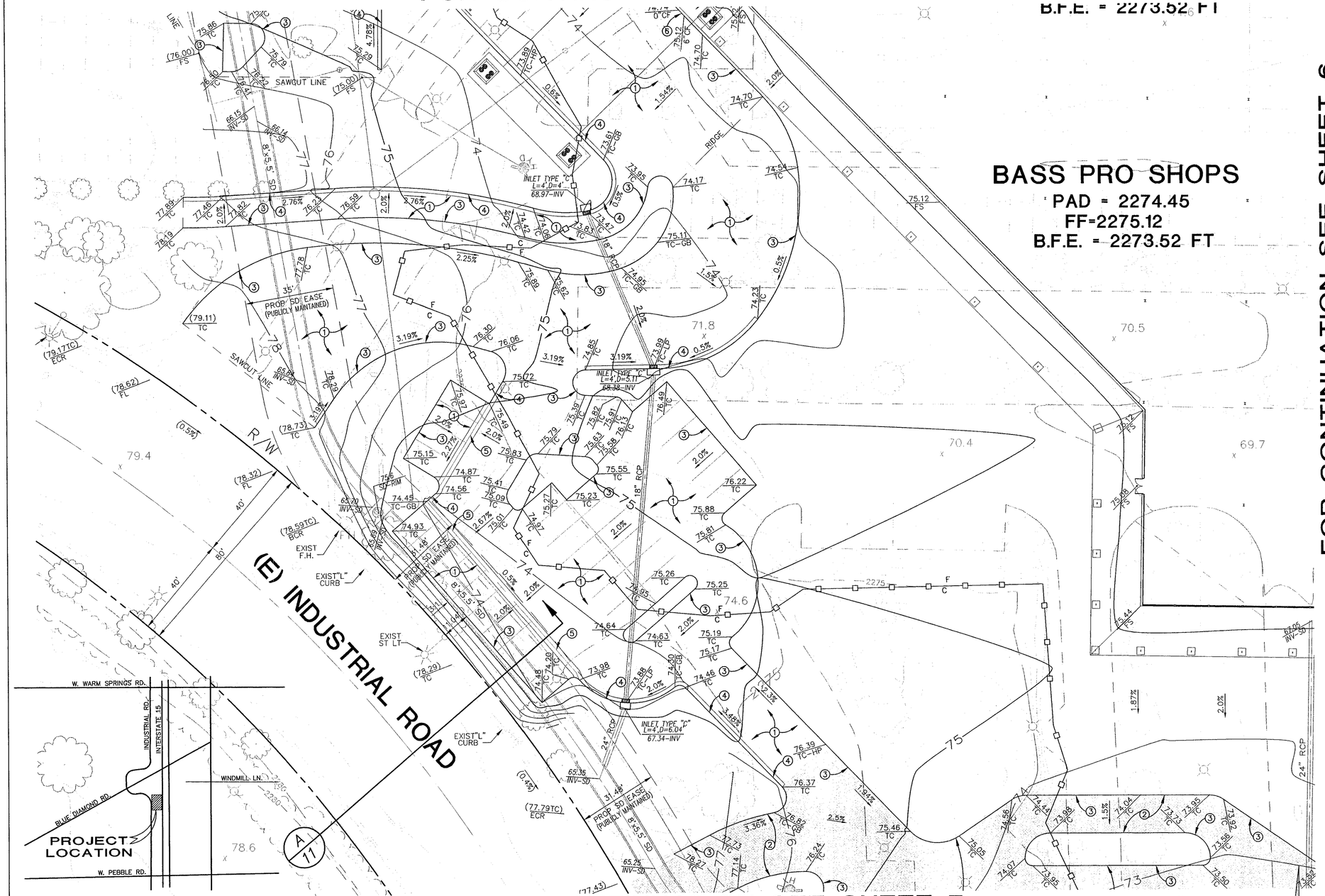
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-4
4 OF 17 SHEETS
HTE #

S:\141-1\EV\PG3-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 11:59am by rquinn

FOR CONTINUATION SEE SHEET 3



FOR CONTINUATION SEE SHEET 7

VICINITY MAP
NO SCALE

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 3200225666 EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

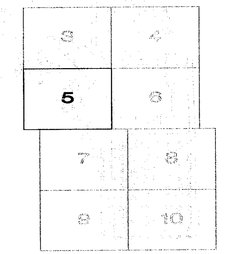
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA KENNARD F. MIZE II No. 12937 EXP. 12-31-04
10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

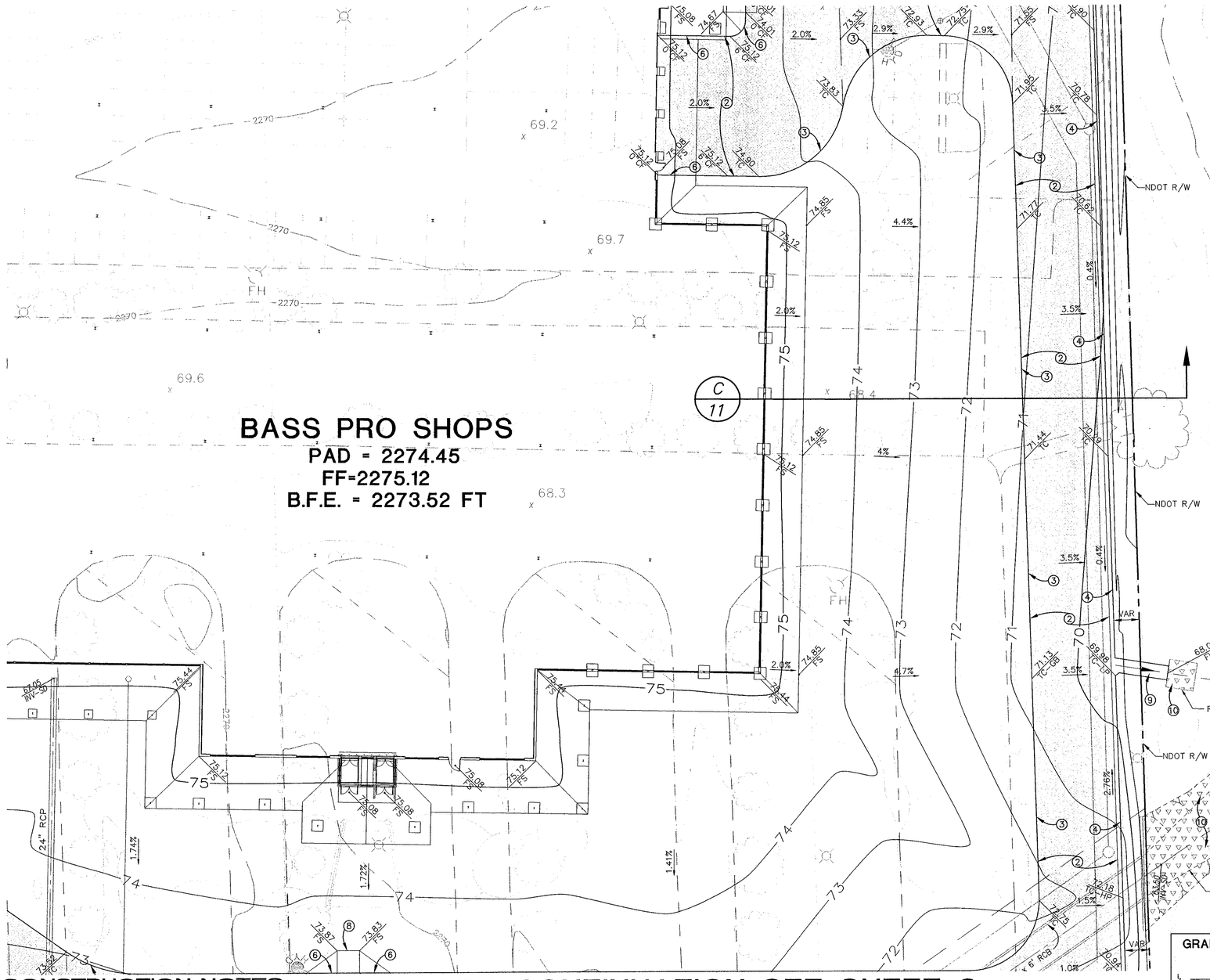
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-5
5 OF 17 SHEETS
HTE #

S:\342-1\PG\PG5-10.dwg Last Modified: 21 Sep 2003 - 11:57am
Plotted on: 21 Sep 2003 - 12:00pm by qunter

FOR CONTINUATION SEE SHEET 4

FOR CONTINUATION SEE SHEET 5



FOR CONTINUATION SEE SHEET 8

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL - SHT 11

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

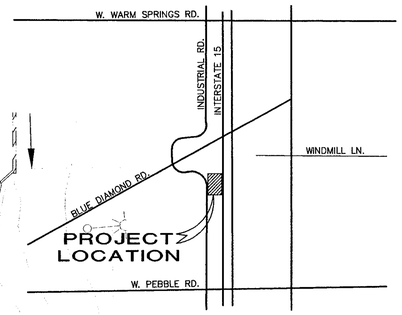
I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

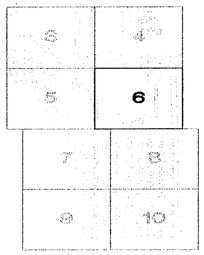
A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

NOTE: NDOT ENCROACHMENT PERMIT REQUIRED FOR WORK WITHIN NDOT RIGHT OF WAY

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

CALL BEFORE YOU DIG
CALL TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA

NORTH

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 12857 — EXP. 12-31-04 — CIVIL — 10-9-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 • 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS

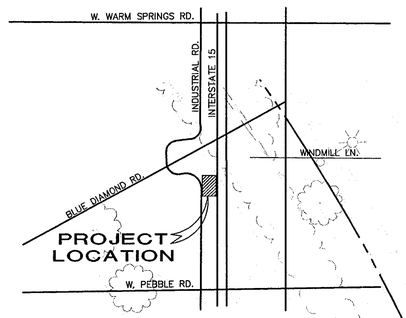
PRECISE GRADING PLAN

JOB #

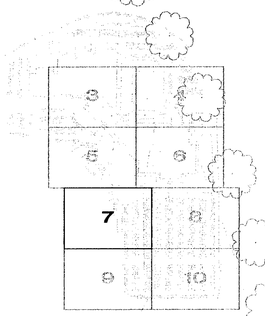
SHEET NO.:
PG-6
6 OF 17 SHEETS

HTE #

S:\343-1\PD\PG3-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 12:01pm by dennon



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
GF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 87 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- 77.5 x — PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C / F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

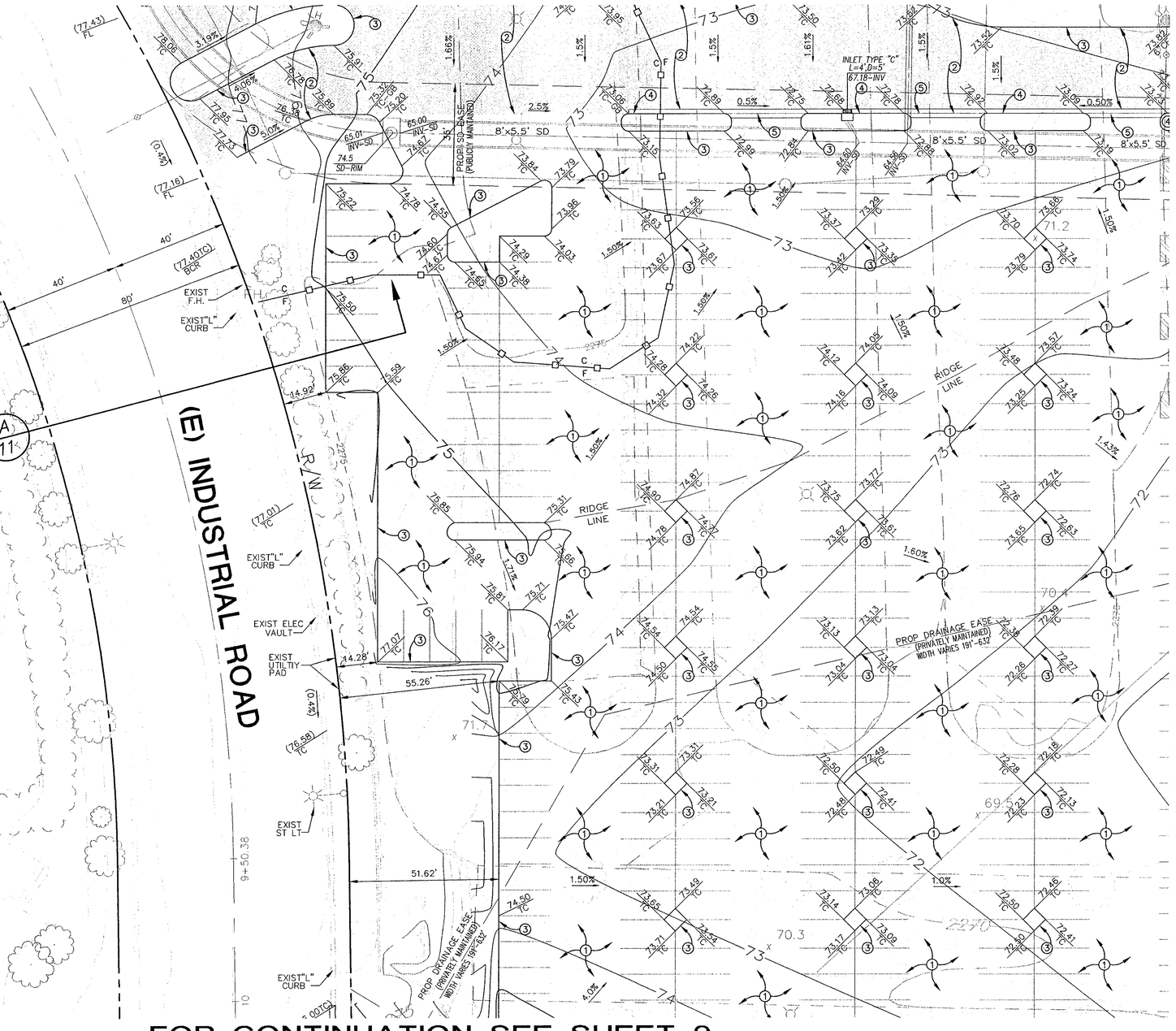
CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
10. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

FOR CONTINUATION SEE SHEET 5



FOR CONTINUATION SEE SHEET 8

FOR CONTINUATION SEE SHEET 9

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

CALL BEFORE YOU DIG
CALL/TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PCA
NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "OC21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
KENNARD F. MIZE II
No. 10935
EXPIRES: 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE, SUITE E-2
COSTA MESA, CA. 92626
(714) 241-3400 241-3432 FAX

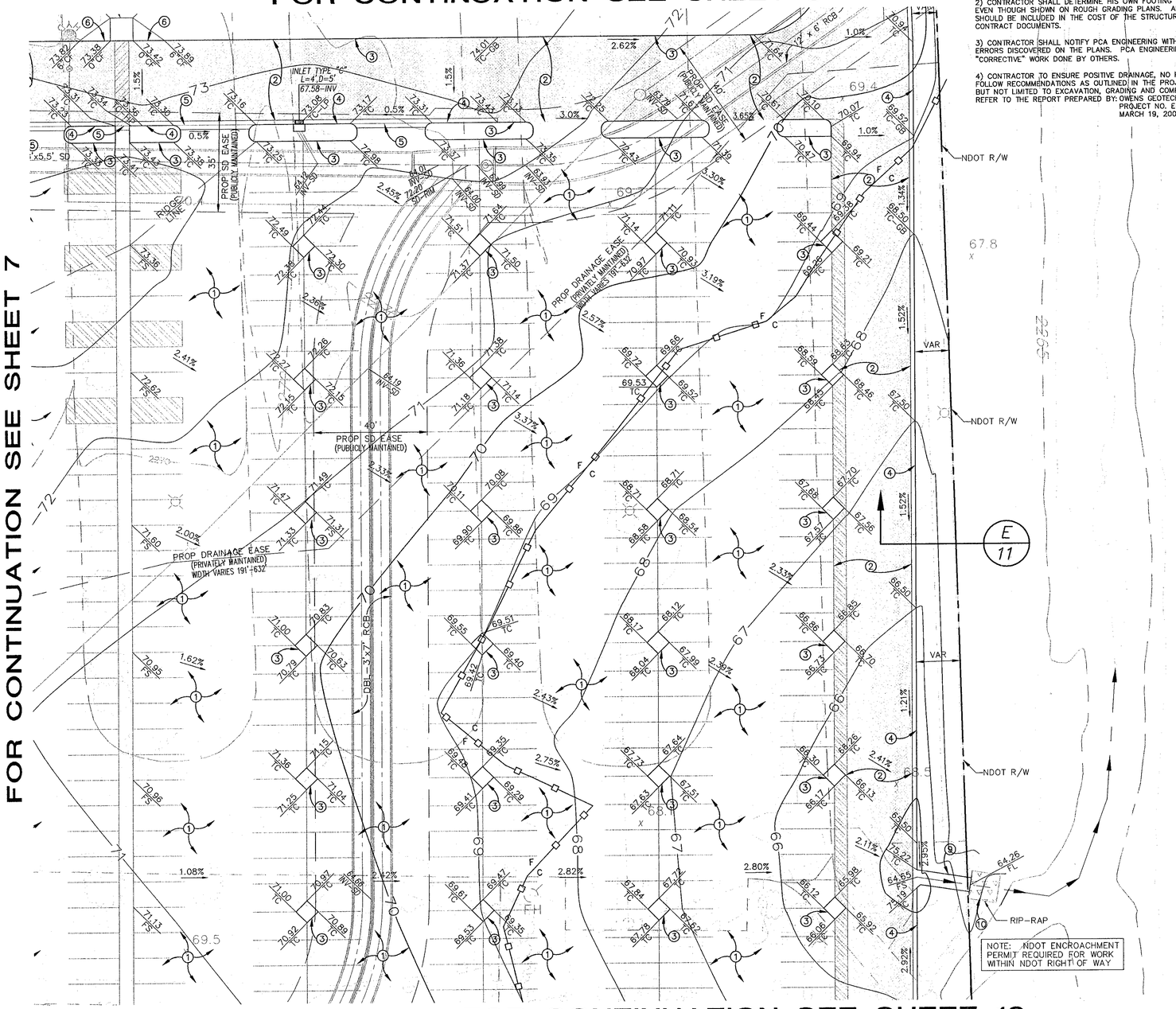
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-7
7 OF 17 SHEETS
HTE #

R:\1345-1\P\DWGS\ 10-Sht Set\ Modified: 23 Sep 2003 - 11:37am
Printed on: 23 Sep 2003 - 11:38am by dperez

FOR CONTINUATION SEE SHEET 6

FOR CONTINUATION SEE SHEET 7



FOR CONTINUATION SEE SHEET 10

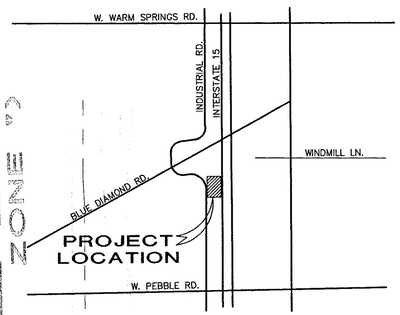
GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

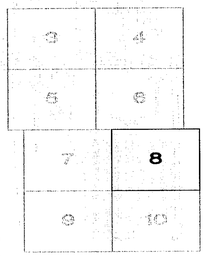
2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

CALL BEFORE YOU DIG
CALL TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935
CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — EXP. 12-31-04 — 10-9-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

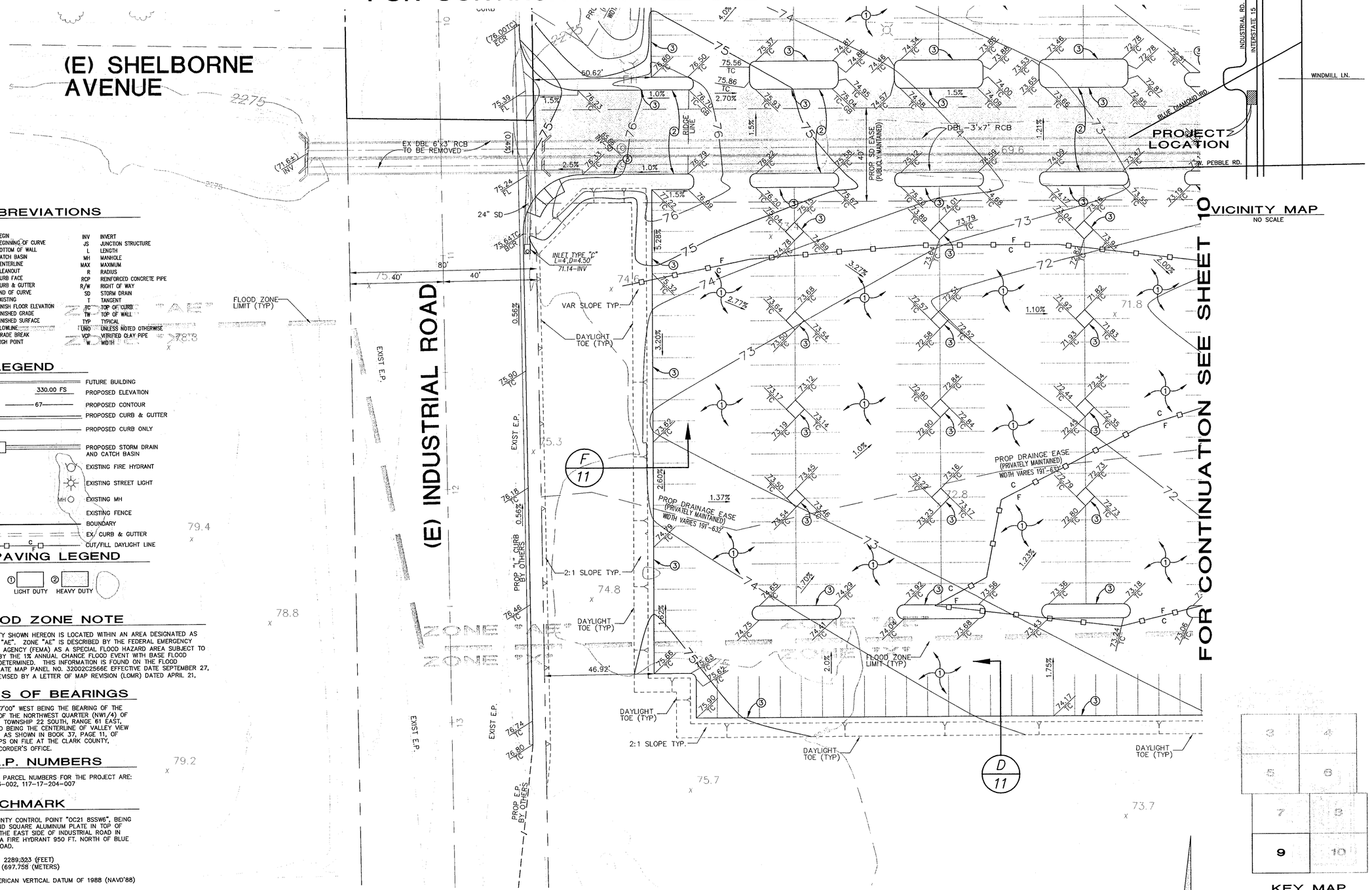
PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-8
8 OF 17 SHEETS
HTE #

S:\342-1\PCP\PG8-10.dwg Last Modified: 22 Sep 2003 - 11:57am
Plotted on: 22 Sep 2003 - 12:02pm by taurino

FOR CONTINUATION SEE SHEET 7



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 177-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION. REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

CALL BEFORE YOU DIG
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

KEY MAP
NO SCALE

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PROFESSIONAL ENGINEER STATE OF NEVADA
KENNARD F. MIZE II
No. 10935
EXP. 12-31-04
12-5-03

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400-241-3432 FAX

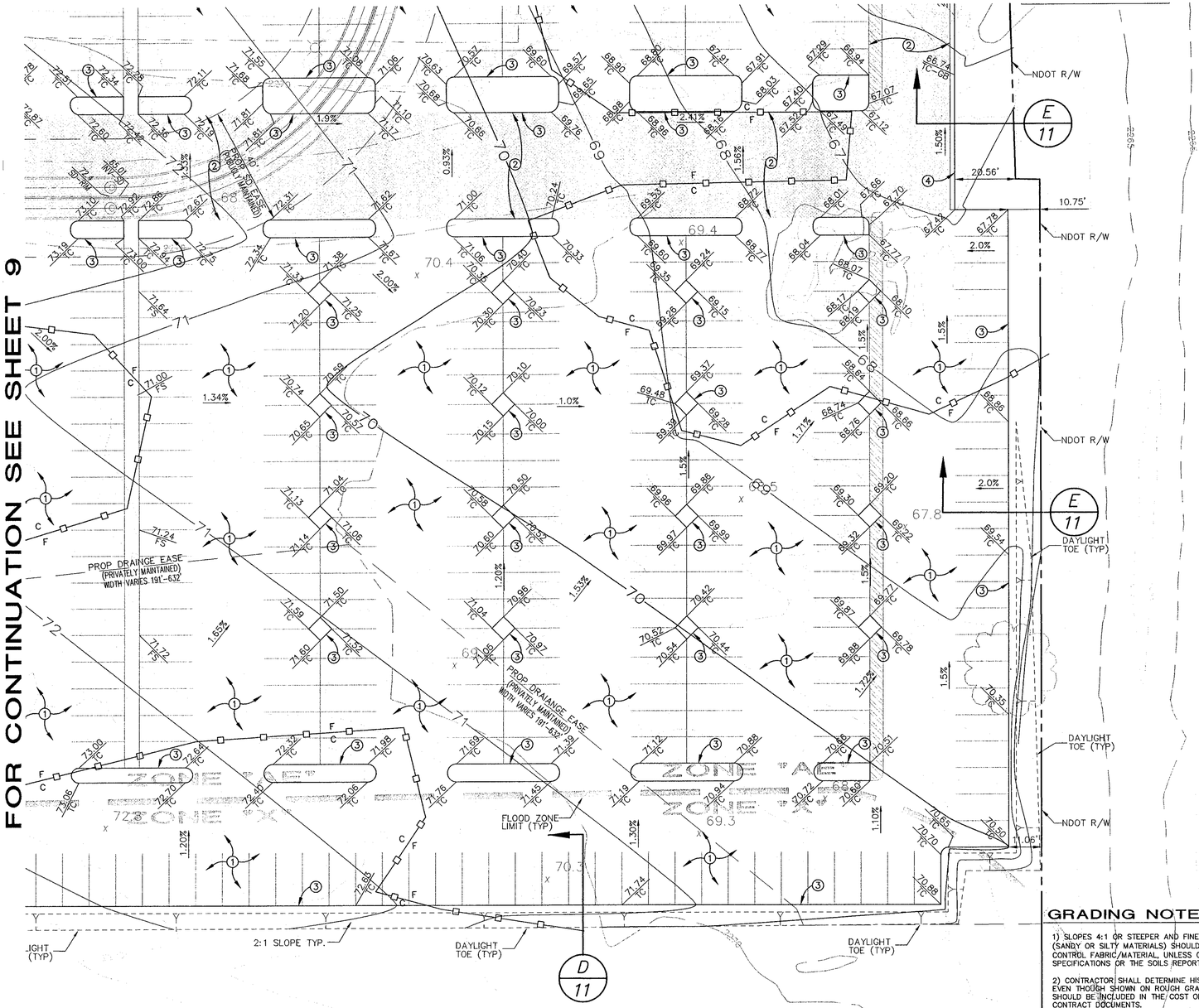
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

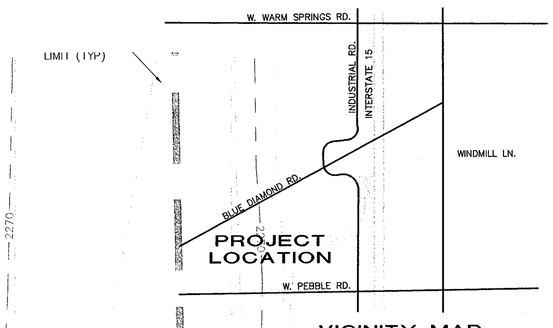
JOB #
SHEET NO.: PG-9
9 OF 17 SHEETS
HTE #

S:\Job's\PCA\PCA0218\10dwg last modified 22-Dec-2003 - 11:57am
S:\Job's\PCA\PCA0218\Xrefs\Xrefs.dwg last modified 17-Dec-2003 - 10:53am by JeffB

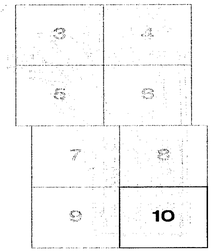
FOR CONTINUATION SEE SHEET 8

FOR CONTINUATION SEE SHEET 9





VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER
- C F — CUT/FILL DAYLIGHT LINE

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CALL BEFORE YOU DIG
CALL TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, Kennard F. Mize II, P.E. No. 10935 DATE: _____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PCA
NORTH

PROFESSIONAL ENGINEER STATE OF NEVADA
KENNARD F. MIZE II No. 12937 CIVIL
EXP. 12-31-04
10-3-03

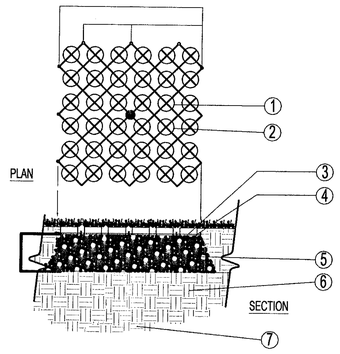
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING PLAN

JOB #
SHEET NO.: PG-10
10 OF 17 SHEETS
HTE #

S:\343-1\FG\PG10.dwg Last Modified: 23 Sep 2003 - 11:37am
Plotted on: 23 Sep 2003 - 12:04pm by Jashton



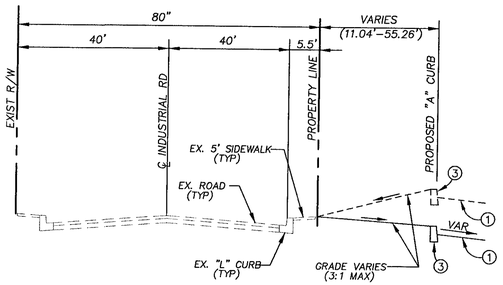
LEGEND:

1. Grass filled Grasspave² units
2. Trim individual rings to conform to irrigation head contour.
3. Hydrogrow mix below rings only, supplied free by manufacturer.
4. Concrete sand (clean, sharp sand).
5. Compacted sandy gravel road base under Grasspave² only layer base to support edge of Grasspave² square.
6. Compacted subgrade, 95% modified proctor density.
7. Excavate compacted to permint irrigation head installation.

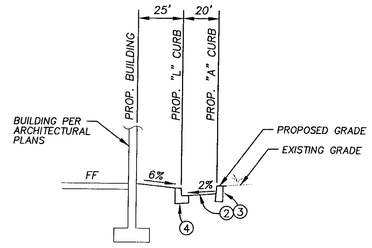
SPECIFICATION

Unit Size- 20" X 20" X 1", available in 9 standard roll sizes.
Unit Weight - 510 grams (18oz.) or 2.0 KG (4.5 pounds)
Strength - 402 KG/CM (5720 PSI)
Color - Black (standard)
Resin - 100% post-consumer recycled HDPE/LDPE.
NOTE:
Compacted subgrade, 95% modified proctor density grass/plant types shall be specified by geotechnical report.

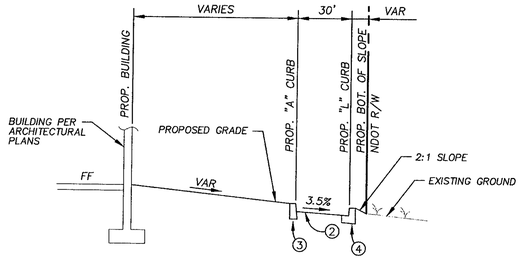
11 GRASSPAVE² LAYOUT DETAIL
N.T.S.



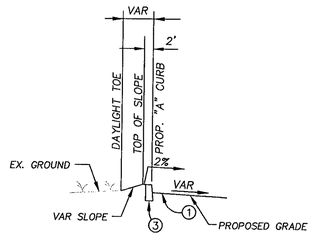
SECTION "A"
NOT TO SCALE
SEE SHTS. 5 & 7



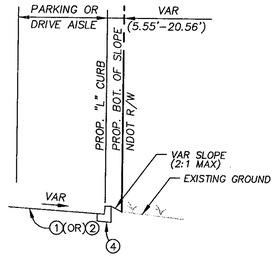
SECTION "B"
NOT TO SCALE



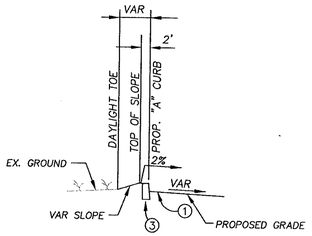
SECTION "C"
NOT TO SCALE
SEE SHT. 6 SEE SHT. 4



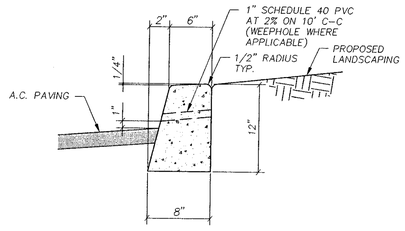
SECTION "D"
NOT TO SCALE
SEE SHT. 9 & 10



SECTION "E"
NOT TO SCALE
SEE SHT. 4, 8 & 106

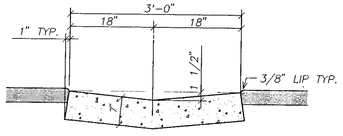


SECTION "F"
NOT TO SCALE
SEE SHT. 9

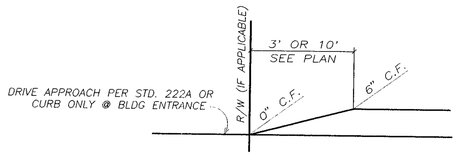


3 MODIFIED "A" CURB DETAIL
N.T.S.

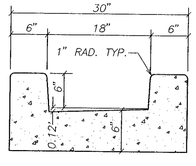
NOTE: WEEPHOLES ARE TO BE INSTALLED IN CURB FOR ALL CURB INSTALLED ADJACENT TO PLANTER AREAS



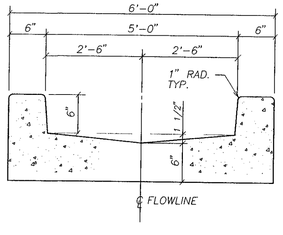
5 VALLEY GUTTER DETAIL
N.T.S.



6 CURB TRANSITION DETAIL
0" TO 6" CURB TRANSITION N.T.S.



7 18" "U" CHANNEL DETAIL
N.T.S.



9 5' "U" CHANNEL DETAIL
N.T.S.

CONSTRUCTION NOTES

1. CONST. 2" A.C. OVER 6" TYPE II A.B. OR C.M.B. (LIGHT DUTY)
2. CONST. 3" A.C. OVER 6" TYPE II A.B. OR C.M.B. (HEAVY DUTY)
3. CONST. MODIFIED "A" CURB PER DETAIL ON SHEET 11
4. CONST. "L" TYPE CURB PER C.C.A.U.S.D. No. 216
5. CONST. 3' VALLEY GUTTER PER DETAIL ON SHEET 11
6. CONST. 0" TO 6" CURB FACE TRANSITION PER DETAIL ON SHEET 11
7. CONST. 1.5' WIDE (UNO) "U" CHANNEL PER DETAIL ON SHEET 11
8. CONST. SIDEWALK RAMP PER CLARK COUNTY STD. 235, CASE II
9. CONST. 5' "U" CHANNEL PER DETAIL ON SHEET 11
10. INSTALL 12" THICK RIP-RAP PAD AS SHOWN, (D50=6") PER NDOT STD R-3.1.4
11. INSTALL "GRASSPAVE-2" DRIVEABLE TURF SYSTEM PER DETAIL – SHT 11

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSWS", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

GRADING NOTES

1) SLOPES 4:1 OR STEEPER AND FINE-GRAINED MATERIALS THAT HAVE BEEN DISTURBED (SANDY OR SILTY MATERIALS) SHOULD BE PROTECTED WITH BURLAP OR OTHER EROSION CONTROL FABRIC/MATERIAL, UNLESS OTHERWISE SPECIFIED BY LANDSCAPE DRAWINGS AND SPECIFICATIONS OR THE SOILS REPORT.

2) CONTRACTOR SHALL DETERMINE HIS OWN FOOTING OR BASEMENT EXCAVATION QUANTITIES, EVEN THOUGH SHOWN ON ROUGH GRADING PLANS. ADDITIONALLY, STRUCTURE BACKFILL COSTS SHOULD BE INCLUDED IN THE COST OF THE STRUCTURE, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.

3) CONTRACTOR SHALL NOTIFY PCA ENGINEERING WITHIN 24 HOURS OF OMISSIONS AND/OR ERRORS DISCOVERED ON THE PLANS. PCA ENGINEERING WILL NOT BE RESPONSIBLE FOR ANY "CORRECTIVE" WORK DONE BY OTHERS.

4) CONTRACTOR TO ENSURE POSITIVE DRAINAGE, NO PONDING ALLOWED. CONTRACTOR TO FOLLOW RECOMMENDATIONS AS OUTLINED IN THE PROJECT GEOTECHNICAL REPORT, INCLUDING BUT NOT LIMITED TO EXCAVATION, GRADING AND COMPACTION.
REFER TO THE REPORT PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NO. E-02-288
MARCH 19, 2003

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY:_____ DATE:_____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE:_____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — EXP. 12-31-04 — 10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE, BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
PRECISE GRADING SECTIONS AND DETAILS

JOB #
SHEET NO.:
PG-11
11 OF 17 SHEETS
HTE #

EXISTING CASINO

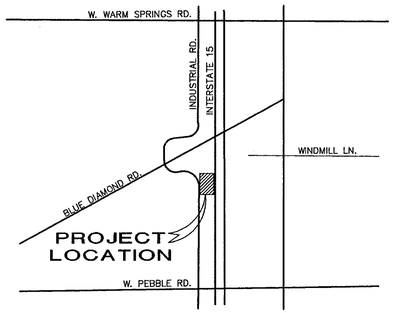
EXISTING HOTEL

BASS PRO SHOPS

(E) INDUSTRIAL ROAD

FOR ALL BUILDING RELATED DIMENSIONS NOT SHOWN, SEE ARCHITECTURAL DWGS

FOR CONTINUATION SEE SHEET 13



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

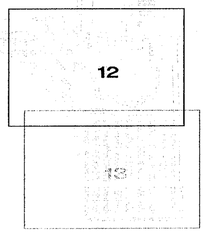
PCA

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



KEY MAP
NO SCALE

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES

ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, Kennard F. Mize II, P.E. No. 10935 DATE: _____

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — CIVIL — EXP. 12-31-04

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 • 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
HORIZONTAL CONTROL PLAN

JOB #

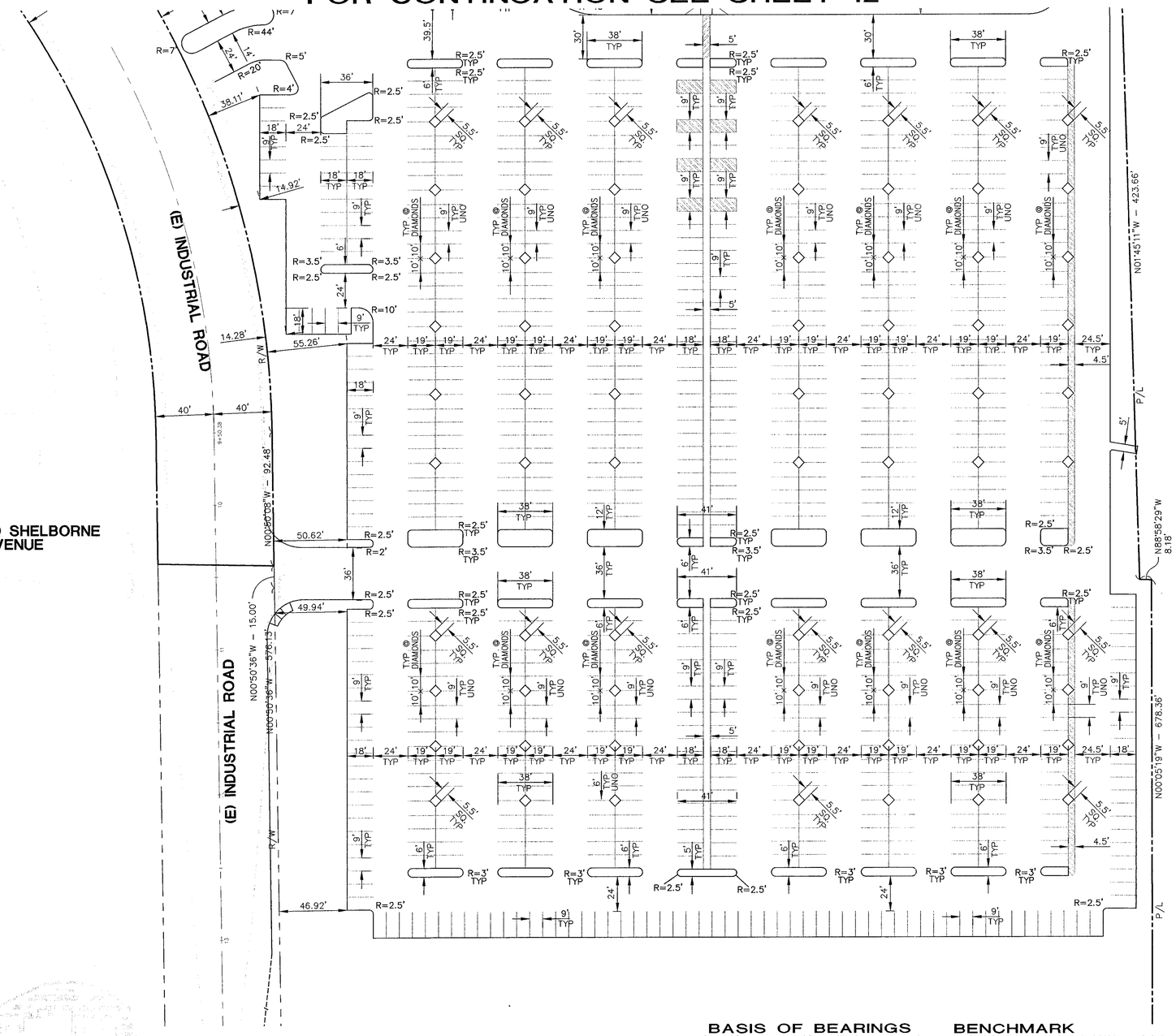
SHEET NO.:
PG-12

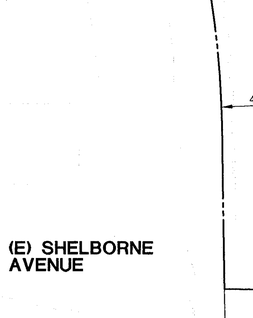
12 OF 17 SHEETS

HTE #

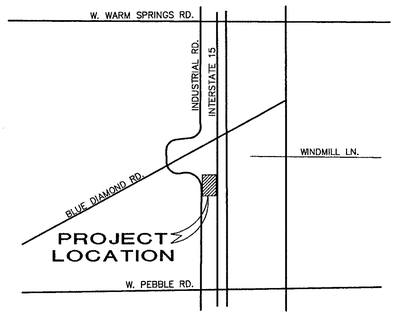
S:\143-1\PC\PG12-1HC.dwg, Last Modified: 22 Sep 2003 - 11:42am
Plotted on: 22 Sep 2003 - 12:10pm by fountain

FOR CONTINUATION SEE SHEET 12





KEY MAP
NO SCALE



VICINITY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

① LIGHT DUTY ② HEAVY DUTY

PCA

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA KENNARD F. MIZE II No. 10935 EXP. 12-31-04 — 10-9-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
HORIZONTAL CONTROL PLAN

JOB #

SHEET NO.:
PG-13
13 OF 17 SHEETS

HTE #

S:\143-1\TOPO\PG2-1HC.dwg Last Modified: 22 Sep 2003 - 11:42am
Plotted on: 22 Sep 2003 - 12:10pm by Houston

EXISTING CASINO

EXISTING HOTEL

BASS PRO SHOPS

(E) INDUSTRIAL ROAD

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

A.P. NUMBERS

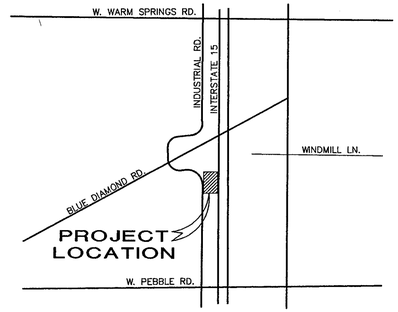
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE: 177-17-103-002, 117-17-204-007

BENCHMARK

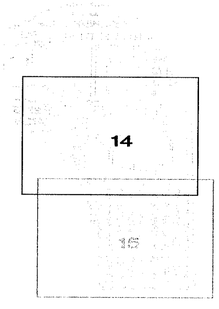
CLARK COUNTY CONTROL POINT "0C21 8SSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)



VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

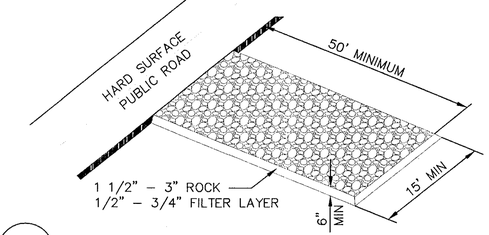
FOR CONTINUATION SEE SHEET 15

EROSION CONTROL NOTES:

(A) SINGLE ROW, SINGLE HEIGHT SANDBAGS SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS

(B) SINGLE ROW, DOUBLE HEIGHT SANDBAGS; BASE COURSE SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS. TOP COURSE BAGS SHALL BE CENTERED OVER THE ENDS OF THE BASE COURSE WITH NO GAPS BETWEEN THE BAGS.

(C) BAGS AROUND CATCH BASINS SHALL BE DOUBLE ROW, DOUBLE HEIGHT. BASE COURSE: SAME AS ABOVE; TOP COURSE TO BE PLACED WITH APPROXIMATELY 3" WIDE GAPS.



VTC VEHICLE TRACKING CONTROL
N.T.S.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA KENNARD F. MIZE II No. 10935 CIVIL EXP. 12-31-04 10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
EROSION CONTROL PLAN

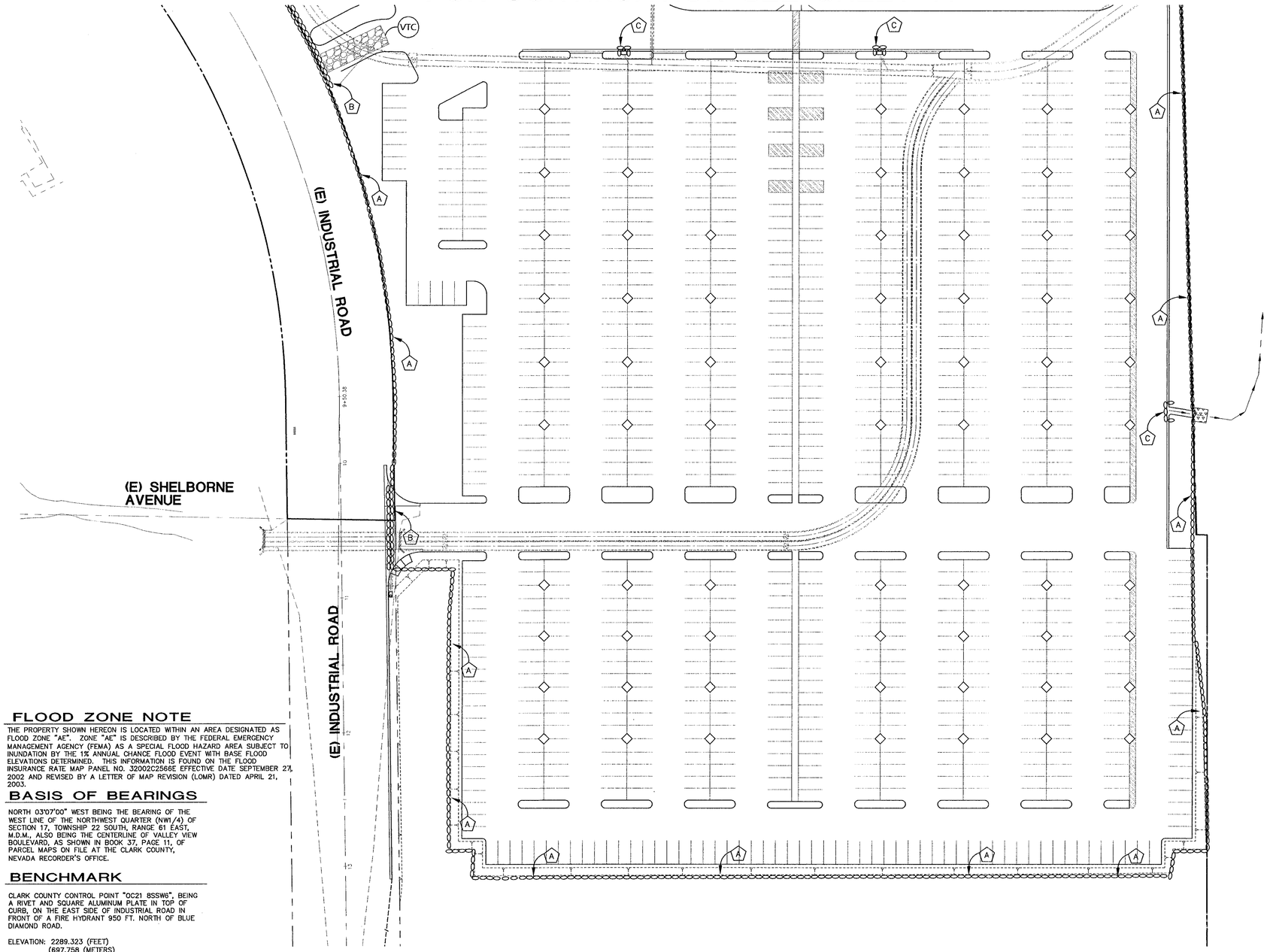
JOB #

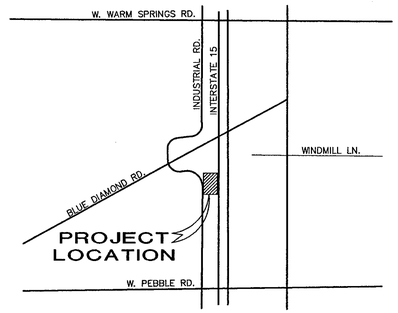
SHEET NO.:
PG-14
14 OF 17 SHEETS

HTE #

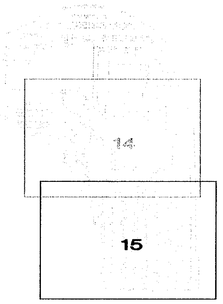
S:\243-1\PG\PG14-TEC.dwg Last Modified: 22 Sep 2003 - 11:48am
Plotted on: 22 Sep 2003 - 12:11pm by taunton

FOR CONTINUATION SEE SHEET 14





VICINITY MAP
NO SCALE



KEY MAP
NO SCALE

ABBREVIATIONS

BEG	BEGIN	INV	INVERT
BC	BEGINNING OF CURVE	JS	JUNCTION STRUCTURE
BW	BOTTOM OF WALL	L	LENGTH
CB	CATCH BASIN	MH	MANHOLE
CL	CENTERLINE	MAX	MAXIMUM
CO	CLEANOUT	R	RADIUS
CF	CURB FACE	RCP	REINFORCED CONCRETE PIPE
C & G	CURB & GUTTER	R/W	RIGHT OF WAY
EC	END OF CURVE	SD	STORM DRAIN
EX./EXIST	EXISTING	T	TANGENT
FF	FINISH FLOOR ELEVATION	TC	TOP OF CURB
FG	FINISHED GRADE	TW	TOP OF WALL
FS	FINISHED SURFACE	TYP	TYPICAL
FL	FLOWLINE	UNO	UNLESS NOTED OTHERWISE
GB	GRADE BREAK	VCP	VITRIFIED CLAY PIPE
HP	HIGH POINT	W	WIDTH

LEGEND

- FUTURE BUILDING
- 330.00 FS — PROPOSED ELEVATION
- 67 — PROPOSED CONTOUR
- PROPOSED CURB & GUTTER
- PROPOSED CURB ONLY
- PROPOSED STORM DRAIN AND CATCH BASIN
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHT
- MH — EXISTING MH
- EXISTING FENCE
- BOUNDARY
- EX. CURB & GUTTER

PAVING LEGEND

1 LIGHT DUTY 2 HEAVY DUTY

FLOOD ZONE NOTE

THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AN AREA DESIGNATED AS FLOOD ZONE "AE". ZONE "AE" IS DESCRIBED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AS A SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT WITH BASE FLOOD ELEVATIONS DETERMINED. THIS INFORMATION IS FOUND ON THE FLOOD INSURANCE RATE MAP PANEL NO. 32002C2566E EFFECTIVE DATE SEPTEMBER 27, 2002 AND REVISED BY A LETTER OF MAP REVISION (LOMR) DATED APRIL 21, 2003.

BASIS OF BEARINGS

NORTH 03°07'00" WEST BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 17, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., ALSO BEING THE CENTERLINE OF VALLEY VIEW BOULEVARD, AS SHOWN IN BOOK 37, PAGE 11, OF PARCEL MAPS ON FILE AT THE CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

CLARK COUNTY CONTROL POINT "0C21 BSSW6", BEING A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, ON THE EAST SIDE OF INDUSTRIAL ROAD IN FRONT OF A FIRE HYDRANT 950 FT. NORTH OF BLUE DIAMOND ROAD.

ELEVATION: 2289.323 (FEET)
(697.758 (METERS)

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88)

A.P. NUMBERS

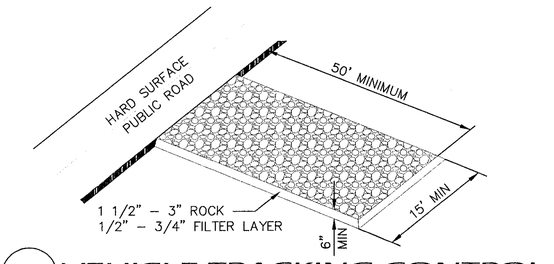
ASSESSOR'S PARCEL NUMBERS FOR THE PROJECT ARE:
177-17-103-002, 117-17-204-007

EROSION CONTROL NOTES:

(A) SINGLE ROW, SINGLE HEIGHT SANDBAGS SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS

(B) SINGLE ROW, DOUBLE HEIGHT SANDBAGS; BASE COURSE SHALL BE PLACED END TO END WITH NO GAPS BETWEEN THE BAGS. TOP COURSE BAGS SHALL BE CENTERED OVER THE ENDS OF THE BASE COURSE WITH NO GAPS BETWEEN THE BAGS.

(C) BAGS AROUND CATCH BASINS SHALL BE DOUBLE ROW, DOUBLE HEIGHT. BASE COURSE: SAME AS ABOVE; TOP COURSE TO BE PLACED WITH APPROXIMATELY 3" WIDE GAPS.



VTC VEHICLE TRACKING CONTROL
N.T.S.

CLARK COUNTY
DEPARTMENT OF DEVELOPMENT SERVICES
ACCEPTANCE OF PLANS FOR FILING

BY: _____ DATE: _____

ACCEPTANCE OF THESE PLANS FOR FILING SHALL NOT BE CONSTRUED TO BE A PERMIT FOR, OR AN APPROVAL OF ANY VIOLATION OF ANY OF THE PROVISIONS OF THE STATE OR COUNTY LAWS AND/OR SPECIFICATIONS. CLARK COUNTY SHALL BE HELD FREE FROM DAMAGES WHICH MAY RESULT FROM THE CONSTRUCTION OF THE IMPROVEMENTS FROM THE ENGINEERING DESIGN DEPICTED HEREIN. NOTE: POWER POLES AND/OR OTHER EXISTING FACILITIES NOT IN PROPER LOCATION, BASED ON PROPOSED IMPROVEMENTS SHOWN HEREON WILL BE RELOCATED AT NO EXPENSE TO CLARK COUNTY.

GRADING PLAN CERTIFICATION

I, _____ DATE: _____
Kennard F. Mize II, P.E. No. 10935

CERTIFY THAT HIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH CLARK COUNTY FOR THIS PROJECT.

PCA

NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

STATE OF NEVADA — PROFESSIONAL ENGINEER — KENNARD F. MIZE II — No. 10935 — EXP. 12-31-04
10-5-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

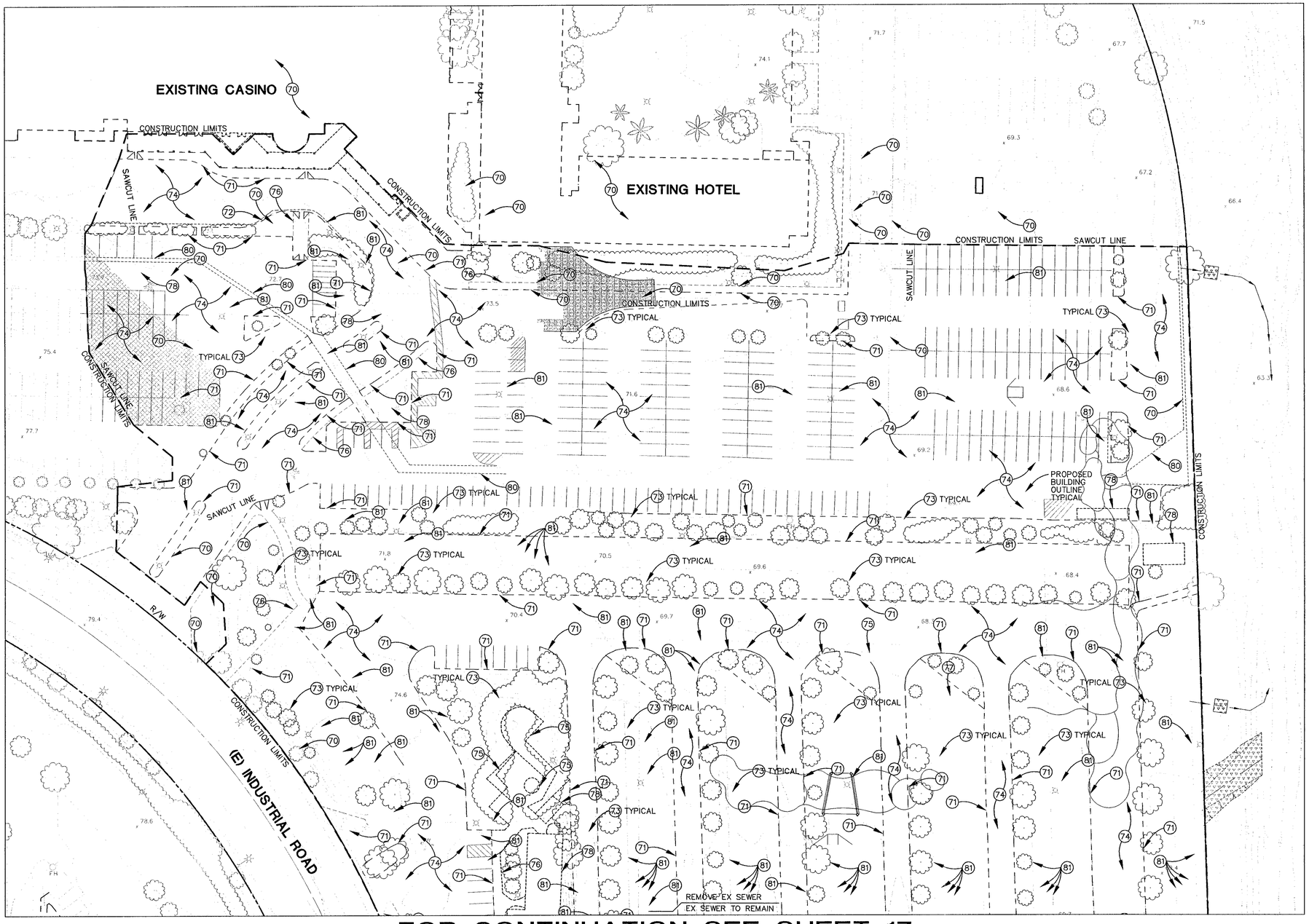
SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
EROSION CONTROL PLAN

JOB #

SHEET NO.:
PG-15
15 OF 17 SHEETS

HTE #

S:\Jobs\1PCA\PCA-1450\Land Development 22-Sep-2003 - 11:48am
Plotted on: 22-Sep-2003 - 12:12pm by Rumana



FOR CONTINUATION SEE SHEET 17

LEGEND

- EXIST. PARCEL LINE
- EXIST. CURB AND GUTTER
- EXIST. CURB ONLY
- EXIST. STORM DRAIN
- EXIST. CATCH BASIN
- EXIST. SEWER
- EXIST. WATER LINE
- EXIST. FIRE LINE
- EXIST. CROSS GUTTER
- EXIST. FENCE
- EXIST. BUILDING WALL
- EXIST. SCREEN WALL
- EXIST. RETAINING WALL
- SAWCUT LINE
- EXIST. HYDRANT
- EXIST. TREE
- EXIST. BOLLARD
- EXIST. GRATED INLET
- EXIST. MANHOLE
- EXIST. POWER POLE
- EXIST. PILASTER
- EXIST. STREET LIGHT
- EXIST. VAULT
- CONSTRUCTION LIMITS

DEMOLITION NOTES

(70) — PROTECT IN PLACE
(71) — REMOVE EXISTING CURB
(72) — REMOVE EXISTING CURB & GUTTER
(73) — REMOVE EXISTING TREES
(74) — REMOVE EXISTING AC PAVEMENT
(75) — REMOVE EXISTING CONCRETE PAVEMENT
(76) — REMOVE EXISTING SIDEWALK
(77) — REMOVE EXISTING WALL
(78) — REMOVE EXISTING STRUCTURE
(79) — REMOVE EXISTING CHAIN LINK FENCE
(80) — REMOVE EXISTING RIBBON GUTTER
(81) — REMOVE/ABANDON EXISTING UTILITY (CONTRACTOR'S CHOICE)*

* NOTE: REMOVE ALL EXISTING UTILITIES UNDER PROPOSED BUILDING OUTLINE. DO NOT ABANDON.

PCA NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

PROFESSIONAL ENGINEER STATE OF NEVADA
FRED CORNWELL
No. 12537
EXP. 12-31-04
4-9-03

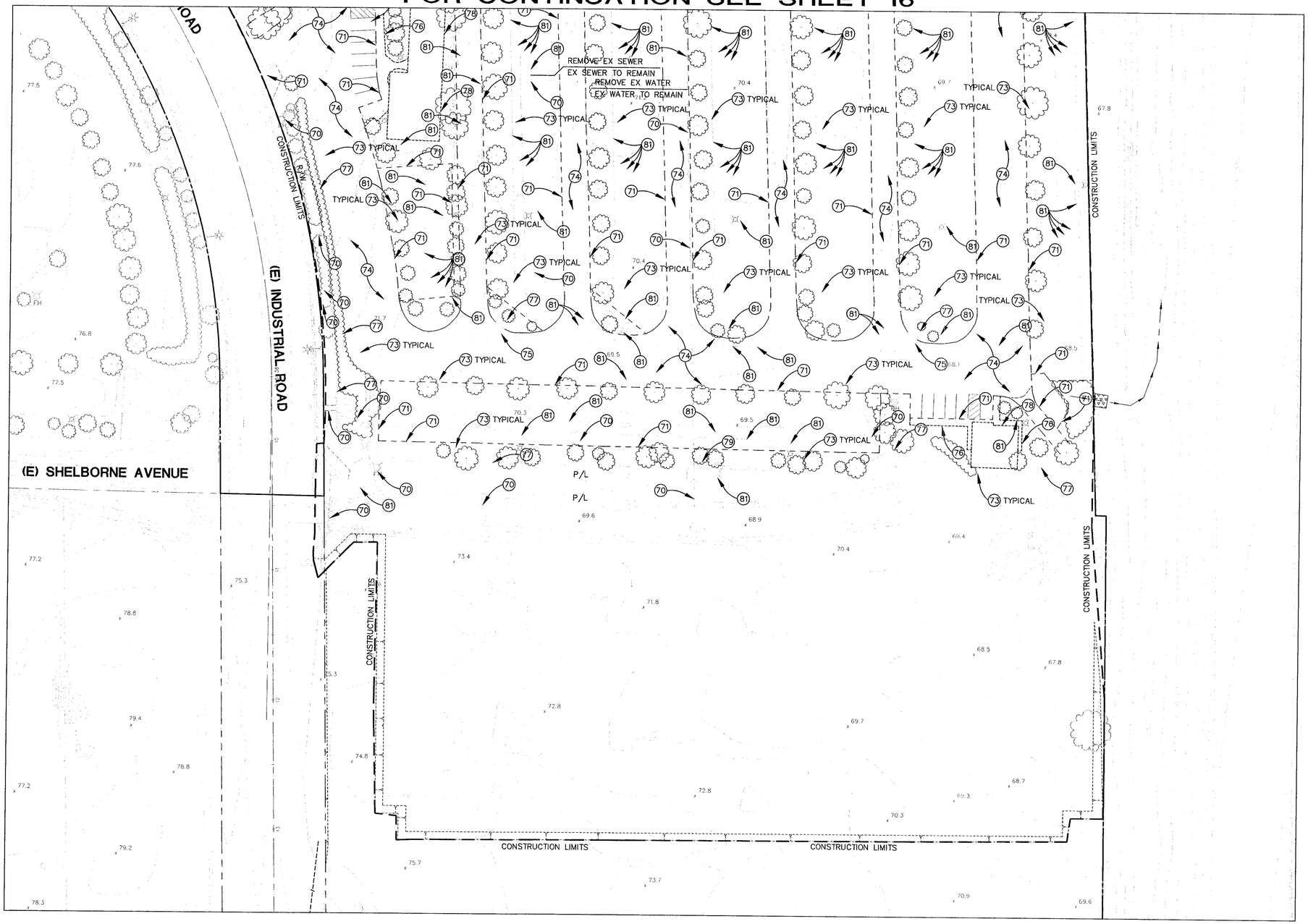
REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE, BLDG. E, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3400 241-3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
DEMOLITION PLAN

JOB #
SHEET NO.:
PG-16
16 OF 17 SHEETS
HTE #

FOR CONTINUATION SEE SHEET 16



LEGEND

- EXIST. PARCEL LINE
- EXIST. CURB AND GUTTER
- EXIST. CURB ONLY
- EXIST. STORM DRAIN
- EXIST. CATCH BASIN
- EXIST. SEWER
- EXIST. WATER LINE
- EXIST. FIRE LINE
- EXIST. CROSS GUTTER
- EXIST. FENCE
- EXIST. BUILDING WALL
- EXIST. SCREEN WALL
- EXIST. RETAINING WALL
- SAWCUT LINE
- EXIST. HYDRANT
- EXIST. TREE
- EXIST. BOLLARD
- EXIST. GRATED INLET
- EXIST. MANHOLE
- EXIST. POWER POLE
- EXIST. PILASTER
- EXIST. STREET LIGHT
- EXIST. VAULT
- CONSTRUCTION LIMITS

DEMOLITION NOTES

(70) — PROTECT IN PLACE
(71) — REMOVE EXISTING CURB
(72) — REMOVE EXISTING CURB & GUTTER
(73) — REMOVE EXISTING TREES
(74) — REMOVE EXISTING AC PAVEMENT
(75) — REMOVE EXISTING CONCRETE PAVEMENT
(76) — REMOVE EXISTING SIDEWALK
(77) — REMOVE EXISTING WALL
(78) — REMOVE EXISTING STRUCTURE
(79) — REMOVE EXISTING CHAIN LINK FENCE
(80) — REMOVE EXISTING RIBBON GUTTER
(81) — REMOVE/ABANDON EXISTING UTILITY (CONTRACTOR'S CHOICE)*

* NOTE: REMOVE ALL EXISTING UTILITIES UNDER PROPOSED BUILDING OUTLINE. DO NOT ABANDON.

PCA
NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

REGISTERED ENGINEER — STATE OF NEVADA — PROFESSIONAL ENGINEER — No. 12531 — EXP. 12-31-04 — 12-1-03

REV.	DATE	DESCRIPTION	DATE	APPROVAL

PARDUE, CORNWELL & ASSOCIATES, INC.
Planning • Engineering • Surveying
151 KALMUS DRIVE BLDG. M, SUITE-2
COSTA MESA, CALIF. 92626
(714) 241-3400-24F3432 FAX

SILVERTON EXPANSION PHASE 1
BASS PRO SHOPS
DEMOLITION PLAN

JOB #
SHEET NO.:
PG-17
17 OF 17 SHEETS
HTE #