TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

Volume I of II

Prepared for:

Basic Remediation Company
875 W. Warm Springs Road
Henderson, NV 89015

Prepared by:

PBS&J

2270 Corporate Circle, Suite 100
Henderson, Nevada 89074-6382
Phone: (702)-263-7275

October 6, 2006
PBS&J Reference No.: 511693.19

Date Submitted ____________
PIN # ____________

CLARK COUNTY DEPARTMENT OF DEVELOPMENT SERVICES
CIVIL ENGINEERING DIVISION

HTE # ____

DRAINAGE STUDY SUBMITTAL SHEET

(Each Drainage Study must have a separate submittal sheet and separate check)

Is this project located within a Major Project? ☐ **Yes** ☒ **No** **If yes, which Major Project is it?** ____

Assessor's Parcel Number (APN)

1. 178-11-501-006 **2.** 178-12-201-002 **3.** 178-12-301-001

This project is within the city limits of: ☐ Henderson ☐ Las Vegas ☐ North Las Vegas ☒ Other Clark County

Type of Submittal ☒ Initial of 1st study review ☐ Over 2 study reviews

Number of Acres

☐ up to 5 acres ☐ up to 40 acres ☒ up to 320 acres ☐ up to 2,560 acres ☐ over 2,560 acres

Project Name Technical Drainage Study for Eastside Landfill

Street Location

East/West Eastgate Rd/ 4th Street North/South Warm Springs Rd/ Lake Mead Dr

Land Use Applications

1. Landfill
2.
3.
4.
5.
6.

Engineering Firm PBS&J **Responsible Engineer** Harshal Desai, P.E., CFM

Address 2270 Corporate Circle, Suite 100

City/State/Zip Henderson, NV 89074 **Phone Number** (702) 263-7275

Owner/Developer Basic Remediation Company

Address 875 West Warm Springs Rd

City/State/Zip Henderson, NV 89015 **Phone Number** (702) 567-0400

(Revised 7/1/03)

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **Eastside Landfill** Date: **6th Oct 06**

Location of Development: a) Descriptive (Cross Streets) **Eastgate Rd/ Warm Springs Rd**

b) Sect. **11/12** Twn. **22S** Rng. **62E**

Name of Owner: **Basic Remediation Company** Assessors Parcel No: **178-11-501-006, 178-11-201-002 and 178-12-301-001**

Telephone No: **(702) 567-0473** Facsimile No:

Address: **875 West Warm Springs Rd**

Henderson, NV 89015

Contact Person Name: **Harshal Desai, P.E., CFM** Telephone No: **(702) 263-7275**

Firm: **P B S & J**

Address: **2270 Corporate Circle, Suite 100, Henderson, Nevada 89074**

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development	X	Other (Please specify below)
	Large Parcel Map		Building Permit		CCRFCD Facility

1. Total Owned Land Area: At Site: **113 +/- acres** Being Developed/Disturbed: **74 +/- acres**

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? YES **[NO]**

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? YES **[NO]**

4. Proposed type of development (Residential, Commercial, Etc.)? **Landfill**

5. Approximate upstream land area which drains to the subject site? **80 +/-acres**

6. Has the site drainage been evaluated in the past? **[YES*]** NO If yes, please identify documentation:
Henderson Commerce Center Two (Formerly known as Harsch)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
Into existing 60" storm drain located on adjacent property and to the undeveloped land to the north

8. Briefly describe your proposed schedule for the subject project: **ASAP**

PROFESSIONAL ENGINEER - STATE OF NEVADA
HARSHAL B. DESAI
Exp. 12-31-08
CIVIL
No. 17468
10-06-06

Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File No.

Revision	Date

PBS&J Job Number: **511693.19** **STANDARD FORM 1**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Eastside Landfill	Map ID:
Firm Name: PBS&J	Engineer: Harshal Desai, P.E., CFM
Address: 2270 Corporate Circle, Suite 100	
City: Henderson	State: NV Zip: 89074
Phone Number: (702) 263-7275	Fax Number: (702) 263-7200
Property Owner: Basin Remediation Company	
Address: 875 Warm Springs Rd	
City: Henderson	State: NV Zip: 89015
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 t the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minim 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 Con District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit t extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended lan 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**

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-22), 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.

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.
NA		Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
X		Proposed typical street sections.
NA		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 and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year ad 100-year storm peak flows at basin concentration points.
NA		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and drainage 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.
NA		Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
NA		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.
X		Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
NA	____	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.
N/A	____	Building and/or lot numbers.
NA	____	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X	____	Limits of existing floodplain based on current FIRM or 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. Finish floor elevations must be a minimum of 18 inches above BFE.
N/A	____	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.
N/A	____	Street slopes 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 and 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 and 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 $_{100}$ 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.

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
NA		Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
NA		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.
NA		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.
NA		Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
NA		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.
NA		Provide necessary freeboard requirements to set the finish floor elevations of all proposed buildings, 2 x depth of flow or 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.
NA		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 location 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 for drop inlets.
NA		Provide a 50 percent clogging factor in the capacity calculations 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.

REFERENCE:

October 6, 2006

Dave Betley, P.E.
Clark County Development Services
500 S. Grand Central Parkway
PO Box 551842
Las Vegas, NV 89155-1842

RE: TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL
PBS&J PROJECT NO.: 511693.19

Dear Mr. Betley:

Submitted for your review and approval are two copies of the *Technical Drainage Study for Eastside Landfill.*

If you have any questions regarding this study, please contact our office at (702) 263-7275.

Sincerely,

PBS&J

PROFESSIONAL ENGINEER - STATE OF NEVADA
HARSHAL B. DESAI
Exp. 12-31-08
CIVIL
No. 17468
10-06-06

Krystle Pemberton, E.I
Hydrologist

Harshal Desai, P.E., CFM
Project Manager

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I. Introduction and Purpose

This report is intended to serve as the Technical Drainage Study (TDS) for Eastside Landfill. The purpose of this study is to establish a technical analysis of peak flow rates affecting the site under existing, interim and developed conditions. It includes an analysis of onsite and offsite drainage patterns and flow rates for use in the design of flood protection facilities. The study shows that the flood protection facilities designed within this study will improve/ perpetuate existing drainage patterns.

This study was conducted in accordance with the criteria set forth by Clark County Regional Flood Control District (CCRFCD) *Hydrologic Criteria and Drainage Design Manual* (Criteria Manual), prepared by WRC Engineering and updated by Montgomery Watson, August 1999.

II. General Information

A. Location and Description

The Eastside Landfill property is located within Sections 11 and 12, Township 22 South, Range 62 East of Clark County, Nevada. The Assessor's Parcel Numbers for the subject site are 178-11-501-006, 178-12-201-002, and 178-12-301-001. The proposed development is located south of Warm Springs Road, west of 4^{th} Street and north of the Union Pacific Railroad (UPRR).

The proposed site is bordered to the north by undeveloped land and to the south by Pioneer America LLC (north of the Union Pacific Railroad). American Potash & Chemical Corporation is located east of the project site and undeveloped land is west of the project site. Henderson Commerce Center II (formerly known as Harsch Development) is northwest of the site. Please refer to **Figure 1: Area/Vicinity Map** in **Appendix A**.

The project site area is approximately 113 (+/-) acres. The project entails the construction of a landfill with a total volume of approximately 2.6 million cubic yards of fill. The top of the proposed landfill will be approximately 40 feet above existing grade to reach the desired volume. Channels are proposed around the perimeter of the landfill to collect / convey the offsite and onsite flows. These proposed channels will serve as drainage facilities as wells as access roads for the maintenance of the landfill. The west channel (Channel C-1) drains into a proposed detention basin, with a volume of 16+/- ac-ft, located in the northwest corner of the project site. The purpose of this detention basin is to provide necessary storage to perpetuate the design outflow of the existing 60" storm drain constructed with the Harsch Development. The east channel (Channel C-2) drains into an equalizer basin located just northeast of the proposed landfill. This equalizer basin was designed to split the flow north to perpetuate the existing drainage conditions and west through a proposed storm drain that drains into the detention basin. The top of the landfill was graded such that the runoff would reach the two proposed embankment channels, one draining into equalizer basin and the other draining into the detention basin. The conceptual layout of the proposed drainage facilities discussed above is shown in the exhibit below. The hydraulic calculations associated with the above mentioned facilities are further discussed in **Section III-D**. The improvement plans for the proposed facilities are provided in **Appendix E**.

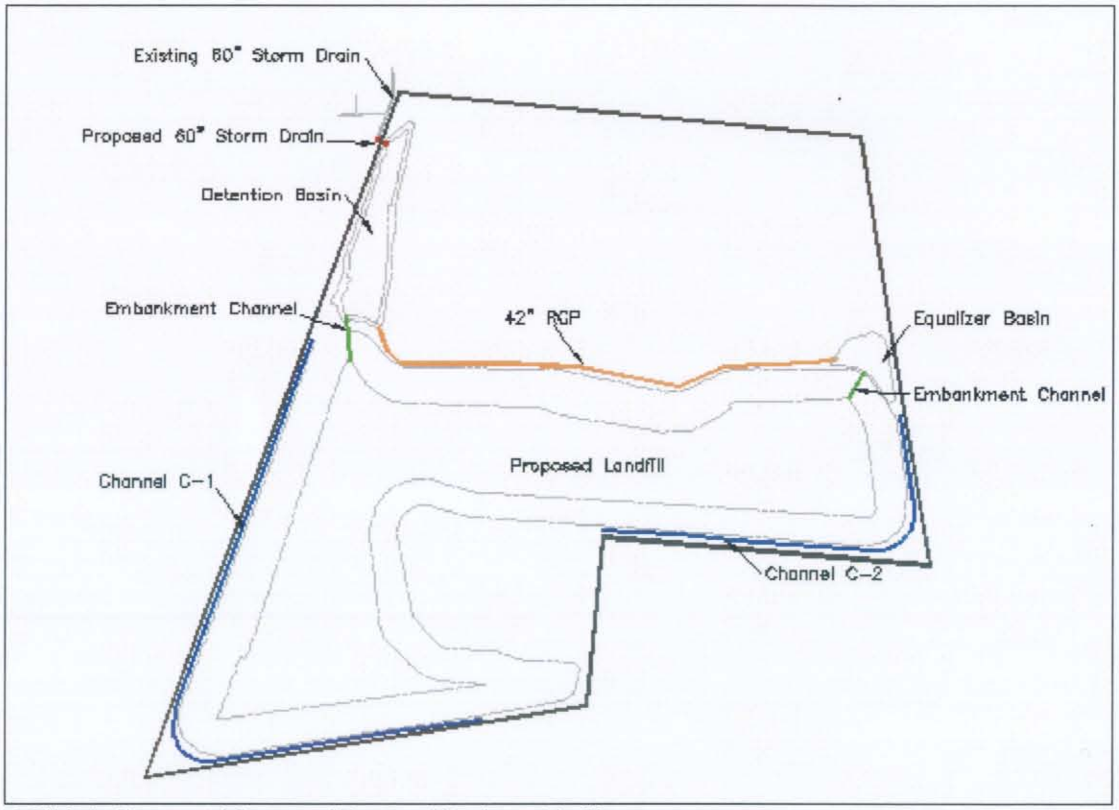

Exhibit 1: Conceptual Layout of Proposed Drainage Facility

B. CCRFCD Master Plan Information

Figure 2: CCRFCD Flood Control Facilities Map (in **Appendix A**) shows the subject property in relation to CCRFCD Master Planned facilities. The exhibits were reproduced from the 2002 CCRFCD Master Plan Update (MPU) of the Las Vegas Valley. The figure shows that the nearest regional facility, Pioneer Detention Basin (PTVW 0185), is located southwest of the proposed site. The detention basin's associated drainage system located west of the site carries the flow north past Warm Springs Road. The drainage from this development will not contribute flow through this facility.

The majority of flow from the project site is conveyed through the existing 60" storm drain which ultimately drains into the existing 10'x5' Reinforced Concrete Box (RCB) located under Warm Springs Road.

C. FEMA Floodplain Information

Figure 3: FEMA Map (in **Appendix A**) is a reproduction of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Clark County, Nevada, Community-Panel Numbers 32003C2595E dated September 27, 2002. **Figure 3** shows that the project site is within a non-shaded Zone X. Zone X is defined by FEMA as areas determined to be outside the 500-year floodplain.

D. Hydrologic Procedures Used

HEC-1 Flood Hydrograph Package, Version 4.1, developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center, was used to develop runoff data for this study. This is in accordance with the CCRFCD Criteria Manual. The methodology and calculations used to determine the hydrologic parameters are located in **Appendix B-4.** The hydrologic analysis is discussed in further detail under **Section III** of this TDS. HEC-1 runoff models for existing, interim and developed conditions are included in **Appendix B-1**, **B-2** and **B-3** respectively.

E. Hydraulic Procedures Used

Various hydraulic procedures were used for the analysis and design of different drainage facilities. The procedures used were in accordance with the CCRFCD Criteria Manual.

HEC-RAS, version 3.1.2, was used to model the two channels (Channel C-1 and Channel C-2) bordering the east and west side of the proposed landfill. Please refer to the conceptual layout above for the location of the two channels

WSPG model was used to model the proposed and existing storm drains.

FlowMaster was used for normal depth calculations to estimate the velocity and water depth for other minor channels, top of the landfill and embankment channels.

The hydraulic procedures and associated analyses are discussed in further detail under the hydraulic section (**Section III-D**) of this TDS.

F. Previous Studies in Project Vicinity

The following studies were reviewed in the preparation of this study. Reference material from each of these studies is included in **Appendix D**.

1. ***Addendum #1 to the Technical Drainage Study for Henderson Commerce Center II (Formerly known as Harsch).*** **Prepared by PBS&J., February 2003.**

This reference study performed a hydrologic analysis for the area located west of the proposed site. Offsite basin, OFFD1, from the 2003 referenced TDS is a combination of onsite and offsite basins, ONEX1 and OFFEX1, of this TDS. The hydrologic drainage patterns derived from the referenced TDS contributed to the design of the existing 60" storm drain located along the east side of the Harsch Development. An inlet is located just southeast of Harsch Development (combination point C18), where 100-year flow of 120 cfs was determined to be collected. At combination point C18B 100-year flow of 127 cfs was calculated to be in the existing 60" storm drain. Please refer to **Appendix D** for the reference material.

2. *Update to the Technical Drainage Study for Henderson Commerce Center (Formerly known as Harsch)*. Prepared by PBS&J., February 2005.

This reference study is an update to the previous study and had only minor changes to the storm drain design that runs along the east boundary of the Harsch Development, but does not change the overall hydrology of the site. Refer to **Appendix D** for the latest storm drain alignment and WSPG model.

III. Hydrology / Hydraulics

A. Existing Condition Hydrology

The 113 (+/-) acre site presently has two existing landfills and the rest of the site is undeveloped. The locations of the existing landfills are delineated on **Figure 4: Existing Condition Drainage Map** included in Appendix B-1. The existing landfills and the undeveloped land are hydrologically characterized as industrial and natural desert landscape respectively.

The onsite subbasins for the existing condition hydrology were delineated using 1 foot aerial topography and field reconnaissance. The onsite subbasins are labeled as ONEX1 through ONEX5. The existing condition hydrology used the offsite hydrology from the above mentioned reference study in **Section II-F**. In addition to the referenced offsite subbasins, PBS&J delineated offsite subbasins (OFFEX1 through OFFEX5) north of the UPRR that contribute flow to the proposed property. The area of the existing chemical ponds located within these offsite basins was deducted from the total area of the basins because these ponds will contain the precipitation and will not contribute to the runoff to the proposed site. **Figure 4** located in **Appendix B-1** shows the onsite and offsite basins for the project site under existing condition. The flow leaving the site is identified on the figures as a combination point or a discharge point.

The offsite basins OFFEX1 and OFFEX2 routes through the project site combining with ONEX1 at Combination point CP-1, with a 10-year and 100-year flow of 33 cfs and 105 cfs respectively. This flow is conveyed to an existing inlet (Combination Point C18) via an existing channel where it combines with the flow from the referenced basins west of the property boundary. The referenced basins are clearly identified on **Figure-4.** The 10-year and 100-year flow at C18 is 57 cfs and 162 cfs respectively. The flow captured by the inlet is conveyed through the existing 60" storm drain which ultimately discharges into the existing 10'x5' RCB under Warm Springs Road.

Subbasin ONEX2 flows northwest to combine with referenced basins HR1 through HR3 and C18 at combination point C18B. The 10-year and 100-year flow at this combination point was determined to be 78 cfs and 212 cfs respectively. Onsite subbasin ONEX3 discharges directly north into existing washes. The 10-year and 100-year flow at that discharge point is 27 cfs and 59 cfs respectively.

The offsite subbasin OFFEX5 flows north through an existing channels within ONEX4 to combine with ONEX4 at combination point CP-3. Combination point CP-3 outlets 10-year and 100-year flows of 27 and 65 cfs respectively into an existing channel north of the property boundary.

Flow produced by offsite subbasin OFFEX4 will be diverted east by an existing culvert under Fourth Street. The flow will reach the culvert through an existing riprap channel or by an existing graded swale along the northern border of this offsite basin. Therefore, the flow from this basin will not impact the project site. The picture below shows the riprap channel and the culvert under Fourth Street.

Exhibit 2: Picture of the riprap channel and the culvert under Fourth Street (looking west)

The offsite subbasin OFFEX3 has a shallow ponding area where the runoff is contained, preventing the flow from continuing north and impacting the project site. This low area also captures flow produced by onsite subbasin ONEX5. These two basins were combined at combination point CP-2. The existing shallow ponding area within OFFEX3 was modeled in the existing drainage condition HEC-1 model using a stage-storage discharge curve. The volume of the shallow area was determined by using 1' aerial topography. A negligible outflow was used to run the model. The existing condition HEC-1 model determined a water surface elevation (WSE) of 1768.34 feet produced by the runoff generated by these two subbasins. This shallow ponding area has containment up to an elevation of 1770 feet, therefore this flow was not assumed to continue north. Below is the summary of the information used in the stage-storage discharge curve.

Table 1: Summary Table for OFFEX3 Shallow Ponding Area Stage-Storage Discharge Curve

ELEVATION	AREA (ft2)	VOLUME (ft3)	VOLUME (ac-ft)	CUMULATIVE VOLUME (ac-ft)	OUTFLOW (cfs)
1766	10475	0	0.00	0.00	0
1767	30499	20487	0.47	0.47	0.01
1768	47931	39215	0.90	1.37	0.02
1769	68570	58250.5	1.34	2.71	0.03
1770	89398	78984	1.81	4.52	0.04

The discussion on the development of the hydrologic parameters is included in **Appendix B-4**. The existing condition HEC-1 model is included in **Appendix B-1. Table 2** below shows the summary of the flows in existing condition.

Table 2: Summary Table for Existing Condition

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ONEX1	32.76	47	17
ONEX2	28.77	49	21
ONEX3	22.12	59	29
ONEX4	28.27	56	25
ONEX5	1.06	3	2
OFFEX1	42.20	48	14
OFFEX2	9.63	13	4
OFFEX3	16.40	21	8
OFFEX4	7.61	14	6
OFFEX5	5.11	10	4
CP-1	NA	105	33
CP-2	NA	23	8
CP-3	NA	65	27
C18	NA	162	57
C18B	NA	212	78

B. Interim Condition Hydrology

The interim condition hydrology is analyzed assuming that the onsite basins are developed and the offsite basins have existing condition hydrologic parameters.

The onsite subbasins for the interim drainage condition hydrology were developed using the improvement plans included in **Appendix E**. The onsite subbasins are labeled as OND1 through OND15. **Figure 5: Interim Condition Drainage Map** shows the onsite and offsite basins for the project site under interim drainage condition. This figure is included in **Appendix B-2.**

As previously mentioned, two main channels were designed around the perimeter of the proposed landfill. Channel C-1 collects runoff produced by the west side of the landfill (from onsite basins OND1 through 3 and OND7) and offsite flow (from offsite basins OFFEX1 and OFFEX2) and eventually discharges into the proposed detention basin. The combination point CP-4 represents the total flow collected by Channel C-1. The 10-year and 100-year flow at CP-4 is 26 cfs and 79 cfs respectively.

Subbasin OND8 produces a flow of 16 cfs / 33 cfs (10-year / 100-year) which is conveyed through a graded channel along the perimeter of the proposed landfill. The channel starts at the southern boundary of OND8 and is graded to convey the flow to Channel C-2.

Channel C-2 collects flow from the east side of the landfill (from onsite basins OND8, OND10 and OND12) and offsite flow (from offsite basin OFFEX5). The combination point CP-10A represents the total flow collected by Channel C-2. The 10-year and 100-year flow at CP-4 is 25 cfs and 55 cfs respectively. Channel C-2 discharges into the proposed equalizer basin.

As discussed above, the top of the landfill has been graded to have positive drainage and to convey the flow to the two embankment channels located on either side of the proposed landfill. The top of the landfill was divided into three subbasins: OND4, OND5 and OND11. Subbasins OND4 and OND5 drains to the embankment channel located on west side of the proposed landfill (CP-5) whereas OND11 drains to the embankment channel located on east side of the proposed landfill. The west embankment channel conveys the flow of 19 cfs / 40 cfs (10-year / 100-year) from CP-5 to the proposed detention basin. The east embankment channel conveys the flow of 12 cfs / 24 cfs (10-year / 100-year) from OND11 to the proposed equalizer basin.

Subbasin OND6 has a proposed graded channel proposed along the perimeter of the landfill directing the flow into the detention basin. This subbasin will produce 10-year/100-year flow of 11/23 cfs. Subbasin OND13 also has a proposed graded channel along the perimeter of the landfill proposed directing the 10-year and 100-year flow of 6 cfs and 12 cfs respectively into the equalizer basin.

The purposed of the equalizer basin proposed at the northeast corner of the proposed landfill is to split the flow north and west. The peak flow (10-year/ 100-year) reaching the equalizer basin in interim drainage condition is 42 cfs / 90 cfs (10-year / 100-year) represented by combination point CP-10. This is the combined flow from CP-10A, OND11 and OND13. An elliptical pipe (53"x 34"), equivalent to a 42" RCP, is proposed as the outlet structure for this basin. A 30' spillway is proposed at an elevation of 1747.75 feet on the north side of the basin. The equalizer basin was modeled in HEC-1 using a stage storage discharge curve. The outflow through the 42" elliptical pipe was determined using the inlet control nomograph provided in the CCRFCD manual and flow overtopping the spillway was calculated using the weir equation. The WSE in interim drainage condition in the equalizer basin is 1747.53 feet, preventing any flow from overtopping the spillway and continuing north. Below is a table containing the flows and areas calculated by the above mentioned procedure. Please refer to **Appendix B-3** for sample calculations of the flow used in the stage-storage discharge curve for the equalizer basin.

Table 3: Summary Table for Equalizer Basin Stage-Storage Discharge Curve

ELEVATION	AREA (ft2)	AREA (ac-ft)	42" ELLIPTICAL PIPE FLOW (cfs)	SPILLWAY OVERFLOW (cfs)	TOTAL DISCHARGE(cfs)
1744.50	0	0.00	0	0	0
1745.00	3480	0.08	0	0	0
1746.00	30510	0.70	18	0	18
1747.00	34005	0.78	42	0	42
1747.75	36890	0.85	59	0	59
1748.00	37850	0.87	64	10	74
1748.50	42210	0.97	73	53	126

As previously mentioned, a 16+/- ac-ft detention pond is proposed at the northwest side of the property. The peak flow reaching the detention pond, represented by HEC-1 combination point CP-6, is contributed by Channel C-1, the west embankment channel, flow conveyed through the 42" RCP and subbasin OND6. The 10 year and 100 year flows reaching the detention pond are 79 cfs and 190 cfs respectively.

A 60" outlet pipe is proposed from the detention pond which ties into the existing 60" storm drain placed with the Harsch Development. A 25" restrictor plate is designed for the 60" outlet pipe to control the outflow. The peak 100-year outflow from the detention is calculated to be 41 cfs with a peak WSE of 1732.22 feet. The calculated freeboard for the detention basin in the interim condition is 2.78 feet (1735-1732.22). A stage-storage discharge curve was used to model the proposed detention basin in HEC-1. The outflow was calculated using the orifice equation. Please refer to **Appendix B-3** for sample calculations of the calculated outflows. Below is a summary table containing the information used in stage-storage discharge curve.

Table 4: Summary Table for Detention Basin Stage-Storage Discharge Curve

ELEVATION	HEIGHT (ft)	AREA (ft2)	VOLUME (ft3)	VOLUME (acre-ft)	CUMMULATIVE VOLUME (acre/ft)	OUTFLOW (ft3/s)
1725.25	0.0	0	0	0.00	0.00	0
1726.00	0.75	9360	3510	0.08	0.08	0
1728.00	2.0	53790	63150	1.45	1.53	22
1729.00	1.0	76290	65040	1.49	3.02	27
1730.00	1.0	82060	79175	1.82	4.84	32
1732.00	2.0	93665	175725	4.03	8.88	40
1734.00	2.0	105690	199355	4.58	13.45	46
1735.00	1.0	112360	109025	2.50	15.95	49

HEC-1 combination point C18 is the combination of the outflow from the detention basin and the referenced subbasins. The 10-year and 100-year flow at combination point

C18 is 62 cfs and 123 cfs. The referenced hydrology from Addendum #1 for the Harsch Development calculated a 100-year discharge of 120 cfs at this combination point. The difference in the flows computed at CP-18 is only 3 cfs (2.5%). The existing 60" storm drain is analyzed for flow greater than 120 cfs and has the capacity for the additional flow. The analysis completed will be discussed in further detail in **Section D.**

The remaining two onsite subbasins, OND14 and OND15, discharge into existing channels to the north. The 10-year and 100-year peak flows at CP-11 are 15 cfs and 31 cfs respectively. It should be noted that the flow reaching the northeast corner of the property after the proposed improvements is lower than the existing condition peak flow (27/65 cfs) at this location.

The discussion on the development of the hydrologic parameters is included in **Appendix B-4**. The interim drainage condition HEC-1 model is included in **Appendix B-2. Table 2** below shows the summary of the flows in interim condition.

Table 5: Summary Table for Interim Condition

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
OND1	0.94	3	1
OND2	3.70	8	4
OND3	1.38	4	2
OND4	11.67	27	13
OND5	5.03	12	6
OND6	9.90	23	11
OND7	5.87	16	8
OND8	14.26	33	16
OND9	1.06	3	2
OND10	4.28	10	5
OND11	9.60	24	12
OND12	2.77	8	4
OND13	4.70	12	6
OND14	11.12	31	15
OND15	21.47	57	28
DETPD	5.14	16	8
OFFEX1	42.20	48	14
OFFEX2	9.63	13	4
OFFEX3	16.40	21	8
OFFEX4	7.61	14	6
OFFEX5	5.11	10	4
CP-1	NA	15	5
CP-2	NA	68	22
CP-3	NA	70	22
CP-4	NA	79	26
CP-5	NA	40	19
CP-6	NA	190	79
CP-7	NA	23	8
CP-9	NA	51	23
CP-10	NA	90	42
CP-10A	NA	55	25
CP-11	NA	31	15
C18	NA	123	62
C18B	NA	133	67

C. Developed Condition Hydrology

The developed condition hydrology was analyzed assuming that onsite and offsite basins were developed. The developed curve numbers for the offsite basins were assumed to be industrial based on its current land use and the surrounding properties. Please refer to **Appendix B-4** for the development of the hydrologic parameters. It should be noted that developed condition produced higher runoff, and therefore was used in the design of the drainage facilities. **Figure 6 Developed Condition Drainage Map** shows the onsite and offsite basins for the project site under developed drainage condition. This figure is included in **Appendix B-3.**

The drainage patterns of the onsite and offsite basins are consistent with the drainage patterns discussed in the interim drainage condition. Only one modification was made to the drainage patterns in the developed condition hydrology. The shallow ponding area located within subbasin OFFD3 was removed from the HEC-1 model. Therefore, the flow produced by OFFD3 and OND9 will now combine with the flow in Channel C-2 at HEC-1 combination point CP-8. HEC-1 combination point CP-8 is the combination of subbasins OND8, OND9 and OFFD3. The remaining flow contributions to Channel C-2 remain unchanged.

The 10-year and 100-year peak flow reaching the equalizer basin in developed conditions is 60 cfs and 127 cfs respectively. The peak WSE in the equalizer basin was determined by the HEC-1 model to be 1748.19 feet. This WSE is 0.44 feet above the spillway height. It was determined that 67 cfs will be conveyed through the 42" RCP into the detention basin whereas 26 cfs will flow north combining with subbasin OND14 at HEC-1 combination point CP-11. The peak flow (10-year/100-year) at this combination point is 15/39 cfs. The peak flow reaching the northeast corner of the property is less than existing drainage condition peak flows of 27/65 cfs.

The 10-year and 100-year peak flow reaching the detention basin in developed conditions is 119 cfs and 254 cfs respectively. The 100-year WSE in the detention basin determined by the HEC-1 model is 1733.80ft, resulting in a freeboard of 1.2 feet. The outflow though the 25" opening is 45 cfs, resulting in the 100-year peak flow at HEC-1 combination point C18 to be 126 cfs. The proposed development will add an additional 6 cfs (additional 5%) to the existing 60" storm drain. A hydraulic analysis was performed on the additional flow anticipated to be conveyed through the existing 60" storm drain. This will be discussed in further detail in **Section D.**

Table 6: Summary Table for Developed Condition

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
OND1	0.94	3	1
OND2	3.70	8	4
OND3	1.38	4	2
OND4	11.67	27	13
OND5	5.03	12	6
OND6	9.90	23	11
OND7	5.87	16	8
OND8	14.26	33	16
OND9	1.06	3	2
OND10	4.28	10	5
OND11	9.60	24	12
OND12	2.77	8	4
OND13	4.70	12	6
OND14	11.12	31	15
OND15	21.47	57	28
DETPD	5.14	16	8
OFFD1	42.20	87	39
OFFD2	9.63	23	10
OFFD3	16.40	35	16
OFFD4	7.61	19	9
OFFD5	5.11	13	6
CP-1	NA	25	11
CP-2	NA	120	54
CP-3	NA	121	54
CP-4	NA	131	59
CP-5	NA	40	19
CP-6	NA	254	119
CP-7	NA	37	17
CP-8	NA	70	33
CP-9	NA	89	41
CP-10	NA	127	60
CP-10A	NA	92	43
CP-11	NA	39	15
C18	NA	126	68
C18B	NA	136	74

The discussion on the development of the hydrologic parameters is included in **Appendix B-4**. The developed drainage condition HEC-1 model is included in **Appendix B-3**. Please refer to **Appendix E** for the proposed grading plans.

D. Hydraulics

HEC-RAS Model for Channel C-1

HEC-RAS was used to model Channel C-1 (from station 10+00 to 20+00) which begins as an unlined 10 feet wide channel, 3:1 side slopes with a minimum depth of 3 ft. The channel then transitions to a 10 feet wide concrete bottom section, with riprap lined banks with 3:1 side slopes with a minimum depth of 3 feet until the channel discharges into the detention basin. Please refer to proposed grading plans included in **Appendix E** for the cross-section details and locations.

Boundary conditions for Channel C-1 were set to anticipate the effects of the proposed grading. The upstream boundary condition was set to normal depth with the channel slope of 0.40%. The downstream boundary condition was set to normal depth with the channel slope of 6.00% which represents the slope of the access road entering the detention basin. This slope was the most critical condition to ensure the velocities meet CCRFCD criteria at the terminus of the model.

The HEC-RAS model was ended at station 38+74.10 because the runoff in Channel C-1 will spread across the access road and over the grouted riprap into the detention basin. The geometry data used in HEC-RAS model is consistent with the proposed grading plans.

The HEC-RAS model simulated under mixed flow regime using the flows summarized in the table below.

Table 7: Summary of flows used for Channel C-1 HEC-RAS model

STATION	FLOW (cfs)	NOTES
1100	3	flow of OND1
1200	33	sum of CP-1 and OND2
2000	120	flow at CP-2
2200	121	flow at CP-3
2587.70	131	flow at CP-4

The results of the analysis shows that the maximum velocity in the unlined channel and the concrete/riprap channel are less than 5 feet/sec and 10feet/sec respectively. The freeboard calculations for Channel C-1 are located in **Appendix C-4**. Superelevation was calculated from station 20+50 through 23+73.86 because of the channel bend.

Please refer to **Figure7 – Cross Section and Drainage Facility Map** in **Appendix C-1** for channel stationing and **Appendix C-2** for the HEC-RAS model. An electronic copy of the HEC-RAS models is also included in **Appendix F**.

HEC-RAS Model for Channel C-2

HEC-RAS was used to model Channel C-2 (from station 10+00 to 26+69.88) which begins as an unlined 10 feet wide channel, 3:1 side slopes with a minimum depth of 3 ft. The channel then transitions to a 10 feet wide concrete bottom section, with riprap lined banks with 3:1 side slopes with a minimum depth of 3 feet (from station 20+00 to 25+45). The channel then transitions to a 10 feet wide concrete bottom section, with riprap lined banks with 3:1 side slopes with a minimum depth of 4 feet until the channel discharges into the equalizer basin. Please refer to proposed grading plans included in **Appendix E** for the cross-section details and locations.

The upstream boundary condition was set to normal depth with the channel slope of 0.40%. The downstream boundary condition was set to known WSE of 1748.19 which represents the peak WSE in the equalizer basin. The geometry data used in HEC-RAS model is consistent with the proposed grading plans.

The HEC-RAS model simulated under mixed flow regime using the flows summarized in the table below.

Table 8: Summary of flows used for Channel C-2 HEC-RAS model

STATION	FLOW (cfs)	NOTES
1000	80	sum of CP-8 and OND10
2000	89	flow at CP-9
2319.91	92	flow at CP-10A

The results of the analysis shows that the maximum velocity in the unlined channel and the concrete/riprap channel are less than 5 feet/s and 10feet/s respectively. The freeboard calculations for Channel C-2 are located in **Appendix C-4**. Superelevation was calculated through the channel bend.

Please refer to **Figure 7 – Cross-Section and Drainage Facility Map** in **Appendix C-1** for channel stationing and **Appendix C-2** for the HEC-RAS model. An electronic copy of the HEC-RAS models is also included in **Appendix F**.

FlowMaster Calculations

FlowMaster was used to calculate normal depth and velocity at the cross-sections shown on **Figure7- Cross-Section and Drainage Facility Map** included in **Appendix C-1**. Freeboard was calculated on the channels along the perimeter of the proposed landfill. The cross-sections on the top of the landfill were analyzed to show the peak flow is contained within the cross-section. The embankment channels were also analyzed using the FlowMaster to the show the containment of flow. The embankment channels are grouted riprap lined with 10' feet wide, 3:1 side slopes and depth of 1 foot. The velocities within these embankment channels are less than 15 feet /sec meeting the CCRFCD criteria.

Please refer to **Appendix C-5** for the FlowMaster calculations and the proposed grading plans included in **Appendix E** for the cross-section details.

<u>42" Storm Drain</u>

WSPG was used to analyze the 42" storm drain. Under developed condition, 67 cfs was calculated to enter the 42" storm drain based on the stage-storage discharge curve that was previously discussed in **Section III-B**. The upstream boundary condition uses a WSE of 1748.19 feet which was taken from HEC-1 model at the equalizer basin. The downstream boundary condition uses a WSE of 1733.8 feet which was taken from HEC-1 model at the detention basin.

Please refer to **Appendix C-6** for the WSPG model and the proposed grading plans included in **Appendix E** for the storm drain alignment, stationing and inverts.

<u>60" Storm Drain</u>

WSPG was used to analyze the proposed 60" storm drain that ties into the existing 60" storm drain built with the Harsch Development. The outflow from the detention pond was calculated to be 45 cfs determined from the stage-storage discharge curve. At HEC-1 combination point C18 in the developed conditions, the peak flow is 126 cfs. The referenced WSPG model was revised to show the changes in the existing storm drain due to the addition of 6 cfs. In the model, stations 2899.20 thru 1144.65 were directly referenced from the above mentioned study.

The peak outflow from the detention pond was 45 cfs and the peak flow at combination point C18 is 126 cfs. Therefore, 81 cfs was introduced at station 2899.20 where the existing inlet is located (126-45 = 81 cfs). As shown in the chart below, the 60" storm drain has adequate capacity to convey additional 6 cfs with minimal differences in the HGL and EGL between the proposed storm drain flow and the original flow calculated in the referenced study.

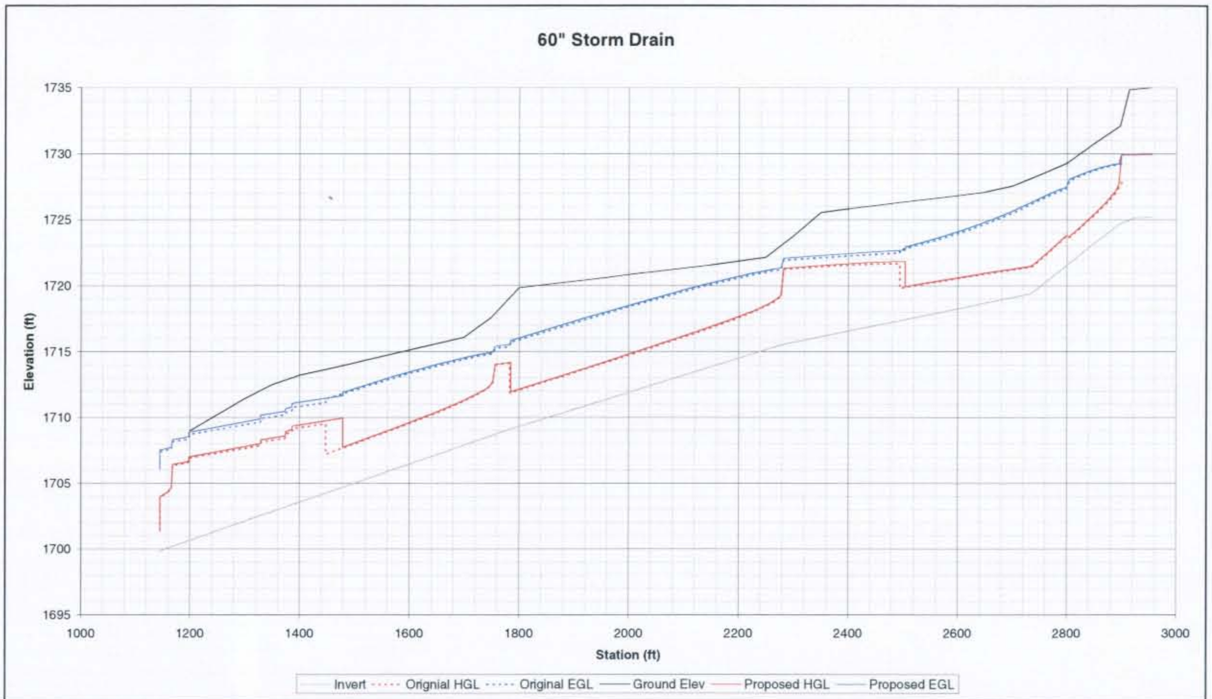

Exhibit 3: 60" Storm Drain Analysis Chart

Riprap Calculations

Riprap calculations were performed to show that 12" riprap will withstand the shear stress acting on the side slopes of Channel C-1 and Channel C-2. The shear stress calculations were conducted on stations 20+00 thru 38+74.10 of Channel C-1 and stations 20+00 thru 26+69.88 for Channel C-2.

PBS&J sized the riprap based on critical shear stress calculations. The results of proposed HEC-RAS model were used to calculate the average boundary shear stress on the channel bed (τo) using the following equation:

$\tau o = \lambda DSf$

where λ is the density of water (62.4 lb/ft2), D is the flow depth, and Sf is the frictional slope).

The critical shear stress (τcr) for the riprap bed was calculated based on the following equation:

$\tau cr = 0.06\ (\lambda s - \lambda w)\ d\ \text{Tan}\ \Phi$

where λs is the density of the riprap (149.76 lb/ft2, specific gravity = 2.4), λw is the density of water (62.4 lb/ft2), d is the median diameter of the riprap, and Φ is the angle of repose, which is based on Figure 705A of the Clark County Regional Flood Control District (CCRFCD) design manual.

PBS&J computed the shear stress on the banks and side slopes (τm) using the following equation:

$$\tau m = 0.75\ \lambda DSf$$
$$\tau m = 0.75\ \tau o$$

where τo is average boundary shear stress on the bed as discussed above.

The critical shear stress (τs) on the banks and side slopes is calculated based on the following equation:

$$\tau_s = \tau_{cr} \sqrt{1 - \frac{Sin^2\theta}{Sin^2\phi}}$$

where τcr is critical shear stress on the bed as discussed above, and θ is bank side slope.

PBS&J selected the riprap sizes such that the critical stress for banks is always greater than the shear stress for banks with a factor of safety always higher than 3 (refer to **Appendix C-8** for supporting calculations).

IV. Conclusions

This study presents the findings of a detailed evaluation of existing, interim, and developed drainage conditions for the proposed landfill.

This study investigated the onsite and offsite drainage conditions and determined that the site will be able to convey the 100-year peak flow rate through the proposed drainage facilities.

The study shows that the flood protection facilities designed within this study will improve/ perpetuate existing drainage patterns.

A copy of the grading plans are included **Appendix E**.

V. References

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

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

3. HEC-1 Flood Hydrograph Package Version 4.1. U.S. Army Corps of Engineers, Hydrologic Engineering Center, September 1990.

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

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

6. *Addendum #1 to the Technical Drainage Study for Henderson Commerce Center Two (Formerly known as Harsch).* Prepared by PBS&J, February 2003.

7. Update to the Technical Drainage Study for Henderson Commerce Center (Formerly known as Harsch Development). Prepared by PBS&J, February 2005.

Appendix A: General Information Figures

ASSESSOR'S PARCELS - CLARK CO., NV.
M. W. Schofield, Assessor

NOTES

This map is for assessment use only and does NOT represent a survey.
No liability is assumed for the accuracy of the data deliniated herein.
Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.

This map is compiled from official records, including surveys and deeds, but only contains the information required for assessment. See the recorded documents for more detailed legal information.

USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL

0 50 100 200 400 600 800

AVERAGE QA VALUE 35

MAP LEGEND

PARCEL BOUNDARY	001 / 1.00 PARCEL NUMBER / ACREAGE
SUBD BOUNDARY	202 PARCEL SUB/SEQ NUMBER
ROAD EASEMENT	PB 25-45 PLAT RECORDING NUMBER
PM/LD BOUNDARY	5 BLOCK NUMBER
NON-PARCEL LOT LINE	5 LOT NUMBER
MATCH LINE / LEADER LINE	GL5 GOV. LOT NUMBER
001 ROAD ID NUMBER	

BOOK T22S R62E

	R61E	R62E	R63E
T21S	162	161	160
T22S	177	178	179
T23S	191	190	189

SEC. 11

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

MAP N 2 NE 4

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7	3	7	3
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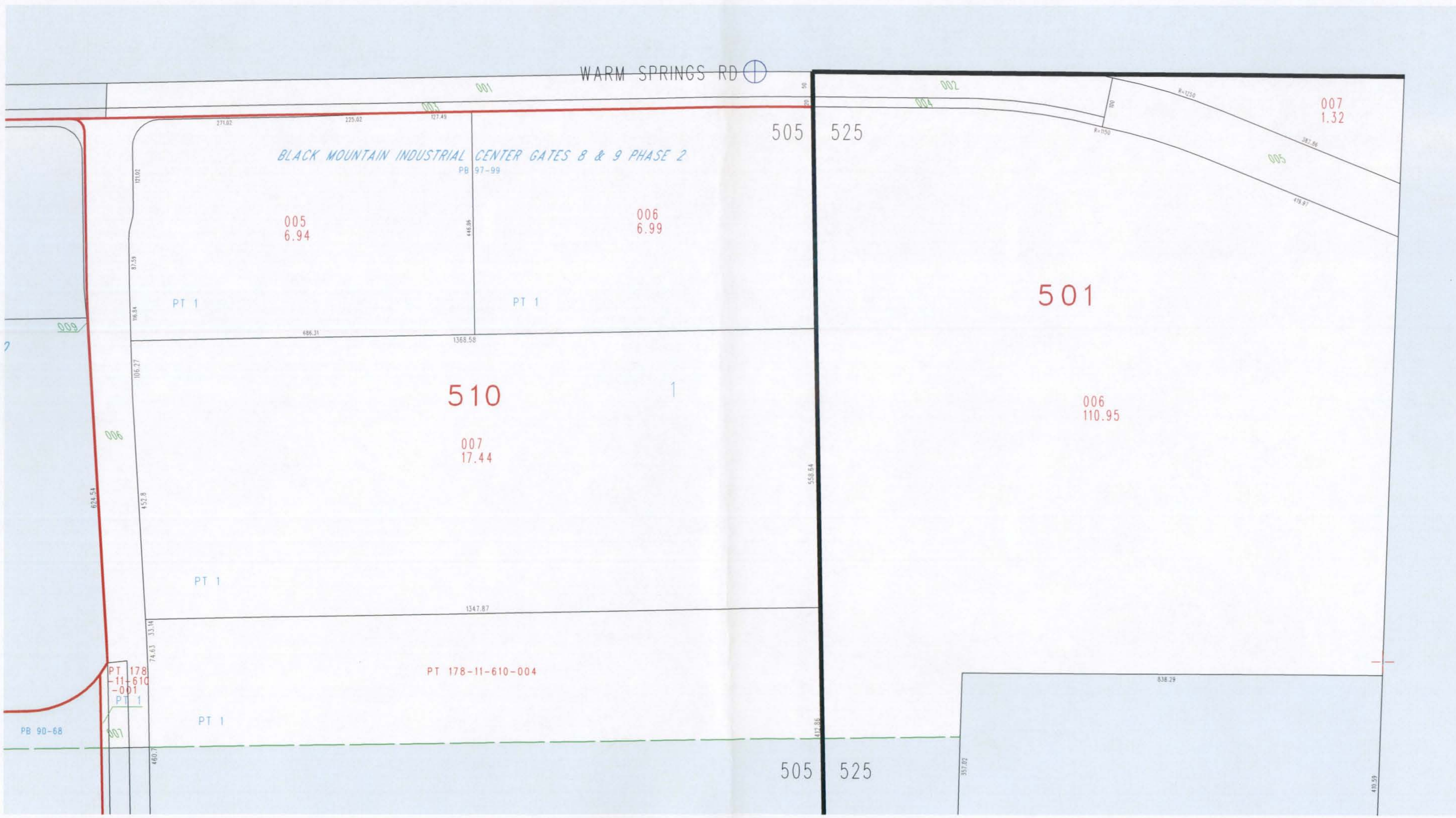
Rev:02/04/05

178-11-5

CLARK COUNTY ASSESSOR MAPPING DIVISION NEVADA



TAX DIST 505,525

NOTES

This map is for assessment use only and does NOT represent a survey.
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USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL
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AVERAGE QA VALUE 35

ASSESSOR'S PARCELS - CLARK CO., NV.
M. W. Schofield, Assessor

MAP LEGEND

	PARCEL BOUNDARY
	SUBD BOUNDARY
	ROAD EASEMENT
	PM/LD BOUNDARY
	NON-PARCEL LOT LINE
	MATCH LINE / LEADER LINE
001	ROAD ID NUMBER
001 1.00	PARCEL NUMBER ACREAGE
202	PARCEL SUB/SEQ NUMBER
PB 25-45	PLAT RECORDING NUMBER
5	BLOCK NUMBER
5	LOT NUMBER
GL5	GOV. LOT NUMBER

BOOK T22S R62E

	R61E	R62E	R63E
T21S	162	161	160
T22S	177	178	179
T23S	191	190	189

Scale:1"=200'

SEC. 11

6	5	4	3	2	1
7	8	9	10	11	12
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19	20	21	22	23	24
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31	32	33	34	35	36

Rev:02/03/06

MAP N 2 SE 4

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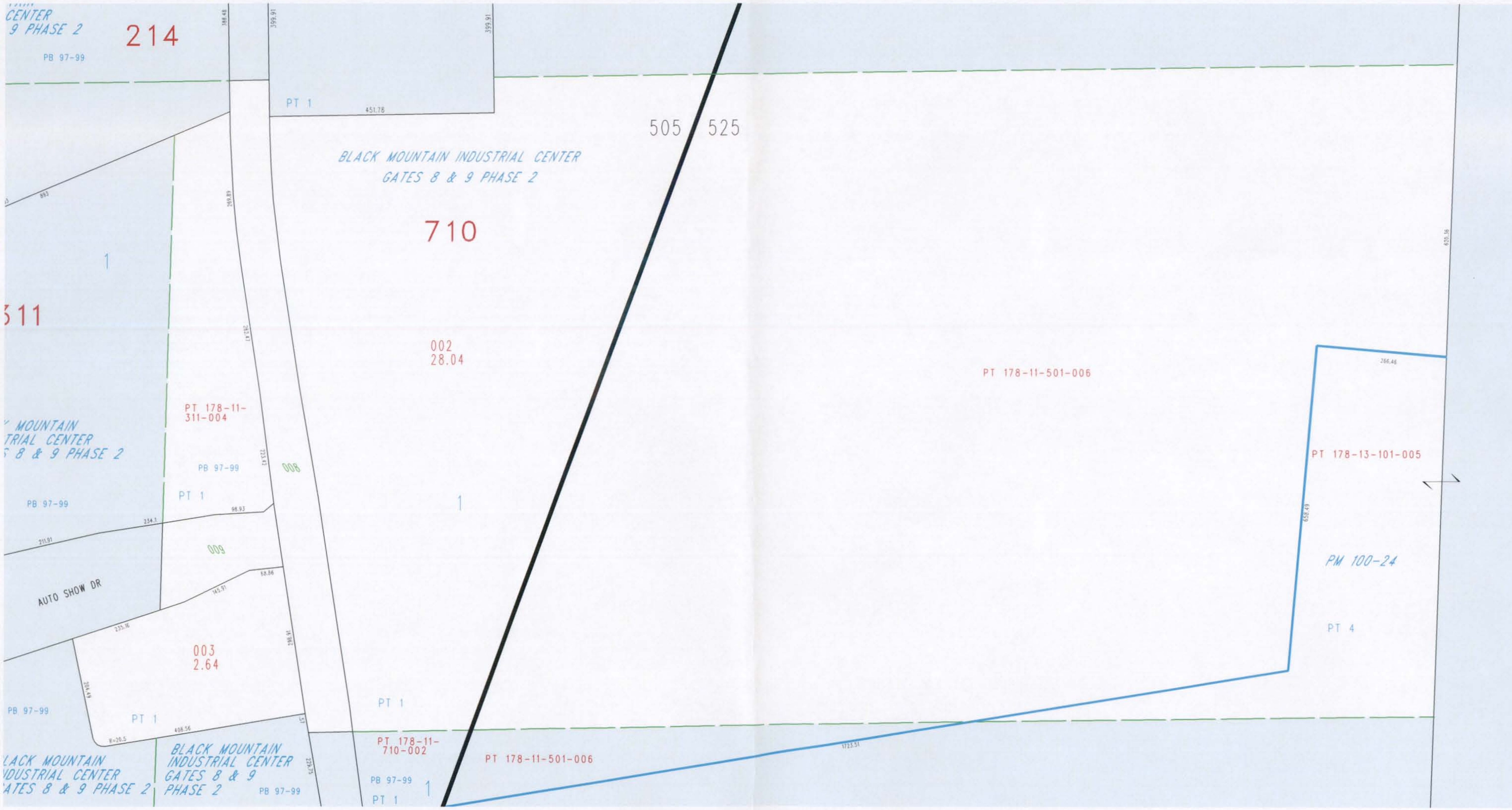
178-11-7

CLARK COUNTY ASSESSOR MAPPING DIVISION NEVADA



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NOTES

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MAP LEGEND

———	PARCEL BOUNDARY
——— (red)	SUBD BOUNDARY
- - - - -	ROAD EASEMENT
——— (blue)	PM/LD BOUNDARY
-------------	NON-PARCEL LOT LINE
—— —— (green)	MATCH LINE
001	ROAD ID NUMBER
001 1.00	PARCEL NUMBER ACREAGE
202	PARCEL SUB/SEQ NUMBER
PB 25-45	PLAT RECORDING NUMBER
5	BLOCK NUMBER
5	LOT NUMBER
GL5	GOV. LOT NUMBER

AVERAGE QA VALUE 45

ASSESSOR'S PARCELS - CLARK CO., NV.

M. W. Schofield, Assessor

BOOK T22S R62E

	R61E	R62E	R63E
T21S	162	161	160
T22S	177	178	179
T23S	191	190	189

SEC. 12

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31	32	33	34	35	36

MAP S 2 NW 4

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178-12-2

CLARK COUNTY ASSESSOR MAPPING DIVISION NEVADA

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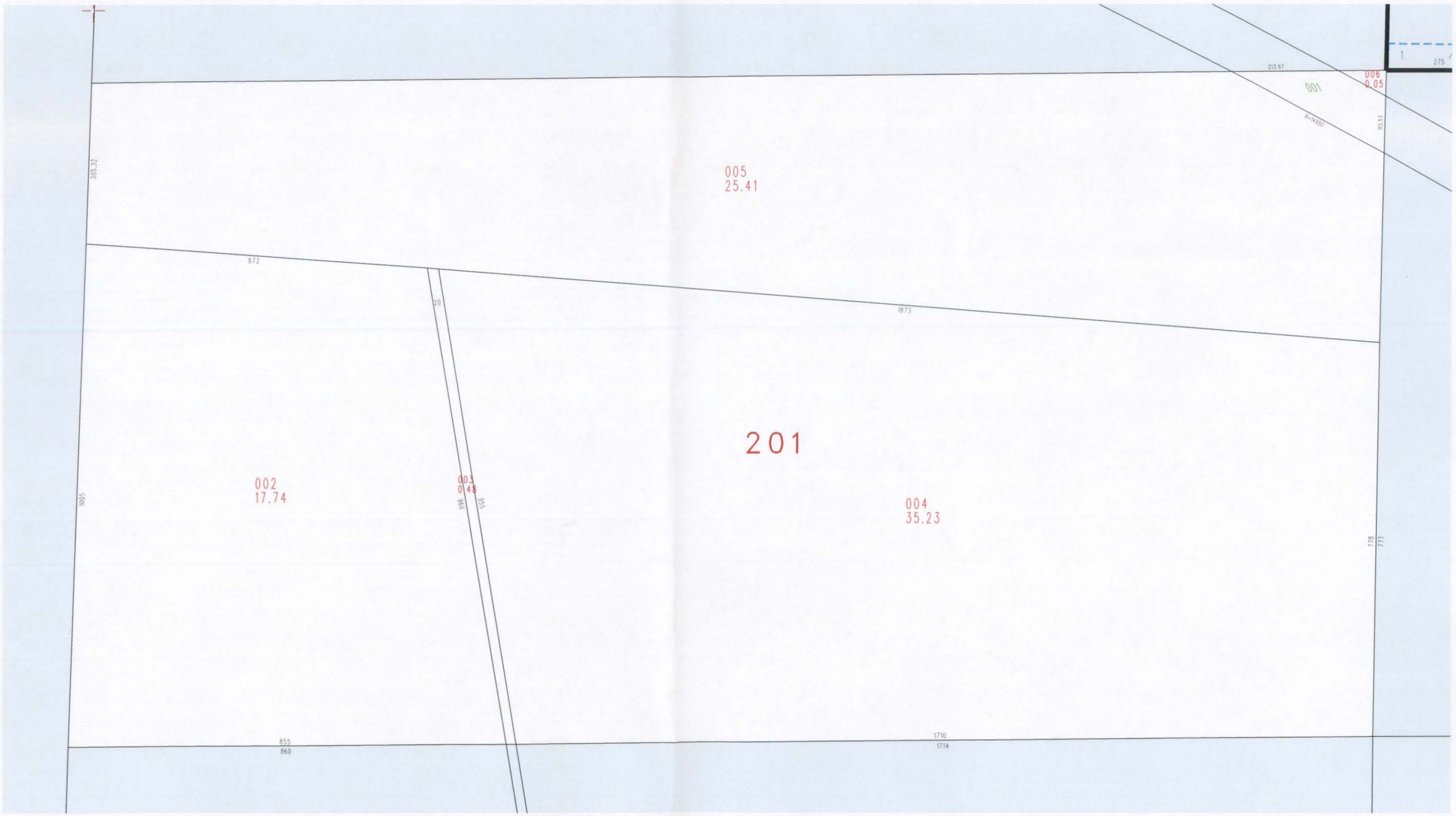
Rev:09/17/98



TAX DIST 525

ASSESSOR'S PARCELS - CLARK CO., NV.
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NOTES

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USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL

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AVERAGE QA VALUE 45

MAP LEGEND

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ROAD EASEMENT	PB 25-45 PLAT RECORDING NUMBER
PM/LD BOUNDARY	5 BLOCK NUMBER
NON-PARCEL LOT LINE	5 LOT NUMBER
MATCH LINE / LEADER LINE	GL5 GOV. LOT NUMBER
001 ROAD ID NUMBER	

BOOK T22S R62E

	R61E	R62E	R63E
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T22S	177	178	179
T23S	191	190	189

Scale:1"=200'

SEC. 12

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31	32	33	34	35	36

Rev:05/15/01

MAP N 2 SW 4

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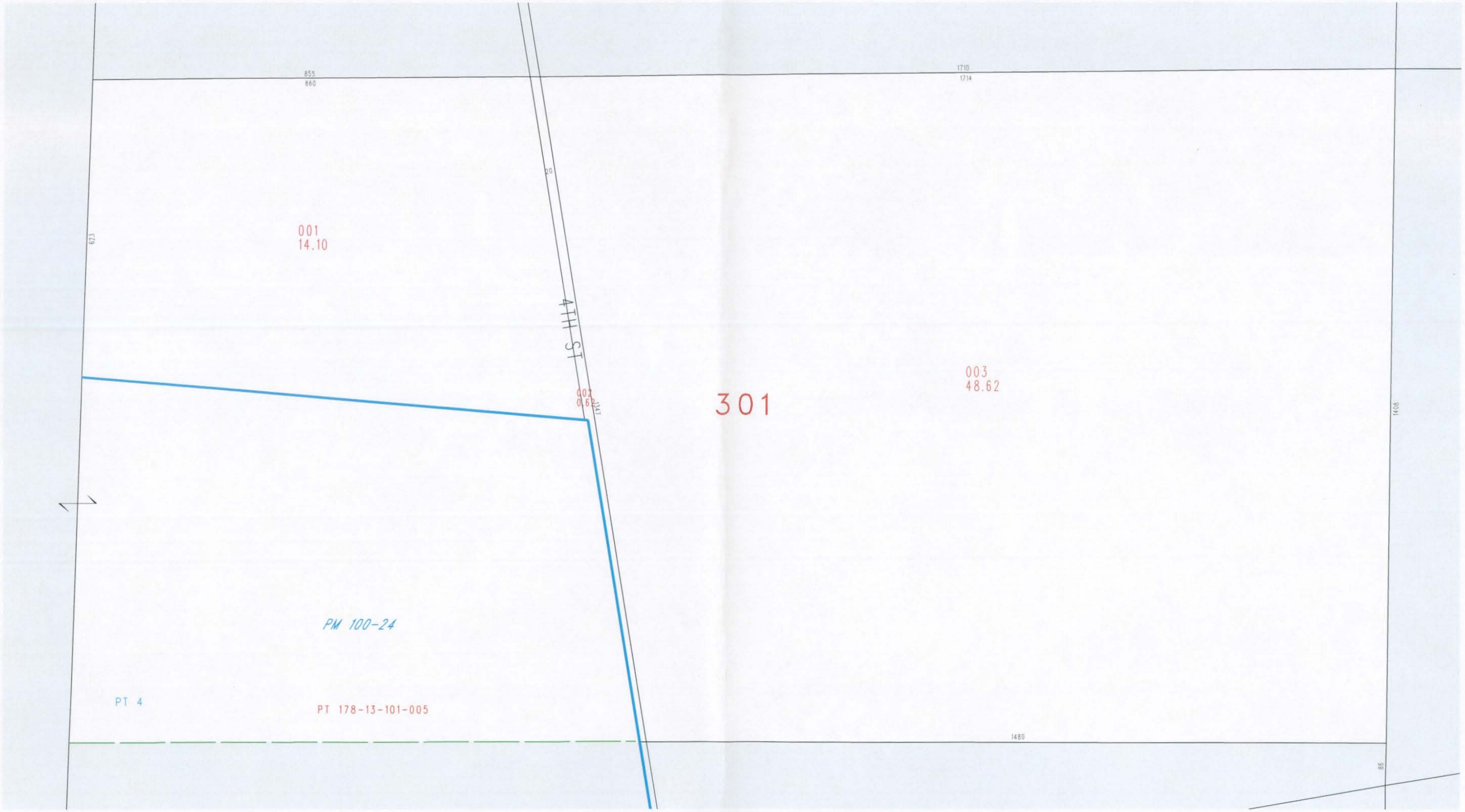
178-12-3

CLARK COUNTY ASSESSOR MAPPING DIVISION NEVADA



TAX DIST 525

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PBSJ

GRAPHIC SCALE

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(IN FEET)
1 inch = 800 ft.

511963.19 SEPTEMBER 2006

FIGURE 1
AREA/ VICINITY MAP

TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

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ENGINEERING PLANNING• SURVEYING CONSTRUCTION SERVICES

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FIGURE 2: CCRFCD FLOOD CONTROL FACILITIES MAP

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
C1BH		**C-1 CHANNEL - BOULDER HWY**						
0000	P1	Conc Chnl 30'W 6'D 2:1 SS	2140	3224	CP22	C1SDN3	3.19	1.00
0040	P1	3: 15' X 6' RCBC @ Horizon Dr	100	3194	CP21	C1SDN3	3.11	1.00
0042	P1	Conc Chnl 30'W 6'D 2:1 SS	1525	3194	CP21	C1SDN3	3.11	1.00
0071	E	10' X 4' RCBC @ Equestrian Dr	100	2842	CP20	C1SDN3	2.77	1.00
0071	P1	3: 14' X 6' RCBC @ Equestrian Dr	100	2842	CP20	C1SDN3	2.77	1.00
0073	P1	Conc Chnl 30'W 6'D 2:1 SS	2000	2842	CP20	C1SDN3	2.77	0.80
0111	P1	Conc Chnl 20'W 6'D 2:1 SS	1960	1937	CP17	C1SDN3	1.53	0.80
0148	E	5: 8' X 4' RCBC @ Robert Way	120	1832	CP16	C1SDN3	1.42	1.00
0150	E	Earth Chnl 80'-90'W 5'D 2:1 SS with Drop Structures	1745	1832	CP16	C1SDN3	1.42	1.30
0150	P0	Conc Chnl 40'W 4'D 2:1 SS	1745	1832	CP16	C1SDN3	1.42	1.30
C1CH		**C-1 CHANNEL**						
0040	P2	Conc Chnl 40'W 10'D 0:1 SS	4200	7324	CP61*	C1SDN4	11.92	1.00
0125	P2	Conc Chnl 40'W 10'D 0:1 SS	2100	7324	CP61*	C1SDN4	11.92	1.00
0159	E	Energy Dissipator		7324	CP61*	C1SDN4	11.92	
0161	E	Earth Chnl 30'-60'W 7'-20'D with Gabion 2:1 SS	2750	7324	CP61*	C1SDN4	11.92	2.00
0161	P0	Conc Chnl 40'W 8'D 0:1 SS	2750	7325	CP61*	C1SDN4	11.92	2.00
0213	E	Energy Dissipator		7324	CP61*	C1SDN4	11.92	
0215	E	2: 12' X 9' RCBC @ Lake Mead Dr	270	7324	CP61*	C1SDN4	11.92	3.20
0220	E	Conc Chnl 15'W 9'D 1:1 SS: West Floodwall	2560	7324	CP61*	C1SDN4	11.92	2.30
0269	E	Conc Chnl 15'W 7'D 2:1 SS: West Floodwall	1740	7324	CP61*	C1SDN4	11.92	2.30
0284	E	Conc Chnl 15'W 9'D 1:1 SS: West Floodwall	1760	7324	CP61*	C1SDN4	11.92	1.70
0335	E	Conc Chnl 50'W 12'D 0:1 SS	280	7324	CP61*	C1SDN4	11.92	1.20
0340	E	Conc Chnl 40-50'W 12'D 0:1 SS	300	7324	CP61*	C1SDN4	11.92	1.20
0346	E	Conc Chnl 40'W 6'D 2:1 SS: West Floodwall	290	7324	CP61	C1SDN4	11.92	1.20
0351	E	4: 12' X 7' RCBC @ Warm Springs Rd	100	7175	CP59	C1SDN4	11.25	1.00
0353	E	Conc Chnl 14.5'W 8'D 2:1 SS: West Floodwall	1245	6961	CPC1D	C1SDN4	10.44	0.84
0377	E	Conc Chnl 15'W 10'D 2:1 SS: West Floodwall	815	6961	CPC1D	C1SDN4	10.44	0.84
0392	E	Conc Chnl 50'W 14'D 0:1 SS	325	6961	CPC1D	C1SDN4	10.44	0.70
0398	E	Junction Structure	70	6961	CPC1D	C1SDN4	10.44	
0400	E	Conc Chnl 39.5'W 9'-14'D 0:1 SS	450	5919	CP51	C1SDN4	8.52	2.70
0408	E	Conc Chnl 25'W 9'D 2:1 SS	1650	5919	CP51	C1SDN4	8.52	2.00
0439	E	Single Span Bridge @ Burkholder Blvd	100	5919	CP51	C1SDN4	8.52	2.00
0441	E	Conc Chnl 25'W 9'D 2:1 SS	500	5666	CP27	C1SDN3	6.48	2.00
0455	E	Conc Chnl 25'W 7.5'D 2:1 SS	2695	5666	CP27	C1SDN3	6.48	2.60
0502	E	Conc Chnl 25'W 7'D 2:1 SS	1100	5666	CP27	C1SDN3	6.48	2.50
0523	E	Conc Chnl 39'W 8'D 0:1 SS with Junction Structure	310	5630	CP26	C1SDN3	6.33	2.00
0528	E	Conc Chnl 25'W 7'D 2:1 SS	1340	4876	CP23	C1SDN3	5.33	2.00
0554	E	3: 20' X 7' RCBC @ Boulder Hwy	350	4828	CPC1BH	C1SDN3	5.26	2.40
0561	P3	Conc Chnl 20'W 6'D 0:1 SS	1801	1765	CP14	C1SDN3	2.08	2.00
0600	E	3: 10' X 7' RCBC @ Horizon Dr	436	1765	CP14	C1SDN3	2.08	1.20
0603	P3	Conc Chnl 30'W 6'D 0:1 SS	520	1765	CP14	C1SDN3	2.08	5.34
0604	E	Bridge 36'W 8.5'D @ UPRR	50	1765	CP14	C1SDN3	2.08	1.00
0613	P3	Conc Chnl 12.5'W 6'D 2:1 SS	1470	1765	CP14	C1SDN3	2.08	2.40
0641	P3	Conc Chnl 12.5'W 5'D 2:1 SS	1645	1641	CP13	C1SDN3	1.84	2.70
0672	E	4: 10' X 5' RCBC @ Vermillion Dr	115	1641	CP13	C1SDN3	1.84	0.50
0674	E	Conc Chnl 25'W 6'D 2:1 SS	630	1641	CP13	C1SDN3	1.84	0.70
0686	E	NDOT Sediment Basin		1239	CP12	C1SDN3	1.43	
C1DC		**C-1 CHANNEL - DRAKE CHANNEL**						
0000	E	Conc Chnl 25'W 5'-14'D 0:1 SS	700	1778	CP55	C1SDN3	1.92	2.70
0013	E	Earth Chnl 10'W 5'D with Conc 2:1 SS	650	1778	CP55	C1SDN3	1.92	2.70
0013	P1	Conc Chnl 16'W 5'D 2:1 SS	650	1778	CP55	C1SDN3	1.92	2.70
0026	E	Conc Chnl 20.5'W 5'D 0:1 SS South Wall, 2:1 SS North Wall	300	1778	CP55	C1SDN3	1.92	2.70
0031	E	Conc Chnl 26'W 5'D 0:1 SS South Wall, 2:1 SS North Wall	750	1778	CP55	C1SDN3	1.92	2.70
0045	E	Junction Structure	200	1778	CP55	C1SDN3	1.92	
0049	E	2: 12' X 6' RCBC @ Racetrack Rd	92	1628	CP54	C1SDN3	1.69	0.50
0051	E	Earth Chnl 20'-50'W 20'-10'D 2:1 SS with 9'-12' Gabion Drop Structures	2640	1628	CP54	C1SDN3	1.69	0.50
0101	E	Earth Chnl 20'-50'W 20'-10'D 2:1 SS with 9'-12' Gabion Drop Structures	3660	1486	CP53	C1SDN3	1.44	0.50
0170	P1	Soil Cement Levee 7.5'	2950	1132	CP52	C1SDN3B	6.39	2.90
0226	E	Soil Cement Levee 5'	3800	1132	CP52	C1SDN3B	6.39	2.90
0298	E	48" RCPC Outlet	226	90	DB5	C1SDN3B	5.41	0.50
0302	E	20,789 cfs PMF Spillway		20789	C1-54	C1SDN3B	5.41	
0303	E	880 ac-ft East C-1 Detention Basin		3397	C1-54	C1SDN3B	5.41	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
C1E1		**C-1 CHANNEL - EQUESTRIAN TRIBUTARY 1**						
0000	P1	Energy Dissipator		688	CP30	C1SDN3B	1.21	
0002	P1	Conc Chnl 10'W 4.5'D 2:1 SS	2200	688	CP30	C1SDN3B	1.21	1.40
C1EQ		**C-1 CHANNEL - EQUESTRIAN D.B. OUTFALL**						
0000	P1	Conc Chnl 10'W 5.5'D 2:1 SS	3920	1097	CP48	C1SDN3	1.38	1.40
0074	E	9: 45" X 29" HERCP	220	679	CP46	C1SDN3B	7.82	0.50
0078	E	Grass Chnl 40'W 4.5'D 5:1 SS	1760	679	CP46	C1SDN3B	7.82	1.50
0112	E	Earth Chnl 45'-80'W 4'D 2:1 SS with Drop Structures	1445	679	CP46	C1SDN3B	7.82	1.40
0139	E	5' X 4' RCB	586	224	DB4	C1SDN3B	7.06	1.90
0151	E	Energy Dissipator		224	DB4	C1SDN3B	7.06	
0152	E	48" RCPC Outlet	325	224	DB4	C1SDN3B	7.06	0.40
0158	E	39,100 cfs PMF Spillway		39100	CP44	C1SDN3B	7.06	
0159	E	409 ac-ft Equestrian Detention Basin		5196	CP44	C1SDN3B	7.06	
0202	E	Conc Chnl 20'W 8.0'D 2:1 SS	5000	3115	CP38	C1SDN3B	4.35	2.40
0297	E	Rip Rap Levee 10'	9000	3115	CP38	C1SDN3B	3.49	2.00
C1FK		**C-1 CHANNEL - FOUR KIDS**						
0000	P2	10' X 5' RCB	770	935	CP72B	C1SDN3	1.00	2.50
0014	E	Earth Chnl 21'W 4'-5'D with Rock 0:1 SS	1280	935	CP72B	C1SDN3	1.00	1.80
0039	E	12' X 4' RCBC @ Eagle Rock Rd	70	935	CP72B	C1SDN3	1.00	2.70
0040	P1	Conc Chnl 10'W 4.5'D 2:1 SS	1750	935	CP72B	C1SDN3	1.00	2.70
0073	E	4: 6' X 3' RCBC @ Lake Mead Dr	160	721	CP72A	C1SDN3	0.78	2.00
0076	P1	Conc Chnl 10'W 5'D 0:1 SS	1400	721	CP72A	C1SDN3	0.78	3.00
C1GW		**C-1 CHANNEL - GREENWAY**						
0000	E	16' X 6' RCBC @ Pueblo Blvd	114	920	CP25	C1SDN3	1.01	1.00
0002	E	Conc Chnl 6'W 9.5'D 1:1 SS	1170	920	CP25	C1SDN3	1.01	0.40
0024	E	2: 12' X 4' RCBC @ Boulder Hwy	200	920	CP25	C1SDN3	1.01	0.40
0028	E	Conc Chnl 15'W 4'D 1:1 SS	490	920	CP25	C1SDN3	1.01	0.40
0037	E	2: 12' X 4' RCBC	40	920	CP25	C1SDN3	1.01	0.90
0038	E	Conc Chnl 15.3'W 4.8'D 1:1 SS	450	920	CP25	C1SDN3	1.01	0.70
0047	E	2: 12' X 4' RCBC @ Mona Ln	70	568	CP24	C1SDN3	0.63	0.60
0048	E	Conc Chnl 17'W 4'D 1:1 SS	685	568	CP24	C1SDN3	0.63	1.60
0061	E	2: 12' X 4' RCBC @ Greenway Rd	190	568	CP24	C1SDN3	0.63	1.00
0064	E	Earth Chnl 16'-20'W 6'-9'D 0:1 SS	300	568	CP24	C1SDN3	0.63	1.20
0064	P0	Conc Chnl 15'W 4'D 0:1 SS	300	568	CP24	C1SDN3	0.63	1.20
0070	E	2: 12' X 4' RCBC @ Van Wagenen Ave	85	568	CP24	C1SDN3	0.63	0.80
0072	E	Earth Chnl 28'W 3'-8'D 2:1 SS	470	568	CP24	C1SDN3	0.63	0.80
0072	P0	Conc Chnl 15'W 4.5'D 0:1 SS	470	568	CP24	C1SDN3	0.63	0.80
0081	E	3: 9.5' X 6.5' CMAP @ UPRR	50	568	CP24	C1SDN3	0.63	0.80
C1IT		**C-1 CHANNEL - ITHACA**						
0000	P1	72" RCP Outlet	6200	424	DB6	C1SDN3B	3.42	2.20
0117	P1	16,830 cfs PMF Spillway		16830	CP64	C1SDN3B	3.42	
0118	P1	310 ac-ft N.E. Detention Basin		1683	CP64	C1SDN3B	3.42	
0155	P1	Soil Cement Levee 11'	4000	1514	C1-65	C1SDN3B	2.54	3.00
0273	P1	Soil Cement Levee 11'	400	1514	C1-65	C1SDN3B	2.54	3.00
C1LM		**C-1 CHANNEL - LAKE MEAD**						
0000	P1	Conc Chnl 10'W 6'D 2:1 SS	2525	1385	CP71	C1SDN3	1.96	0.90
0048	P1	2: 11' X 6' RCBC @ Mohawk Dr	60	1385	CP71	C1SDN3	1.96	0.90
0049	P1	Conc Chnl 10'W 6'D 2:1 SS	1560	1385	CP71	C1SDN3	1.96	0.90
0079	P1	2: 11' X 6' RCBC @ Pawnee Ln	60	1385	CP71	C1SDN3	1.96	0.90
0083	P1	Conc Chnl 10'W 6'D 2:1 SS	570	1385	CP70	C1SDN3	1.77	0.90
0090	P1	2: 11' X 6' RCBC @ Navajo Dr	60	1305	CP70	C1SDN3	1.77	0.90
0092	P1	Conc Chnl 10'W 6'D 2:1 SS	325	1305	CP70	C1SDN3	1.77	0.90
0096	P1	2: 11' X 6' RCBC @ Shoshone Dr	60	1305	CP70	C1SDN3	1.77	0.90
0099	P1	Conc Chnl 10'W 6'D 2:1 SS	345	1305	CP70	C1SDN3	1.77	0.90
0105	P1	2: 11' X 6' RCBC @ Center St	100	1305	CP70	C1SDN3	1.77	0.90
0107	P1	Conc Chnl 10'W 6'D 2:1 SS	555	1305	CP70	C1SDN3	1.77	0.90
0118	P1	2: 11' X 6' RCBC @ Entrance	50	1305	CP70	C1SDN3	1.77	0.90
0119	P1	Conc Chnl 10'W 6'D 2:1 SS	295	1305	CP70	C1SDN3	1.77	0.90
0124	P1	2: 11' X 6' RCBC @ Entrance	50	1305	CP70	C1SDN3	1.77	0.90
0125	P1	Conc Chnl 10'W 6'D 2:1 SS	870	1305	CP70	C1SDN3	1.77	0.90
0142	P1	15' X 6' RCBC @ Warm Springs Rd	125	1054	CP69	C1SDN3	1.44	0.90
0144	P1	Conc Chnl 10'W 4.5'D 2:1 SS	655	682	CP67	C1SDN3	0.81	0.90
0156	P1	11' X 6' RCBC @ Ash St	60	682	CP67	C1SDN3	0.81	0.90
0158	P1	Conc Chnl 10'W 4.5'D 2:1 SS	1305	682	CP67	C1SDN3	0.81	0.90
0182	P1	11' X 6' RCBC @ Ivy St	60	682	CP67	C1SDN3	0.81	0.90
0184	P1	Conc Chnl 10'W 4.5'D 2:1 SS	900	682	CP67	C1SDN3	0.81	0.90

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LLMW		**LAKE LAS VEGAS - MAGIC WAY**						
0003	P0	Conc Chnl 10'W 6'D 2:1 SS	6670	1932	CP80	C1SDN3	3.52	3.50
0129	E	6: 8' X 3' RCBC	160	1842	CP79	C1SDN3	3.04	1.00
0132	P0	Conc Chnl 15'W 5'D 2:1 SS	3720	1564	CP77	C1SDN3	2.30	3.10
0203	E	Conc Chnl 35'W 5'-6'D 0.5:1 SS	3000	1515	C1-85	C1SDN3	2.06	3.10
PTBR		**PITTMAN WASH - BURNS**						
0029	E	Rip Rap Chnl 35'W 9'D 2:1 SS	2850	5448	CPBR160	PIT3SC	5.85	0.68
0029	P1	Rip Rap Chnl 60'W 9'D 3:1 SS	2850	5448	CPBR160	PIT3SC	5.85	0.68
0090	E	2: 24' X 8.5' RCAC @ Weisner Way	190	5448	CPBR160	PIT3SC	5.85	0.90
0091	E	Conc Chnl 25'W 9'D 2:1 SS	2570	5448	CPBR160	PIT3SC	5.85	1.10
0140	E	Conc Chnl 25'W 9'D 2:1 SS	1110	5254	CPBR150	PIT3SC	5.54	0.50
0160	E	Conc Chnl 10'W 8'D 2:1 SS	210	2881	CPBR090	PIT3SC	3.19	1.00
0163	E	Conc Chnl 20'W 8'D 0:1 SS	250	2881	CPBR090	PIT3SC	3.19	1.00
0164	P1	Add 4: 16' X 4' RCBC @ Boulder Hwy	330	2881	CPBR090	PIT3SC	3.19	1.50
0165	E	2: 6' X 4' RCBC @ Boulder Hwy	330	2881	CPBR090	PIT3SC	3.19	1.50
PTGB		**PITTMAN WASH - GIBSON**						
0058	P1	Conc Chnl 15'W 5.5'D 2:1 SS	1560	1532	CPBR080	PIT3SC	1.76	1.50
0087	P3	2: 10' X 6' RCB	660	1532	CPBR080	PIT3SC	1.76	0.50
0093	E	Earth/Conc Chnl 8'W 5'D 2:1 SS	550	1532	CPBR080	PIT3SC	1.76	1.50
0093	P1	Conc Chnl 30'W 5'D 0:1 SS	550	1532	CPBR080	PIT3SC	1.76	1.50
PTGL		**PITTMAN GAS LINE**						
0000	E	72" RCP	1675	678	CPPD030	PIT3SC	0.69	3.40
PTHR		**PITTMAN HORIZON RIDGE**						
0000	P1	Conc Chnl 15'W 5'D 2:1 SS	2300	1652	CPPD170	PIT3SC	1.49	3.00
0043	P1	2: 12' X 6' RCBC @ UPRR	100	1371	CPPD165	PIT3SC	1.25	2.00
0044	P1	Conc Chnl 15'W 5.5'D 2:1 SS	1250	1371	CPPD165	PIT3SC	1.25	1.20
0049	E	12' X 5' RCBC @ Lake Mead Dr	150	1345	CPPD160	PIT3SC	1.20	1.20
0067	E	8' X 5' RCB	1800	1345	CPPD160	PIT3SC	1.20	2.60
0104	P1	Conc Chnl 15'W 4.5'D 2:1 SS	1825	1345	CPPD160	PIT3SC	1.20	4.90
0139	E	36" RCP @ Horizon Ridge Pkwy	100	1065	CPPD135	PIT3SC	0.89	7.00
0139	P1	12' X 6' RCBC @ Horizon Ridge Pkwy	100	1065	CPPD135	PIT3SC	0.89	7.00
0140	P1	Conc Chnl 15'W 4'D 2:1 SS	3425	1065	CPPD135	PIT3SC	0.89	4.00
0203	P1	84" RCP Outlet	200	882	CPPD125	PIT3SC	0.72	4.00
0204	P1	882 cfs Spillway		882	CPPD125	PIT3SC	0.72	
0205	P1	2.5 ac-ft Pittman Horizon Ridge Debris Basin		882	CPPD125	PIT3SC	0.72	
0210	E	Natural Wash	2950	882	CPPD125	PIT3SC	0.72	7.00
PTIS		**PITTMAN WASH - INTERSTATE**						
0000	P1	Conc Chnl 30'W 6'D 2:1 SS	2100	4530	CPPD150	PIT3SC	5.90	3.00
0007	P1	4: 14' X 6' RCBC @ I-515	200	4530	CPPD150	PIT3SC	5.90	1.40
0008	P1	Conc Chnl 30'W 6.5'D 2:1 SS	150	4530	CPPD150	PIT3SC	5.90	1.40
0014	P1	4: 14' X 6' RCBC @ I-515	150	4530	CPPD150	PIT3SC	5.90	1.40
0015	P1	Conc Chnl 30'W 6.5'D 2:1 SS	250	4261	CPPD150	PIT3SC	5.24	1.40
0023	E	Conc Chnl 40'W 7'D 2:1 SS	110	3497	CPPD140	PIT3SC	3.68	3.00
0028	E	4: 8' X 8' RCBC @ I-515	350	3497	CPPD140	PIT3	3.68	2.80
0029	E	Conc Chnl 30'W 5'D 2:1 SS	1100	2520	CPPD070	PIT3	2.57	3.00
0050	E	Conc Chnl 30'W 5'D 2:1 SS	380	2520	CPPD070	PIT3SC	2.57	3.00
0055	E	2: 7' X 7' RCBC @ UPRR	1000	2520	CPPD070	PIT3SC	2.57	3.00
0056	E	Conc Chnl 30'W 5'D 2:1 SS	650	2520	CPPD070	PIT3SC	2.57	3.60
0068	E	Rip Rap Chnl 35'W 6'D 2:1 SS	1000	2520	CPPD070	PIT3SC	2.57	1.10
0087	E	Conc Chnl 35'W 6'D 2:1 SS	800	2380	CPPD060	PIT3SC	2.36	2.50
0102	E	Rip Rap Chnl 35'W 6'D 2:1 SS	3390	2380	CPPD060	PIT3SC	2.36	1.10
0166	E	2: 6' X 6' RCB	950	1365	CPPD045	PIT3SC	1.17	3.50
0184	E	Conc Chnl 9'W 4'D 3:1 SS	750	1962	CPPD050	PIT3SC	1.86	5.00
0197	E	3: 60" RCP @ Horizon Ridge Pkwy	150	681	CPPD030	PIT3SC	0.69	3.00
0198	E	Conc Chnl 10'W 4'D 2:1 SS	3150	681	CPPD030	PIT3SC	0.69	1.30

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
PTPA		**PITTMAN PABCO**						
0000	P1	Conc Chnl 30'W 6.5'D 2:1 SS	12430	2251	CPLW120	PIT3SC	4.69	0.30
0235	E	10' X 5' RCBC @ Pabco	140	302	PABCODB	PIT3SC	1.28	2.30
0236	P1	Conc Chnl 12'W 3'D 2:1 SS	950	302	PABCODB	PIT3SC	1.28	1.70
0254	E	1: 10' X 6' RCBC @ Warm Springs	90	302	PABCODB	PIT3SC	1.28	1.70
0255	P1	Conc Chnl 12'W 3'D 2:1 SS	280	302	PABCODB	PIT3SC	1.28	1.70
0260	E	2: 6' X 4' RCBC @ Boulder Hwy	61	302	PABCODB	PIT3SC	1.28	1.70
0262	P1	Conc Chnl 12'W 3'D 2:1 SS	45	302	PABCODB	PIT3SC	1.28	1.70
0264	E	2: 6' X 4' RCBC Outlet	230	302	PABCODB	PIT3SC	1.28	
0265	P1	10,300 cfs PMF Spillway		10300	CPPA030	PIT3SC	1.28	
0266	P1	53 ac-ft Pabco Detention Basin		1026	CPPA030	PIT3SC	1.28	
PTPD		**PITTMAN PIONEER DETENTION**						
0000	P1	Conc Chnl 12'W 4'D 2:1 SS	500	668	CPPD145	PIT3SC	0.54	3.00
0010	E	2: 60" RCP @ UPRR	50	668	CPPD145	PIT3SC	0.54	1.50
0012	E	Rip Rap Chnl 18'W 4.3'D 2:1 SS	300	668	CPPD145	PIT3SC	0.54	3.30
0018	E	9' X 4' RCBC @ Las Palmas	100	668	CPPD145	PIT3SC	0.54	0.90
0020	E	Rip Rap Chnl 18'W 4.3'D 2:1 SS	2275	668	CPPD145	PIT3SC	1.00	3.60
0063	E	72" RCP	1650	556	PPD130	PIT3SC	0.40	2.80
PTRR		**PITTMAN RAILROAD**						
0000	P2	14' X 8' RCB	1070	1092	CPPD110	PIT3SC	1.57	1.40
0020	P2	Conc Chnl 14'W 6'D 0:1 SS	890	1092	CPPD110	PIT3SC	1.57	3.00
0027	P2	14' X 8' RCB	850	1092	CPPD110	PIT3SC	1.57	1.20
0035	P2	Conc Chnl 10'W 6'D 2:1 SS	5350	1092	CPPD110	PIT3SC	1.57	1.20
0115	P2	12' X 6' RCB	100	563	CPPD090	PIT3SC	0.81	1.30
0116	P2	Conc Chnl 10'W 5'D 2:1 SS	3850	563	CPPD090	PIT3SC	0.81	0.80
PTVW		**PITTMAN WASH - VAN WAGENEN**						
0000	P1	Conc Chnl 25'W 6'D 2:1 SS	1460	2848	CPBR090	PIT3	3.19	1.50
0025	E	12' X 8' RCB	1650	1160	CPBR030	PIT3SC	1.07	1.00
0055	E	12' X 6' RCB	2770	840	CPBR020	PIT3SC	0.07	1.00
0107	E	96" RCP	1260	840	CPBR020	PIT3	0.71	0.85
0130	E	90" RCP	750	840	CPBR020	PIT3	0.71	1.07
0144	E	8' X 5' RCBC @ Commercial Way	70	840	CPBR020	PIT3	0.71	1.32
0145	E	84" RCP	620	553	CPBR010	PIT3	3.46	1.32
0157	E	90" RCP	300	553	CPBR010	PIT3	0.46	1.29
0163	E	72" RCP	2030	444	PTVW0185	PIT3SC	7.66	0.95
0180	E	60" RCP	510	444	PTVW0185	PIT3SC	7.66	0.28
0183	E	60" RCP Outlet	150	444	PTVW0185	PIT3	7.66	
0184	E	35,500 cfs PMF Spillway		35500	CPPD190	PIT3	7.66	
0185	E	390 ac-ft Pioneer Detention Basin		5857	CPPD190	PIT3	7.66	
0186	E	6 Span Bridge 120'W 7'D @ UPRR	20	5857	CPPD190	PIT3	7.66	1.30
PTWH		**PITTMAN WEST HORIZON**						
0000	P1	Conc Chnl 12'W 5'D 2:1 SS	500	1365	CPPD045	PIT3	1.17	4.00
0010	P1	12' X 6' RCBC @ Horizon Dr	50	1365	CPPD045	PIT3	1.17	4.00
0011	P1	Conc Chnl 12'W 5'D 2:1 SS	6300	1365	CPPD045	PIT3	1.17	4.10

FLOOD CONTROL FACILITIES INVENTORY TO ACCOMPANY FIGURE 2

**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-22

LEGEND

Street Name Designator AA BB
Parent Stream Name
Stream Name
ID / River Mile 00 00
Distance above confluence
With parent stream
Miles in tenths

Existing Facility .... E
Proposed or Modified Facility .... P
Contingency Level
Category B P0
Master Plan P1
Preliminary Design P2
Design P3

Bottom Width .... W
Depth .... D
Side Slope, H:V .... SS

Construction Features

Cast in Place Concrete Pipe .... CIPCP
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.

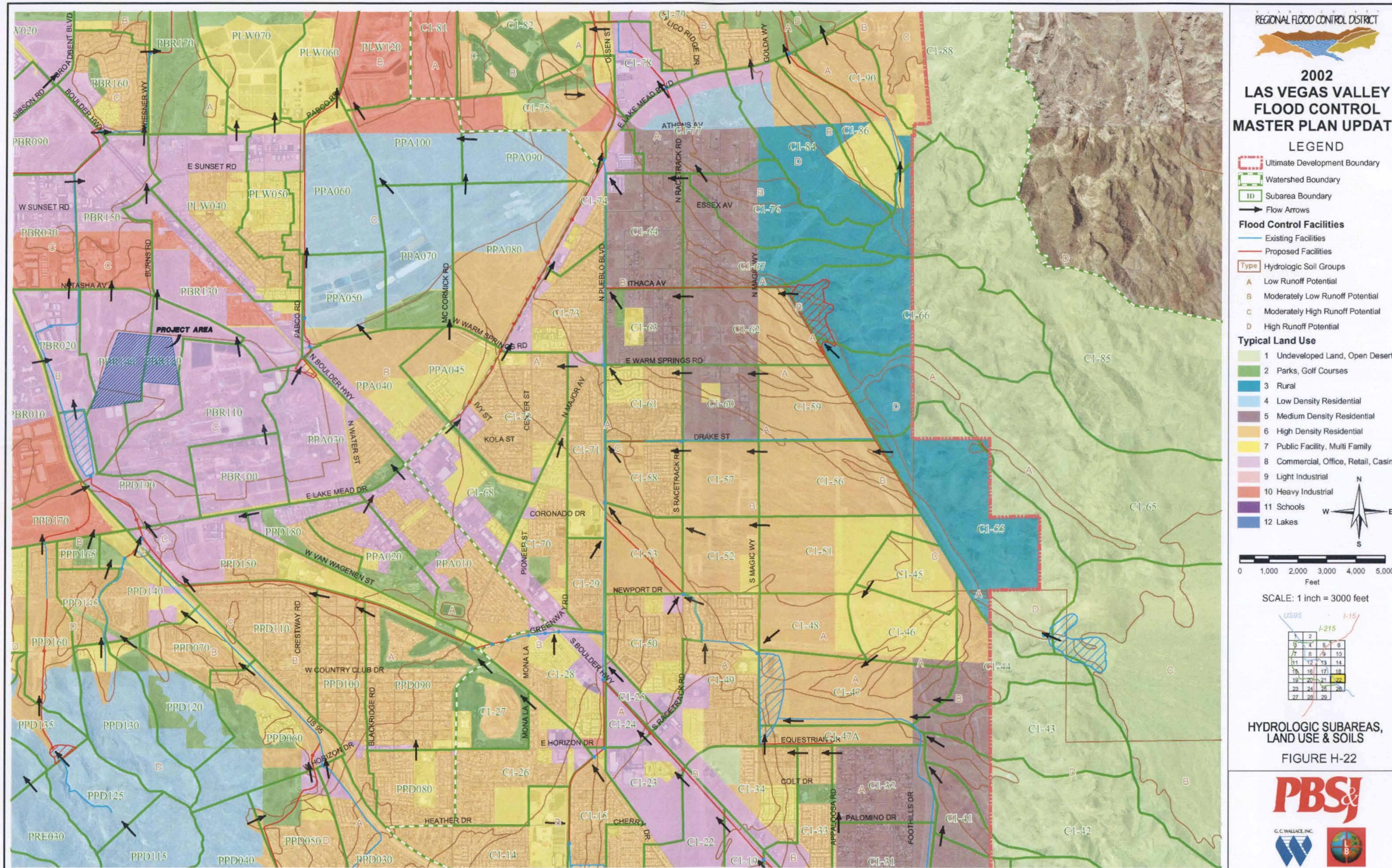
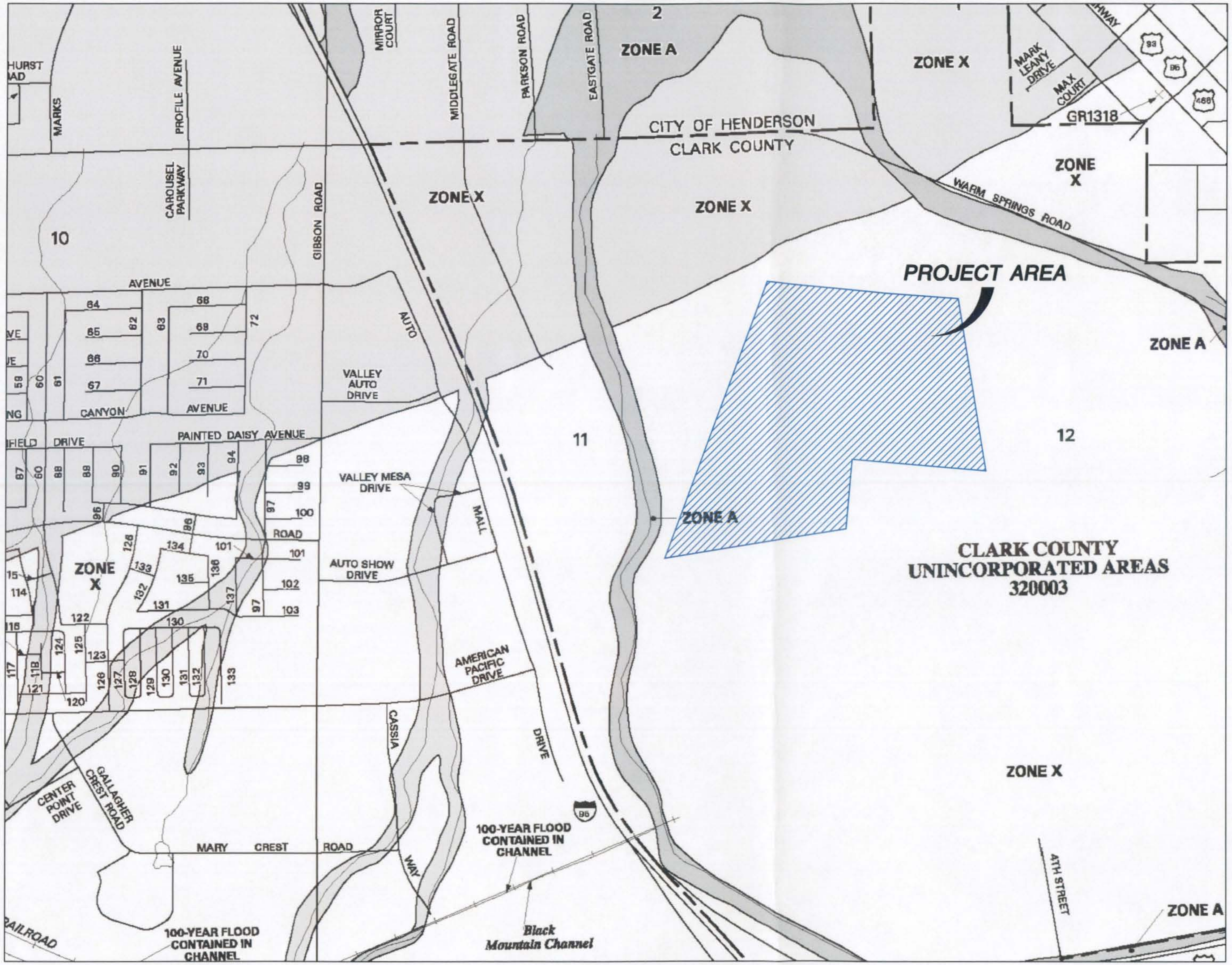


FIGURE 2A: HYDROLOGIC SUBAREAS LAND USE & SOILS MAP



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2595 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HENDERSON, CITY OF	320005	2595	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2595	E

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 32003C2595 E

MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

N

GRAPHIC SCALE

1000 0 500 1000

(IN FEET)
1 inch =1000 ft.

511693.19 SEPTEMBER 2006

FIGURE 3
FEMA MAP

TECHNICAL DRANAGE STUDY FOR EASTSIDE LANDFILL

PBSJ

2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200

ENGINEERING PLANNING• SURVEYING CONSTRUCTION SERVICES

L:\PROJECTS\511693.19-Eastside landfill\figures\figure3.dwg Sep 21, 2006 - 3:35pm 20322

Appendix B: Hydrologic Calculations

Appendix B-1: Existing Condition Hydrology

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

PBS&J
File: TDS-Standard Form 4.xls

EASTSIDE LANDFILL

Existing Condition Hydrology

BY: **KP**
DATE: **10/5/06**

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./UN. (D or U)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	
ONEX1	U	81.9	0.6911	32.76	0.0512	252	4.0	7.4	2082	1.4	1.78	3.5	12.2	19.5	N/A	**0.20**	
ONEX2	U	86.7	0.7544	28.77	0.0450	300	5.0	6.3	2415	0.8	1.35	2.7	18.1	24.4	N/A	**0.24**	
ONEX3	U	91.0	0.8112	22.12	0.0346	200	2.5	5.4	711	3.0	2.56	5.1	3.9	9.4	N/A	**0.09**	
ONEX4	U	87.3	0.7624	28.27	0.0442	300	4.8	6.2	1751	1.5	1.82	3.6	10.4	16.6	N/A	**0.17**	
ONEX5	U	91.0	0.8112	1.06	0.0017	50	1.3	3.4	453	1.9	2.05	4.1	3.7	7.0	N/A	**0.07**	
OFFEX1	U	77.6	0.6343	42.20	0.0659	278	2.5	10.3	2213	2.0	2.09	4.1	10.9	21.1	N/A	**0.21**	
OFFEX2	U	78.5	0.6462	9.63	0.0150	195	3.6	7.4	942	1.8	1.99	3.9	6.1	13.5	N/A	**0.14**	
OFFEX3	U	82.0	0.6924	16.40	0.0256	300	0.3	18.3	1245	1.7	1.92	3.8	7.6	25.9	N/A	**0.26**	
OFFEX4	U	85.0	0.7320	7.61	0.0119	300	1.0	11.5	750	1.9	2.02	4.0	5.2	16.6	N/A	**0.17**	
OFFEX5	U	85.0	0.7320	5.11	0.0080	300	1.3	10.4	625	1.6	1.87	3.7	5.0	15.4	N/A	**0.15**	

Tc = Ti + Tt **Eqn. 601**
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3 **Eqn. 602**
K = 0.0132 (CN) - 0.39 **Eqn. 603**
Tc Check = L/180+10 **Eqn. 604**
Tlag = 0.6 Tc **Eqn. 612**
Tt = 500/V1+ (Travel Length-500)/V2

For the travel time (Tt) calculations (**Sec. 602.1**),
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Min Tc = 10 mins for undeveloped basins
Min Tc = 5 mins for developed basins

Undeveloped V1 = 14.8*(S/100)^1/2
Undeveloped V2 = 29.4*(S/100)^1/2

Developed V1 = 20.2*(S/100)^1/2
Developed V2 = 30.6*(S/100)^1/2

REFERENCE :

STANDARD FORM 4

```
1****************************************                                       ***************************************
 *                                      *                                       *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                       *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998               *                                       *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                       *         609 SECOND STREET           *
 *                                      *                                       *     DAVIS, CALIFORNIA 95616         *
 * RUN DATE   05OCT06  TIME  19:48:16   *                                       *         (916) 756-1104              *
 *                                      *                                       *                                     *
****************************************                                       ***************************************


                              X     X  XXXXXXX   XXXXX          X
                              X     X  X        X     X        XX
                              X     X  X        X               X
                              XXXXXXX  XXXX     X       XXXXX   X
                              X     X  X        X               X
                              X     X  X        X     X         X
                              X     X  XXXXXXX   XXXXX         XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                      HEC-1 INPUT                                                     PAGE  1

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 *** FREE ***

                      *DIAGRAM
           1          ID    EASTSIDE LANDFILL IMPROVEMENTS
           2          ID    EXISTING CONDITION MODEL
           3          ID    INPUT FILE = EXISTING_SDN3.DAT
           4          ID    SEPTEMBER 2006
           5          ID    DESIGN STORM = 100-YEAR 6-HR STORM
           6          ID    STORM DISTRIBUTION = SDN #3
           7          ID    MODELED BY PBS&J
           8          ID
           9          IT       5       0       0     300
          10          IN       5       0       0
          11          IO       5
          12          JR    PREC    1.00    0.60    0.58
                      *

          13          KK   ONEX1
          14          KM    EXISTING ONSITE BASIN
          15          BA  0.0512
          16          PB    2.79
          17          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
          18          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
          19          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
          20          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
          21          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
          22          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
          23          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
          24          PC    .998    .999    1.00
          25          LS       0    81.9
          26          UD    0.20
                      *

          27          KK  OFFEX1
          28          KM    EXISTING OFFSITE BASIN
          29          BA  0.0659
          30          LS       0    77.6
          31          UD    0.21
                      *

          32          KKROFF1-ON1
          33          KM    ROUTE OFFEX1 FLOW TO CP-1
          34          RK    2250   0.016   0.030       0    TRAP      15       3
                      *

          35          KK  OFFEX2
          36          KM    EXISTING OFFSITE BASIN
          37          BA   .0150
          38          LS       0    78.5
          39          UD    0.14
                      *
1                                      HEC-1 INPUT                                                     PAGE  2

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          40          KKROFF2-CP1
          41          KM    ROUTE OFFEX2 FLOW TO CP-1
          42          RK    2070   0.020   0.030       0    TRAP      15       3
                      *

          43          KK     CP-1
          44          KM    COMBINE ONEX1 AND OFFEX1
          45          HC       3
                      *

          46          KKRCP1-C18
          47          KM    ROUTE CP-1 FLOW TO C18
          48          RK     705   0.008   0.030       0    TRAP      20       3
                      *
                      * ****************************************************************************
                      *                              Referenced from PBSJ
                      *        "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
                      *                Center Two (Formerly known as HARSCH)" (February 2003)
                      * ****************************************************************************
                      *

          49          KK OFFD-14
          50          KM    OFSITE DEVELOPED BASIN OFFD-14
          51          KM    REFERENCED FROM EG02
          52          BA  0.0028
          53          PB    2.79
          54          LS       0      88
```

```
  55        UD   0.200
            *

  56        KK  RT-B14
  57        KM   ROUTE OFFD-14 THROUGH BMIC-1
  58        RK    1050   0.014   0.013        0    TRAP      15      10
            *

  59        KK  BMIC-1
  60        KM   ONSITE DEVELOPED BASIN BMIC-1
  61        KM   REFERENCED FROM EG02
  62        BA  0.0141
  63        PB    2.79
  64        LS       0       92
  65        UD   0.081
            *

  66        KK     C15
  67        KM   COMBINE RT-B14 AND BMIC-1
  68        HC       2
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  69        KK   RT-14
  70        KM   ROUTE C15 THROUGH BMIC-2
  71        RK     450   0.018   0.013        0    TRAP      15      10
            *

  72        KK  BMIC-2
  73        KM   ONSITE DEVELOPED BASIN BMIC-2
  74        KM   REFERENCED FROM EG02
  75        BA  0.0118
  76        PB    2.79
  77        LS       0       92
  78        UD   0.073
            *

  79        KK     C16
  80        KM   COMBINE RT-14 AND BMIC-2
  81        HC       2
            *

  82        KK   RT-15
  83        KM   ROUTE C16 THROUGH SCH-2
  84        RK     400   0.019   0.013        0    TRAP      15      10
            *

  85        KK   SCH-2
  86        KM   ONSITE DEVELOPED BASIN SCH-2
  87        KM   REFERENCED FROM EG02
  88        BA  0.0065
  89        PB    2.79
  90        LS       0       92
  91        UD   0.060
            *

  92        KK     C17
  93        KM   COMBINE RT-15 AND SCH-2
  94        HC       2
            *

  95        KK   RT-16
  96        KM   ROUTE C17 THROUGH BMIC-3
  97        RK     750   0.013   0.013        0    TRAP      15      10
            *

  98        KK  BMIC-3
  99        KM   ONSITE DEVELOPED BASIN BMIC-3
 100        KM   REFERENCED FROM EG02
 101        BA  0.0106
 102        PB    2.79
 103        LS       0       92
 104        UD   0.062
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 105        KK MGDEV-2
 106        KM   MILGARD MANUFACTURING ONSITE BASIN
 107        KM   REFERENCED FROM EG02
 108        BA  0.0093
 109        PB    2.79
 110        LS       0       92
 111        UD   0.075
            *
            * ****************************************************************************
            *

 112        KK     C18
 113        KM   COMBINE RT-16, BMIC-3, MGDEV-2 AND CP-1
 114        HC       4
            *

 115        KK   ONEX2
 116        KM   EXISTING ONSITE BASIN
 117        BA   .0450
 118        PB    2.79
 119        LS       0     86.7
 120        UD    0.24
            *
            * ****************************************************************************
            *                          Referenced from PBSJ
            *      "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
            *              Center Two (Formerly known as HARSH)" (February 2003)
            * ****************************************************************************
            *

 121        KK     HR3
 122        KM   HARSCH ONSITE BASIN
 123        BA  0.0014
 124        PB    2.79
 125        LS       0       92
 126        UD   0.049
            *
```

```
            127           KK     HR2
            128           KM   HARSCH ONSITE BASIN
            129           BA  0.0016
            130           PB    2.79
            131           LS      0        98
            132           UD   0.037
                          *

            133           KK     HR1
            134           KM   HARSCH ONSITE BASIN
            135           BA  0.0015
            136           PB    2.79
            137           LS      0       92
            138           UD    0.05
                          *
1                                                  HEC-1 INPUT                                                    PAGE  5

           LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


            139           KK    CHR1
            140           KM   COMBINE HR3, HR2, HR1
            141           KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
            142           KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H1"
            143           KM   ON FIGURE 7
            144           HC       3
                          *
                          * ************************************************************************
                          *

            145           KK    C18B
            146           KM   COMBINE C18, CHR1 AND ONEX2
            147           HC       3
                          *

            148           KK   ONEX4
            149           KM   EXISTING ONSITE BASIN
            150           BA   .0442
            151           PB    2.79
            152           LS      0    87.3
            153           UD    0.17
                          *

            154           KK  OFFEX5
            155           KM   EXISTING OFFSITE BASIN
            156           BA   .0080
            157           LS      0    85.0
            158           UD    0.15
                          *

            159           KKROFF5-CP3
            160           KM   ROUTE OFFEX5 FLOW TO CP-3
            161           RK    1692   0.019   0.030       0    TRAP      10       3
                          *

            162           KK    CP-3
            163           KM   COMBINE ONEX4 AND OFFEX5
            164           HC       2
                          *

            165           KK   ONEX3
            166           KM   EXISTING ONSITE BASIN
            167           BA   .0346
            168           PB    2.79
            169           LS      0    91.0
            170           UD    0.09
                          *

            171           KK  OFFEX4
            172           KM   EXISTING OFFSITE BASIN
            173           BA   .0119
            174           LS      0    85.0
            175           UD    0.17
                          *
1                                                  HEC-1 INPUT                                                    PAGE  6

           LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


            176           KK  OFFEX3
            177           KM   EXISTING OFFSITE BASIN
            178           BA   .0256
            179           PB    2.79
            180           LS      0    82.0
            181           UD    0.26
                          *

            182           KK   ONEX5
            183           KM   EXISTING ONSITE BASIN
            184           BA   .0017
            185           LS      0    91.0
            186           UD    0.07
                          *

            187           KK    CP-2
            188           KM   COMBINE OFFEX3 AND ONEX5
            189           HC       2
                          *

            190           KKOFFEX3POND
            191           KM   COLLECTS FLOW FROM OFFEX3 AND ONEX5
            192           RS       1    STOR      -1
            193           SV       0    0.47    1.37    2.71    4.52
            194           SE    1766    1767    1768    1769    1770
            195           SQ       0    0.01    0.02    0.03    0.04
                          *
            196           ZZ
1
                  SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE        (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.        (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

   13         ONEX1
                .
                .
   27           .        OFFEX1
                .            V
                .            V
```

```
  32            .    ROFF1-ON
                .           .
                .           .
  35            .           .      OFFEX2
                .           .           V
                .           .           V
  40            .           .    ROFF2-CP
                .           .           .
                .           .           .
  43         CP-1........................
                V
                V
  46     RCP1-C18
                .
                .
  49            .     OFFD-14
                .           V
                .           V
  56            .      RT-B14
                .           .
                .           .
  59            .           .      BMIC-1
                .           .           .
                .           .           .
  66            .         C15............
                .           V
                .           V
  69            .       RT-14
                .           .
                .           .
  72            .           .      BMIC-2
                .           .           .
                .           .           .
  79            .         C16............
                .           V
                .           V
  82            .       RT-15
                .           .
                .           .
  85            .           .       SCH-2
                .           .           .
                .           .           .
  92            .         C17............
                .           V
                .           V
  95            .       RT-16
                .           .
                .           .
  98            .           .      BMIC-3
                .           .           .
                .           .           .
 105            .           .           .     MGDEV-2
                .           .           .           .
                .           .           .           .
 112          C18....................................
                .
                .
 115            .       ONEX2
                .           .
                .           .
 121            .           .         HR3
                .           .           .
                .           .           .
 127            .           .           .         HR2
                .           .           .           .
                .           .           .           .
 133            .           .           .           .         HR1
                .           .           .           .           .
                .           .           .           .           .
 139            .           .        CHR1........................
                .           .           .
                .           .           .
 145         C18B........................
                .
                .
 148            .       ONEX4
                .           .
                .           .
 154            .           .      OFFEX5
                .           .           V
                .           .           V
 159            .           .    ROFF5-CP
                .           .           .
                .           .           .
 162            .        CP-3............
                .           .
                .           .
 165            .           .       ONEX3
                .           .           .
                .           .           .
 171            .           .           .      OFFEX4
                .           .           .           .
                .           .           .           .
 176            .           .           .           .      OFFEX3
                .           .           .           .           .
                .           .           .           .           .
 182            .           .           .           .           .       ONEX5
                .           .           .           .           .           .
                .           .           .           .           .           .
 187            .           .           .           .        CP-2............
                .           .           .           .           V
                .           .           .           .           V
 190            .           .           .           .    OFFEX3PO

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                         *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *
*              JUN  1998                  *
*             VERSION 4.1                 *
*                                         *
* RUN DATE   05OCT06  TIME  19:48:16      *
*                                         *
*******************************************

*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*         609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
*****************************************

                    EASTSIDE LANDFILL IMPROVEMENTS
```

```
                    EXISTING CONDITION MODEL
                    INPUT FILE = EXISTING_SDN3.DAT
                    SEPTEMBER 2006
                    DESIGN STORM = 100-YEAR 6-HR STORM
                    STORM DISTRIBUTION = SDN #3
                    MODELED BY PBS&J

 11 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                    NMIN          5  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1   0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2   0  ENDING DATE
                  NDTIME       0055  ENDING TIME
                   ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP        MULTI-PLAN OPTION
                   NPLAN          1  NUMBER OF PLANS

    JR        MULTI-RATIO OPTION
                RATIOS OF PRECIPITATION
                1.00       .60       .58

       *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .60	RATIO 3 .58
HYDROGRAPH AT +	ONEX1	.05	1	FLOW	47.	17.	16.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	OFFEX1	.07	1	FLOW	48.	14.	13.
				TIME	3.67	3.67	3.67
ROUTED TO +	ROFF1-ON	.07	1	FLOW	47.	14.	12.
				TIME	3.75	3.83	3.83
HYDROGRAPH AT +	OFFEX2	.01	1	FLOW	13.	4.	4.
				TIME	3.58	3.58	3.58
ROUTED TO +	ROFF2-CP	.01	1	FLOW	13.	4.	4.
				TIME	3.67	3.75	3.75
3 COMBINED AT +	CP-1	.13	1	FLOW	105.	33.	30.
				TIME	3.67	3.75	3.75
ROUTED TO +	RCP1-C18	.13	1	FLOW	101.	32.	29.
				TIME	3.67	3.75	3.83
HYDROGRAPH AT +	OFFD-14	.00	1	FLOW	3.	2.	1.
				TIME	3.58	3.67	3.67
ROUTED TO +	RT-B14	.00	1	FLOW	3.	1.	1.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	BMIC-1	.01	1	FLOW	26.	13.	12.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	C15	.02	1	FLOW	28.	14.	13.
				TIME	3.50	3.50	3.50
ROUTED TO +	RT-14	.02	1	FLOW	27.	13.	13.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	BMIC-2	.01	1	FLOW	22.	11.	11.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	C16	.03	1	FLOW	50.	25.	24.
				TIME	3.50	3.50	3.50
ROUTED TO +	RT-15	.03	1	FLOW	49.	24.	23.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	SCH-2	.01	1	FLOW	13.	7.	6.
				TIME	3.50	3.50	3.50

2 COMBINED AT +	C17	.04	1	FLOW	61.	31.	29.
				TIME	3.50	3.50	3.50
ROUTED TO +	RT-16	.04	1	FLOW	59.	29.	27.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	BMIC-3	.01	1	FLOW	21.	11.	10.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	MGDEV-2	.01	1	FLOW	17.	9.	8.
				TIME	3.50	3.50	3.50
4 COMBINED AT +	C18	.19	1	FLOW	162.	57.	53.
				TIME	3.58	3.58	3.50
HYDROGRAPH AT +	ONEX2	.05	1	FLOW	49.	21.	20.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	HR3	.00	1	FLOW	3.	1.	1.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	HR2	.00	1	FLOW	4.	2.	2.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	HR1	.00	1	FLOW	3.	2.	2.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	CHR1	.00	1	FLOW	10.	5.	5.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	C18B	.24	1	FLOW	212.	78.	73.
				TIME	3.58	3.67	3.58
HYDROGRAPH AT +	ONEX4	.04	1	FLOW	56.	25.	23.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFEX5	.01	1	FLOW	10.	4.	4.
				TIME	3.58	3.58	3.58
ROUTED TO +	ROFF5-CP	.01	1	FLOW	9.	4.	3.
				TIME	3.67	3.67	3.67
2 COMBINED AT +	CP-3	.05	1	FLOW	65.	27.	26.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	ONEX3	.03	1	FLOW	59.	29.	28.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OFFEX4	.01	1	FLOW	14.	6.	5.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFEX3	.03	1	FLOW	21.	8.	7.
				TIME	3.67	3.75	3.75
HYDROGRAPH AT +	ONEX5	.00	1	FLOW	3.	2.	1.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-2	.03	1	FLOW	23.	8.	8.
				TIME	3.67	3.75	3.75
ROUTED TO +	OFFEX3PO	.03	1	FLOW	0.	0.	0.
				TIME	5.92	5.33	5.42
				** PEAK STAGES IN FEET **			
			1	STAGE	1768.34	1767.24	1767.18
				TIME	6.67	6.58	6.67

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

						INTERPOLATED TO COMPUTATION INTERVAL			
ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= 1.00									
ROFF1-ON	MANE	2.18	46.96	222.91	.96	5.00	46.94	225.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3375E+01 EXCESS= .0000E+00 OUTFLOW= .3380E+01 BASIN STORAGE= .3651E-05 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .60									
ROFF1-ON	MANE	3.08	13.76	228.58	.30	5.00	13.59	230.00	.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1061E+01 EXCESS= .0000E+00 OUTFLOW= .1065E+01 BASIN STORAGE= .3304E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .58									
ROFF1-ON	MANE	3.12	12.50	227.50	.28	5.00	12.40	230.00	.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9696E+00 EXCESS= .0000E+00 OUTFLOW= .9733E+00 BASIN STORAGE= .3663E-05 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= 1.00									
ROFF2-CP	MANE	2.57	13.17	219.45	1.01	5.00	13.07	220.00	1.01

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8075E+00 EXCESS= .0000E+00 OUTFLOW= .8108E+00 BASIN STORAGE= .2611E-05 PERCENT ERROR=   -.4

        FOR PLAN = 1  RATIO=  .60
        ROFF2-CP  MANE        3.75     3.97   225.11      .33     5.00     3.97   225.00        .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2625E+00 EXCESS= .0000E+00 OUTFLOW= .2649E+00 BASIN STORAGE= .1921E-05 PERCENT ERROR=   -.9

        FOR PLAN = 1  RATIO=  .58
        ROFF2-CP  MANE        3.93     3.71   222.59      .30     5.00     3.61   225.00        .30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2406E+00 EXCESS= .0000E+00 OUTFLOW= .2435E+00 BASIN STORAGE= .2215E-05 PERCENT ERROR=  -1.2

        FOR PLAN = 1  RATIO= 1.00
        RCP1-C18  MANE         .77   104.64   221.47     1.06     5.00   101.21   220.00       1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7492E+01 EXCESS= .0000E+00 OUTFLOW= .7497E+01 BASIN STORAGE= .6376E-05 PERCENT ERROR=   -.1

        FOR PLAN = 1  RATIO=  .60
        RCP1-C18  MANE        1.09    32.76   226.76      .36     5.00    31.80   225.00        .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2533E+01 EXCESS= .0000E+00 OUTFLOW= .2534E+01 BASIN STORAGE= .6774E-05 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .58
        RCP1-C18  MANE        1.10    29.80   226.94      .33     5.00    28.60   230.00        .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2330E+01 EXCESS= .0000E+00 OUTFLOW= .2331E+01 BASIN STORAGE= .6358E-05 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO= 1.00
          RT-B14  MANE        1.36     3.39   218.69     1.64     5.00     3.37   220.00       1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2438E+00 EXCESS= .0000E+00 OUTFLOW= .2442E+00 BASIN STORAGE= .7570E-08 PERCENT ERROR=   -.2

        FOR PLAN = 1  RATIO=  .60
          RT-B14  MANE        1.71     1.51   223.43      .71     5.00     1.50   220.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1061E+00 EXCESS= .0000E+00 OUTFLOW= .1063E+00 BASIN STORAGE= .7638E-08 PERCENT ERROR=   -.2

        FOR PLAN = 1  RATIO=  .58
          RT-B14  MANE        1.76     1.42   222.80      .67     5.00     1.41   220.00        .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E-01 EXCESS= .0000E+00 OUTFLOW= .9993E-01 BASIN STORAGE= .5886E-08 PERCENT ERROR=   -.1

        FOR PLAN = 1  RATIO= 1.00
           RT-14  MANE         .37    27.93   210.77     1.91     5.00    27.32   210.00       1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1720E+01 EXCESS= .0000E+00 OUTFLOW= .1721E+01 BASIN STORAGE= .7751E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .60
           RT-14  MANE         .42    13.81   211.01      .91     5.00    13.40   210.00        .91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8203E+00 EXCESS= .0000E+00 OUTFLOW= .8205E+00 BASIN STORAGE= .6549E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .58
           RT-14  MANE         .41    13.17   210.75      .86     5.00    12.73   210.00        .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7778E+00 EXCESS= .0000E+00 OUTFLOW= .7780E+00 BASIN STORAGE= .6560E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO= 1.00
           RT-15  MANE         .36    49.16   210.62     1.93     5.00    48.56   210.00       1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2959E+01 EXCESS= .0000E+00 OUTFLOW= .2959E+01 BASIN STORAGE= .9128E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .60
           RT-15  MANE         .35    24.51   210.82      .93     5.00    24.04   210.00        .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1419E+01 EXCESS= .0000E+00 OUTFLOW= .1420E+01 BASIN STORAGE= .8611E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .58
           RT-15  MANE         .35    23.31   210.84      .88     5.00    22.85   210.00        .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1347E+01 EXCESS= .0000E+00 OUTFLOW= .1347E+01 BASIN STORAGE= .8421E-08 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO= 1.00
           RT-16  MANE         .53    60.94   211.13     1.94     5.00    58.94   210.00       1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3645E+01 EXCESS= .0000E+00 OUTFLOW= .3647E+01 BASIN STORAGE= .3120E-07 PERCENT ERROR=   -.1

        FOR PLAN = 1  RATIO=  .60
           RT-16  MANE         .65    30.36   211.36      .93     5.00    28.90   210.00        .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1751E+01 EXCESS= .0000E+00 OUTFLOW= .1752E+01 BASIN STORAGE= .3374E-07 PERCENT ERROR=   -.1

        FOR PLAN = 1  RATIO=  .58
           RT-16  MANE         .62    28.82   211.06      .89     5.00    27.44   210.00        .89
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1661E+01 EXCESS= .0000E+00 OUTFLOW= .1663E+01 BASIN STORAGE= .3305E-07 PERCENT ERROR=   -.1

         FOR PLAN = 1  RATIO= 1.00
         ROFF5-CP  MANE        2.26      9.49    218.94      1.42      5.00      9.35    220.00         1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6031E+00 EXCESS= .0000E+00 OUTFLOW= .6052E+00 BASIN STORAGE= .4046E-06 PERCENT ERROR=   -.3

         FOR PLAN = 1  RATIO=  .60
         ROFF5-CP  MANE        2.88      3.85    221.66       .57      5.00      3.73    220.00          .57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2413E+00 EXCESS= .0000E+00 OUTFLOW= .2419E+00 BASIN STORAGE= .4920E-06 PERCENT ERROR=   -.2

         FOR PLAN = 1  RATIO=  .58
         ROFF5-CP  MANE        2.92      3.61    221.61       .53      5.00      3.45    220.00          .53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2254E+00 EXCESS= .0000E+00 OUTFLOW= .2260E+00 BASIN STORAGE= .3400E-06 PERCENT ERROR=   -.2


*** NORMAL END OF HEC-1 ***
```

OFFEX3 Shallow Pondind Area

ELEVATION	AREA (ft2)	VOLUME (ft3)	VOLUME (ac-ft)	CUMULATIVE VOLUME (ac-ft)	OUTFLOW (cfs)
1766	10475	0	0.00	0.00	0
1767	30499	20487	0.47	0.47	0.01
1768	47931	39215	0.90	1.37	0.02
1769	68570	58250.5	1.34	2.71	0.03
1770	89398	78984	1.81	4.52	0.04

Note: Area was determined from 1' topography using AutoCAD

LEGEND

- ONSITE BASIN BOUNDARY
- OFFSITE BASIN BOUNDARY
- REFERENCED BASIN BOUNDARY
- ONEX1 — ONSITE BASIN LABEL
- OFFEX1 — OFFSITE BASIN LABEL
- HR1 — REFERENCED BASIN LABEL
- CP-1 — HEC-1 COMBINATION POINT
- DISCHARGE POINT
- FLOW DIRECTION
- TOPOGRAPHY BOUNDARY
- EXISTING LANDFILL BOUNDARY

NOTES

"ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR HENDERSON COMMERCE CENTER TWO (FORMERLY KNOWN AS HARSCH)" PREPARED BY PBS&J (FEBRUARY 2003) WAS USED FOR REFERENCED BASINS

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ONEX1	32.76	47	17
ONEX2	28.77	49	21
ONEX3	22.12	59	29
ONEX4	28.27	56	25
ONEX5	1.06	3	2
OFFEX1	42.20	48	14
OFFEX2	9.63	13	4
OFFEX3	16.40	21	8
OFFEX4	7.61	14	6
OFFEX5	5.11	10	4
CP-1	NA	105	33
CP-2	NA	23	8
CP-3	NA	65	27
C18	NA	162	57
C18B	NA	212	78

N

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

511963.19 OCTOBER 2006

FIGURE 4
EXISTING CONDITION DRAINAGE MAP

TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200

ENGINEERING PLANNING • SURVEYING CONSTRUCTION SERVICES

L:\PROJECTS\511963.19-Eastside landfill\figures\Fig\figure 4_existing.dwg Oct 06, 2006 - 1:49pm 20322

Appendix B-2: Interim Condition Hydrology

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

PBS&J
File: TDS-Standard Form 4.xls

EASTSIDE LANDFILL

Interim Condition Hydrology

BY: **KP**
DATE: **10/5/06**

SUB-BASIN DATA						INITIAL / OVERLAND TIME (TI)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./UN. (D or U)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	
OND1	D	87.7	0.7676	0.94	0.0015	130	33.0	2.1	247	0.4	1.28	1.9	3.2	5.3	12.1	**0.05**	
OND2	D	87.7	0.7676	3.70	0.0058	137	33.0	2.2	910	0.4	1.28	1.9	10.1	12.2	15.8	**0.12**	
OND3	D	88.6	0.7795	1.38	0.0022	156	33.0	2.2	360	1.0	2.02	3.1	3.0	5.2	12.9	**0.05**	
OND4	D	89.7	0.7940	11.67	0.0182	240	2.0	6.8	1276	2.6	3.26	4.9	5.2	12.0	18.4	**0.12**	
OND5	D	91.0	0.8112	5.03	0.0079	300	1.7	7.6	573	1.1	2.07	3.1	4.4	12.0	14.9	**0.12**	
OND6	D	91.0	0.8112	9.90	0.0155	70	1.4	3.9	1407	0.6	1.56	2.4	11.7	15.6	18.2	**0.16**	
OND7	D	90.8	0.8086	5.87	0.0092	158	33.0	2.1	1345	1.8	2.67	4.0	6.6	8.7	18.4	**0.09**	
OND8	D	90.3	0.8020	14.26	0.0223	128	33.0	1.9	2382	0.4	1.28	1.9	22.7	24.6	23.9	**0.24**	**Use Tlag = 0.15 See Note**
OND9	U	91.0	0.8112	1.06	0.0017	50	1.3	3.4	453	1.9	2.05	4.1	3.7	7.0	N/A	**0.07**	
OND10	D	91.0	0.8112	4.28	0.0067	119	33.0	1.8	1190	0.4	1.28	1.9	12.5	14.2	17.3	**0.14**	
OND11	D	91.0	0.8112	9.60	0.0150	220	1.6	6.6	1050	1.1	2.12	3.2	6.8	13.4	17.1	**0.13**	
OND12	D	91.4	0.8165	2.77	0.0043	138	33.0	1.9	610	1.5	2.47	3.7	3.9	5.7	14.2	**0.06**	
OND13	D	91.0	0.8112	4.70	0.0073	95	33.0	1.6	714	0.4	1.28	1.9	8.4	9.9	14.5	**0.10**	
OND14	U	91.0	0.8112	11.12	0.0174	122	1.0	5.7	559	5.0	3.31	6.6	2.7	8.4	N/A	**0.08**	
OND15	U	91.0	0.8112	21.47	0.0335	200	2.5	5.4	711	3.0	2.56	5.1	3.9	9.4	N/A	**0.09**	
DETPD	D	91.4	0.8165	5.14	0.0080	60	8.3	2.0	35	34.0	11.78	17.8	0.0	*2.0*	10.5	**0.02**	
OFFEX1	U	77.6	0.6343	42.20	0.0659	278	2.5	10.3	2213	2.0	2.09	4.1	10.9	21.1	N/A	**0.21**	
OFFEX2	U	78.5	0.6462	9.63	0.0150	195	3.6	7.4	942	1.8	1.99	3.9	6.1	13.5	N/A	**0.14**	
OFFEX3	U	82.0	0.6924	16.40	0.0256	300	0.3	18.3	1245	1.7	1.92	3.8	7.6	25.9	N/A	**0.26**	
OFFEX4	U	85.0	0.7320	7.61	0.0119	300	1.0	11.5	750	1.9	2.02	4.0	5.2	16.6	N/A	**0.17**	
OFFEX5	U	85.0	0.7320	5.11	0.0080	300	1.3	10.4	625	1.6	1.87	3.7	5.0	15.4	N/A	**0.15**	

Tc = Ti + Tt — **Eqn. 601**
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3 — **Eqn. 602**
K = 0.0132 (CN) - 0.39 — **Eqn. 603**
Tc Check = L/180+10 — **Eqn. 604**
Tlag = 0.6 Tc — **Eqn. 612**
Tt = 500/V1+ (Travel Length-500)/V2

For the travel time (Tt) calculations (**Sec. 602.1**),
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Min Tc = 10 mins for undeveloped basins
Min Tc = 5 mins for developed basins

Undeveloped V1 = 14.8*(S/100)^1/2 — Developed V1 = 20.2*(S/100)^1/2
Undeveloped V2 = 29.4*(S/100)^1/2 — Developed V2 = 30.6*(S/100)^1/2

REFERENCE :

Note: The lag time or basin OND8 was changed to 0.15 hrs because the velocities were not accurate for the cross section. Please refer to the FlowMaster cross section located in Appendix B-3 for the time calculations.

STANDARD FORM 4

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS       *
 *             JUN  1998                *                    *   HYDROLOGIC ENGINEERING CENTER      *
 *           VERSION 4.1                *                    *        609 SECOND STREET             *
 *                                      *                    *     DAVIS, CALIFORNIA 95616          *
 * RUN DATE   27SEP06  TIME  19:18:46   *                    *          (916) 756-1104              *
 *                                      *                    *                                      *
****************************************                    ****************************************


                    X      X  XXXXXXX   XXXXX           X
                    X      X  X        X     X         XX
                    X      X  X        X                X
                    XXXXXXX   XXXX     X         XXXXX  X
                    X      X  X        X                X
                    X      X  X        X     X          X
                    X      X  XXXXXXX   XXXXX          XXX


     THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

     THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
     THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
     NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
     DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
     KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                        HEC-1 INPUT                                              PAGE  1

       LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

*** FREE ***
                   *DIAGRAM
          1        ID    EASTSIDE LANDFILL IMPROVEMENTS
          2        ID    INTERIM CONDITION MODEL
          3        ID    INPUT FILE = INT_SDN3.DAT
          4        ID    SEPTEMBER 2006
          5        ID    DESIGN STORM = 100-YEAR 6-HR STORM
          6        ID    STORM DISTRIBUTION = SDN #3
          7        ID    MODELED BY PBS&J
          8        ID
          9        IT       5       0       0     300
         10        IN       5       0       0
         11        IO       5
         12        JR    PREC    1.00    0.60    0.58
                   *

         13        KK    OND9
         14        KM    EXISTING ONSITE BASIN
         15        BA  0.0017
         16        PB    2.79
         17        PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
         18        PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
         19        PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
         20        PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
         21        PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
         22        PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
         23        PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
         24        PC    .998    .999    1.00
         25        LS       0    91.0
         26        UD    0.07
                   *

         27        KK  OFFEX3
         28        KM    EXISTING OFFSITE BASIN
         29        BA  0.0256
         30        LS       0    82.0
         31        UD    0.26
                   *

         32        KK    CP-7
         33        KM    COMBINE OND9 AND OFFD3
         34        HC       2
                   *

         35        KK    OND8
         36        KM    DEVELOPED ONSITE BASIN
         37        BA  0.0223
         38        LS       0    90.3
         39        UD    0.15
                   *
1                                        HEC-1 INPUT                                              PAGE  2

       LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

         40        KKROND8-CP-9
         41        KM    ROUTE OND8 TO CP-9
         42        RK    1190   0.004   0.025       0    TRAP      10       3
                   *

         43        KK    OND10
         44        KM    DEVELOPED ONSITE BASIN
         45        BA  0.0067
         46        LS       0    91.0
         47        UD    0.14
                   *

         48        KK  OFFEX5
         49        KM    EXISTING OFFSITE BASIN
         50        BA  0.0080
         51        LS       0    85.0
         52        UD    0.15
                   *

         53        KK    CP-9
         54        KM    COMBINE RCP8-CP9, OFFD5 AND OND10
         55        HC       3
                   *

         56        KKRCP9-CP-10
         57        KM    ROUTE CP-9 TO CP-10
         58        RK     725   0.015   0.015       0    TRAP      10       3
```

```
*
KK   OND12
KM   DEVELOPED ONSITE BASIN
BA  0.0043
LS       0    91.4
UD    0.06
*

KK   CP-10A
KM   COMBINE CP-9 AND OND12
HC       2
*

KK   OND11
KM   DEVELOPED ONSITE BASIN
BA  0.0150
LS       0    91.0
UD    0.13
*

KK   OND13
KM   DEVELOPED ONSITE BASIN
BA  0.0073
LS       0    91.0
UD    0.10
*
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   CP-10
KM   COMBINE CP-10A, OND11 AND OND13
HC       3
*

KK EQBASIN
KM   EQUALIZER BASIN TO SPLIT FLOW NORTH AND
KM   TO THE DETENTION POND
RS       1    STOR      -1
SA       0    0.08    0.70    0.78    0.85    0.87    0.97
SE  1744.5    1745    1746    1747 1747.75    1748  1748.5
SQ       0       0      18      42      59      74     126
*

KK DIVWEIR
KM   DIVERT FLOW FROM EQ BASIN
DT  DVPIPE
DI       0      59      74     126
DQ       0      59      64      73
*

KK   OND14
KM   DEVELOPED ONSITE BASIN
BA  0.0174
LS       0    91.0
UD    0.08
*

KK   CP-11
KM   COMBINE WEIR FLOW AND OND14
HC       2
*

KK    OND1
KM   DEVELOPED ONSITE BASIN
BA  0.0015
LS       0    87.7
UD    0.05
*

KK  OFFEX2
KM   EXISTING OFFSITE BASIN
BA  0.0150
LS       0    78.5
UD    0.14
*

KK    CP-1
KM   COMBINE OND1 AND OFFD2
HC       2
*
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KKRCP1-CP2
KM   ROUTE CP-1 TO CP-2
RK     910   0.004   0.025       0    TRAP      10       3
*

KK    OND2
KM   DEVELOPED ONSITE BASIN
BA  0.0058
LS       0    87.7
UD    0.12
*

KK  OFFEX1
KM   EXISTING OFFSITE BASIN
BA  0.0659
LS       0    77.6
UD    0.21
*

KK    CP-2
KM   COMBINE CP-1, OFFD1 AND OND2
HC       3
*

KKRCP2-CP-3
KM   ROUTE
RK     360   0.010   0.015       0    TRAP      10       3
*

KK    OND3
KM   DEVELOPED ONSITE BASIN
BA  0.0022
```

```
 135         LS     0    88.6
 136         UD   0.05
             *

 137         KK    CP-3
 138         KM   COMBINE CP-2 AND OND3
 139         HC       2
             *

 140         KKRCP3-CP4
 141         KM   ROUTE CP-3 TO CP-4
 142         RK    1345   0.018  0.015       0    TRAP      10       3
             *

 143         KK    OND7
 144         KM   DEVELOPED ONSITE BASIN
 145         BA  0.0092
 146         LS     0    90.8
 147         UD   0.09
             *
1                                      HEC-1 INPUT                                          PAGE  5

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 148         KK    CP-4
 149         KM   COMBINE CP-3 AND OND7
 150         HC       2
             *

 151         KK    OND4
 152         KM   DEVELOPED ONSITE BASIN
 153         BA  0.0182
 154         LS     0    89.7
 155         UD   0.12
             *

 156         KK    OND5
 157         KM   DEVELOPED ONSITE BASIN
 158         BA  0.0079
 159         LS     0    91.0
 160         UD   0.12
             *

 161         KK    CP-5
 162         KM   COMBINE OND4 AND OND5
 163         HC       2
             *

 164         KK    OND6
 165         KM   DEVELOPED ONSITE BASIN
 166         BA  0.0155
 167         LS     0    91.0
 168         UD   0.16
             *

 169         KK  DVPIPE
 170         KM   RETURN FLOW FROM EQ BASIN PIPE
 171         DR  DVPIPE
             *

 172         KK RDVPIPE
 173         KM   ROUTE FLOW THROUGH 42" RCP
 174         RK    1880   0.005  0.013       0    CIRC     3.5       0
             *

 175         KK    DETPD
 176         KM   DETENTION POND BASIN
 177         BA  0.0080
 178         LS     0    91.4
 179         UD   0.05
             *

 180         KK    CP-6
 181         KM   COMBINE CP-4, CP-5, OND6, DVPIPE AND DETPD
 182         HC       5
             *
1                                      HEC-1 INPUT                                          PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 183         KK DETPOND
 184         KM
 185         RS       1    STOR      -1
 186         SV       0    0.08    1.53    3.02    4.84    8.88   13.45   15.95
 187         SE 1725.25    1726    1728    1729    1730    1732    1734    1735
 188         SQ       0       0      22      27      32      40      46      49
 189         KO       1
             *
             * ****************************************************************************
             *                                Referenced from PBSJ
             *     "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
             *             Center Two (Formerly known as HARSCH)" (February 2003)
             * ****************************************************************************
             *

 190         KK OFFD-14
 191         KM   OFSITE DEVELOPED BASIN OFFD-14
 192         KM   REFERENCED FROM EG02
 193         BA  0.0028
 194         PB    2.79
 195         LS       0       88
 196         UD   0.200
             *

 197         KK  RT-B14
 198         KM   ROUTE OFFD-14 THROUGH BMIC-1
 199         RK    1050   0.014  0.013       0    TRAP      15      10
             *

 200         KK  BMIC-1
 201         KM   ONSITE DEVELOPED BASIN BMIC-1
 202         KM   REFERENCED FROM EG02
 203         BA  0.0141
 204         PB    2.79
 205         LS       0       92
 206         UD   0.081
             *
```

```
 207          KK     C15
 208          KM   COMBINE RT-B14 AND BMIC-1
 209          HC       2
              *

 210          KK   RT-14
 211          KM   ROUTE C15 THROUGH BMIC-2
 212          RK     450   0.018   0.013        0    TRAP      15       10
              *

 213          KK   BMIC-2
 214          KM   ONSITE DEVELOPED BASIN BMIC-2
 215          KM   REFERENCED FROM EG02
 216          BA  0.0118
 217          PB    2.79
 218          LS       0       92
1                                              HEC-1 INPUT                                             PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 219          UD   0.073
              *

 220          KK     C16
 221          KM   COMBINE RT-14 AND BMIC-2
 222          HC       2
              *

 223          KK   RT-15
 224          KM   ROUTE C16 THROUGH SCH-2
 225          RK     400   0.019   0.013        0    TRAP      15       10
              *

 226          KK   SCH-2
 227          KM   ONSITE DEVELOPED BASIN SCH-2
 228          KM   REFERENCED FROM EG02
 229          BA  0.0065
 230          PB    2.79
 231          LS       0       92
 232          UD   0.060
              *

 233          KK     C17
 234          KM   COMBINE RT-15 AND SCH-2
 235          HC       2
              *

 236          KK   RT-16
 237          KM   ROUTE C17 THROUGH BMIC-3
 238          RK     750   0.013   0.013        0    TRAP      15       10
              *

 239          KK   BMIC-3
 240          KM   ONSITE DEVELOPED BASIN BMIC-3
 241          KM   REFERENCED FROM EG02
 242          BA  0.0106
 243          PB    2.79
 244          LS       0       92
 245          UD   0.062
              *

 246          KK MGDEV-2
 247          KM   MILGARD MANUFACTURING ONSITE BASIN
 248          KM   REFERENCED FROM EG02
 249          BA  0.0093
 250          PB    2.79
 251          LS       0       92
 252          UD   0.075
              *
              * *****************************************************************************
              *
1                                              HEC-1 INPUT                                             PAGE  8

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 253          KK     C18
 254          KM   COMBINE RT-16, BMIC-3, BGDEV-2 AND OUTFLOW FROM DETENTION POND
 255          HC       4
              *
              * *****************************************************************************
              *                             Referenced from PBSJ
              *      "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
              *              Center Two (Formerly known as HARSCH)" (February 2003)
              * *****************************************************************************
              *

 256          KK     HR3
 257          KM   HARSCH ONSITE BASIN
 258          BA  0.0014
 259          PB    2.79
 260          LS       0       92
 261          UD   0.049
              *

 262          KK     HR2
 263          KM   HARSCH ONSITE BASIN
 264          BA  0.0016
 265          PB    2.79
 266          LS       0       98
 267          UD   0.037
              *

 268          KK     HR1
 269          KM   HARSCH ONSITE BASIN
 270          BA  0.0015
 271          PB    2.79
 272          LS       0       92
 273          UD    0.05
              *

 274          KK    CHR1
 275          KM   COMBINE HR3, HR2, HR1
 276          KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
 277          KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H1"
 278          KM   ON FIGURE 7
 279          HC       3
              *
              * *****************************************************************************
              *
```

```
          280          KK    C18B
          281          KM    COMBINE C18 AND CHR1
          282          HC       2
                        *
1                                                HEC-1 INPUT                                           PAGE  9

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          283          KK    OND15
          284          KM    DEVELOPED ONSITE BASIN
          285          BA  0.0335
          286          LS       0     91.0
          287          UD    0.09
                        *

          288          KK   OFFEX4
          289          KM    EXISTING OFFSITE BASIN
          290          BA  0.0119
          291          LS       0     85.0
          292          UD    0.17
                        *
          293          ZZ
1
            SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE   (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.   (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    13      OND9
                 .
    27           .      OFFEX3
                 .           .
                 .           .
    32      CP-7.............
                 .
                 .
    35           .        OND8
                 .           V
                 .           V
    40           .    ROND8-CP
                 .           .
                 .           .
    43           .           .          OND10
                 .           .           .
                 .           .           .          OFFEX5
                 .           .           .           .
                 .           .           .           .
    53           .         CP-9........................
                 .           V
                 .           V
    56           .    RCP9-CP-
                 .           .
                 .           .
    59           .           .          OND12
                 .           .           .
                 .           .           .
    64           .      CP-10A............
                 .           .
                 .           .
    67           .           .          OND11
                 .           .           .
                 .           .           .
    72           .           .           .          OND13
                 .           .           .           .
                 .           .           .           .
    77           .        CP-10........................
                 .           V
                 .           V
    80           .     EQBASIN
                 .           .
                 .           .
    89           .           .------->  DVPIPE
    87           .     DIVWEIR
                 .           .
                 .           .
    92           .           .          OND14
                 .           .           .
                 .           .           .
    97           .        CP-11............
                 .           .
                 .           .
   100           .           .           OND1
                 .           .           .
                 .           .           .
   105           .           .           .          OFFEX2
                 .           .           .           .
                 .           .           .           .
   110           .           .         CP-1............
                 .           .           V
                 .           .           V
   113           .           .    RCP1-CP2
                 .           .           .
                 .           .           .
   116           .           .           .           OND2
                 .           .           .           .
                 .           .           .           .
   121           .           .           .           .         OFFEX1
                 .           .           .           .           .
                 .           .           .           .           .
   126           .           .         CP-2........................
                 .           .           V
                 .           .           V
   129           .           .    RCP2-CP-
                 .           .           .
                 .           .           .
   132           .           .           .           OND3
                 .           .           .           .
                 .           .           .           .
   137           .           .         CP-3............
                 .           .           V
                 .           .           V
   140           .           .    RCP3-CP4
                 .           .           .
                 .           .           .
   143           .           .           .           OND7
```

```
              .           .           .           .
148           .           .       CP-4............
              .           .           .
151           .           .           .       OND4
              .           .           .           .
156           .           .           .           .       OND5
              .           .           .           .           .
161           .           .           .       CP-5............
              .           .           .           .
164           .           .           .           .       OND6
              .           .           .           .           .
171           .           .           .           .           .           .<-------  DVPIPE
169           .           .           .           .           .     DVPIPE
              .           .           .           .           .           V
              .           .           .           .           .           V
172           .           .           .           .           .    RDVPIPE
              .           .           .           .           .           .
175           .           .           .           .           .           .       DETPD
              .           .           .           .           .           .           .
180           .           .       CP-6....................................................
              .           .           V
              .           .           V
183           .           .     DETPOND
              .           .           .
190           .           .           .    OFFD-14
              .           .           .           V
              .           .           .           V
197           .           .           .     RT-B14
              .           .           .           .
200           .           .           .           .     BMIC-1
              .           .           .           .           .
207           .           .           .        C15............
              .           .           .           V
              .           .           .           V
210           .           .           .      RT-14
              .           .           .           .
213           .           .           .           .     BMIC-2
              .           .           .           .           .
220           .           .           .        C16............
              .           .           .           V
              .           .           .           V
223           .           .           .      RT-15
              .           .           .           .
226           .           .           .           .      SCH-2
              .           .           .           .           .
233           .           .           .        C17............
              .           .           .           V
              .           .           .           V
236           .           .           .      RT-16
              .           .           .           .
239           .           .           .           .     BMIC-3
              .           .           .           .           .
246           .           .           .           .           .    MGDEV-2
              .           .           .           .           .           .
253           .           .        C18....................................
              .           .           .
256           .           .           .        HR3
              .           .           .           .
262           .           .           .           .        HR2
              .           .           .           .           .
268           .           .           .           .           .        HR1
              .           .           .           .           .           .
274           .           .           .       CHR1........................
              .           .           .           .
280           .           .       C18B............
              .           .           .
283           .           .           .      OND15
              .           .           .           .
288           .           .           .           .     OFFEX4
(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
1*****************************************                    *****************************************
 *                                       *                    *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
 *             JUN   1998                *                    *   HYDROLOGIC ENGINEERING CENTER       *
 *           VERSION 4.1                 *                    *         609 SECOND STREET             *
 *                                       *                    *      DAVIS, CALIFORNIA 95616          *
 *  RUN DATE   27SEP06  TIME  19:18:46   *                    *          (916) 756-1104               *
 *                                       *                    *                                       *
 *****************************************                    *****************************************
```

```
                              EASTSIDE LANDFILL IMPROVEMENTS
                              INTERIM CONDITION MODEL
                              INPUT FILE = INT_SDN3.DAT
                              SEPTEMBER 2006
                              DESIGN STORM = 100-YEAR 6-HR STORM
                              STORM DISTRIBUTION = SDN #3
                              MODELED BY PBS&J

 11 IO          OUTPUT CONTROL VARIABLES
```

```
                  IPRNT          5  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT           HYDROGRAPH TIME DATA
                  NMIN           5  MINUTES IN COMPUTATION INTERVAL
                  IDATE      1   0  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE      2   0  ENDING DATE
                 NDTIME       0055  ENDING TIME
                  ICENT         19  CENTURY MARK

               COMPUTATION INTERVAL    .08 HOURS
                    TOTAL TIME BASE  24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA            SQUARE MILES
             PRECIPITATION DEPTH      INCHES
             LENGTH, ELEVATION        FEET
             FLOW                     CUBIC FEET PER SECOND
             STORAGE VOLUME           ACRE-FEET
             SURFACE AREA             ACRES
             TEMPERATURE              DEGREES FAHRENHEIT

  JP           MULTI-PLAN OPTION
                  NPLAN              1  NUMBER OF PLANS

  JR           MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                1.00      .60      .58
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

        **************
        *            *
183 KK  *  DETPOND   *
        *            *
        **************

189 KO         OUTPUT CONTROL VARIABLES
                  IPRNT          1  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

185 RS         STORAGE ROUTING
                  NSTPS          1  NUMBER OF SUBREACHES
                   ITYP       STOR  TYPE OF INITIAL CONDITION
                 RSVRIC      -1.00  INITIAL CONDITION
                      X        .00  WORKING R AND D COEFFICIENT
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186 SV	STORAGE	.0	.1	1.5	3.0	4.8	8.9	13.4	15.9
187 SE	ELEVATION	1725.25	1726.00	1728.00	1729.00	1730.00	1732.00	1734.00	1735.00
188 SQ	DISCHARGE	0.	0.	22.	27.	32.	40.	46.	49.

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HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	*	1		0820	101	23.	1.9	1728.2	*	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	*	1		0825	102	23.	1.7	1728.1	*	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	*	1		0830	103	22.	1.6	1728.0	*	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	*	1		0835	104	20.	1.4	1727.8	*	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	*	1		0840	105	18.	1.3	1727.7	*	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	*	1		0845	106	16.	1.2	1727.5	*	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	*	1		0850	107	15.	1.1	1727.3	*	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	*	1		0855	108	13.	1.0	1727.2	*	1		1715	208	0.	.1	1726.0
1		0040	9	1.	.1	1726.1	*	1		0900	109	12.	.9	1727.1	*	1		1720	209	0.	.1	1726.0
1		0045	10	1.	.1	1726.1	*	1		0905	110	11.	.8	1727.0	*	1		1725	210	0.	.1	1726.0
1		0050	11	1.	.1	1726.1	*	1		0910	111	10.	.7	1726.9	*	1		1730	211	0.	.1	1726.0
1		0055	12	1.	.1	1726.1	*	1		0915	112	9.	.7	1726.8	*	1		1735	212	0.	.1	1726.0
1		0100	13	1.	.1	1726.1	*	1		0920	113	8.	.6	1726.7	*	1		1740	213	0.	.1	1726.0
1		0105	14	1.	.1	1726.1	*	1		0925	114	7.	.5	1726.6	*	1		1745	214	0.	.1	1726.0
1		0110	15	1.	.1	1726.1	*	1		0930	115	6.	.5	1726.6	*	1		1750	215	0.	.1	1726.0
1		0115	16	1.	.2	1726.1	*	1		0935	116	6.	.5	1726.5	*	1		1755	216	0.	.1	1726.0
1		0120	17	1.	.2	1726.1	*	1		0940	117	5.	.4	1726.5	*	1		1800	217	0.	.1	1726.0
1		0125	18	1.	.2	1726.1	*	1		0945	118	5.	.4	1726.4	*	1		1805	218	0.	.1	1726.0
1		0130	19	2.	.2	1726.1	*	1		0950	119	4.	.4	1726.4	*	1		1810	219	0.	.1	1726.0
1		0135	20	2.	.2	1726.2	*	1		0955	120	4.	.3	1726.3	*	1		1815	220	0.	.1	1726.0
1		0140	21	2.	.2	1726.2	*	1		1000	121	3.	.3	1726.3	*	1		1820	221	0.	.1	1726.0
1		0145	22	3.	.3	1726.3	*	1		1005	122	3.	.3	1726.3	*	1		1825	222	0.	.1	1726.0
1		0150	23	3.	.3	1726.3	*	1		1010	123	3.	.3	1726.3	*	1		1830	223	0.	.1	1726.0
1		0155	24	4.	.3	1726.3	*	1		1015	124	2.	.2	1726.2	*	1		1835	224	0.	.1	1726.0
1		0200	25	4.	.3	1726.3	*	1		1020	125	2.	.2	1726.2	*	1		1840	225	0.	.1	1726.0
1		0205	26	4.	.3	1726.4	*	1		1025	126	2.	.2	1726.2	*	1		1845	226	0.	.1	1726.0
1		0210	27	4.	.3	1726.4	*	1		1030	127	2.	.2	1726.2	*	1		1850	227	0.	.1	1726.0
1		0215	28	4.	.4	1726.4	*	1		1035	128	2.	.2	1726.1	*	1		1855	228	0.	.1	1726.0
1		0220	29	5.	.4	1726.4	*	1		1040	129	1.	.2	1726.1	*	1		1900	229	0.	.1	1726.0
1		0225	30	5.	.4	1726.5	*	1		1045	130	1.	.2	1726.1	*	1		1905	230	0.	.1	1726.0
1		0230	31	6.	.5	1726.5	*	1		1050	131	1.	.2	1726.1	*	1		1910	231	0.	.1	1726.0
1		0235	32	6.	.5	1726.6	*	1		1055	132	1.	.2	1726.1	*	1		1915	232	0.	.1	1726.0
1		0240	33	7.	.5	1726.6	*	1		1100	133	1.	.1	1726.1	*	1		1920	233	0.	.1	1726.0
1		0245	34	7.	.6	1726.7	*	1		1105	134	1.	.1	1726.1	*	1		1925	234	0.	.1	1726.0
1		0250	35	8.	.6	1726.7	*	1		1110	135	1.	.1	1726.1	*	1		1930	235	0.	.1	1726.0
1		0255	36	8.	.6	1726.7	*	1		1115	136	1.	.1	1726.1	*	1		1935	236	0.	.1	1726.0
1		0300	37	8.	.6	1726.8	*	1		1120	137	1.	.1	1726.1	*	1		1940	237	0.	.1	1726.0
1		0305	38	9.	.7	1726.8	*	1		1125	138	1.	.1	1726.1	*	1		1945	238	0.	.1	1726.0
1		0310	39	10.	.8	1726.9	*	1		1130	139	1.	.1	1726.0	*	1		1950	239	0.	.1	1726.0
1		0315	40	13.	.9	1727.2	*	1		1135	140	0.	.1	1726.0	*	1		1955	240	0.	.1	1726.0
1		0320	41	17.	1.2	1727.6	*	1		1140	141	0.	.1	1726.0	*	1		2000	241	0.	.1	1726.0
1		0325	42	23.	1.8	1728.2	*	1		1145	142	0.	.1	1726.0	*	1		2005	242	0.	.1	1726.0
1		0330	43	25.	2.6	1728.7	*	1		1150	143	0.	.1	1726.0	*	1		2010	243	0.	.1	1726.0
1		0335	44	29.	3.6	1729.3	*	1		1155	144	0.	.1	1726.0	*	1		2015	244	0.	.1	1726.0
1		0340	45	32.	4.7	1729.9	*	1		1200	145	0.	.1	1726.0	*	1		2020	245	0.	.1	1726.0
1		0345	46	34.	5.7	1730.4	*	1		1205	146	0.	.1	1726.0	*	1		2025	246	0.	.1	1726.0
1		0350	47	35.	6.5	1730.8	*	1		1210	147	0.	.1	1726.0	*	1		2030	247	0.	.1	1726.0

1	0355	48	37.	7.1	1731.1	1	1215	148	0.	.1	1726.0	1	2035	248	0.	.1	1726.0
1	0400	49	38.	7.7	1731.4	1	1220	149	0.	.1	1726.0	1	2040	249	0.	.1	1726.0
1	0405	50	38.	8.1	1731.6	1	1225	150	0.	.1	1726.0	1	2045	250	0.	.1	1726.0
1	0410	51	39.	8.3	1731.7	1	1230	151	0.	.1	1726.0	1	2050	251	0.	.1	1726.0
1	0415	52	39.	8.5	1731.8	1	1235	152	0.	.1	1726.0	1	2055	252	0.	.1	1726.0
1	0420	53	40.	8.7	1731.9	1	1240	153	0.	.1	1726.0	1	2100	253	0.	.1	1726.0
1	0425	54	40.	8.7	1731.9	1	1245	154	0.	.1	1726.0	1	2105	254	0.	.1	1726.0
1	0430	55	40.	8.8	1732.0	1	1250	155	0.	.1	1726.0	1	2110	255	0.	.1	1726.0
1	0435	56	40.	8.9	1732.0	1	1255	156	0.	.1	1726.0	1	2115	256	0.	.1	1726.0
1	0440	57	40.	9.0	1732.0	1	1300	157	0.	.1	1726.0	1	2120	257	0.	.1	1726.0
1	0445	58	40.	9.1	1732.1	1	1305	158	0.	.1	1726.0	1	2125	258	0.	.1	1726.0
1	0450	59	40.	9.2	1732.1	1	1310	159	0.	.1	1726.0	1	2130	259	0.	.1	1726.0
1	0455	60	41.	9.3	1732.2	1	1315	160	0.	.1	1726.0	1	2135	260	0.	.1	1726.0
1	0500	61	41.	9.4	1732.2	1	1320	161	0.	.1	1726.0	1	2140	261	0.	.1	1726.0
1	0505	62	41.	9.4	1732.2	1	1325	162	0.	.1	1726.0	1	2145	262	0.	.1	1726.0
1	0510	63	41.	9.4	1732.2	1	1330	163	0.	.1	1726.0	1	2150	263	0.	.1	1726.0
1	0515	64	41.	9.3	1732.2	1	1335	164	0.	.1	1726.0	1	2155	264	0.	.1	1726.0
1	0520	65	40.	9.2	1732.1	1	1340	165	0.	.1	1726.0	1	2200	265	0.	.1	1726.0
1	0525	66	40.	9.0	1732.1	1	1345	166	0.	.1	1726.0	1	2205	266	0.	.1	1726.0
1	0530	67	40.	8.9	1732.0	1	1350	167	0.	.1	1726.0	1	2210	267	0.	.1	1726.0
1	0535	68	40.	8.7	1731.9	1	1355	168	0.	.1	1726.0	1	2215	268	0.	.1	1726.0
1	0540	69	39.	8.5	1731.8	1	1400	169	0.	.1	1726.0	1	2220	269	0.	.1	1726.0
1	0545	70	39.	8.3	1731.7	1	1405	170	0.	.1	1726.0	1	2225	270	0.	.1	1726.0
1	0550	71	38.	8.1	1731.6	1	1410	171	0.	.1	1726.0	1	2230	271	0.	.1	1726.0
1	0555	72	38.	7.8	1731.5	1	1415	172	0.	.1	1726.0	1	2235	272	0.	.1	1726.0
1	0600	73	38.	7.6	1731.4	1	1420	173	0.	.1	1726.0	1	2240	273	0.	.1	1726.0
1	0605	74	37.	7.4	1731.3	1	1425	174	0.	.1	1726.0	1	2245	274	0.	.1	1726.0
1	0610	75	37.	7.2	1731.2	1	1430	175	0.	.1	1726.0	1	2250	275	0.	.1	1726.0
1	0615	76	36.	7.0	1731.0	1	1435	176	0.	.1	1726.0	1	2255	276	0.	.1	1726.0
1	0620	77	36.	6.7	1730.9	1	1440	177	0.	.1	1726.0	1	2300	277	0.	.1	1726.0
1	0625	78	35.	6.5	1730.8	1	1445	178	0.	.1	1726.0	1	2305	278	0.	.1	1726.0
1	0630	79	35.	6.3	1730.7	1	1450	179	0.	.1	1726.0	1	2310	279	0.	.1	1726.0
1	0635	80	34.	6.0	1730.6	1	1455	180	0.	.1	1726.0	1	2315	280	0.	.1	1726.0
1	0640	81	34.	5.8	1730.5	1	1500	181	0.	.1	1726.0	1	2320	281	0.	.1	1726.0
1	0645	82	33.	5.6	1730.4	1	1505	182	0.	.1	1726.0	1	2325	282	0.	.1	1726.0
1	0650	83	33.	5.3	1730.3	1	1510	183	0.	.1	1726.0	1	2330	283	0.	.1	1726.0
1	0655	84	33.	5.1	1730.1	1	1515	184	0.	.1	1726.0	1	2335	284	0.	.1	1726.0
1	0700	85	32.	4.9	1730.0	1	1520	185	0.	.1	1726.0	1	2340	285	0.	.1	1726.0
1	0705	86	32.	4.7	1729.9	1	1525	186	0.	.1	1726.0	1	2345	286	0.	.1	1726.0
1	0710	87	31.	4.5	1729.8	1	1530	187	0.	.1	1726.0	1	2350	287	0.	.1	1726.0
1	0715	88	30.	4.3	1729.7	1	1535	188	0.	.1	1726.0	1	2355	288	0.	.1	1726.0
1	0720	89	30.	4.1	1729.6	1	1540	189	0.	.1	1726.0	2	0000	289	0.	.1	1726.0
1	0725	90	29.	3.9	1729.5	1	1545	190	0.	.1	1726.0	2	0005	290	0.	.1	1726.0
1	0730	91	29.	3.7	1729.3	1	1550	191	0.	.1	1726.0	2	0010	291	0.	.1	1726.0
1	0735	92	28.	3.5	1729.2	1	1555	192	0.	.1	1726.0	2	0015	292	0.	.1	1726.0
1	0740	93	28.	3.3	1729.1	1	1600	193	0.	.1	1726.0	2	0020	293	0.	.1	1726.0
1	0745	94	27.	3.1	1729.0	1	1605	194	0.	.1	1726.0	2	0025	294	0.	.1	1726.0
1	0750	95	27.	2.9	1728.9	1	1610	195	0.	.1	1726.0	2	0030	295	0.	.1	1726.0
1	0755	96	26.	2.7	1728.8	1	1615	196	0.	.1	1726.0	2	0035	296	0.	.1	1726.0
1	0800	97	25.	2.5	1728.7	1	1620	197	0.	.1	1726.0	2	0040	297	0.	.1	1726.0
1	0805	98	25.	2.4	1728.6	1	1625	198	0.	.1	1726.0	2	0045	298	0.	.1	1726.0
1	0810	99	24.	2.2	1728.4	1	1630	199	0.	.1	1726.0	2	0050	299	0.	.1	1726.0
1	0815	100	24.	2.0	1728.3	1	1635	200	0.	.1	1726.0	2	0055	300	0.	.1	1726.0

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 41.	5.08		31.	9.	8.	8.
		(INCHES)	1.944	2.126	2.126	2.126
		(AC-FT)	15.	17.	17.	17.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
9.	5.08	5.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1732.22	5.08	1730.12	1727.10	1727.06	1727.06

CUMULATIVE AREA = .15 SQ MI

HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = .60

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	1		0820	101	1.	.2	1726.1	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	1		0825	102	1.	.2	1726.1	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	1		0830	103	1.	.2	1726.1	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	1		0835	104	1.	.1	1726.1	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	1		0840	105	1.	.1	1726.1	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	1		0845	106	1.	.1	1726.1	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	1		0850	107	1.	.1	1726.1	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	1		0855	108	1.	.1	1726.1	1		1715	208	0.	.1	1726.0
1		0040	9	0.	.1	1726.0	1		0900	109	1.	.1	1726.1	1		1720	209	0.	.1	1726.0
1		0045	10	0.	.1	1726.0	1		0905	110	1.	.1	1726.0	1		1725	210	0.	.1	1726.0
1		0050	11	0.	.1	1726.0	1		0910	111	0.	.1	1726.0	1		1730	211	0.	.1	1726.0
1		0055	12	0.	.1	1726.0	1		0915	112	0.	.1	1726.0	1		1735	212	0.	.1	1726.0
1		0100	13	0.	.1	1726.0	1		0920	113	0.	.1	1726.0	1		1740	213	0.	.1	1726.0
1		0105	14	0.	.1	1726.0	1		0925	114	0.	.1	1726.0	1		1745	214	0.	.1	1726.0
1		0110	15	0.	.1	1726.0	1		0930	115	0.	.1	1726.0	1		1750	215	0.	.1	1726.0
1		0115	16	0.	.1	1726.0	1		0935	116	0.	.1	1726.0	1		1755	216	0.	.1	1726.0
1		0120	17	0.	.1	1726.0	1		0940	117	0.	.1	1726.0	1		1800	217	0.	.1	1726.0
1		0125	18	0.	.1	1726.0	1		0945	118	0.	.1	1726.0	1		1805	218	0.	.1	1726.0
1		0130	19	0.	.1	1726.0	1		0950	119	0.	.1	1726.0	1		1810	219	0.	.1	1726.0
1		0135	20	0.	.1	1726.0	1		0955	120	0.	.1	1726.0	1		1815	220	0.	.1	1726.0
1		0140	21	0.	.1	1726.0	1		1000	121	0.	.1	1726.0	1		1820	221	0.	.1	1726.0
1		0145	22	0.	.1	1726.0	1		1005	122	0.	.1	1726.0	1		1825	222	0.	.1	1726.0
1		0150	23	0.	.1	1726.0	1		1010	123	0.	.1	1726.0	1		1830	223	0.	.1	1726.0
1		0155	24	1.	.1	1726.1	1		1015	124	0.	.1	1726.0	1		1835	224	0.	.1	1726.0
1		0200	25	1.	.1	1726.1	1		1020	125	0.	.1	1726.0	1		1840	225	0.	.1	1726.0
1		0205	26	1.	.1	1726.1	1		1025	126	0.	.1	1726.0	1		1845	226	0.	.1	1726.0
1		0210	27	1.	.1	1726.1	1		1030	127	0.	.1	1726.0	1		1850	227	0.	.1	1726.0
1		0215	28	1.	.1	1726.1	1		1035	128	0.	.1	1726.0	1		1855	228	0.	.1	1726.0
1		0220	29	1.	.1	1726.1	1		1040	129	0.	.1	1726.0	1		1900	229	0.	.1	1726.0
1		0225	30	1.	.2	1726.1	1		1045	130	0.	.1	1726.0	1		1905	230	0.	.1	1726.0
1		0230	31	1.	.2	1726.1	1		1050	131	0.	.1	1726.0	1		1910	231	0.	.1	1726.0
1		0235	32	2.	.2	1726.1	1		1055	132	0.	.1	1726.0	1		1915	232	0.	.1	1726.0
1		0240	33	2.	.2	1726.2	1		1100	133	0.	.1	1726.0	1		1920	233	0.	.1	1726.0
1		0245	34	2.	.2	1726.2	1		1105	134	0.	.1	1726.0	1		1925	234	0.	.1	1726.0

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0250	35	2.	.2	1726.2	1		1110	135	0.	.1	1726.0	1		1930	235	0.	.1	1726.0
1		0255	36	2.	.2	1726.2	1		1115	136	0.	.1	1726.0	1		1935	236	0.	.1	1726.0
1		0300	37	2.	.2	1726.2	1		1120	137	0.	.1	1726.0	1		1940	237	0.	.1	1726.0
1		0305	38	3.	.2	1726.2	1		1125	138	0.	.1	1726.0	1		1945	238	0.	.1	1726.0
1		0310	39	3.	.3	1726.3	1		1130	139	0.	.1	1726.0	1		1950	239	0.	.1	1726.0
1		0315	40	4.	.3	1726.4	1		1135	140	0.	.1	1726.0	1		1955	240	0.	.1	1726.0
1		0320	41	6.	.4	1726.5	1		1140	141	0.	.1	1726.0	1		2000	241	0.	.1	1726.0
1		0325	42	9.	.6	1726.8	1		1145	142	0.	.1	1726.0	1		2005	242	0.	.1	1726.0
1		0330	43	13.	1.0	1727.2	1		1150	143	0.	.1	1726.0	1		2010	243	0.	.1	1726.0
1		0335	44	19.	1.4	1727.8	1		1155	144	0.	.1	1726.0	1		2015	244	0.	.1	1726.0
1		0340	45	23.	1.7	1728.1	1		1200	145	0.	.1	1726.0	1		2020	245	0.	.1	1726.0
1		0345	46	24.	2.1	1728.4	1		1205	146	0.	.1	1726.0	1		2025	246	0.	.1	1726.0
1		0350	47	25.	2.4	1728.6	1		1210	147	0.	.1	1726.0	1		2030	247	0.	.1	1726.0
1		0355	48	26.	2.7	1728.8	1		1215	148	0.	.1	1726.0	1		2035	248	0.	.1	1726.0
1		0400	49	26.	2.8	1728.9	1		1220	149	0.	.1	1726.0	1		2040	249	0.	.1	1726.0
1		0405	50	27.	3.0	1729.0	1		1225	150	0.	.1	1726.0	1		2045	250	0.	.1	1726.0
1		0410	51	27.	3.0	1729.0	1		1230	151	0.	.1	1726.0	1		2050	251	0.	.1	1726.0
1		0415	52	27.	3.1	1729.0	1		1235	152	0.	.1	1726.0	1		2055	252	0.	.1	1726.0
1		0420	53	27.	3.1	1729.0	1		1240	153	0.	.1	1726.0	1		2100	253	0.	.1	1726.0
1		0425	54	27.	3.0	1729.0	1		1245	154	0.	.1	1726.0	1		2105	254	0.	.1	1726.0
1		0430	55	27.	3.0	1729.0	1		1250	155	0.	.1	1726.0	1		2110	255	0.	.1	1726.0
1		0435	56	27.	3.0	1729.0	1		1255	156	0.	.1	1726.0	1		2115	256	0.	.1	1726.0
1		0440	57	27.	3.0	1729.0	1		1300	157	0.	.1	1726.0	1		2120	257	0.	.1	1726.0
1		0445	58	27.	3.0	1729.0	1		1305	158	0.	.1	1726.0	1		2125	258	0.	.1	1726.0
1		0450	59	27.	2.9	1729.0	1		1310	159	0.	.1	1726.0	1		2130	259	0.	.1	1726.0
1		0455	60	27.	2.9	1728.9	1		1315	160	0.	.1	1726.0	1		2135	260	0.	.1	1726.0
1		0500	61	27.	2.9	1728.9	1		1320	161	0.	.1	1726.0	1		2140	261	0.	.1	1726.0
1		0505	62	27.	2.9	1728.9	1		1325	162	0.	.1	1726.0	1		2145	262	0.	.1	1726.0
1		0510	63	26.	2.8	1728.9	1		1330	163	0.	.1	1726.0	1		2150	263	0.	.1	1726.0
1		0515	64	26.	2.8	1728.8	1		1335	164	0.	.1	1726.0	1		2155	264	0.	.1	1726.0
1		0520	65	26.	2.7	1728.8	1		1340	165	0.	.1	1726.0	1		2200	265	0.	.1	1726.0
1		0525	66	25.	2.6	1728.7	1		1345	166	0.	.1	1726.0	1		2205	266	0.	.1	1726.0
1		0530	67	25.	2.4	1728.6	1		1350	167	0.	.1	1726.0	1		2210	267	0.	.1	1726.0
1		0535	68	25.	2.3	1728.5	1		1355	168	0.	.1	1726.0	1		2215	268	0.	.1	1726.0
1		0540	69	24.	2.2	1728.4	1		1400	169	0.	.1	1726.0	1		2220	269	0.	.1	1726.0
1		0545	70	24.	2.0	1728.3	1		1405	170	0.	.1	1726.0	1		2225	270	0.	.1	1726.0
1		0550	71	23.	1.9	1728.3	1		1410	171	0.	.1	1726.0	1		2230	271	0.	.1	1726.0
1		0555	72	23.	1.8	1728.2	1		1415	172	0.	.1	1726.0	1		2235	272	0.	.1	1726.0
1		0600	73	22.	1.6	1728.1	1		1420	173	0.	.1	1726.0	1		2240	273	0.	.1	1726.0
1		0605	74	22.	1.5	1728.0	1		1425	174	0.	.1	1726.0	1		2245	274	0.	.1	1726.0
1		0610	75	20.	1.4	1727.8	1		1430	175	0.	.1	1726.0	1		2250	275	0.	.1	1726.0
1		0615	76	18.	1.3	1727.6	1		1435	176	0.	.1	1726.0	1		2255	276	0.	.1	1726.0
1		0620	77	16.	1.2	1727.5	1		1440	177	0.	.1	1726.0	1		2300	277	0.	.1	1726.0
1		0625	78	15.	1.1	1727.3	1		1445	178	0.	.1	1726.0	1		2305	278	0.	.1	1726.0
1		0630	79	13.	1.0	1727.2	1		1450	179	0.	.1	1726.0	1		2310	279	0.	.1	1726.0
1		0635	80	12.	.9	1727.1	1		1455	180	0.	.1	1726.0	1		2315	280	0.	.1	1726.0
1		0640	81	11.	.8	1727.0	1		1500	181	0.	.1	1726.0	1		2320	281	0.	.1	1726.0
1		0645	82	10.	.7	1726.9	1		1505	182	0.	.1	1726.0	1		2325	282	0.	.1	1726.0
1		0650	83	9.	.7	1726.8	1		1510	183	0.	.1	1726.0	1		2330	283	0.	.1	1726.0
1		0655	84	8.	.6	1726.7	1		1515	184	0.	.1	1726.0	1		2335	284	0.	.1	1726.0
1		0700	85	7.	.6	1726.7	1		1520	185	0.	.1	1726.0	1		2340	285	0.	.1	1726.0
1		0705	86	7.	.5	1726.6	1		1525	186	0.	.1	1726.0	1		2345	286	0.	.1	1726.0
1		0710	87	6.	.5	1726.5	1		1530	187	0.	.1	1726.0	1		2350	287	0.	.1	1726.0
1		0715	88	5.	.4	1726.5	1		1535	188	0.	.1	1726.0	1		2355	288	0.	.1	1726.0
1		0720	89	5.	.4	1726.4	1		1540	189	0.	.1	1726.0	2		0000	289	0.	.1	1726.0
1		0725	90	4.	.4	1726.4	1		1545	190	0.	.1	1726.0	2		0005	290	0.	.1	1726.0
1		0730	91	4.	.3	1726.4	1		1550	191	0.	.1	1726.0	2		0010	291	0.	.1	1726.0
1		0735	92	4.	.3	1726.3	1		1555	192	0.	.1	1726.0	2		0015	292	0.	.1	1726.0
1		0740	93	3.	.3	1726.3	1		1600	193	0.	.1	1726.0	2		0020	293	0.	.1	1726.0
1		0745	94	3.	.3	1726.3	1		1605	194	0.	.1	1726.0	2		0025	294	0.	.1	1726.0
1		0750	95	3.	.3	1726.2	1		1610	195	0.	.1	1726.0	2		0030	295	0.	.1	1726.0
1		0755	96	2.	.2	1726.2	1		1615	196	0.	.1	1726.0	2		0035	296	0.	.1	1726.0
1		0800	97	2.	.2	1726.2	1		1620	197	0.	.1	1726.0	2		0040	297	0.	.1	1726.0
1		0805	98	2.	.2	1726.2	1		1625	198	0.	.1	1726.0	2		0045	298	0.	.1	1726.0
1		0810	99	2.	.2	1726.2	1		1630	199	0.	.1	1726.0	2		0050	299	0.	.1	1726.0
1		0815	100	2.	.2	1726.1	1		1635	200	0.	.1	1726.0	2		0055	300	0.	.1	1726.0

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 27.	4.25		14.	4.	4.	4.
		(INCHES)	.890	.906	.906	.906
		(AC-FT)	7.	7.	7.	7.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
3.	4.25		1.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)					
1729.02	4.25		1727.46	1726.37	1726.36	1726.36

CUMULATIVE AREA = .15 SQ MI

HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = .58

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	1		0820	101	1.	.2	1726.1	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	1		0825	102	1.	.2	1726.1	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	1		0830	103	1.	.1	1726.1	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	1		0835	104	1.	.1	1726.1	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	1		0840	105	1.	.1	1726.1	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	1		0845	106	1.	.1	1726.1	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	1		0850	107	1.	.1	1726.1	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	1		0855	108	1.	.1	1726.1	1		1715	208	0.	.1	1726.0
1		0040	9	0.	.1	1726.0	1		0900	109	1.	.1	1726.0	1		1720	209	0.	.1	1726.0
1		0045	10	0.	.1	1726.0	1		0905	110	0.	.1	1726.0	1		1725	210	0.	.1	1726.0
1		0050	11	0.	.1	1726.0	1		0910	111	0.	.1	1726.0	1		1730	211	0.	.1	1726.0
1		0055	12	0.	.1	1726.0	1		0915	112	0.	.1	1726.0	1		1735	212	0.	.1	1726.0
1		0100	13	0.	.1	1726.0	1		0920	113	0.	.1	1726.0	1		1740	213	0.	.1	1726.0
1		0105	14	0.	.1	1726.0	1		0925	114	0.	.1	1726.0	1		1745	214	0.	.1	1726.0
1		0110	15	0.	.1	1726.0	1		0930	115	0.	.1	1726.0	1		1750	215	0.	.1	1726.0
1		0115	16	0.	.1	1726.0	1		0935	116	0.	.1	1726.0	1		1755	216	0.	.1	1726.0
1		0120	17	0.	.1	1726.0	1		0940	117	0.	.1	1726.0	1		1800	217	0.	.1	1726.0
1		0125	18	0.	.1	1726.0	1		0945	118	0.	.1	1726.0	1		1805	218	0.	.1	1726.0
1		0130	19	0.	.1	1726.0	1		0950	119	0.	.1	1726.0	1		1810	219	0.	.1	1726.0
1		0135	20	0.	.1	1726.0	1		0955	120	0.	.1	1726.0	1		1815	220	0.	.1	1726.0
1		0140	21	0.	.1	1726.0	1		1000	121	0.	.1	1726.0	1		1820	221	0.	.1	1726.0

1	0145	22	0.	.1	1726.0	*	1	1005	122	0.	.1	1726.0	*	1	1825	222	0.	.1	1726.0
1	0150	23	0.	.1	1726.0	*	1	1010	123	0.	.1	1726.0	*	1	1830	223	0.	.1	1726.0
1	0155	24	0.	.1	1726.0	*	1	1015	124	0.	.1	1726.0	*	1	1835	224	0.	.1	1726.0
1	0200	25	1.	.1	1726.0	*	1	1020	125	0.	.1	1726.0	*	1	1840	225	0.	.1	1726.0
1	0205	26	1.	.1	1726.0	*	1	1025	126	0.	.1	1726.0	*	1	1845	226	0.	.1	1726.0
1	0210	27	1.	.1	1726.1	*	1	1030	127	0.	.1	1726.0	*	1	1850	227	0.	.1	1726.0
1	0215	28	1.	.1	1726.1	*	1	1035	128	0.	.1	1726.0	*	1	1855	228	0.	.1	1726.0
1	0220	29	1.	.1	1726.1	*	1	1040	129	0.	.1	1726.0	*	1	1900	229	0.	.1	1726.0
1	0225	30	1.	.1	1726.1	*	1	1045	130	0.	.1	1726.0	*	1	1905	230	0.	.1	1726.0
1	0230	31	1.	.2	1726.1	*	1	1050	131	0.	.1	1726.0	*	1	1910	231	0.	.1	1726.0
1	0235	32	1.	.2	1726.1	*	1	1055	132	0.	.1	1726.0	*	1	1915	232	0.	.1	1726.0
1	0240	33	1.	.2	1726.1	*	1	1100	133	0.	.1	1726.0	*	1	1920	233	0.	.1	1726.0
1	0245	34	2.	.2	1726.1	*	1	1105	134	0.	.1	1726.0	*	1	1925	234	0.	.1	1726.0
1	0250	35	2.	.2	1726.2	*	1	1110	135	0.	.1	1726.0	*	1	1930	235	0.	.1	1726.0
1	0255	36	2.	.2	1726.2	*	1	1115	136	0.	.1	1726.0	*	1	1935	236	0.	.1	1726.0
1	0300	37	2.	.2	1726.2	*	1	1120	137	0.	.1	1726.0	*	1	1940	237	0.	.1	1726.0
1	0305	38	2.	.2	1726.2	*	1	1125	138	0.	.1	1726.0	*	1	1945	238	0.	.1	1726.0
1	0310	39	3.	.3	1726.2	*	1	1130	139	0.	.1	1726.0	*	1	1950	239	0.	.1	1726.0
1	0315	40	4.	.3	1726.3	*	1	1135	140	0.	.1	1726.0	*	1	1955	240	0.	.1	1726.0
1	0320	41	5.	.4	1726.5	*	1	1140	141	0.	.1	1726.0	*	1	2000	241	0.	.1	1726.0
1	0325	42	8.	.6	1726.7	*	1	1145	142	0.	.1	1726.0	*	1	2005	242	0.	.1	1726.0
1	0330	43	12.	.9	1727.1	*	1	1150	143	0.	.1	1726.0	*	1	2010	243	0.	.1	1726.0
1	0335	44	18.	1.3	1727.6	*	1	1155	144	0.	.1	1726.0	*	1	2015	244	0.	.1	1726.0
1	0340	45	22.	1.6	1728.1	*	1	1200	145	0.	.1	1726.0	*	1	2020	245	0.	.1	1726.0
1	0345	46	23.	2.0	1728.3	*	1	1205	146	0.	.1	1726.0	*	1	2025	246	0.	.1	1726.0
1	0350	47	24.	2.2	1728.5	*	1	1210	147	0.	.1	1726.0	*	1	2030	247	0.	.1	1726.0
1	0355	48	25.	2.5	1728.6	*	1	1215	148	0.	.1	1726.0	*	1	2035	248	0.	.1	1726.0
1	0400	49	26.	2.6	1728.7	*	1	1220	149	0.	.1	1726.0	*	1	2040	249	0.	.1	1726.0
1	0405	50	26.	2.7	1728.8	*	1	1225	150	0.	.1	1726.0	*	1	2045	250	0.	.1	1726.0
1	0410	51	26.	2.8	1728.9	*	1	1230	151	0.	.1	1726.0	*	1	2050	251	0.	.1	1726.0
1	0415	52	26.	2.8	1728.9	*	1	1235	152	0.	.1	1726.0	*	1	2055	252	0.	.1	1726.0
1	0420	53	26.	2.8	1728.9	*	1	1240	153	0.	.1	1726.0	*	1	2100	253	0.	.1	1726.0
1	0425	54	26.	2.8	1728.9	*	1	1245	154	0.	.1	1726.0	*	1	2105	254	0.	.1	1726.0
1	0430	55	26.	2.8	1728.8	*	1	1250	155	0.	.1	1726.0	*	1	2110	255	0.	.1	1726.0
1	0435	56	26.	2.7	1728.8	*	1	1255	156	0.	.1	1726.0	*	1	2115	256	0.	.1	1726.0
1	0440	57	26.	2.7	1728.8	*	1	1300	157	0.	.1	1726.0	*	1	2120	257	0.	.1	1726.0
1	0445	58	26.	2.7	1728.8	*	1	1305	158	0.	.1	1726.0	*	1	2125	258	0.	.1	1726.0
1	0450	59	26.	2.7	1728.8	*	1	1310	159	0.	.1	1726.0	*	1	2130	259	0.	.1	1726.0
1	0455	60	26.	2.7	1728.8	*	1	1315	160	0.	.1	1726.0	*	1	2135	260	0.	.1	1726.0
1	0500	61	26.	2.7	1728.8	*	1	1320	161	0.	.1	1726.0	*	1	2140	261	0.	.1	1726.0
1	0505	62	26.	2.6	1728.7	*	1	1325	162	0.	.1	1726.0	*	1	2145	262	0.	.1	1726.0
1	0510	63	25.	2.6	1728.7	*	1	1330	163	0.	.1	1726.0	*	1	2150	263	0.	.1	1726.0
1	0515	64	25.	2.5	1728.6	*	1	1335	164	0.	.1	1726.0	*	1	2155	264	0.	.1	1726.0
1	0520	65	25.	2.4	1728.6	*	1	1340	165	0.	.1	1726.0	*	1	2200	265	0.	.1	1726.0
1	0525	66	25.	2.3	1728.5	*	1	1345	166	0.	.1	1726.0	*	1	2205	266	0.	.1	1726.0
1	0530	67	24.	2.2	1728.4	*	1	1350	167	0.	.1	1726.0	*	1	2210	267	0.	.1	1726.0
1	0535	68	24.	2.1	1728.4	*	1	1355	168	0.	.1	1726.0	*	1	2215	268	0.	.1	1726.0
1	0540	69	23.	1.9	1728.3	*	1	1400	169	0.	.1	1726.0	*	1	2220	269	0.	.1	1726.0
1	0545	70	23.	1.8	1728.2	*	1	1405	170	0.	.1	1726.0	*	1	2225	270	0.	.1	1726.0
1	0550	71	22.	1.7	1728.1	*	1	1410	171	0.	.1	1726.0	*	1	2230	271	0.	.1	1726.0
1	0555	72	22.	1.5	1728.0	*	1	1415	172	0.	.1	1726.0	*	1	2235	272	0.	.1	1726.0
1	0600	73	20.	1.4	1727.8	*	1	1420	173	0.	.1	1726.0	*	1	2240	273	0.	.1	1726.0
1	0605	74	18.	1.3	1727.7	*	1	1425	174	0.	.1	1726.0	*	1	2245	274	0.	.1	1726.0
1	0610	75	17.	1.2	1727.5	*	1	1430	175	0.	.1	1726.0	*	1	2250	275	0.	.1	1726.0
1	0615	76	15.	1.1	1727.4	*	1	1435	176	0.	.1	1726.0	*	1	2255	276	0.	.1	1726.0
1	0620	77	14.	1.0	1727.3	*	1	1440	177	0.	.1	1726.0	*	1	2300	277	0.	.1	1726.0
1	0625	78	13.	.9	1727.1	*	1	1445	178	0.	.1	1726.0	*	1	2305	278	0.	.1	1726.0
1	0630	79	11.	.8	1727.0	*	1	1450	179	0.	.1	1726.0	*	1	2310	279	0.	.1	1726.0
1	0635	80	10.	.8	1726.9	*	1	1455	180	0.	.1	1726.0	*	1	2315	280	0.	.1	1726.0
1	0640	81	9.	.7	1726.9	*	1	1500	181	0.	.1	1726.0	*	1	2320	281	0.	.1	1726.0
1	0645	82	9.	.6	1726.8	*	1	1505	182	0.	.1	1726.0	*	1	2325	282	0.	.1	1726.0
1	0650	83	8.	.6	1726.7	*	1	1510	183	0.	.1	1726.0	*	1	2330	283	0.	.1	1726.0
1	0655	84	7.	.5	1726.6	*	1	1515	184	0.	.1	1726.0	*	1	2335	284	0.	.1	1726.0
1	0700	85	6.	.5	1726.6	*	1	1520	185	0.	.1	1726.0	*	1	2340	285	0.	.1	1726.0
1	0705	86	6.	.5	1726.5	*	1	1525	186	0.	.1	1726.0	*	1	2345	286	0.	.1	1726.0
1	0710	87	5.	.4	1726.5	*	1	1530	187	0.	.1	1726.0	*	1	2350	287	0.	.1	1726.0
1	0715	88	5.	.4	1726.4	*	1	1535	188	0.	.1	1726.0	*	1	2355	288	0.	.1	1726.0
1	0720	89	4.	.4	1726.4	*	1	1540	189	0.	.1	1726.0	*	2	0000	289	0.	.1	1726.0
1	0725	90	4.	.3	1726.3	*	1	1545	190	0.	.1	1726.0	*	2	0005	290	0.	.1	1726.0
1	0730	91	3.	.3	1726.3	*	1	1550	191	0.	.1	1726.0	*	2	0010	291	0.	.1	1726.0
1	0735	92	3.	.3	1726.3	*	1	1555	192	0.	.1	1726.0	*	2	0015	292	0.	.1	1726.0
1	0740	93	3.	.3	1726.3	*	1	1600	193	0.	.1	1726.0	*	2	0020	293	0.	.1	1726.0
1	0745	94	2.	.2	1726.2	*	1	1605	194	0.	.1	1726.0	*	2	0025	294	0.	.1	1726.0
1	0750	95	2.	.2	1726.2	*	1	1610	195	0.	.1	1726.0	*	2	0030	295	0.	.1	1726.0
1	0755	96	2.	.2	1726.2	*	1	1615	196	0.	.1	1726.0	*	2	0035	296	0.	.1	1726.0
1	0800	97	2.	.2	1726.2	*	1	1620	197	0.	.1	1726.0	*	2	0040	297	0.	.1	1726.0
1	0805	98	2.	.2	1726.1	*	1	1625	198	0.	.1	1726.0	*	2	0045	298	0.	.1	1726.0
1	0810	99	1.	.2	1726.1	*	1	1630	199	0.	.1	1726.0	*	2	0050	299	0.	.1	1726.0
1	0815	100	1.	.2	1726.1	*	1	1635	200	0.	.1	1726.0	*	2	0055	300	0.	.1	1726.0
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 26.	4.25		13.	3.	3.	3.
		(INCHES)	.838	.852	.852	.852
		(AC-FT)	7.	7.	7.	7.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
3.	4.25	1.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1728.88	4.25	1727.35	1726.34	1726.33	1726.33

CUMULATIVE AREA = .15 SQ MI

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION		
					RATIO 1	RATIO 2	RATIO 3
					1.00	.60	.58
HYDROGRAPH AT							
+	OND9	.00	1	FLOW	3.	2.	1.

Operation	Station	Area	Plan		Ratio 1	Ratio 2	Ratio 3
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OFFEX3	.03	1	FLOW	21.	8.	7.
				TIME	3.67	3.75	3.75
2 COMBINED AT +	CP-7	.03	1	FLOW	23.	8.	8.
				TIME	3.67	3.75	3.75
HYDROGRAPH AT +	OND8	.02	1	FLOW	33.	16.	15.
				TIME	3.58	3.58	3.58
ROUTED TO +	ROND8-CP	.02	1	FLOW	32.	16.	15.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	OND10	.01	1	FLOW	10.	5.	5.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFEX5	.01	1	FLOW	10.	4.	4.
				TIME	3.58	3.58	3.58
3 COMBINED AT +	CP-9	.04	1	FLOW	51.	23.	22.
				TIME	3.58	3.67	3.67
ROUTED TO +	RCP9-CP-	.04	1	FLOW	50.	23.	22.
				TIME	3.58	3.67	3.67
HYDROGRAPH AT +	OND12	.00	1	FLOW	8.	4.	4.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-10A	.04	1	FLOW	55.	25.	24.
				TIME	3.58	3.67	3.67
HYDROGRAPH AT +	OND11	.01	1	FLOW	24.	12.	11.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OND13	.01	1	FLOW	12.	6.	6.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	CP-10	.06	1	FLOW	90.	42.	40.
				TIME	3.58	3.58	3.58
ROUTED TO +	EQBASIN	.06	1	FLOW	54.	27.	26.
				TIME	3.83	3.83	3.83
			** PEAK STAGES IN FEET **				
			1	STAGE	1747.53	1746.40	1746.34
				TIME	3.83	3.83	3.83
DIVERSION TO +	DVPIPE	.06	1	FLOW	54.	27.	26.
				TIME	3.83	3.83	3.83
HYDROGRAPH AT +	DIVWEIR	.06	1	FLOW	0.	0.	0.
				TIME	.00	.00	.00
HYDROGRAPH AT +	OND14	.02	1	FLOW	31.	15.	14.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-11	.08	1	FLOW	31.	15.	14.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OND1	.00	1	FLOW	3.	1.	1.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OFFEX2	.01	1	FLOW	13.	4.	4.
				TIME	3.58	3.58	3.58
2 COMBINED AT +	CP-1	.02	1	FLOW	15.	5.	4.
				TIME	3.58	3.58	3.58
ROUTED TO +	RCP1-CP2	.02	1	FLOW	14.	5.	4.
				TIME	3.58	3.67	3.67
HYDROGRAPH AT +	OND2	.01	1	FLOW	8.	4.	3.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFEX1	.07	1	FLOW	48.	14.	13.
				TIME	3.67	3.67	3.67
3 COMBINED AT +	CP-2	.09	1	FLOW	68.	22.	20.
				TIME	3.67	3.67	3.67
ROUTED TO +	RCP2-CP-	.09	1	FLOW	68.	21.	19.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	OND3	.00	1	FLOW	4.	2.	2.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-3	.09	1	FLOW	70.	22.	20.
				TIME	3.67	3.67	3.67
ROUTED TO +	RCP3-CP4	.09	1	FLOW	69.	21.	19.

				TIME	3.67	3.67	3.75
HYDROGRAPH AT +	OND7	.01	1	FLOW TIME	16. 3.50	8. 3.50	7. 3.50
2 COMBINED AT +	CP-4	.10	1	FLOW TIME	79. 3.58	26. 3.67	24. 3.67
HYDROGRAPH AT +	OND4	.02	1	FLOW TIME	27. 3.58	13. 3.58	12. 3.58
HYDROGRAPH AT +	OND5	.01	1	FLOW TIME	12. 3.58	6. 3.58	6. 3.58
2 COMBINED AT +	CP-5	.03	1	FLOW TIME	40. 3.58	19. 3.58	18. 3.58
HYDROGRAPH AT +	OND6	.02	1	FLOW TIME	23. 3.58	11. 3.58	11. 3.58
HYDROGRAPH AT +	DVPIPE	.00	1	FLOW TIME	54. 3.83	27. 3.83	26. 3.83
ROUTED TO +	RDVPIPE	.00	1	FLOW TIME	54. 3.83	27. 3.83	26. 3.83
HYDROGRAPH AT +	DETPD	.01	1	FLOW TIME	16. 3.50	8. 3.50	8. 3.50
5 COMBINED AT +	CP-6	.15	1	FLOW TIME	190. 3.58	79. 3.58	74. 3.58
ROUTED TO +	DETPOND	.15	1	FLOW TIME	41. 5.08	27. 4.25	26. 4.25
			** PEAK STAGES IN FEET **				
			1	STAGE TIME	1732.22 5.08	1729.02 4.25	1728.88 4.25
HYDROGRAPH AT +	OFFD-14	.00	1	FLOW TIME	3. 3.58	2. 3.67	1. 3.67
ROUTED TO +	RT-B14	.00	1	FLOW TIME	3. 3.67	1. 3.67	1. 3.67
HYDROGRAPH AT +	BMIC-1	.01	1	FLOW TIME	26. 3.50	13. 3.50	12. 3.50
2 COMBINED AT +	C15	.02	1	FLOW TIME	28. 3.50	14. 3.50	13. 3.50
ROUTED TO +	RT-14	.02	1	FLOW TIME	27. 3.50	13. 3.50	13. 3.50
HYDROGRAPH AT +	BMIC-2	.01	1	FLOW TIME	22. 3.50	11. 3.50	11. 3.50
2 COMBINED AT +	C16	.03	1	FLOW TIME	50. 3.50	25. 3.50	24. 3.50
ROUTED TO +	RT-15	.03	1	FLOW TIME	49. 3.50	24. 3.50	23. 3.50
HYDROGRAPH AT +	SCH-2	.01	1	FLOW TIME	13. 3.50	7. 3.50	6. 3.50
2 COMBINED AT +	C17	.04	1	FLOW TIME	61. 3.50	31. 3.50	29. 3.50
ROUTED TO +	RT-16	.04	1	FLOW TIME	59. 3.50	29. 3.50	27. 3.50
HYDROGRAPH AT +	BMIC-3	.01	1	FLOW TIME	21. 3.50	11. 3.50	10. 3.50
HYDROGRAPH AT +	MGDEV-2	.01	1	FLOW TIME	17. 3.50	9. 3.50	8. 3.50
4 COMBINED AT +	C18	.20	1	FLOW TIME	123. 3.50	62. 3.50	58. 3.50
HYDROGRAPH AT +	HR3	.00	1	FLOW TIME	3. 3.50	1. 3.50	1. 3.50
HYDROGRAPH AT +	HR2	.00	1	FLOW TIME	4. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT +	HR1	.00	1	FLOW TIME	3. 3.50	2. 3.50	2. 3.50
3 COMBINED AT +	CHR1	.00	1	FLOW	10.	5.	5.

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                                      TIME          3.50     3.50     3.50

 2 COMBINED AT
+              C18B      .21    1    FLOW          133.      67.      64.
                                      TIME          3.50     3.50     3.50

 HYDROGRAPH AT
+              OND15     .03    1    FLOW           57.      28.      27.
                                      TIME          3.50     3.50     3.50

 HYDROGRAPH AT
+              OFFEX4    .01    1    FLOW           14.       6.       5.
                                      TIME          3.58     3.58     3.58
1
                                      SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                            INTERPOLATED TO
                                                                         COMPUTATION INTERVAL
         ISTAQ    ELEMENT     DT       PEAK    TIME TO    VOLUME      DT      PEAK    TIME TO     VOLUME
                                                PEAK                                    PEAK

                            (MIN)     (CFS)     (MIN)      (IN)     (MIN)    (CFS)     (MIN)       (IN)

           FOR PLAN = 1  RATIO= 1.00
           ROND8-CP  MANE      1.62     32.92    217.65     1.82      5.00    31.53    220.00       1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2161E+01 EXCESS= .0000E+00 OUTFLOW= .2168E+01 BASIN STORAGE= .6696E-06 PERCENT ERROR=   -.3

           FOR PLAN = 1  RATIO=  .60
           ROND8-CP  MANE      2.13     15.86    219.44      .84      5.00    15.62    220.00        .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9996E+00 EXCESS= .0000E+00 OUTFLOW= .1003E+01 BASIN STORAGE= .5867E-06 PERCENT ERROR=   -.3

           FOR PLAN = 1  RATIO=  .58
           ROND8-CP  MANE      2.07     14.96    218.61      .80      5.00    14.69    220.00        .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9454E+00 EXCESS= .0000E+00 OUTFLOW= .9483E+00 BASIN STORAGE= .6885E-06 PERCENT ERROR=   -.3

           FOR PLAN = 1  RATIO= 1.00
           RCP9-CP-  MANE       .52     50.82    216.00     1.74      5.00    49.63    215.00       1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3439E+01 EXCESS= .0000E+00 OUTFLOW= .3440E+01 BASIN STORAGE= .3381E-06 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO=  .60
           RCP9-CP-  MANE       .50     23.33    220.56      .79      5.00    23.32    220.00        .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+01 EXCESS= .0000E+00 OUTFLOW= .1561E+01 BASIN STORAGE= .3045E-06 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO=  .58
           RCP9-CP-  MANE       .57     21.96    220.31      .75      5.00    21.96    220.00        .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1473E+01 EXCESS= .0000E+00 OUTFLOW= .1474E+01 BASIN STORAGE= .3331E-06 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO= 1.00
           RCP1-CP2  MANE      1.72     14.82    218.34     1.07      5.00    14.37    215.00       1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9363E+00 EXCESS= .0000E+00 OUTFLOW= .9386E+00 BASIN STORAGE= .2101E-06 PERCENT ERROR=   -.2

           FOR PLAN = 1  RATIO=  .60
           RCP1-CP2  MANE      2.17      4.84    219.55      .36      5.00     4.79    220.00        .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3181E+00 EXCESS= .0000E+00 OUTFLOW= .3191E+00 BASIN STORAGE= .2143E-06 PERCENT ERROR=   -.3

           FOR PLAN = 1  RATIO=  .58
           RCP1-CP2  MANE      2.23      4.38    220.13      .33      5.00     4.37    220.00        .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2929E+00 EXCESS= .0000E+00 OUTFLOW= .2937E+00 BASIN STORAGE= .1728E-06 PERCENT ERROR=   -.3

           FOR PLAN = 1  RATIO= 1.00
           RCP2-CP-  MANE       .31     67.94    220.07     1.02      5.00    67.93    220.00       1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4810E+01 EXCESS= .0000E+00 OUTFLOW= .4810E+01 BASIN STORAGE= .9178E-07 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO=  .60
           RCP2-CP-  MANE       .34     21.49    220.45      .34      5.00    21.35    220.00        .34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1596E+01 EXCESS= .0000E+00 OUTFLOW= .1596E+01 BASIN STORAGE= .8670E-07 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO=  .58
           RCP2-CP-  MANE       .29     19.59    220.58      .31      5.00    19.38    220.00        .31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1466E+01 EXCESS= .0000E+00 OUTFLOW= .1466E+01 BASIN STORAGE= .8727E-07 PERCENT ERROR=    .0

           FOR PLAN = 1  RATIO= 1.00
           RCP3-CP4  MANE       .61     69.46    220.77     1.04      5.00    69.27    220.00       1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5012E+01 EXCESS= .0000E+00 OUTFLOW= .5015E+01 BASIN STORAGE= .4675E-06 PERCENT ERROR=   -.1

           FOR PLAN = 1  RATIO=  .60
           RCP3-CP4  MANE       .90     22.00    222.28      .35      5.00    21.43    220.00        .35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1685E+01 EXCESS= .0000E+00 OUTFLOW= .1686E+01 BASIN STORAGE= .4645E-06 PERCENT ERROR=   -.1
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          FOR PLAN = 1  RATIO=  .58
          RCP3-CP4  MANE         1.00     20.05    221.90       .32      5.00     19.47    225.00        .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1550E+01 EXCESS= .0000E+00 OUTFLOW= .1551E+01 BASIN STORAGE= .4728E-06 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
           RDVPIPE  MANE         1.05     54.03    231.40     -1.00      5.00     54.01    230.00      -1.00


          FOR PLAN = 1  RATIO=  .60
           RDVPIPE  MANE         1.27     27.47    231.34     -1.00      5.00     27.45    230.00      -1.00


          FOR PLAN = 1  RATIO=  .58
           RDVPIPE  MANE         1.18     26.15    231.54     -1.00      5.00     26.12    230.00      -1.00


          FOR PLAN = 1  RATIO= 1.00
            RT-B14  MANE         1.36      3.39    218.69      1.64      5.00      3.37    220.00       1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2438E+00 EXCESS= .0000E+00 OUTFLOW= .2442E+00 BASIN STORAGE= .7570E-08 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .60
            RT-B14  MANE         1.71      1.51    223.43       .71      5.00      1.50    220.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1061E+00 EXCESS= .0000E+00 OUTFLOW= .1063E+00 BASIN STORAGE= .7638E-08 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .58
            RT-B14  MANE         1.76      1.42    222.80       .67      5.00      1.41    220.00        .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E-01 EXCESS= .0000E+00 OUTFLOW= .9993E-01 BASIN STORAGE= .5886E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
             RT-14  MANE          .37     27.93    210.77      1.91      5.00     27.32    210.00       1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1720E+01 EXCESS= .0000E+00 OUTFLOW= .1721E+01 BASIN STORAGE= .7751E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
             RT-14  MANE          .42     13.81    211.01       .91      5.00     13.40    210.00        .91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8203E+00 EXCESS= .0000E+00 OUTFLOW= .8205E+00 BASIN STORAGE= .6549E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
             RT-14  MANE          .41     13.17    210.75       .86      5.00     12.73    210.00        .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7778E+00 EXCESS= .0000E+00 OUTFLOW= .7780E+00 BASIN STORAGE= .6560E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
             RT-15  MANE          .36     49.16    210.62      1.93      5.00     48.56    210.00       1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2959E+01 EXCESS= .0000E+00 OUTFLOW= .2959E+01 BASIN STORAGE= .9128E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
             RT-15  MANE          .35     24.51    210.82       .93      5.00     24.04    210.00        .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1419E+01 EXCESS= .0000E+00 OUTFLOW= .1420E+01 BASIN STORAGE= .8611E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
             RT-15  MANE          .35     23.31    210.84       .88      5.00     22.85    210.00        .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1347E+01 EXCESS= .0000E+00 OUTFLOW= .1347E+01 BASIN STORAGE= .8421E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
             RT-16  MANE          .53     60.94    211.13      1.94      5.00     58.94    210.00       1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3645E+01 EXCESS= .0000E+00 OUTFLOW= .3647E+01 BASIN STORAGE= .3120E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .60
             RT-16  MANE          .65     30.36    211.36       .93      5.00     28.90    210.00        .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1751E+01 EXCESS= .0000E+00 OUTFLOW= .1752E+01 BASIN STORAGE= .3374E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
             RT-16  MANE          .62     28.82    211.06       .89      5.00     27.44    210.00        .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1661E+01 EXCESS= .0000E+00 OUTFLOW= .1663E+01 BASIN STORAGE= .3305E-07 PERCENT ERROR=   -.1


*** NORMAL END OF HEC-1 ***
```

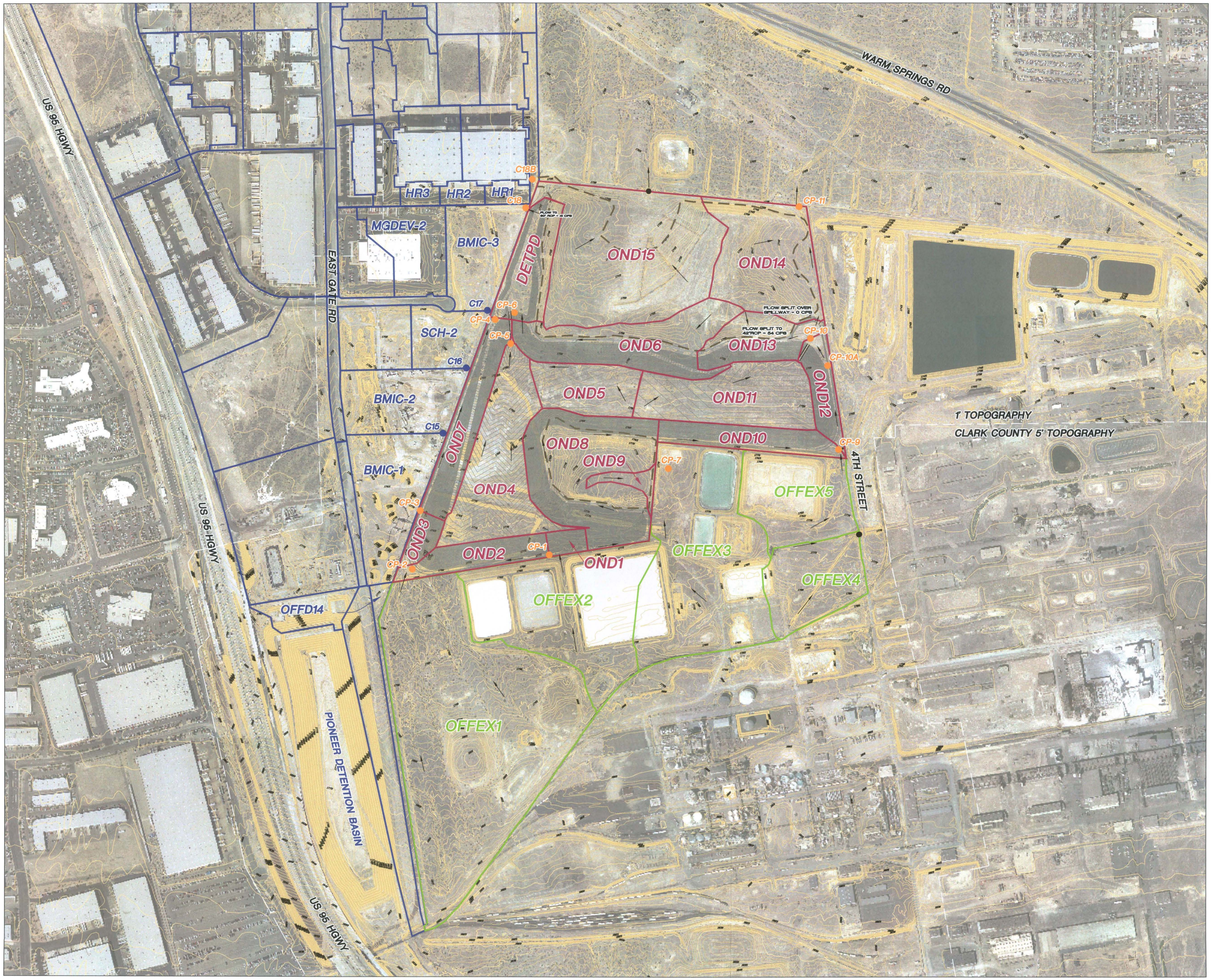

LEGEND

- ONSITE BASIN BOUNDARY
- OFFSITE BASIN BOUNDARY
- REFERENCED BASIN BOUNDARY
- OND1 — ONSITE BASIN LABEL
- OFFEX1 — OFFSITE BASIN LABEL
- HR1 — REFERENCED BASIN LABEL
- CP-1 — HEC-1 COMBINATION POINT
- DISCHARGE POINT
- FLOW DIRECTION
- REFERENCED BASIN BOUNDARY
- EXISTING LANDFILL BOUNDARY

NOTES

"ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR HENDERSON COMMERCE CENTER TWO (FORMERLY KNOWN AS HARSCH)" PREPARED BY PBS&J (FEBRUARY 2003) WAS USED FOR REFERENCED BASINS

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
OND1	0.94	3	1
OND2	3.70	8	4
OND3	1.38	4	2
OND4	11.67	27	13
OND5	5.03	12	6
OND6	9.90	23	11
OND7	5.87	16	8
OND8	14.26	33	16
OND9	1.06	3	2
OND10	4.28	10	5
OND11	9.60	24	12
OND12	2.77	8	4
OND13	4.70	12	6
OND14	11.12	31	15
OND15	21.47	57	28
DETPD	5.14	16	8
OFFEX1	42.20	48	14
OFFEX2	9.63	13	4
OFFEX3	16.40	21	8
OFFEX4	7.61	14	6
OFFEX5	5.11	10	4
CP-1	NA	15	5
CP-2	NA	68	22
CP-3	NA	70	22
CP-4	NA	79	26
CP-5	NA	40	19
CP-6	NA	190	79
CP-7	NA	23	8
CP-9	NA	51	23
CP-10	NA	90	42
CP-10A	NA	55	25
CP-11	NA	31	15
C18	NA	123	62

N

PBSJ

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

511963.19 OCTOBER 2006

FIGURE 5
INTERIM CONDITION DRAINAGE MAP

TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING PLANNING• SURVEYING CONSTRUCTION SERVICES

Appendix B-3: Developed Condition Hydrology

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

PBS&J
File: TDS-Standard Form 4.xls

EASTSIDE LANDFILL

Developed Condition Hydrology

BY: KP
DATE: 10/5/06

SUB-BASIN DATA						INITIAL / OVERLAND TIME (TI)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./UN. (D or U)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	
OND1	D	87.7	0.7676	0.94	0.0015	130	33.0	2.1	247	0.4	1.28	1.9	3.2	5.3	12.1	**0.05**	
OND2	D	87.7	0.7676	3.70	0.0058	137	33.0	2.2	910	0.4	1.28	1.9	10.1	12.2	15.8	**0.12**	
OND3	D	88.6	0.7795	1.38	0.0022	156	33.0	2.2	360	1.0	2.02	3.1	3.0	5.2	12.9	**0.05**	
OND4	D	89.7	0.7940	11.67	0.0182	240	2.0	6.8	1276	2.6	3.26	4.9	5.2	12.0	18.4	**0.12**	
OND5	D	91.0	0.8112	5.03	0.0079	300	1.7	7.6	573	1.1	2.07	3.1	4.4	12.0	14.9	**0.12**	
OND6	D	91.0	0.8112	9.90	0.0155	70	1.4	3.9	1407	0.6	1.56	2.4	11.7	15.6	18.2	**0.16**	
OND7	D	90.8	0.8086	5.87	0.0092	158	33.0	2.1	1345	1.8	2.67	4.0	6.6	8.7	18.4	**0.09**	
OND8	D	90.3	0.8020	14.26	0.0223	128	33.0	1.9	2382	0.4	1.28	1.9	22.7	24.6	23.9	**0.24**	**Use Tlag = 0.15 See Note**
OND9	U	91.0	0.8112	1.06	0.0017	50	1.3	3.4	453	1.9	2.05	4.1	3.7	7.0	N/A	**0.07**	
OND10	D	91.0	0.8112	4.28	0.0067	119	33.0	1.8	1190	0.4	1.28	1.9	12.5	14.2	17.3	**0.14**	
OND11	D	91.0	0.8112	9.60	0.0150	220	1.6	6.6	1050	1.1	2.12	3.2	6.8	13.4	17.1	**0.13**	
OND12	D	91.4	0.8165	2.77	0.0043	138	33.0	1.9	610	1.5	2.47	3.7	3.9	5.7	14.2	**0.06**	
OND13	D	91.0	0.8112	4.70	0.0073	95	33.0	1.6	714	0.4	1.28	1.9	8.4	9.9	14.5	**0.10**	
OND14	U	91.0	0.8112	11.12	0.0174	122	1.0	5.7	559	5.0	3.31	6.6	2.7	8.4	N/A	**0.08**	
OND15	U	91.0	0.8112	21.47	0.0335	200	2.5	5.4	711	3.0	2.56	5.1	3.9	9.4	N/A	**0.09**	
DETPD	D	91.4	0.8165	5.14	0.0080	60	8.3	2.0	35	34.0	11.78	17.8	0.0	*2.0*	10.5	**0.02**	
OFFD1	D	88.2	0.7742	42.20	0.0659	278	2.5	7.2	2213	2.0	2.85	4.3	9.5	16.7	23.8	**0.17**	
OFFD2	D	88.6	0.7795	9.63	0.0150	195	3.6	5.3	942	1.8	2.71	4.1	4.9	10.1	16.3	**0.10**	
OFFD3	D	89.9	0.7967	16.40	0.0256	300	0.3	13.6	1245	1.7	2.63	4.0	6.3	19.9	18.6	**0.19**	
OFFD4	D	91.0	0.8112	7.61	0.0119	300	1.0	9.0	750	1.9	2.76	4.2	4.0	13.0	15.8	**0.13**	
OFFD5	D	91.0	0.8112	5.11	0.0080	300	1.3	8.2	625	1.6	2.56	3.9	3.8	12.0	15.1	**0.12**	

Tc = Ti + Tt — **Eqn. 601**
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3 — **Eqn. 602**
K = 0.0132 (CN) - 0.39 — **Eqn. 603**
Tc Check = L/180+10 — **Eqn. 604**
Tlag = 0.6 Tc — **Eqn. 612**
Tt = 500/V1+ (Travel Length-500)/V2

For the travel time (Tt) calculations (**Sec. 602.1**),
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

Undeveloped V1 = 14.8*(S/100)^1/2 — Developed V1 = 20.2*(S/100)^1/2
Undeveloped V2 = 29.4*(S/100)^1/2 — Developed V2 = 30.6*(S/100)^1/2

Min Tc = 10 mins for undeveloped basins
Min Tc = 5 mins for developed basins

REFERENCE :

Note: The lag time or basin OND8 was changed to 0.15 hrs because the velocities were not accurate for the cross section. Please refer to the FlowMaster cross section located in Appendix B-3 for the time calculations.

STANDARD FORM 4

```
1****************************************                                        ****************************************
*                                       *                                        *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                        *  U.S. ARMY CORPS OF ENGINEERS        *
*              JUN  1998                *                                        *  HYDROLOGIC ENGINEERING CENTER       *
*            VERSION 4.1                *                                        *       609 SECOND STREET              *
*                                       *                                        *    DAVIS, CALIFORNIA 95616           *
* RUN DATE   27SEP06  TIME  18:51:46    *                                        *        (916) 756-1104                *
*                                       *                                        *                                      *
****************************************                                        ****************************************


                              X     X  XXXXXXX   XXXXX           X
                              X     X  X        X     X         XX
                              X     X  X        X                X
                              XXXXXXX  XXXX     X        XXXXX   X
                              X     X  X        X                X
                              X     X  X        X     X          X
                              X     X  XXXXXXX   XXXXX          XXX


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                        PAGE  1

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

*** FREE ***
                     *DIAGRAM
            1        ID   EASTSIDE LANDFILL IMPROVEMENTS
            2        ID   DEVLOPED CONDITION MODEL
            3        ID   INPUT FILE = DEV_SDN3.DAT
            4        ID   SEPTEMBER 2006
            5        ID   DESIGN STORM = 100-YEAR 6-HR STORM
            6        ID   STORM DISTRIBUTION = SDN #3
            7        ID   MODELED BY PBS&J
            8        ID
            9        IT       5       0       0     300
           10        IN       5       0       0
           11        IO       5
           12        JR   PREC   1.00    0.60    0.58
                     *

           13        KK   OND8
           14        KM   DEVELOPED ONSITE BASIN
           15        BA  0.0223
           16        PB    2.79
           17        PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
           18        PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
           19        PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
           20        PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
           21        PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
           22        PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
           23        PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
           24        PC    .998    .999    1.00
           25        LS       0    90.3
           26        UD    0.15
                     *

           27        KK   OND9
           28        KM   DEVELOPED ONSITE BASIN
           29        BA  0.0017
           30        LS       0    91.0
           31        UD    0.07
                     *

           32        KK   OFFD3
           33        KM   DEVELOPED OFFSITE BASIN
           34        BA  0.0256
           35        LS       0    89.9
           36        UD    0.19
                     *

           37        KK    CP-7
           38        KM   COMBINE OND9 AND OFFD3
           39        HC       2
                     *
1                                          HEC-1 INPUT                                        PAGE  2

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


           40        KK    CP-8
           41        KM   COMBINE CP-7 AND OND8
           42        HC       2
                     *

           43        KKRCP8-CP-9
           44        KM   ROUTE CP-8 TO CP-9
           45        RK    1190   0.004   0.025       0    TRAP      10       3
                     *

           46        KK   OND10
           47        KM   DEVELOPED ONSITE BASIN
           48        BA  0.0067
           49        LS       0    91.0
           50        UD    0.14
                     *

           51        KK   OFFD5
           52        KM   DEVELOPED OFFSITE BASIN
           53        BA  0.0080
           54        LS       0    91.0
           55        UD    0.12
                     *

           56        KK    CP-9
           57        KM   COMBINE RCP8-CP9, OFFD5 AND OND10
           58        HC       3
```

```
                 *

  59             KKRCP9-CP-10
  60             KM  ROUTE CP-9 TO CP-10
  61             RK     725  0.015  0.015      0   TRAP     10      3
                 *

  62             KK   OND12
  63             KM   DEVELOPED ONSITE BASIN
  64             BA  0.0043
  65             LS       0    91.4
  66             UD    0.06
                 *

  67             KK  CP-10A
  68             KM   COMBINE CP-9 AND OND12
  69             HC       2
                 *

  70             KK   OND11
  71             KM   DEVELOPED ONSITE BASIN
  72             BA  0.0150
  73             LS       0    91.0
  74             UD    0.13
                 *
1                                   HEC-1 INPUT                                             PAGE  3

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  75             KK   OND13
  76             KM   DEVELOPED ONSITE BASIN
  77             BA  0.0073
  78             LS       0    91.0
  79             UD    0.10
                 *

  80             KK   CP-10
  81             KM   COMBINE CP-10A, OND11 AND OND13
  82             HC       3
                 *

  83             KK EQBASIN
  84             KM   EQUALIZER BASIN TO SPLIT FLOW NORTH AND
  85             KM   TO THE DETENTION POND
  86             RS       1    STOR     -1
  87             SA       0    0.08   0.70   0.78   0.85   0.87   0.97
  88             SE  1744.5    1745   1746   1747 1747.75   1748 1748.5
  89             SQ       0       0     18     42     59     74    126
                 *

  90             KK DIVWEIR
  91             KM   DIVERT FLOW FROM EQ BASIN
  92             DT  DVPIPE
  93             DI       0      59     74    126
  94             DQ       0      59     64     73
                 *

  95             KK   OND14
  96             KM   DEVELOPED ONSITE BASIN
  97             BA  0.0174
  98             LS       0    91.0
  99             UD    0.08
                 *

 100             KK   CP-11
 101             KM   COMBINE WEIR FLOW AND OND14
 102             HC       2
                 *

 103             KK    OND1
 104             KM   DEVELOPED ONSITE BASIN
 105             BA  0.0015
 106             LS       0    87.7
 107             UD    0.05
                 *

 108             KK   OFFD2
 109             KM   DEVELOPED OFFSITE BASIN
 110             BA   .0150
 111             LS       0    88.6
 112             UD    0.10
                 *
1                                   HEC-1 INPUT                                             PAGE  4

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 113             KK    CP-1
 114             KM   COMBINE OND1 AND OFFD2
 115             HC       2
                 *

 116             KKRCP1-CP2
 117             KM  ROUTE CP-1 TO CP-2
 118             RK     910  0.004  0.025      0   TRAP     10      3
                 *

 119             KK    OND2
 120             KM   DEVELOPED ONSITE BASIN
 121             BA  0.0058
 122             LS       0    87.7
 123             UD    0.12
                 *

 124             KK   OFFD1
 125             KM   DEVELOPED OFFSITE BASIN
 126             BA  0.0659
 127             LS       0    88.2
 128             UD    0.17
                 *

 129             KK    CP-2
 130             KM   COMBINE CP-1, OFFD1 AND OND2
 131             HC       3
                 *

 132             KKRCP2-CP-3
 133             KM  ROUTE
 134             RK     360  0.010  0.015      0   TRAP     10      3
```

```
               *
135            KK    OND3
136            KM   DEVELOPED ONSITE BASIN
137            BA  0.0022
138            LS      0    88.6
139            UD    0.05
               *

140            KK    CP-3
141            KM   COMBINE CP-2 AND OND3
142            HC       2
               *

143            KKRCP3-CP4
144            KM   ROUTE CP-3 TO CP-4
145            RK    1345  0.018  0.015       0    TRAP      10       3
               *
1                                            HEC-1 INPUT                                          PAGE  5

LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

146            KK    OND7
147            KM   DEVELOPED ONSITE BASIN
148            BA  0.0092
149            LS      0    90.8
150            UD    0.09
               *

151            KK    CP-4
152            KM   COMBINE CP-3 AND OND7
153            HC       2
               *

154            KK    OND4
155            KM   DEVELOPED ONSITE BASIN
156            BA  0.0182
157            LS      0    89.7
158            UD    0.12
               *

159            KK    OND5
160            KM   DEVELOPED ONSITE BASIN
161            BA  0.0079
162            LS      0    91.0
163            UD    0.12
               *

164            KK    CP-5
165            KM   COMBINE OND4 AND OND5
166            HC       2
               *

167            KK    OND6
168            KM   DEVELOPED ONSITE BASIN
169            BA  0.0155
170            LS      0    91.0
171            UD    0.16
               *

172            KK  DVPIPE
173            KM   RETURN FLOW FROM EQ BASIN PIPE
174            DR  DVPIPE
               *

175            KK RDVPIPE
176            KM   ROUTE FLOW THROUGH 42" RCP
177            RK    1880  0.005  0.013       0    CIRC     3.5       0
               *

178            KK   DETPD
179            KM   DETENTION POND BASIN
180            BA  0.0080
181            LS      0    91.4
182            UD    0.05
               *
1                                            HEC-1 INPUT                                          PAGE  6

LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

183            KK    CP-6
184            KM   COMBINE CP-4, CP-5, OND6, DVPIPE AND DETPD
185            HC       5
               *

186            KK DETPOND
187            KM
188            RS       1    STOR      -1
189            SV       0    0.08    1.53    3.02    4.84    8.88   13.45   15.95
190            SE 1725.25    1726    1728    1729    1730    1732    1734    1735
191            SQ       0       0      22      27      32      40      46      49
192            KO       1
               *
               * ***************************************************************************
               *                                Referenced from PBSJ
               *       "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
               *                Center Two (Formerly known as HARSCH)" (February 2003)
               * ***************************************************************************
               *

193            KK OFFD-14
194            KM   OFSITE DEVELOPED BASIN OFFD-14
195            KM   REFERENCED FROM EG02
196            BA  0.0028
197            PB    2.79
198            LS      0      88
199            UD   0.200
               *

200            KK  RT-B14
201            KM   ROUTE OFFD-14 THROUGH BMIC-1
202            RK    1050  0.014  0.013       0    TRAP      15      10
               *

203            KK  BMIC-1
204            KM   ONSITE DEVELOPED BASIN BMIC-1
205            KM   REFERENCED FROM EG02
206            BA  0.0141
```

```
 207          PB   2.79
 208          LS      0      92
 209          UD   0.081
              *

 210          KK     C15
 211          KM   COMBINE RT-B14 AND BMIC-1
 212          HC      2
              *

 213          KK   RT-14
 214          KM   ROUTE C15 THROUGH BMIC-2
 215          RK     450   0.018   0.013       0    TRAP      15       10
              *
1                                     HEC-1 INPUT                                    PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 216          KK  BMIC-2
 217          KM   ONSITE DEVELOPED BASIN BMIC-2
 218          KM   REFERENCED FROM EG02
 219          BA  0.0118
 220          PB   2.79
 221          LS      0      92
 222          UD   0.073
              *

 223          KK     C16
 224          KM   COMBINE RT-14 AND BMIC-2
 225          HC      2
              *

 226          KK   RT-15
 227          KM   ROUTE C16 THROUGH SCH-2
 228          RK     400   0.019   0.013       0    TRAP      15       10
              *

 229          KK   SCH-2
 230          KM   ONSITE DEVELOPED BASIN SCH-2
 231          KM   REFERENCED FROM EG02
 232          BA  0.0065
 233          PB   2.79
 234          LS      0      92
 235          UD   0.060
              *

 236          KK     C17
 237          KM   COMBINE RT-15 AND SCH-2
 238          HC      2
              *

 239          KK   RT-16
 240          KM   ROUTE C17 THROUGH BMIC-3
 241          RK     750   0.013   0.013       0    TRAP      15       10
              *

 242          KK  BMIC-3
 243          KM   ONSITE DEVELOPED BASIN BMIC-3
 244          KM   REFERENCED FROM EG02
 245          BA  0.0106
 246          PB   2.79
 247          LS      0      92
 248          UD   0.062
              *

 249          KK MGDEV-2
 250          KM   MILGARD MANUFACTURING ONSITE BASIN
 251          KM   REFERENCED FROM EG02
 252          BA  0.0093
 253          PB   2.79
 254          LS      0      92
 255          UD   0.075
              *
              * ****************************************************************************
              *
1                                     HEC-1 INPUT                                    PAGE  8

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 256          KK     C18
 257          KM   COMBINE RT-16, BMIC-3, BGDEV-2 AND OUTFLOW FROM DETENTION POND
 258          HC      4
              *
              * ****************************************************************************
              *                          Referenced from PBSJ
              *    "Addendum #1 to the Technical Drainage Study for Henderson Commmerce
              *           Center Two (Formerly known as HARSCH)" (February 2003)
              * ****************************************************************************
              *

 259          KK     HR3
 260          KM   HARSCH ONSITE BASIN
 261          BA  0.0014
 262          PB   2.79
 263          LS      0      92
 264          UD   0.049
              *

 265          KK     HR2
 266          KM   HARSCH ONSITE BASIN
 267          BA  0.0016
 268          PB   2.79
 269          LS      0      98
 270          UD   0.037
              *

 271          KK     HR1
 272          KM   HARSCH ONSITE BASIN
 273          BA  0.0015
 274          PB   2.79
 275          LS      0      92
 276          UD    0.05
              *

 277          KK    CHR1
 278          KM   COMBINE HR3, HR2, HR1
 279          KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
 280          KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H1"
```

```
           281          KM   ON FIGURE 7
           282          HC       3
                        *
                        * ******************************************************************************
                        *

           283          KK    C18B
           284          KM   COMBINE C18 AND CHR1
           285          HC       2
                        *
1                                                          HEC-1 INPUT                                           PAGE  9

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


           286          KK   OND15
           287          KM   DEVELOPED ONSITE BASIN
           288          BA  0.0335
           289          LS       0    91.0
           290          UD    0.09
                        *

           291          KK   OFFD4
           292          KM   DEVELOPED OFFSITE BASIN
           293          BA  0.0119
           294          LS       0    91.0
           295          UD    0.13
                        *
           296          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   13        OND8
               .
               .
   27          .           OND9
               .             .
               .             .
   32          .             .           OFFD3
               .             .             .
               .             .             .
   37          .           CP-7............
               .             .
               .             .
   40        CP-8............
               V
               V
   43     RCP8-CP-
               .
               .
   46          .          OND10
               .             .
               .             .
   51          .             .           OFFD5
               .             .             .
               .             .             .
   56        CP-9........................
               V
               V
   59     RCP9-CP-
               .
               .
   62          .          OND12
               .             .
               .             .
   67      CP-10A............
               .
               .
   70          .          OND11
               .             .
               .             .
   75          .             .           OND13
               .             .             .
               .             .             .
   80       CP-10........................
               V
               V
   83     EQBASIN
               .
               .
   92          .------->  DVPIPE
   90     DIVWEIR
               .
               .
   95          .          OND14
               .             .
               .             .
  100       CP-11............
               .
               .
  103          .           OND1
               .             .
               .             .
  108          .             .           OFFD2
               .             .             .
               .             .             .
  113          .           CP-1............
               .             V
               .             V
  116          .       RCP1-CP2
               .             .
               .             .
  119          .             .            OND2
               .             .             .
               .             .             .
  124          .             .             .           OFFD1
               .             .             .             .
               .             .             .             .
  129          .           CP-2........................
               .             V
               .             V
  132          .       RCP2-CP-
               .             .
               .             .
  135          .             .            OND3
               .             .             .
```

```
                 .          .          .
 140             .        CP-3...........
                 .          V
                 .          V
 143             .      RCP3-CP4
                 .          .
                 .          .
 146             .          .        OND7
                 .          .          .
                 .          .          .
 151             .        CP-4...........
                 .          .
                 .          .
 154             .          .        OND4
                 .          .          .
                 .          .          .
 159             .          .          .        OND5
                 .          .          .          .
                 .          .          .          .
 164             .          .        CP-5...........
                 .          .          .
                 .          .          .
 167             .          .          .        OND6
                 .          .          .          .
                 .          .          .          .
 174             .          .          .          .          .<------- DVPIPE
 172             .          .          .          .        DVPIPE
                 .          .          .          .          V
                 .          .          .          .          V
 175             .          .          .          .       RDVPIPE
                 .          .          .          .          .
                 .          .          .          .          .
 178             .          .          .          .          .        DETPD
                 .          .          .          .          .          .
                 .          .          .          .          .          .
 183             .        CP-6.............................................
                 .          V
                 .          V
 186             .       DETPOND
                 .          .
                 .          .
 193             .          .      OFFD-14
                 .          .          V
                 .          .          V
 200             .          .       RT-B14
                 .          .          .
                 .          .          .
 203             .          .          .      BMIC-1
                 .          .          .          .
                 .          .          .          .
 210             .          .         C15...........
                 .          .          V
                 .          .          V
 213             .          .        RT-14
                 .          .          .
                 .          .          .
 216             .          .          .      BMIC-2
                 .          .          .          .
                 .          .          .          .
 223             .          .         C16...........
                 .          .          V
                 .          .          V
 226             .          .        RT-15
                 .          .          .
                 .          .          .
 229             .          .          .       SCH-2
                 .          .          .          .
                 .          .          .          .
 236             .          .         C17...........
                 .          .          V
                 .          .          V
 239             .          .        RT-16
                 .          .          .
                 .          .          .
 242             .          .          .      BMIC-3
                 .          .          .          .
                 .          .          .          .
 249             .          .          .          .     MGDEV-2
                 .          .          .          .          .
                 .          .          .          .          .
 256             .         C18.................................
                 .          .
                 .          .
 259             .          .         HR3
                 .          .          .
                 .          .          .
 265             .          .          .         HR2
                 .          .          .          .
                 .          .          .          .
 271             .          .          .          .         HR1
                 .          .          .          .          .
                 .          .          .          .          .
 277             .          .        CHR1......................
                 .          .          .
                 .          .          .
 283             .        C18B...........
                 .          .
                 .          .
 286             .          .        OND15
                 .          .          .
                 .          .          .
 291             .          .          .       OFFD4
(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                 ****************************************
*                                       *                 *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                 *   U.S. ARMY CORPS OF ENGINEERS       *
*            JUN  1998                  *                 *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.1                  *                 *        609 SECOND STREET             *
*                                       *                 *      DAVIS, CALIFORNIA 95616         *
* RUN DATE   27SEP06  TIME  18:51:46    *                 *          (916) 756-1104              *
*                                       *                 *                                      *
*****************************************                 ****************************************


                         EASTSIDE LANDFILL IMPROVEMENTS
                         DEVLOPED CONDITION MODEL
```

```
                         INPUT FILE = DEV_SDN3.DAT
                         SEPTEMBER 2006
                         DESIGN STORM = 100-YEAR 6-HR STORM
                         STORM DISTRIBUTION = SDN #3
                         MODELED BY PBS&J

11 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1    0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME       0055  ENDING TIME
                    ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
                1.00      .60      .58
```

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
186 KK    *  DETPOND   *
          *            *
          **************

192 KO         OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

188 RS         STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC      -1.00  INITIAL CONDITION
                        X        .00  WORKING R AND D COEFFICIENT

189 SV           STORAGE        .0       .1      1.5      3.0      4.8      8.9     13.4     15.9

190 SE         ELEVATION   1725.25  1726.00  1728.00  1729.00  1730.00  1732.00  1734.00  1735.00

191 SQ         DISCHARGE        0.       0.      22.      27.      32.      40.      46.      49.

                                                        ***

*******************************************************************************************************************************
```

HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	*	1		0820	101	30.	4.3	1729.7	*	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	*	1		0825	102	30.	4.1	1729.6	*	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	*	1		0830	103	29.	3.9	1729.5	*	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	*	1		0835	104	29.	3.7	1729.4	*	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	*	1		0840	105	28.	3.5	1729.3	*	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	*	1		0845	106	28.	3.3	1729.1	*	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	*	1		0850	107	27.	3.1	1729.0	*	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	*	1		0855	108	27.	2.9	1728.9	*	1		1715	208	0.	.1	1726.0
1		0040	9	1.	.1	1726.1	*	1		0900	109	26.	2.7	1728.8	*	1		1720	209	0.	.1	1726.0
1		0045	10	1.	.1	1726.1	*	1		0905	110	25.	2.6	1728.7	*	1		1725	210	0.	.1	1726.0
1		0050	11	1.	.2	1726.1	*	1		0910	111	25.	2.4	1728.6	*	1		1730	211	0.	.1	1726.0
1		0055	12	1.	.2	1726.1	*	1		0915	112	24.	2.2	1728.5	*	1		1735	212	0.	.1	1726.0
1		0100	13	1.	.2	1726.1	*	1		0920	113	24.	2.0	1728.3	*	1		1740	213	0.	.1	1726.0
1		0105	14	1.	.2	1726.1	*	1		0925	114	23.	1.9	1728.2	*	1		1745	214	0.	.1	1726.0
1		0110	15	2.	.2	1726.1	*	1		0930	115	23.	1.7	1728.1	*	1		1750	215	0.	.1	1726.0
1		0115	16	2.	.2	1726.1	*	1		0935	116	22.	1.6	1728.0	*	1		1755	216	0.	.1	1726.0
1		0120	17	2.	.2	1726.2	*	1		0940	117	20.	1.4	1727.9	*	1		1800	217	0.	.1	1726.0
1		0125	18	2.	.2	1726.2	*	1		0945	118	18.	1.3	1727.7	*	1		1805	218	0.	.1	1726.0
1		0130	19	2.	.2	1726.2	*	1		0950	119	17.	1.2	1727.5	*	1		1810	219	0.	.1	1726.0
1		0135	20	3.	.3	1726.3	*	1		0955	120	15.	1.1	1727.4	*	1		1815	220	0.	.1	1726.0
1		0140	21	4.	.3	1726.3	*	1		1000	121	13.	1.0	1727.2	*	1		1820	221	0.	.1	1726.0
1		0145	22	4.	.4	1726.4	*	1		1005	122	12.	.9	1727.1	*	1		1825	222	0.	.1	1726.0
1		0150	23	5.	.4	1726.5	*	1		1010	123	11.	.8	1727.0	*	1		1830	223	0.	.1	1726.0
1		0155	24	6.	.5	1726.5	*	1		1015	124	10.	.7	1726.9	*	1		1835	224	0.	.1	1726.0
1		0200	25	6.	.5	1726.6	*	1		1020	125	9.	.7	1726.8	*	1		1840	225	0.	.1	1726.0
1		0205	26	7.	.5	1726.6	*	1		1025	126	8.	.6	1726.7	*	1		1845	226	0.	.1	1726.0
1		0210	27	7.	.5	1726.6	*	1		1030	127	7.	.6	1726.7	*	1		1850	227	0.	.1	1726.0
1		0215	28	7.	.5	1726.6	*	1		1035	128	6.	.5	1726.6	*	1		1855	228	0.	.1	1726.0
1		0220	29	8.	.6	1726.7	*	1		1040	129	6.	.5	1726.5	*	1		1900	229	0.	.1	1726.0
1		0225	30	9.	.7	1726.8	*	1		1045	130	5.	.4	1726.5	*	1		1905	230	0.	.1	1726.0
1		0230	31	10.	.7	1726.9	*	1		1050	131	5.	.4	1726.4	*	1		1910	231	0.	.1	1726.0
1		0235	32	10.	.8	1726.9	*	1		1055	132	4.	.4	1726.4	*	1		1915	232	0.	.1	1726.0
1		0240	33	11.	.8	1727.0	*	1		1100	133	4.	.3	1726.3	*	1		1920	233	0.	.1	1726.0
1		0245	34	12.	.9	1727.1	*	1		1105	134	3.	.3	1726.3	*	1		1925	234	0.	.1	1726.0
1		0250	35	13.	.9	1727.2	*	1		1110	135	3.	.3	1726.3	*	1		1930	235	0.	.1	1726.0
1		0255	36	13.	1.0	1727.2	*	1		1115	136	3.	.3	1726.3	*	1		1935	236	0.	.1	1726.0
1		0300	37	14.	1.0	1727.3	*	1		1120	137	3.	.2	1726.2	*	1		1940	237	0.	.1	1726.0
1		0305	38	15.	1.0	1727.3	*	1		1125	138	2.	.2	1726.2	*	1		1945	238	0.	.1	1726.0
1		0310	39	16.	1.1	1727.5	*	1		1130	139	2.	.2	1726.2	*	1		1950	239	0.	.1	1726.0

1		0315	40	19.	1.4	1727.8	*	1		1135	140	2.	.2	1726.2	*	1		1955	240	0.	.1	1726.0
1		0320	41	23.	1.8	1728.2	*	1		1140	141	2.	.2	1726.2	*	1		2000	241	0.	.1	1726.0
1		0325	42	25.	2.5	1728.7	*	1		1145	142	1.	.2	1726.1	*	1		2005	242	0.	.1	1726.0
1		0330	43	29.	3.7	1729.4	*	1		1150	143	1.	.2	1726.1	*	1		2010	243	0.	.1	1726.0
1		0335	44	33.	5.1	1730.1	*	1		1155	144	1.	.2	1726.1	*	1		2015	244	0.	.1	1726.0
1		0340	45	35.	6.6	1730.9	*	1		1200	145	1.	.2	1726.1	*	1		2020	245	0.	.1	1726.0
1		0345	46	38.	7.9	1731.5	*	1		1205	146	1.	.1	1726.1	*	1		2025	246	0.	.1	1726.0
1		0350	47	40.	8.9	1732.0	*	1		1210	147	1.	.1	1726.1	*	1		2030	247	0.	.1	1726.0
1		0355	48	41.	9.7	1732.4	*	1		1215	148	1.	.1	1726.1	*	1		2035	248	0.	.1	1726.0
1		0400	49	42.	10.3	1732.6	*	1		1220	149	1.	.1	1726.1	*	1		2040	249	0.	.1	1726.0
1		0405	50	43.	10.8	1732.8	*	1		1225	150	1.	.1	1726.1	*	1		2045	250	0.	.1	1726.0
1		0410	51	43.	11.2	1733.0	*	1		1230	151	1.	.1	1726.1	*	1		2050	251	0.	.1	1726.0
1		0415	52	43.	11.5	1733.1	*	1		1235	152	1.	.1	1726.0	*	1		2055	252	0.	.1	1726.0
1		0420	53	44.	11.7	1733.2	*	1		1240	153	0.	.1	1726.0	*	1		2100	253	0.	.1	1726.0
1		0425	54	44.	11.8	1733.3	*	1		1245	154	0.	.1	1726.0	*	1		2105	254	0.	.1	1726.0
1		0430	55	44.	11.9	1733.3	*	1		1250	155	0.	.1	1726.0	*	1		2110	255	0.	.1	1726.0
1		0435	56	44.	12.1	1733.4	*	1		1255	156	0.	.1	1726.0	*	1		2115	256	0.	.1	1726.0
1		0440	57	44.	12.3	1733.5	*	1		1300	157	0.	.1	1726.0	*	1		2120	257	0.	.1	1726.0
1		0445	58	45.	12.4	1733.6	*	1		1305	158	0.	.1	1726.0	*	1		2125	258	0.	.1	1726.0
1		0450	59	45.	12.6	1733.6	*	1		1310	159	0.	.1	1726.0	*	1		2130	259	0.	.1	1726.0
1		0455	60	45.	12.8	1733.7	*	1		1315	160	0.	.1	1726.0	*	1		2135	260	0.	.1	1726.0
1		0500	61	45.	12.9	1733.8	*	1		1320	161	0.	.1	1726.0	*	1		2140	261	0.	.1	1726.0
1		0505	62	45.	13.0	1733.8	*	1		1325	162	0.	.1	1726.0	*	1		2145	262	0.	.1	1726.0
1		0510	63	45.	13.0	1733.8	*	1		1330	163	0.	.1	1726.0	*	1		2150	263	0.	.1	1726.0
1		0515	64	45.	13.0	1733.8	*	1		1335	164	0.	.1	1726.0	*	1		2155	264	0.	.1	1726.0
1		0520	65	45.	12.9	1733.7	*	1		1340	165	0.	.1	1726.0	*	1		2200	265	0.	.1	1726.0
1		0525	66	45.	12.7	1733.7	*	1		1345	166	0.	.1	1726.0	*	1		2205	266	0.	.1	1726.0
1		0530	67	45.	12.6	1733.6	*	1		1350	167	0.	.1	1726.0	*	1		2210	267	0.	.1	1726.0
1		0535	68	45.	12.4	1733.5	*	1		1355	168	0.	.1	1726.0	*	1		2215	268	0.	.1	1726.0
1		0540	69	44.	12.2	1733.4	*	1		1400	169	0.	.1	1726.0	*	1		2220	269	0.	.1	1726.0
1		0545	70	44.	12.0	1733.4	*	1		1405	170	0.	.1	1726.0	*	1		2225	270	0.	.1	1726.0
1		0550	71	44.	11.7	1733.3	*	1		1410	171	0.	.1	1726.0	*	1		2230	271	0.	.1	1726.0
1		0555	72	43.	11.5	1733.1	*	1		1415	172	0.	.1	1726.0	*	1		2235	272	0.	.1	1726.0
1		0600	73	43.	11.3	1733.0	*	1		1420	173	0.	.1	1726.0	*	1		2240	273	0.	.1	1726.0
1		0605	74	43.	11.0	1732.9	*	1		1425	174	0.	.1	1726.0	*	1		2245	274	0.	.1	1726.0
1		0610	75	42.	10.8	1732.8	*	1		1430	175	0.	.1	1726.0	*	1		2250	275	0.	.1	1726.0
1		0615	76	42.	10.5	1732.7	*	1		1435	176	0.	.1	1726.0	*	1		2255	276	0.	.1	1726.0
1		0620	77	42.	10.2	1732.6	*	1		1440	177	0.	.1	1726.0	*	1		2300	277	0.	.1	1726.0
1		0625	78	41.	10.0	1732.5	*	1		1445	178	0.	.1	1726.0	*	1		2305	278	0.	.1	1726.0
1		0630	79	41.	9.7	1732.4	*	1		1450	179	0.	.1	1726.0	*	1		2310	279	0.	.1	1726.0
1		0635	80	41.	9.4	1732.2	*	1		1455	180	0.	.1	1726.0	*	1		2315	280	0.	.1	1726.0
1		0640	81	40.	9.1	1732.1	*	1		1500	181	0.	.1	1726.0	*	1		2320	281	0.	.1	1726.0
1		0645	82	40.	8.9	1732.0	*	1		1505	182	0.	.1	1726.0	*	1		2325	282	0.	.1	1726.0
1		0650	83	39.	8.6	1731.9	*	1		1510	183	0.	.1	1726.0	*	1		2330	283	0.	.1	1726.0
1		0655	84	39.	8.3	1731.7	*	1		1515	184	0.	.1	1726.0	*	1		2335	284	0.	.1	1726.0
1		0700	85	38.	8.1	1731.6	*	1		1520	185	0.	.1	1726.0	*	1		2340	285	0.	.1	1726.0
1		0705	86	38.	7.8	1731.5	*	1		1525	186	0.	.1	1726.0	*	1		2345	286	0.	.1	1726.0
1		0710	87	37.	7.6	1731.3	*	1		1530	187	0.	.1	1726.0	*	1		2350	287	0.	.1	1726.0
1		0715	88	37.	7.3	1731.2	*	1		1535	188	0.	.1	1726.0	*	1		2355	288	0.	.1	1726.0
1		0720	89	36.	7.1	1731.1	*	1		1540	189	0.	.1	1726.0	*	2		0000	289	0.	.1	1726.0
1		0725	90	36.	6.8	1731.0	*	1		1545	190	0.	.1	1726.0	*	2		0005	290	0.	.1	1726.0
1		0730	91	35.	6.6	1730.9	*	1		1550	191	0.	.1	1726.0	*	2		0010	291	0.	.1	1726.0
1		0735	92	35.	6.3	1730.7	*	1		1555	192	0.	.1	1726.0	*	2		0015	292	0.	.1	1726.0
1		0740	93	34.	6.1	1730.6	*	1		1600	193	0.	.1	1726.0	*	2		0020	293	0.	.1	1726.0
1		0745	94	34.	5.8	1730.5	*	1		1605	194	0.	.1	1726.0	*	2		0025	294	0.	.1	1726.0
1		0750	95	34.	5.6	1730.4	*	1		1610	195	0.	.1	1726.0	*	2		0030	295	0.	.1	1726.0
1		0755	96	33.	5.4	1730.3	*	1		1615	196	0.	.1	1726.0	*	2		0035	296	0.	.1	1726.0
1		0800	97	33.	5.2	1730.2	*	1		1620	197	0.	.1	1726.0	*	2		0040	297	0.	.1	1726.0
1		0805	98	32.	4.9	1730.0	*	1		1625	198	0.	.1	1726.0	*	2		0045	298	0.	.1	1726.0
1		0810	99	32.	4.7	1729.9	*	1		1630	199	0.	.1	1726.0	*	2		0050	299	0.	.1	1726.0
1		0815	100	31.	4.5	1729.8	*	1		1635	200	0.	.1	1726.0	*	2		0055	300	0.	.1	1726.0

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 45.	5.17		38.	11.	11.	11.
		(INCHES)	2.342	2.786	2.786	2.786
		(AC-FT)	19.	22.	22.	22.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
13.	5.17		8.	2.	2.	2.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)					
1733.80	5.17		1731.59	1727.56	1727.50	1727.50

CUMULATIVE AREA = .15 SQ MI

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HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = .60

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	*	1		0820	101	4.	.4	1726.4	*	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	*	1		0825	102	4.	.3	1726.3	*	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	*	1		0830	103	3.	.3	1726.3	*	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	*	1		0835	104	3.	.3	1726.3	*	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	*	1		0840	105	3.	.3	1726.2	*	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	*	1		0845	106	2.	.2	1726.2	*	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	*	1		0850	107	2.	.2	1726.2	*	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	*	1		0855	108	2.	.2	1726.2	*	1		1715	208	0.	.1	1726.0
1		0040	9	0.	.1	1726.0	*	1		0900	109	2.	.2	1726.2	*	1		1720	209	0.	.1	1726.0
1		0045	10	0.	.1	1726.0	*	1		0905	110	2.	.2	1726.1	*	1		1725	210	0.	.1	1726.0
1		0050	11	0.	.1	1726.0	*	1		0910	111	1.	.2	1726.1	*	1		1730	211	0.	.1	1726.0
1		0055	12	0.	.1	1726.0	*	1		0915	112	1.	.2	1726.1	*	1		1735	212	0.	.1	1726.0
1		0100	13	0.	.1	1726.0	*	1		0920	113	1.	.2	1726.1	*	1		1740	213	0.	.1	1726.0
1		0105	14	0.	.1	1726.0	*	1		0925	114	1.	.2	1726.1	*	1		1745	214	0.	.1	1726.0
1		0110	15	0.	.1	1726.0	*	1		0930	115	1.	.1	1726.1	*	1		1750	215	0.	.1	1726.0
1		0115	16	0.	.1	1726.0	*	1		0935	116	1.	.1	1726.1	*	1		1755	216	0.	.1	1726.0
1		0120	17	0.	.1	1726.0	*	1		0940	117	1.	.1	1726.1	*	1		1800	217	0.	.1	1726.0
1		0125	18	0.	.1	1726.0	*	1		0945	118	1.	.1	1726.1	*	1		1805	218	0.	.1	1726.0
1		0130	19	0.	.1	1726.0	*	1		0950	119	1.	.1	1726.1	*	1		1810	219	0.	.1	1726.0
1		0135	20	0.	.1	1726.0	*	1		0955	120	1.	.1	1726.1	*	1		1815	220	0.	.1	1726.0
1		0140	21	0.	.1	1726.0	*	1		1000	121	1.	.1	1726.0	*	1		1820	221	0.	.1	1726.0
1		0145	22	0.	.1	1726.0	*	1		1005	122	0.	.1	1726.0	*	1		1825	222	0.	.1	1726.0
1		0150	23	1.	.1	1726.0	*	1		1010	123	0.	.1	1726.0	*	1		1830	223	0.	.1	1726.0
1		0155	24	1.	.1	1726.1	*	1		1015	124	0.	.1	1726.0	*	1		1835	224	0.	.1	1726.0
1		0200	25	1.	.1	1726.1	*	1		1020	125	0.	.1	1726.0	*	1		1840	225	0.	.1	1726.0
1		0205	26	1.	.1	1726.1	*	1		1025	126	0.	.1	1726.0	*	1		1845	226	0.	.1	1726.0

1	0210	27	1.	.1	1726.1	*	1	1030	127	0.	.1	1726.0	*	1	1850	227	0.	.1	1726.0
1	0215	28	1.	.2	1726.1	*	1	1035	128	0.	.1	1726.0	*	1	1855	228	0.	.1	1726.0
1	0220	29	1.	.2	1726.1	*	1	1040	129	0.	.1	1726.0	*	1	1900	229	0.	.1	1726.0
1	0225	30	2.	.2	1726.1	*	1	1045	130	0.	.1	1726.0	*	1	1905	230	0.	.1	1726.0
1	0230	31	2.	.2	1726.2	*	1	1050	131	0.	.1	1726.0	*	1	1910	231	0.	.1	1726.0
1	0235	32	2.	.2	1726.2	*	1	1055	132	0.	.1	1726.0	*	1	1915	232	0.	.1	1726.0
1	0240	33	2.	.2	1726.2	*	1	1100	133	0.	.1	1726.0	*	1	1920	233	0.	.1	1726.0
1	0245	34	3.	.3	1726.3	*	1	1105	134	0.	.1	1726.0	*	1	1925	234	0.	.1	1726.0
1	0250	35	3.	.3	1726.3	*	1	1110	135	0.	.1	1726.0	*	1	1930	235	0.	.1	1726.0
1	0255	36	3.	.3	1726.3	*	1	1115	136	0.	.1	1726.0	*	1	1935	236	0.	.1	1726.0
1	0300	37	4.	.3	1726.3	*	1	1120	137	0.	.1	1726.0	*	1	1940	237	0.	.1	1726.0
1	0305	38	4.	.3	1726.4	*	1	1125	138	0.	.1	1726.0	*	1	1945	238	0.	.1	1726.0
1	0310	39	5.	.4	1726.4	*	1	1130	139	0.	.1	1726.0	*	1	1950	239	0.	.1	1726.0
1	0315	40	6.	.5	1726.5	*	1	1135	140	0.	.1	1726.0	*	1	1955	240	0.	.1	1726.0
1	0320	41	8.	.6	1726.8	*	1	1140	141	0.	.1	1726.0	*	1	2000	241	0.	.1	1726.0
1	0325	42	13.	.9	1727.2	*	1	1145	142	0.	.1	1726.0	*	1	2005	242	0.	.1	1726.0
1	0330	43	20.	1.4	1727.8	*	1	1150	143	0.	.1	1726.0	*	1	2010	243	0.	.1	1726.0
1	0335	44	24.	2.0	1728.3	*	1	1155	144	0.	.1	1726.0	*	1	2015	244	0.	.1	1726.0
1	0340	45	26.	2.6	1728.7	*	1	1200	145	0.	.1	1726.0	*	1	2020	245	0.	.1	1726.0
1	0345	46	28.	3.2	1729.1	*	1	1205	146	0.	.1	1726.0	*	1	2025	246	0.	.1	1726.0
1	0350	47	29.	3.7	1729.4	*	1	1210	147	0.	.1	1726.0	*	1	2030	247	0.	.1	1726.0
1	0355	48	30.	4.1	1729.6	*	1	1215	148	0.	.1	1726.0	*	1	2035	248	0.	.1	1726.0
1	0400	49	31.	4.4	1729.7	*	1	1220	149	0.	.1	1726.0	*	1	2040	249	0.	.1	1726.0
1	0405	50	31.	4.6	1729.9	*	1	1225	150	0.	.1	1726.0	*	1	2045	250	0.	.1	1726.0
1	0410	51	32.	4.7	1729.9	*	1	1230	151	0.	.1	1726.0	*	1	2050	251	0.	.1	1726.0
1	0415	52	32.	4.8	1730.0	*	1	1235	152	0.	.1	1726.0	*	1	2055	252	0.	.1	1726.0
1	0420	53	32.	4.9	1730.0	*	1	1240	153	0.	.1	1726.0	*	1	2100	253	0.	.1	1726.0
1	0425	54	32.	4.9	1730.0	*	1	1245	154	0.	.1	1726.0	*	1	2105	254	0.	.1	1726.0
1	0430	55	32.	4.9	1730.0	*	1	1250	155	0.	.1	1726.0	*	1	2110	255	0.	.1	1726.0
1	0435	56	32.	4.9	1730.0	*	1	1255	156	0.	.1	1726.0	*	1	2115	256	0.	.1	1726.0
1	0440	57	32.	4.9	1730.0	*	1	1300	157	0.	.1	1726.0	*	1	2120	257	0.	.1	1726.0
1	0445	58	32.	4.9	1730.1	*	1	1305	158	0.	.1	1726.0	*	1	2125	258	0.	.1	1726.0
1	0450	59	32.	5.0	1730.1	*	1	1310	159	0.	.1	1726.0	*	1	2130	259	0.	.1	1726.0
1	0455	60	32.	5.0	1730.1	*	1	1315	160	0.	.1	1726.0	*	1	2135	260	0.	.1	1726.0
1	0500	61	32.	5.0	1730.1	*	1	1320	161	0.	.1	1726.0	*	1	2140	261	0.	.1	1726.0
1	0505	62	32.	5.0	1730.1	*	1	1325	162	0.	.1	1726.0	*	1	2145	262	0.	.1	1726.0
1	0510	63	32.	4.9	1730.0	*	1	1330	163	0.	.1	1726.0	*	1	2150	263	0.	.1	1726.0
1	0515	64	32.	4.8	1730.0	*	1	1335	164	0.	.1	1726.0	*	1	2155	264	0.	.1	1726.0
1	0520	65	32.	4.7	1729.9	*	1	1340	165	0.	.1	1726.0	*	1	2200	265	0.	.1	1726.0
1	0525	66	31.	4.6	1729.9	*	1	1345	166	0.	.1	1726.0	*	1	2205	266	0.	.1	1726.0
1	0530	67	31.	4.5	1729.8	*	1	1350	167	0.	.1	1726.0	*	1	2210	267	0.	.1	1726.0
1	0535	68	31.	4.3	1729.7	*	1	1355	168	0.	.1	1726.0	*	1	2215	268	0.	.1	1726.0
1	0540	69	30.	4.2	1729.6	*	1	1400	169	0.	.1	1726.0	*	1	2220	269	0.	.1	1726.0
1	0545	70	30.	4.0	1729.5	*	1	1405	170	0.	.1	1726.0	*	1	2225	270	0.	.1	1726.0
1	0550	71	29.	3.8	1729.4	*	1	1410	171	0.	.1	1726.0	*	1	2230	271	0.	.1	1726.0
1	0555	72	29.	3.7	1729.4	*	1	1415	172	0.	.1	1726.0	*	1	2235	272	0.	.1	1726.0
1	0600	73	28.	3.5	1729.3	*	1	1420	173	0.	.1	1726.0	*	1	2240	273	0.	.1	1726.0
1	0605	74	28.	3.3	1729.2	*	1	1425	174	0.	.1	1726.0	*	1	2245	274	0.	.1	1726.0
1	0610	75	27.	3.2	1729.1	*	1	1430	175	0.	.1	1726.0	*	1	2250	275	0.	.1	1726.0
1	0615	76	27.	3.0	1729.0	*	1	1435	176	0.	.1	1726.0	*	1	2255	276	0.	.1	1726.0
1	0620	77	26.	2.8	1728.9	*	1	1440	177	0.	.1	1726.0	*	1	2300	277	0.	.1	1726.0
1	0625	78	26.	2.7	1728.8	*	1	1445	178	0.	.1	1726.0	*	1	2305	278	0.	.1	1726.0
1	0630	79	25.	2.5	1728.6	*	1	1450	179	0.	.1	1726.0	*	1	2310	279	0.	.1	1726.0
1	0635	80	25.	2.3	1728.5	*	1	1455	180	0.	.1	1726.0	*	1	2315	280	0.	.1	1726.0
1	0640	81	24.	2.2	1728.4	*	1	1500	181	0.	.1	1726.0	*	1	2320	281	0.	.1	1726.0
1	0645	82	24.	2.0	1728.3	*	1	1505	182	0.	.1	1726.0	*	1	2325	282	0.	.1	1726.0
1	0650	83	23.	1.8	1728.2	*	1	1510	183	0.	.1	1726.0	*	1	2330	283	0.	.1	1726.0
1	0655	84	23.	1.7	1728.1	*	1	1515	184	0.	.1	1726.0	*	1	2335	284	0.	.1	1726.0
1	0700	85	22.	1.5	1728.0	*	1	1520	185	0.	.1	1726.0	*	1	2340	285	0.	.1	1726.0
1	0705	86	20.	1.4	1727.8	*	1	1525	186	0.	.1	1726.0	*	1	2345	286	0.	.1	1726.0
1	0710	87	18.	1.3	1727.6	*	1	1530	187	0.	.1	1726.0	*	1	2350	287	0.	.1	1726.0
1	0715	88	16.	1.1	1727.5	*	1	1535	188	0.	.1	1726.0	*	1	2355	288	0.	.1	1726.0
1	0720	89	15.	1.0	1727.3	*	1	1540	189	0.	.1	1726.0	*	2	0000	289	0.	.1	1726.0
1	0725	90	13.	.9	1727.2	*	1	1545	190	0.	.1	1726.0	*	2	0005	290	0.	.1	1726.0
1	0730	91	12.	.9	1727.1	*	1	1550	191	0.	.1	1726.0	*	2	0010	291	0.	.1	1726.0
1	0735	92	11.	.8	1727.0	*	1	1555	192	0.	.1	1726.0	*	2	0015	292	0.	.1	1726.0
1	0740	93	10.	.7	1726.9	*	1	1600	193	0.	.1	1726.0	*	2	0020	293	0.	.1	1726.0
1	0745	94	9.	.7	1726.8	*	1	1605	194	0.	.1	1726.0	*	2	0025	294	0.	.1	1726.0
1	0750	95	8.	.6	1726.7	*	1	1610	195	0.	.1	1726.0	*	2	0030	295	0.	.1	1726.0
1	0755	96	7.	.5	1726.6	*	1	1615	196	0.	.1	1726.0	*	2	0035	296	0.	.1	1726.0
1	0800	97	6.	.5	1726.6	*	1	1620	197	0.	.1	1726.0	*	2	0040	297	0.	.1	1726.0
1	0805	98	6.	.5	1726.5	*	1	1625	198	0.	.1	1726.0	*	2	0045	298	0.	.1	1726.0
1	0810	99	5.	.4	1726.5	*	1	1630	199	0.	.1	1726.0	*	2	0050	299	0.	.1	1726.0
1	0815	100	5.	.4	1726.4	*	1	1635	200	0.	.1	1726.0	*	2	0055	300	0.	.1	1726.0

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 32.	5.00		20.	5.	5.	5.
		(INCHES)	1.266	1.301	1.301	1.301
		(AC-FT)	10.	10.	10.	10.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
5.	5.00	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1730.08	5.00	1728.29	1726.59	1726.56	1726.56

CUMULATIVE AREA = .15 SQ MI

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HYDROGRAPH AT STATION DETPOND
PLAN 1, RATIO = .58

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.1	1726.0	*	1		0820	101	3.	.3	1726.3	*	1		1640	201	0.	.1	1726.0
1		0005	2	0.	.1	1726.0	*	1		0825	102	3.	.3	1726.3	*	1		1645	202	0.	.1	1726.0
1		0010	3	0.	.1	1726.0	*	1		0830	103	3.	.3	1726.3	*	1		1650	203	0.	.1	1726.0
1		0015	4	0.	.1	1726.0	*	1		0835	104	3.	.2	1726.2	*	1		1655	204	0.	.1	1726.0
1		0020	5	0.	.1	1726.0	*	1		0840	105	2.	.2	1726.2	*	1		1700	205	0.	.1	1726.0
1		0025	6	0.	.1	1726.0	*	1		0845	106	2.	.2	1726.2	*	1		1705	206	0.	.1	1726.0
1		0030	7	0.	.1	1726.0	*	1		0850	107	2.	.2	1726.2	*	1		1710	207	0.	.1	1726.0
1		0035	8	0.	.1	1726.0	*	1		0855	108	2.	.2	1726.2	*	1		1715	208	0.	.1	1726.0
1		0040	9	0.	.1	1726.0	*	1		0900	109	2.	.2	1726.1	*	1		1720	209	0.	.1	1726.0
1		0045	10	0.	.1	1726.0	*	1		0905	110	1.	.2	1726.1	*	1		1725	210	0.	.1	1726.0
1		0050	11	0.	.1	1726.0	*	1		0910	111	1.	.2	1726.1	*	1		1730	211	0.	.1	1726.0
1		0055	12	0.	.1	1726.0	*	1		0915	112	1.	.2	1726.1	*	1		1735	212	0.	.1	1726.0
1		0100	13	0.	.1	1726.0	*	1		0920	113	1.	.1	1726.1	*	1		1740	213	0.	.1	1726.0

1	0105	14	0.	.1	1726.0	*	1	0925	114	1.	.1	1726.1	*	1	1745	214	0.	.1	1726.0
1	0110	15	0.	.1	1726.0	*	1	0930	115	1.	.1	1726.1	*	1	1750	215	0.	.1	1726.0
1	0115	16	0.	.1	1726.0	*	1	0935	116	1.	.1	1726.1	*	1	1755	216	0.	.1	1726.0
1	0120	17	0.	.1	1726.0	*	1	0940	117	1.	.1	1726.1	*	1	1800	217	0.	.1	1726.0
1	0125	18	0.	.1	1726.0	*	1	0945	118	1.	.1	1726.1	*	1	1805	218	0.	.1	1726.0
1	0130	19	0.	.1	1726.0	*	1	0950	119	1.	.1	1726.0	*	1	1810	219	0.	.1	1726.0
1	0135	20	0.	.1	1726.0	*	1	0955	120	0.	.1	1726.0	*	1	1815	220	0.	.1	1726.0
1	0140	21	0.	.1	1726.0	*	1	1000	121	0.	.1	1726.0	*	1	1820	221	0.	.1	1726.0
1	0145	22	0.	.1	1726.0	*	1	1005	122	0.	.1	1726.0	*	1	1825	222	0.	.1	1726.0
1	0150	23	0.	.1	1726.0	*	1	1010	123	0.	.1	1726.0	*	1	1830	223	0.	.1	1726.0
1	0155	24	1.	.1	1726.0	*	1	1015	124	0.	.1	1726.0	*	1	1835	224	0.	.1	1726.0
1	0200	25	1.	.1	1726.1	*	1	1020	125	0.	.1	1726.0	*	1	1840	225	0.	.1	1726.0
1	0205	26	1.	.1	1726.1	*	1	1025	126	0.	.1	1726.0	*	1	1845	226	0.	.1	1726.0
1	0210	27	1.	.1	1726.1	*	1	1030	127	0.	.1	1726.0	*	1	1850	227	0.	.1	1726.0
1	0215	28	1.	.1	1726.1	*	1	1035	128	0.	.1	1726.0	*	1	1855	228	0.	.1	1726.0
1	0220	29	1.	.2	1726.1	*	1	1040	129	0.	.1	1726.0	*	1	1900	229	0.	.1	1726.0
1	0225	30	1.	.2	1726.1	*	1	1045	130	0.	.1	1726.0	*	1	1905	230	0.	.1	1726.0
1	0230	31	2.	.2	1726.1	*	1	1050	131	0.	.1	1726.0	*	1	1910	231	0.	.1	1726.0
1	0235	32	2.	.2	1726.2	*	1	1055	132	0.	.1	1726.0	*	1	1915	232	0.	.1	1726.0
1	0240	33	2.	.2	1726.2	*	1	1100	133	0.	.1	1726.0	*	1	1920	233	0.	.1	1726.0
1	0245	34	2.	.2	1726.2	*	1	1105	134	0.	.1	1726.0	*	1	1925	234	0.	.1	1726.0
1	0250	35	3.	.3	1726.3	*	1	1110	135	0.	.1	1726.0	*	1	1930	235	0.	.1	1726.0
1	0255	36	3.	.3	1726.3	*	1	1115	136	0.	.1	1726.0	*	1	1935	236	0.	.1	1726.0
1	0300	37	3.	.3	1726.3	*	1	1120	137	0.	.1	1726.0	*	1	1940	237	0.	.1	1726.0
1	0305	38	4.	.3	1726.3	*	1	1125	138	0.	.1	1726.0	*	1	1945	238	0.	.1	1726.0
1	0310	39	4.	.4	1726.4	*	1	1130	139	0.	.1	1726.0	*	1	1950	239	0.	.1	1726.0
1	0315	40	5.	.4	1726.5	*	1	1135	140	0.	.1	1726.0	*	1	1955	240	0.	.1	1726.0
1	0320	41	8.	.6	1726.7	*	1	1140	141	0.	.1	1726.0	*	1	2000	241	0.	.1	1726.0
1	0325	42	12.	.9	1727.1	*	1	1145	142	0.	.1	1726.0	*	1	2005	242	0.	.1	1726.0
1	0330	43	19.	1.3	1727.7	*	1	1150	143	0.	.1	1726.0	*	1	2010	243	0.	.1	1726.0
1	0335	44	23.	1.9	1728.2	*	1	1155	144	0.	.1	1726.0	*	1	2015	244	0.	.1	1726.0
1	0340	45	25.	2.5	1728.6	*	1	1200	145	0.	.1	1726.0	*	1	2020	245	0.	.1	1726.0
1	0345	46	27.	3.0	1729.0	*	1	1205	146	0.	.1	1726.0	*	1	2025	246	0.	.1	1726.0
1	0350	47	28.	3.5	1729.2	*	1	1210	147	0.	.1	1726.0	*	1	2030	247	0.	.1	1726.0
1	0355	48	29.	3.8	1729.4	*	1	1215	148	0.	.1	1726.0	*	1	2035	248	0.	.1	1726.0
1	0400	49	30.	4.1	1729.6	*	1	1220	149	0.	.1	1726.0	*	1	2040	249	0.	.1	1726.0
1	0405	50	30.	4.3	1729.7	*	1	1225	150	0.	.1	1726.0	*	1	2045	250	0.	.1	1726.0
1	0410	51	31.	4.4	1729.8	*	1	1230	151	0.	.1	1726.0	*	1	2050	251	0.	.1	1726.0
1	0415	52	31.	4.5	1729.8	*	1	1235	152	0.	.1	1726.0	*	1	2055	252	0.	.1	1726.0
1	0420	53	31.	4.5	1729.8	*	1	1240	153	0.	.1	1726.0	*	1	2100	253	0.	.1	1726.0
1	0425	54	31.	4.5	1729.8	*	1	1245	154	0.	.1	1726.0	*	1	2105	254	0.	.1	1726.0
1	0430	55	31.	4.5	1729.8	*	1	1250	155	0.	.1	1726.0	*	1	2110	255	0.	.1	1726.0
1	0435	56	31.	4.6	1729.8	*	1	1255	156	0.	.1	1726.0	*	1	2115	256	0.	.1	1726.0
1	0440	57	31.	4.6	1729.9	*	1	1300	157	0.	.1	1726.0	*	1	2120	257	0.	.1	1726.0
1	0445	58	31.	4.6	1729.9	*	1	1305	158	0.	.1	1726.0	*	1	2125	258	0.	.1	1726.0
1	0450	59	31.	4.6	1729.9	*	1	1310	159	0.	.1	1726.0	*	1	2130	259	0.	.1	1726.0
1	0455	60	31.	4.6	1729.9	*	1	1315	160	0.	.1	1726.0	*	1	2135	260	0.	.1	1726.0
1	0500	61	31.	4.6	1729.9	*	1	1320	161	0.	.1	1726.0	*	1	2140	261	0.	.1	1726.0
1	0505	62	31.	4.6	1729.9	*	1	1325	162	0.	.1	1726.0	*	1	2145	262	0.	.1	1726.0
1	0510	63	31.	4.6	1729.8	*	1	1330	163	0.	.1	1726.0	*	1	2150	263	0.	.1	1726.0
1	0515	64	31.	4.5	1729.8	*	1	1335	164	0.	.1	1726.0	*	1	2155	264	0.	.1	1726.0
1	0520	65	31.	4.4	1729.7	*	1	1340	165	0.	.1	1726.0	*	1	2200	265	0.	.1	1726.0
1	0525	66	30.	4.2	1729.7	*	1	1345	166	0.	.1	1726.0	*	1	2205	266	0.	.1	1726.0
1	0530	67	30.	4.1	1729.6	*	1	1350	167	0.	.1	1726.0	*	1	2210	267	0.	.1	1726.0
1	0535	68	30.	4.0	1729.5	*	1	1355	168	0.	.1	1726.0	*	1	2215	268	0.	.1	1726.0
1	0540	69	29.	3.8	1729.4	*	1	1400	169	0.	.1	1726.0	*	1	2220	269	0.	.1	1726.0
1	0545	70	29.	3.7	1729.3	*	1	1405	170	0.	.1	1726.0	*	1	2225	270	0.	.1	1726.0
1	0550	71	28.	3.5	1729.3	*	1	1410	171	0.	.1	1726.0	*	1	2230	271	0.	.1	1726.0
1	0555	72	28.	3.3	1729.2	*	1	1415	172	0.	.1	1726.0	*	1	2235	272	0.	.1	1726.0
1	0600	73	27.	3.2	1729.1	*	1	1420	173	0.	.1	1726.0	*	1	2240	273	0.	.1	1726.0
1	0605	74	27.	3.0	1729.0	*	1	1425	174	0.	.1	1726.0	*	1	2245	274	0.	.1	1726.0
1	0610	75	26.	2.8	1728.9	*	1	1430	175	0.	.1	1726.0	*	1	2250	275	0.	.1	1726.0
1	0615	76	26.	2.7	1728.8	*	1	1435	176	0.	.1	1726.0	*	1	2255	276	0.	.1	1726.0
1	0620	77	25.	2.5	1728.7	*	1	1440	177	0.	.1	1726.0	*	1	2300	277	0.	.1	1726.0
1	0625	78	25.	2.4	1728.6	*	1	1445	178	0.	.1	1726.0	*	1	2305	278	0.	.1	1726.0
1	0630	79	24.	2.2	1728.4	*	1	1450	179	0.	.1	1726.0	*	1	2310	279	0.	.1	1726.0
1	0635	80	24.	2.0	1728.3	*	1	1455	180	0.	.1	1726.0	*	1	2315	280	0.	.1	1726.0
1	0640	81	23.	1.9	1728.2	*	1	1500	181	0.	.1	1726.0	*	1	2320	281	0.	.1	1726.0
1	0645	82	23.	1.7	1728.1	*	1	1505	182	0.	.1	1726.0	*	1	2325	282	0.	.1	1726.0
1	0650	83	22.	1.6	1728.0	*	1	1510	183	0.	.1	1726.0	*	1	2330	283	0.	.1	1726.0
1	0655	84	20.	1.4	1727.9	*	1	1515	184	0.	.1	1726.0	*	1	2335	284	0.	.1	1726.0
1	0700	85	18.	1.3	1727.7	*	1	1520	185	0.	.1	1726.0	*	1	2340	285	0.	.1	1726.0
1	0705	86	17.	1.2	1727.5	*	1	1525	186	0.	.1	1726.0	*	1	2345	286	0.	.1	1726.0
1	0710	87	15.	1.1	1727.4	*	1	1530	187	0.	.1	1726.0	*	1	2350	287	0.	.1	1726.0
1	0715	88	14.	1.0	1727.2	*	1	1535	188	0.	.1	1726.0	*	1	2355	288	0.	.1	1726.0
1	0720	89	12.	.9	1727.1	*	1	1540	189	0.	.1	1726.0	*	2	0000	289	0.	.1	1726.0
1	0725	90	11.	.8	1727.0	*	1	1545	190	0.	.1	1726.0	*	2	0005	290	0.	.1	1726.0
1	0730	91	10.	.7	1726.9	*	1	1550	191	0.	.1	1726.0	*	2	0010	291	0.	.1	1726.0
1	0735	92	9.	.7	1726.8	*	1	1555	192	0.	.1	1726.0	*	2	0015	292	0.	.1	1726.0
1	0740	93	8.	.6	1726.7	*	1	1600	193	0.	.1	1726.0	*	2	0020	293	0.	.1	1726.0
1	0745	94	7.	.6	1726.7	*	1	1605	194	0.	.1	1726.0	*	2	0025	294	0.	.1	1726.0
1	0750	95	7.	.5	1726.6	*	1	1610	195	0.	.1	1726.0	*	2	0030	295	0.	.1	1726.0
1	0755	96	6.	.5	1726.5	*	1	1615	196	0.	.1	1726.0	*	2	0035	296	0.	.1	1726.0
1	0800	97	5.	.4	1726.5	*	1	1620	197	0.	.1	1726.0	*	2	0040	297	0.	.1	1726.0
1	0805	98	5.	.4	1726.4	*	1	1625	198	0.	.1	1726.0	*	2	0045	298	0.	.1	1726.0
1	0810	99	4.	.4	1726.4	*	1	1630	199	0.	.1	1726.0	*	2	0050	299	0.	.1	1726.0
1	0815	100	4.	.3	1726.4	*	1	1635	200	0.	.1	1726.0	*	2	0055	300	0.	.1	1726.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 31.	5.00		19.	5.	5.	5.
		(INCHES)	1.200	1.229	1.229	1.229
		(AC-FT)	10.	10.	10.	10.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
5.	5.00	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
1729.88	5.00	1728.14	1726.55	1726.53	1726.53

CUMULATIVE AREA = .15 SQ MI

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 1

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .60	RATIO 3 .58
HYDROGRAPH AT +	OND8	.02	1	FLOW	33.	16.	15.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OND9	.00	1	FLOW	3.	2.	1.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OFFD3	.03	1	FLOW	35.	16.	15.
				TIME	3.58	3.58	3.58
2 COMBINED AT +	CP-7	.03	1	FLOW	37.	17.	16.
				TIME	3.58	3.58	3.58
2 COMBINED AT +	CP-8	.05	1	FLOW	70.	33.	32.
				TIME	3.58	3.58	3.58
ROUTED TO +	RCP8-CP-	.05	1	FLOW	67.	32.	31.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT +	OND10	.01	1	FLOW	10.	5.	5.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFD5	.01	1	FLOW	13.	6.	6.
				TIME	3.58	3.58	3.58
3 COMBINED AT +	CP-9	.06	1	FLOW	89.	41.	39.
				TIME	3.58	3.58	3.67
ROUTED TO +	RCP9-CP-	.06	1	FLOW	87.	41.	39.
				TIME	3.58	3.67	3.67
HYDROGRAPH AT +	OND12	.00	1	FLOW	8.	4.	4.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-10A	.07	1	FLOW	92.	43.	41.
				TIME	3.58	3.67	3.67
HYDROGRAPH AT +	OND11	.01	1	FLOW	24.	12.	11.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OND13	.01	1	FLOW	12.	6.	6.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	CP-10	.09	1	FLOW	127.	60.	57.
				TIME	3.58	3.58	3.58
ROUTED TO +	EQBASIN	.09	1	FLOW	93.	39.	37.
				TIME	3.75	3.83	3.83
			**	PEAK STAGES IN FEET **			
			1	STAGE	1748.19	1746.86	1746.78
				TIME	3.75	3.83	3.83
DIVERSION TO +	DVPIPE	.09	1	FLOW	67.	39.	37.
				TIME	3.75	3.83	3.83
HYDROGRAPH AT +	DIVWEIR	.09	1	FLOW	26.	0.	0.
				TIME	3.75	.00	.00
HYDROGRAPH AT +	OND14	.02	1	FLOW	31.	15.	14.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-11	.11	1	FLOW	39.	15.	14.
				TIME	3.75	3.50	3.50
HYDROGRAPH AT +	OND1	.00	1	FLOW	3.	1.	1.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	OFFD2	.01	1	FLOW	23.	10.	10.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CP-1	.02	1	FLOW	25.	11.	11.
				TIME	3.50	3.50	3.50
ROUTED TO +	RCP1-CP2	.02	1	FLOW	24.	11.	11.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OND2	.01	1	FLOW	8.	4.	3.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT +	OFFD1	.07	1	FLOW	87.	39.	37.
				TIME	3.58	3.58	3.58
3 COMBINED AT +	CP-2	.09	1	FLOW	120.	54.	51.
				TIME	3.58	3.58	3.58
ROUTED TO +	RCP2-CP-	.09	1	FLOW	119.	53.	50.

				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	OND3	.00	1	FLOW	4.	2.	2.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	CP-3	.09	1	FLOW	121.	54.	51.
				TIME	3.58	3.58	3.58
ROUTED TO							
+	RCP3-CP4	.09	1	FLOW	118.	52.	49.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	OND7	.01	1	FLOW	16.	8.	7.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	CP-4	.10	1	FLOW	131.	59.	55.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	OND4	.02	1	FLOW	27.	13.	12.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	OND5	.01	1	FLOW	12.	6.	6.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	CP-5	.03	1	FLOW	40.	19.	18.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	OND6	.02	1	FLOW	23.	11.	11.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	DVPIPE	.00	1	FLOW	67.	39.	37.
				TIME	3.75	3.83	3.83
ROUTED TO							
+	RDVPIPE	.00	1	FLOW	67.	38.	36.
				TIME	3.83	3.83	3.83
HYDROGRAPH AT							
+	DETPD	.01	1	FLOW	16.	8.	8.
				TIME	3.50	3.50	3.50
5 COMBINED AT							
+	CP-6	.15	1	FLOW	254.	119.	112.
				TIME	3.58	3.58	3.58
ROUTED TO							
+	DETPOND	.15	1	FLOW	45.	32.	31.
				TIME	5.17	5.00	5.00
			** PEAK STAGES IN FEET **				
			1	STAGE	1733.80	1730.08	1729.88
				TIME	5.17	5.00	5.00
HYDROGRAPH AT							
+	OFFD-14	.00	1	FLOW	3.	2.	1.
				TIME	3.58	3.67	3.67
ROUTED TO							
+	RT-B14	.00	1	FLOW	3.	1.	1.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT							
+	BMIC-1	.01	1	FLOW	26.	13.	12.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	C15	.02	1	FLOW	28.	14.	13.
				TIME	3.50	3.50	3.50
ROUTED TO							
+	RT-14	.02	1	FLOW	27.	13.	13.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	BMIC-2	.01	1	FLOW	22.	11.	11.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	C16	.03	1	FLOW	50.	25.	24.
				TIME	3.50	3.50	3.50
ROUTED TO							
+	RT-15	.03	1	FLOW	49.	24.	23.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	SCH-2	.01	1	FLOW	13.	7.	6.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	C17	.04	1	FLOW	61.	31.	29.
				TIME	3.50	3.50	3.50
ROUTED TO							
+	RT-16	.04	1	FLOW	59.	29.	27.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	BMIC-3	.01	1	FLOW	21.	11.	10.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	MGDEV-2	.01	1	FLOW	17.	9.	8.
				TIME	3.50	3.50	3.50
4 COMBINED AT							
+	C18	.20	1	FLOW	126.	68.	65.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	HR3	.00	1	FLOW	3.	1.	1.

```
                                        TIME          3.50     3.50     3.50

HYDROGRAPH AT
+                   HR2      .00    1   FLOW            4.       2.       2.
                                        TIME          3.50     3.50     3.50

HYDROGRAPH AT
+                   HR1      .00    1   FLOW            3.       2.       2.
                                        TIME          3.50     3.50     3.50

 3 COMBINED AT
+                   CHR1     .00    1   FLOW           10.       5.       5.
                                        TIME          3.50     3.50     3.50

 2 COMBINED AT
+                   C18B     .21    1   FLOW          136.      74.      70.
                                        TIME          3.50     3.50     3.50

HYDROGRAPH AT
+                   OND15    .03    1   FLOW           57.      28.      27.
                                        TIME          3.50     3.50     3.50

HYDROGRAPH AT
+                   OFFD4    .01    1   FLOW           19.       9.       9.
                                        TIME          3.58     3.58     3.58
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                         INTERPOLATED TO
                                                                      COMPUTATION INTERVAL
          ISTAQ    ELEMENT     DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO      VOLUME
                                                  PEAK                                      PEAK

                              (MIN)     (CFS)    (MIN)       (IN)     (MIN)     (CFS)    (MIN)        (IN)

          FOR PLAN = 1  RATIO= 1.00
          RCP8-CP-  MANE       1.36     69.67   217.50      1.81      5.00     66.60   220.00        1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4767E+01 EXCESS= .0000E+00 OUTFLOW= .4776E+01 BASIN STORAGE= .5556E-06 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .60
          RCP8-CP-  MANE       1.75     33.06   218.31       .83      5.00     32.31   220.00         .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2194E+01 EXCESS= .0000E+00 OUTFLOW= .2198E+01 BASIN STORAGE= .5369E-06 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .58
          RCP8-CP-  MANE       1.71     31.11   219.15       .79      5.00     30.65   220.00         .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2075E+01 EXCESS= .0000E+00 OUTFLOW= .2079E+01 BASIN STORAGE= .5580E-06 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO= 1.00
          RCP9-CP-  MANE        .43     88.20   215.76      1.82      5.00     86.53   215.00        1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6239E+01 EXCESS= .0000E+00 OUTFLOW= .6240E+01 BASIN STORAGE= .3111E-06 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
          RCP9-CP-  MANE        .49     41.32   216.17       .84      5.00     41.28   220.00         .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2889E+01 EXCESS= .0000E+00 OUTFLOW= .2889E+01 BASIN STORAGE= .3050E-06 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
          RCP9-CP-  MANE        .50     39.15   220.28       .80      5.00     39.15   220.00         .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2735E+01 EXCESS= .0000E+00 OUTFLOW= .2735E+01 BASIN STORAGE= .3190E-06 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
          RCP1-CP2  MANE       1.40     25.01   212.57      1.68      5.00     24.19   215.00        1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1472E+01 EXCESS= .0000E+00 OUTFLOW= .1478E+01 BASIN STORAGE= .1971E-06 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .60
          RCP1-CP2  MANE       1.83     11.24   214.86       .74      5.00     11.22   215.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6495E+00 EXCESS= .0000E+00 OUTFLOW= .6514E+00 BASIN STORAGE= .2695E-06 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .58
          RCP1-CP2  MANE       1.82     10.72   214.12       .70      5.00     10.59   215.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6118E+00 EXCESS= .0000E+00 OUTFLOW= .6142E+00 BASIN STORAGE= .1771E-06 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO= 1.00
          RCP2-CP-  MANE        .25    119.25   215.41      1.65      5.00    118.57   215.00        1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7768E+01 EXCESS= .0000E+00 OUTFLOW= .7768E+01 BASIN STORAGE= .8974E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
          RCP2-CP-  MANE        .29     53.80   215.59       .72      5.00     53.11   215.00         .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3399E+01 EXCESS= .0000E+00 OUTFLOW= .3399E+01 BASIN STORAGE= .9188E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
          RCP2-CP-  MANE        .34     50.63   215.67       .68      5.00     50.01   215.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3201E+01 EXCESS= .0000E+00 OUTFLOW= .3201E+01 BASIN STORAGE= .8963E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
```

```
          RCP3-CP4  MANE         .56    120.24   215.94      1.65      5.00   117.64   215.00        1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7973E+01 EXCESS= .0000E+00 OUTFLOW= .7976E+01 BASIN STORAGE= .3874E-06 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
          RCP3-CP4  MANE         .72     53.97   216.59       .72      5.00    51.67   215.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3490E+01 EXCESS= .0000E+00 OUTFLOW= .3493E+01 BASIN STORAGE= .4528E-06 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
          RCP3-CP4  MANE         .79     50.57   216.98       .68      5.00    48.54   215.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3287E+01 EXCESS= .0000E+00 OUTFLOW= .3290E+01 BASIN STORAGE= .4272E-06 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
           RDVPIPE  MANE        1.04     67.24   226.83     -1.00      5.00    66.79   230.00       -1.00


          FOR PLAN = 1  RATIO=  .60
           RDVPIPE  MANE        1.18     38.60   232.47     -1.00      5.00    38.25   230.00       -1.00


          FOR PLAN = 1  RATIO=  .58
           RDVPIPE  MANE        1.15     36.67   232.60     -1.00      5.00    36.35   230.00       -1.00


          FOR PLAN = 1  RATIO= 1.00
            RT-B14  MANE        1.36      3.39   218.69      1.64      5.00     3.37   220.00        1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2438E+00 EXCESS= .0000E+00 OUTFLOW= .2442E+00 BASIN STORAGE= .7570E-08 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .60
            RT-B14  MANE        1.71      1.51   223.43       .71      5.00     1.50   220.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1061E+00 EXCESS= .0000E+00 OUTFLOW= .1063E+00 BASIN STORAGE= .7638E-08 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .58
            RT-B14  MANE        1.76      1.42   222.80       .67      5.00     1.41   220.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E-01 EXCESS= .0000E+00 OUTFLOW= .9993E-01 BASIN STORAGE= .5886E-08 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
             RT-14  MANE         .37     27.93   210.77      1.91      5.00    27.32   210.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1720E+01 EXCESS= .0000E+00 OUTFLOW= .1721E+01 BASIN STORAGE= .7751E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
             RT-14  MANE         .42     13.81   211.01       .91      5.00    13.40   210.00         .91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8203E+00 EXCESS= .0000E+00 OUTFLOW= .8205E+00 BASIN STORAGE= .6549E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
             RT-14  MANE         .41     13.17   210.75       .86      5.00    12.73   210.00         .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7778E+00 EXCESS= .0000E+00 OUTFLOW= .7780E+00 BASIN STORAGE= .6560E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
             RT-15  MANE         .36     49.16   210.62      1.93      5.00    48.56   210.00        1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2959E+01 EXCESS= .0000E+00 OUTFLOW= .2959E+01 BASIN STORAGE= .9128E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .60
             RT-15  MANE         .35     24.51   210.82       .93      5.00    24.04   210.00         .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1419E+01 EXCESS= .0000E+00 OUTFLOW= .1420E+01 BASIN STORAGE= .8611E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
             RT-15  MANE         .35     23.31   210.84       .88      5.00    22.85   210.00         .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1347E+01 EXCESS= .0000E+00 OUTFLOW= .1347E+01 BASIN STORAGE= .8421E-08 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
             RT-16  MANE         .53     60.94   211.13      1.94      5.00    58.94   210.00        1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3645E+01 EXCESS= .0000E+00 OUTFLOW= .3647E+01 BASIN STORAGE= .3120E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .60
             RT-16  MANE         .65     30.36   211.36       .93      5.00    28.90   210.00         .93

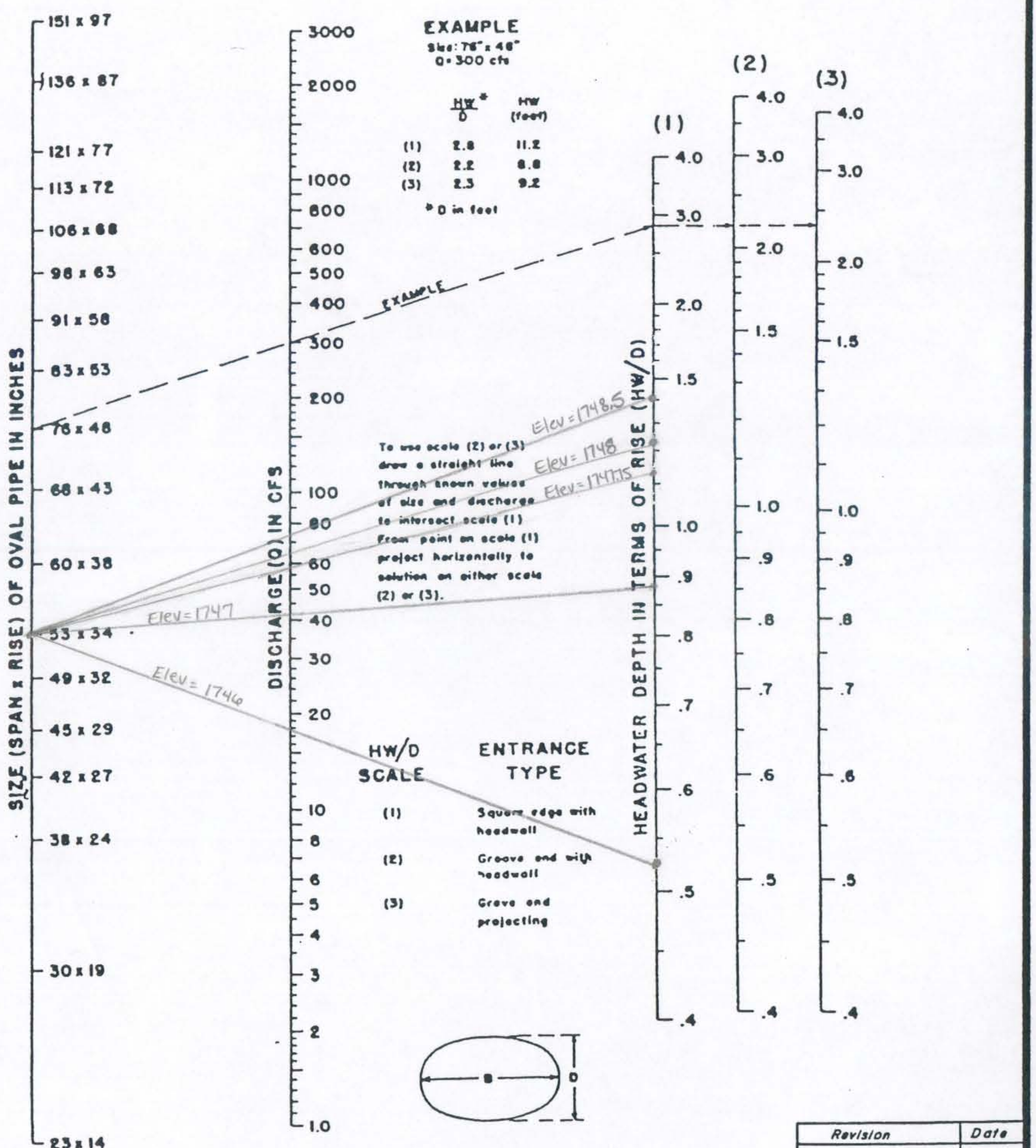
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1751E+01 EXCESS= .0000E+00 OUTFLOW= .1752E+01 BASIN STORAGE= .3374E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
             RT-16  MANE         .62     28.82   211.06       .89      5.00    27.44   210.00         .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1661E+01 EXCESS= .0000E+00 OUTFLOW= .1663E+01 BASIN STORAGE= .3305E-07 PERCENT ERROR=   -.1
```

*** NORMAL END OF HEC-1 ***

NOMOGRAPH - INLET CONTROL ELLIPTICAL PIPE



Revision	Date

Equalizer Basin

ELEVATION	AREA (ft2)	AREA (ac-ft)	42" ELLIPTICAL PIPE FLOW (cfs)	SPILLWAY OVERFLOW (cfs)	TOTAL DISCHARGE(cfs)
1744.50	0	0.00	0	0	0
1745.00	3480	0.08	0	0	0
1746.00	30510	0.70	18	0	18
1747.00	34005	0.78	42	0	42
1747.75	36890	0.85	59	0	59
1748.00	37850	0.87	64	10	74
1748.50	42210	0.97	73	53	126

NOTE: 1) Areas were determined by using AutoCAD

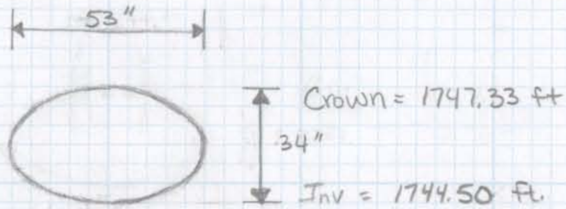
2) The flow through the 42" elliptical pipe was calculated using the nomograph. See attached nomograph.

3) The flow overtopping the equalizer basin was calculated using the weir equation. See attached calculations.

PBS&J

COMP. BY:
CHK.BY:
DATE:
SHEET NO.:
JOB NO.:

Subject: 42" Elliptical RCP at Equalizer Basin
Sample Calculations



42" Elliptical RCP

Sample Calculation @ Elevation 1748.50

$HW = 1748.5 - 1744.5 = 4 \text{ ft}$

$D = \left(\frac{34''}{12}\right) = 2.83 \text{ ft}$

$\frac{HW}{D} = \frac{4.0 \text{ ft}}{2.83 \text{ ft}} = 1.41$

Plot 1.41 on nomograph to get flow through elliptical pipe.

∴ Flow through elliptical pipe at elevation 1748.50 is 73 cfs

Wier Equation

$Q = CLH^{3/2}$

$Q = 2.7(30 \text{ ft})(1748.50 - 1747.75)^{3/2} = 53 \text{ cfs}$

Total flow leaving equalizer basin at elevation 1748.50:

$Q_{TOTAL} = 73 \text{ cfs} + 53 \text{ cfs} = 126 \text{ cfs}$

Detention Basin

ELEVATION	HEIGHT (ft)	AREA (ft2)	VOLUME (ft3)	VOLUME (acre-ft)	CUMMULATIVE VOLUME (acre/ft)	OUTFLOW (ft3/s)
1725.25	0.0	0	0	0.00	0.00	0
1726.00	0.75	9360	3510	0.08	0.08	0
1728.00	2.0	53790	63150	1.45	1.53	22
1729.00	1.0	76290	65040	1.49	3.02	27
1730.00	1.0	82060	79175	1.82	4.84	32
1732.00	2.0	93665	175725	4.03	8.88	40
1734.00	2.0	105690	199355	4.58	13.45	46
1735.00	1.0	112360	109025	2.50	15.95	49

Note: 1) Areas were determined by using AutoCAD

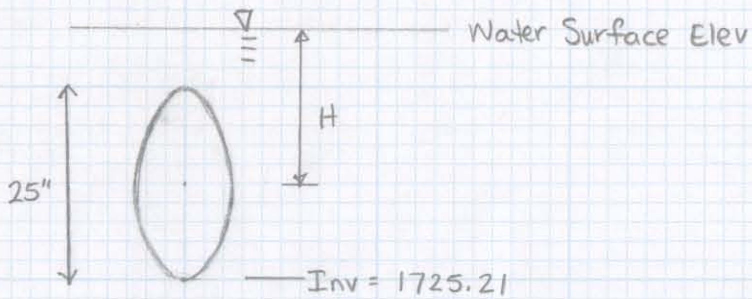
2) The outflow was calculated by using the orifice equation. See attached calculations.

PBSJ

Subject: Detention Basin Outlet

COMP. BY:
CHK.BY:
DATE:
SHEET NO.:
JOB NO.:

$$Q = 0.61\, A \sqrt{2gH}$$



Center Elev of 25" orifice =

$$1725.21 + \frac{\left(\frac{25''}{2}\right)}{12} = 1726.25$$

Sample Calculation for orifice outlet

Water Surface Elev = 1728

$$Q = 0.61\,(\pi)(1.042\text{ ft})^2 \sqrt{2(32.2)(1728 - 1726.25)} = 22.08 \text{ cfs}$$

Worksheet for OND8 channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Discharge	33.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	3.00
0+09	0.00
0+19	0.00
0+25	1.52
0+36	1.65
0+46	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.00)	(0+46, 3.00)	0.025

Results

Normal Depth	0.87	ft
Elevation Range	0.00 to 3.00 ft	
Flow Area	11.20	ft²
Wetted Perimeter	16.12	ft
Top Width	15.87	ft
Normal Depth	0.87	ft
Critical Depth	0.65	ft
Critical Slope	0.01133	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Energy	1.00	ft
Froude Number	0.62	

Worksheet for OND8 channel

Results

Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.87	ft
Critical Depth	0.65	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.01133	ft/ft

Cross Section for OND8 channel

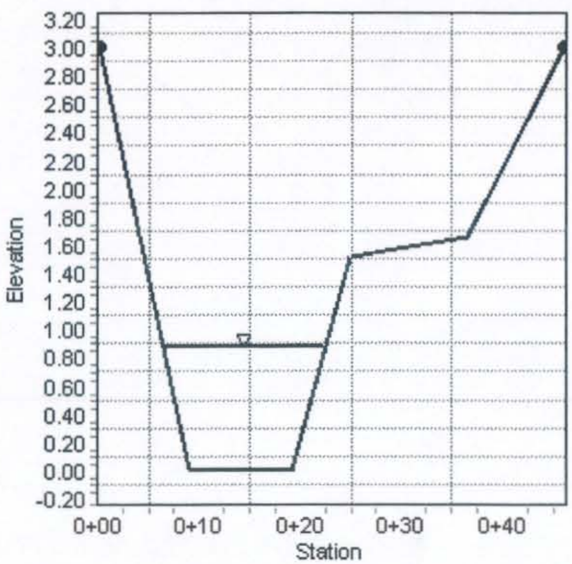
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.87	ft
Discharge	33.00	ft³/s

Cross Section Image

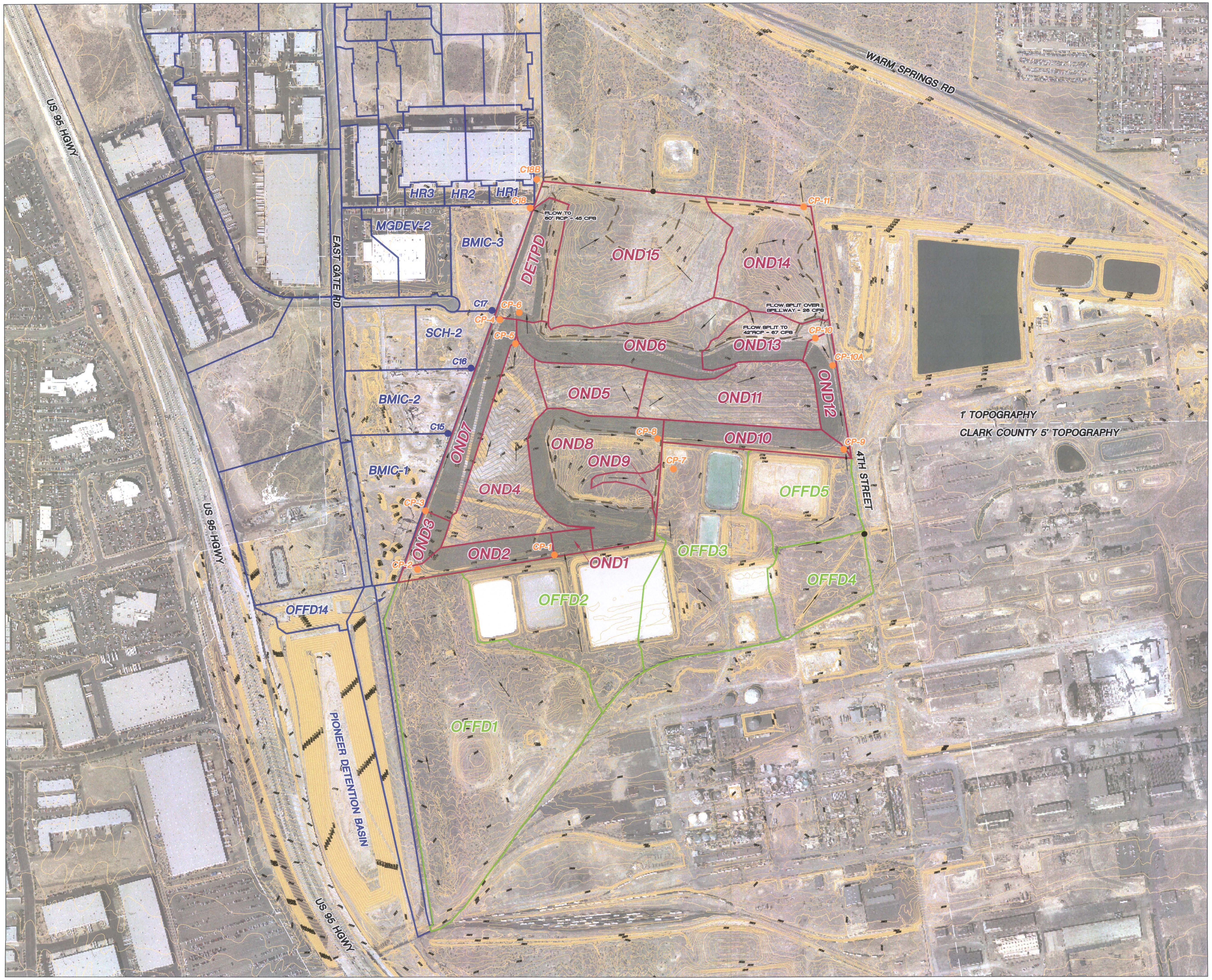


$$t_{channel} = \frac{\text{channel path length}}{\text{velocity}} = \frac{2382 \text{ ft}}{2.95 \text{ ft/s}} = \left(\frac{807.5 \text{ sec}}{1}\right)\left(\frac{1 \text{ min}}{60 \text{ sec}}\right)$$

$$= 13.5 \text{ min}$$

$t_{overland}$ = calculated from standard form 4 = 1.9 min

$t_c = 13.5 + 1.9 = 15.4$ min $\quad \therefore \; t_{lag} = 0.15$ hrs



LEGEND

ONSITE BASIN BOUNDARY
OFFSITE BASIN BOUNDARY
REFERENCED BASIN BOUNDARY
OND1 — ONSITE BASIN LABEL
OFFD1 — OFFSITE BASIN LABEL
HR1 — REFERENCED BASIN LABEL
CP-1 — HEC-1 COMBINATION POINT
DISCHARGE POINT
FLOW DIRECTION
REFERENCED BASIN BOUNDARY
EXISTING LANDFILL BOUNDARY

NOTES

"ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR HENDERSON COMMERCE CENTER TWO (FORMERLY KNOWN AS HARSCH)" PREPARED BY PBS&J (FEBRUARY 2003) WAS USED FOR REFERENCED BASINS

BASIN ID	AREA (ac)	Q_{100} (cfs)	Q_{10} (cfs)
OND1	0.94	3	1
OND2	3.70	8	4
OND3	1.38	4	2
OND4	11.67	27	13
OND5	5.03	12	6
OND6	9.90	23	11
OND7	5.87	16	8
OND8	14.26	33	16
OND9	1.06	3	2
OND10	4.28	10	5
OND11	9.60	24	12
OND12	2.77	8	4
OND13	4.70	12	6
OND14	11.12	31	15
OND15	21.47	57	28
DETPD	5.14	16	8
OFFD1	42.20	87	39
OFFD2	9.63	23	10
OFFD3	16.40	35	16
OFFD4	7.61	19	9
OFFD5	5.11	13	6
CP-1	NA	25	11
CP-2	NA	120	54
CP-3	NA	121	54
CP-4	NA	131	59
CP-5	NA	40	19
CP-6	NA	254	119
CP-7	NA	37	17
CP-8	NA	70	33
CP-9	NA	89	41
CP-10	NA	127	60
CP-10A	NA	92	43
CP-11	NA	39	15
C18	NA	126	68
C18B	NA	136	74

N

PBSJ

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

511963.19 OCTOBER 2006

FIGURE 6 DEVELOPED CONDITION DRAINAGE MAP

TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200

ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

L:\PROJECTS\511963.19-Eastside landfill\figures\figure6_dev.dwg Oct 06, 2006 - 2:25pm 20322

LEGEND

- PROPERTY BOUNDARY
- SOIL BOUNDARY
- 510 SOIL MAP SYMBOL

N

GRAPHIC SCALE

1000 0 500 1000

(IN FEET)
1 inch =1000 ft.

511693.19 SEPTEMBER 2006

FIGURE B-4
SOIL MAP

TECHNICAL DRAINAGE STUDY FOR EASTSIDE LANDFILL

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Suite 100
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Fax: 702/263-7200
ENGINEERING PLANNING• SURVEYING CONSTRUCTION SERVICES

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Curve Number Calculations

Insert Delete

Existing Condition Hydrology

Basin Name	Soil Type	Hydrologic Group	Land Use	Curve No.	% of Composition				Composite Curve No.
ONEX1	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	46%	46%	35.42	35.42	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	44%	90%	37.40	72.82	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	10%	100%	9.10	81.92	81.9
ONEX2	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	72%	72%	61.20	61.20	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	28%	100%	25.48	86.68	86.7
ONEX3	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	100%	91.00	91.00	91.0
ONEX4	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	61%	61%	51.85	51.85	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	39%	100%	35.49	87.34	87.3
ONEX5	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	100%	91.00	91.00	91.0
OFFEX1	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	92%	92%	70.84	70.84	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	8%	100%	6.80	77.64	77.6
OFFEX2	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	81%	81%	62.37	62.37	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	19%	100%	16.15	78.52	78.5
OFFEX3	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	37%	37%	28.49	28.49	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	63%	100%	53.55	82.04	82.0
OFFEX4	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	100%	100%	85.00	85.00	85.0
OFFEX5	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	100%	100%	85.00	85.00	85.0

Curve Number Calculations

Insert | Delete

Interim Condition Hydrology

Basin Name	Soil Type	Hydrologic Group	Land Use	Curve No.	% of Composition	Composite Curve No.
OND1	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	85%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	15%	87.7
OND2	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	87%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	13%	87.7
OND3	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	94%	--
	187	0 %A 100 %B 0 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	6%	88.6
OND4	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	42%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	58%	89.7
OND5	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND6	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	92%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	8%	91.0
OND7	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	19%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	76%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	6%	90.8
OND8	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	21%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	1%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	75%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	3%	90.3
OND9	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND10	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	95%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	5%	91.0
OND11	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND12	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	95%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	5%	91.4
OND13	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	96%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	4%	91.0
OND14	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND15	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	97%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	3%	91.0
DETPD	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	31%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	5%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	64%	91.4
OFFEX1	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	92%	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	8%	77.6
OFFEX2	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	81%	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	19%	78.5
OFFEX3	187	0 %A 100 %B 0 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	77.00	37%	--
	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	63%	82.0
OFFEX4	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	100%	85.0
OFFEX5	615	0 %A 0 %B 100 %C 0 %D	Western Desert Urban Area - Natural Desert Landscaping	85.00	100%	85.0

Curve Number Calculations

Insert Delete

Developed Condition Hydrology

Basin Name	Soil Type	Hydrologic Group	Land Use	Curve No.	% of Composition	Composite Curve No.
OND1	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	85%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	15%	87.7
OND2	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	87%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	13%	87.7
OND3	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	94%	--
	187	0 %A 100 %B 0 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	6%	88.6
OND4	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	42%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	58%	89.7
OND5	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND6	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	92%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	8%	91.0
OND7	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	19%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	76%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	6%	90.8
OND8	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	21%	--
	187	0 %A 100 %B 0 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	86.00	1%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	75%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	3%	90.3
OND9	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND10	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	95%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	5%	91.0
OND11	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND12	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	95%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	5%	91.4
OND13	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	96%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	4%	91.0
OND14	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OND15	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	97%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	3%	91.0
DETPD	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	31%	--
	615	0 %A 0 %B 100 %C 0 %D	Impervious Area- Paved Parking Lots, Roofs, Driveways etc.	98.00	5%	--
	615	0 %A 0 %B 100 %C 0 %D	Newly Graded Areas (Pervious Areas Only, No Vegetation)	91.00	64%	91.4
OFFD1	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	92%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	8%	88.2
OFFD2	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	81%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	19%	88.6
OFFD3	187	0 %A 100 %B 0 %C 0 %D	Industrial (72% Imp)	88.00	37%	--
	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	63%	89.9
OFFD4	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0
OFFD5	615	0 %A 0 %B 100 %C 0 %D	Industrial (72% Imp)	91.00	100%	91.0

Rainfall Methodology

A. Point Rainfall

According to Figure 513 of the Criteria Manual the site is located outside the McCarran Rainfall area. The 100-year, 6-hour rainfall depth duration frequency values for areas located outside the McCarran Airport Rainfall area were obtained from Figure 506 of the Criteria Manual. According to Figure 506, the rainfall depth for the 100-year 6-hour event is 1.95 inches. This value was adjusted according to Table 501 by 1.43, for a 100-year recurrence interval. The adjusted rainfall depth is 2.79 inches and was calculated as follows: (1.95)(1.43) = 2.79 inches. According to Figure 503, the rainfall depth for the 10-year 6-hour event is 1.35 inches. This value was adjusted according to Table 501 by 1.24, for a 10-year recurrence interval. The adjusted rainfall depth is 1.67 inches and is calculated as follows: (1.35)(1.24) = 1.67 inches.

The HEC-1 multi-ratio option (HEC 1990) was used to model the 10-year and 100-year design storms in the HEC-1 input file. The HEC-1 JR card was used to specify the ratio by which to multiply the 100-year precipitation values (point rainfall). The 10-year and 100-year ratios are 0.60 and 1.00, respectively (see calculation for 10-year ratio included in this appendix).

B. Storm Distribution

Table 503 in the Criteria Manual specifies that the 6-hour storm distribution, SDN 3 should be used for drainage areas less than eight square miles.

Runoff Methodology

A. Lag Time

The Criteria Manual's Standard Form 4 was completed to determine the time of concentration for each drainage basin. For all basins which comprise less than 1 square mile, the time of concentration was calculated as follows:

$T_c = T_i + T_t$

Where: Tc = Time of Concentration
Ti = Initial, inlet or overland flow time
Tt = Travel time in the ditch, gutter, etc.

The time of concentration is the sum of the initial flow time, T_i and the travel time, T_t. The minimum T_c recommended for non-urban watersheds is 10 minutes and 5 minute minimum for urban watersheds.

Initial flow time was calculated as follows:

$Ti = 1.8(1.1 - K)Lo^{1/2}/S^{1/3}$

Where: Ti = Initial overland flow time (in minutes)
$K = 0.0132CN - 0.39$
CN = Curve Number
Lo = Length of overland flow (maximum 500 feet)
S = Average basin slope (in percent)

The lag time was calculated as follows:

$T_{lag} = 0.6T_c$ (in hours)

Travel time is calculated as follows:

$$T_t = L_t/(60\ V)$$

Where:

T_t = Travel time in the ditch, gutter, etc. (minutes)
L_t = Travel Length (feet)
V = Average velocity of flow (ft/s)

Now,

$V = CS^{1/2}$
$C = 1.49/nR^{2/3}$
$R = A/P$

Where:

V= Average Velocity (fps)
S = Average Slope (ft/ft0
n = Manning's Roughness Coefficient
R = Hydraulic Radius (ft)
P = Wetted perimeter
A = Area of Flow (sq ft)

Two sets of coefficients were determined, one for developed conditions (Urbanized Areas) and the other for undeveloped (Non-Urbanized Areas) conditions. The following coefficients shall be used for developed areas (Urbanized Areas). For the first developed conditions velocity (V1), the appropriate coefficient ($C = 20.2$) represents street flow with $n = 0.016$ and a depth in the gutter of 0.3 feet. For the second developed conditions velocity (V_2), the appropriate coefficient ($C=30.6$) represents curb height street flow. As may be noted, V_2 is approximately equal to 1.5 times V_1. Typically, drainage areas are delineated such that the channelized flow considered in the calculations of travel times is within streets and other minor water courses and does not include significant lengths of major improved floodway and channels in the travel distance for the time of concentration.

The second set of coefficients shall be used in existing areas (Non-Urbanized Areas). For the first undeveloped conditions velocity (V1), the appropriate coefficient C = 14.8) represents wide channel flow with D = 0.25 feet and n = 0.04. For the second undeveloped conditions velocity (V_2), the appropriate coefficient C = 29.4) represents wide channel flow with D = 0.7 feet and n = 0.04. The time of concentration for the first design point in an urbanized basin using this procedure should not exceed the time of concentration calculated using below equation, which was developed using rainfall/runoff data collected in urbanized regions.

$t_c = L / 180 + 10$ (604)

Where t_c = Time of Concentration at the First Design Point in an Urban Watershed (min)

L = Watershed Length (ft)

If the above equation results in a lesser time of concentration at the first design point and thus would govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream reaches. The minimum t_c recommended for urbanized areas is 5 minutes.

Subbasin OND8 time of concentration was adjusted because the velocities calculated by the above mentioned formulas did not accurately represent to channel velocity. A channel cross section for this basin is included in Appendix B-3. The velocity determined by using FlowMaster was 2.95ft/s. The Standard Form 4 channel velocity was calculated to be 1.9 ft/s. By using the velocity calculated by Flowmaster, the time of concentration reduced to 15 minutes. Please refer to Appendix B-3 for the calculations for the time of concentration.

B. Soils – Curve Number Determination

Soils information, for the onsite and offsite drainage basins, was obtained from the Soil Conservation Service (SCS) Soil Survey of Las Vegas Valley Area, Nevada, 1985. The project site and offsite basin is depicted on a SCS survey map and is included in this appendix, see **Figure B-4: Soil Map**. The soil types were matched to the corresponding SCS Curve Number (CN) for use in the Standard Form 4 and the HEC-1 analysis. The corresponding CN's for these soils are from Table 602 of the Criteria Manual. The onsite and offsite basins are composed of soil types #187 and #615 with a corresponding hydrologic group of B and C respectively.

In developed condition, the proposed landfill was classified as industrial because the landfill is planned to have a type II layer on the top. Since industrial has an imperviousness of 72%, this was assumed to be an appropriate curve number. The curve numbers for industrial are more conservative than curve numbers for gravel which would represent the type II material.

Imperviousness and newly graded curve numbers were also used to appropriately classify the designed drainage facilities around the landfill.

C. Routing

Routing in improved channels or storm drains were performed using the Kinematic method. Kinematic routing requires the following input parameters: roughness coefficient, base width, side slope, slope, and reach length. Kinematic routing was used for subbasins delineated by PBS&J within this TDS.

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE: 1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.

2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.

3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

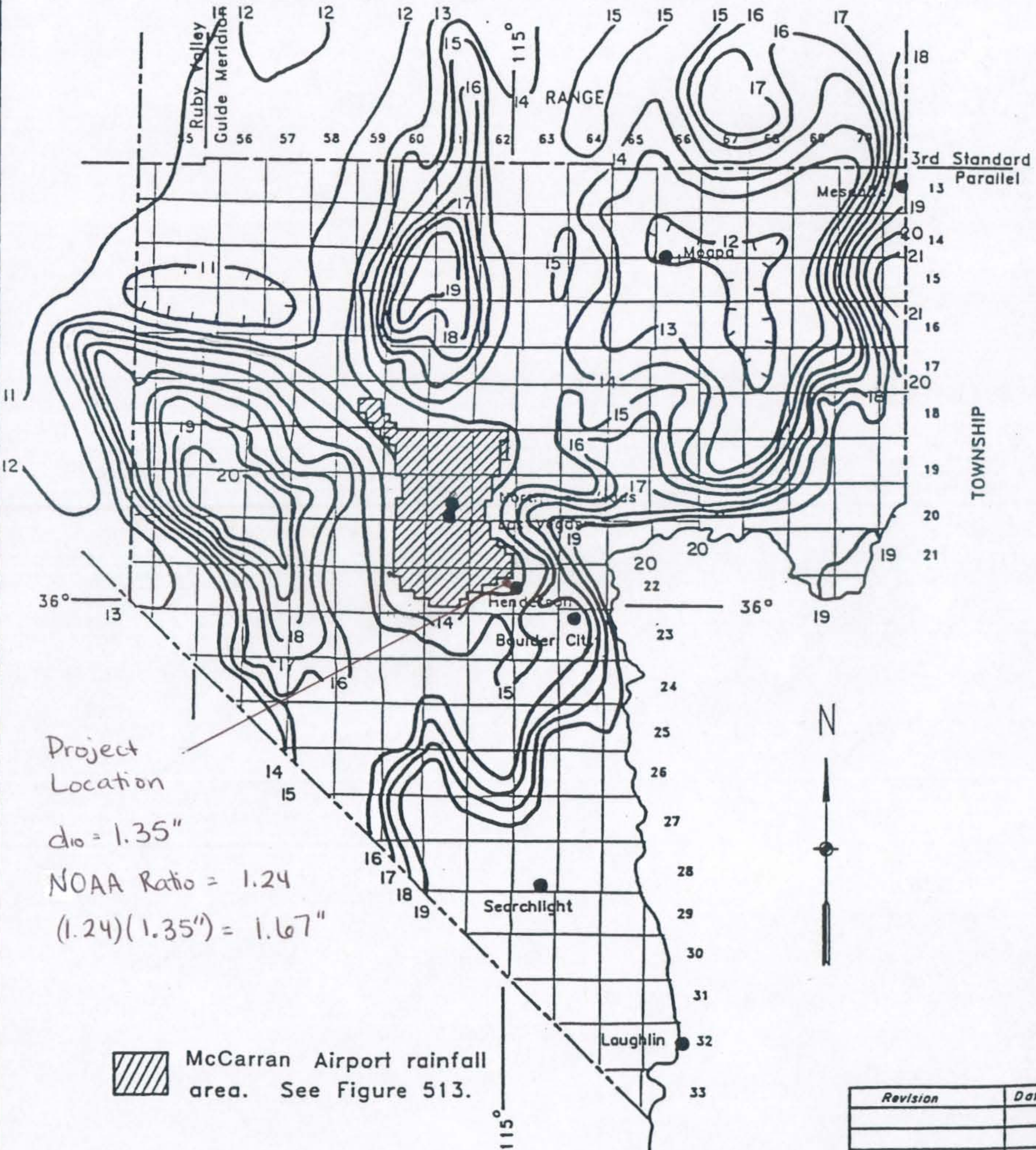
Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5	Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
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:

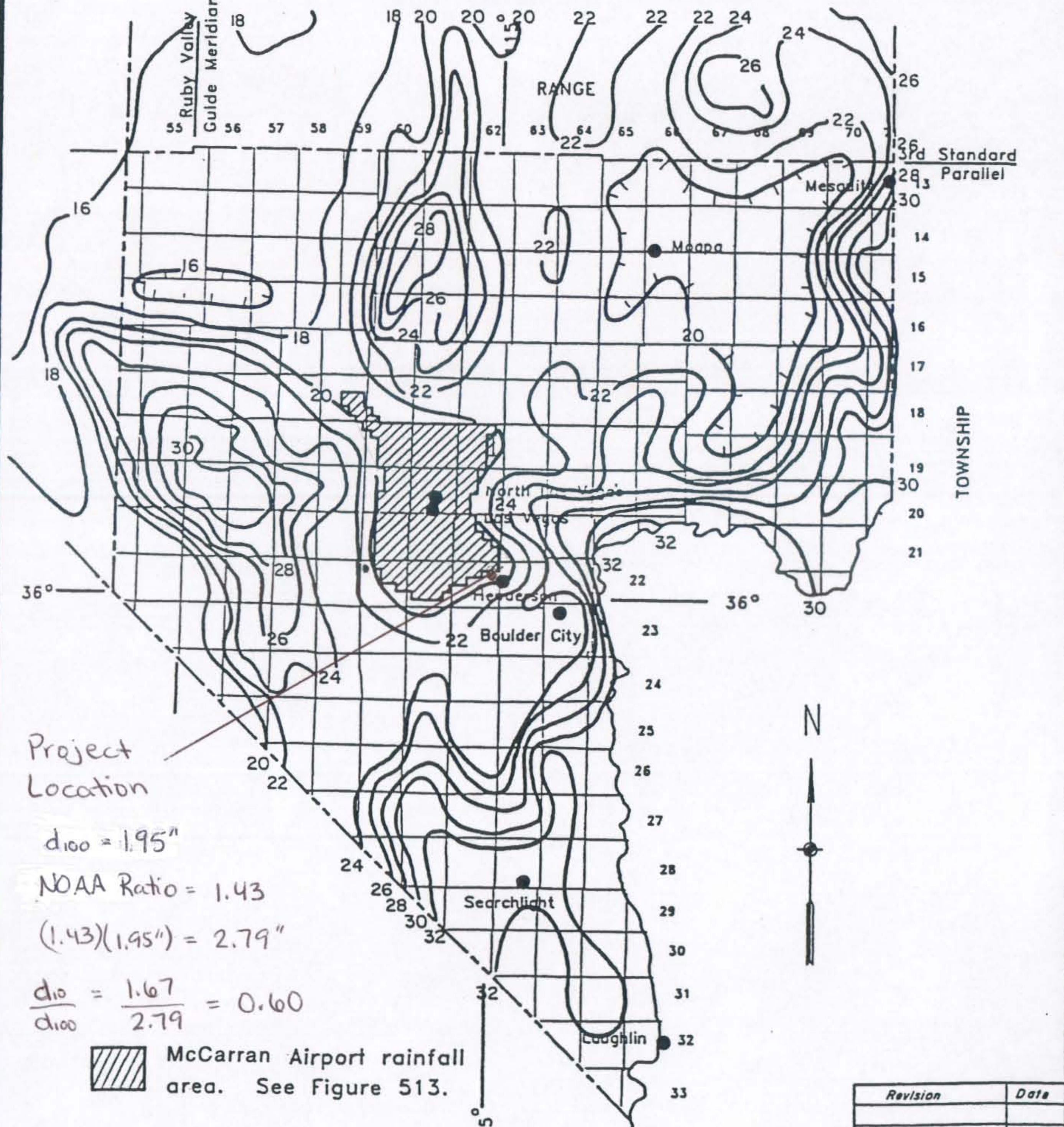
RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 503

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the cobbles and pebbles throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

184—Caliza very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown very gravelly sandy loam about 3 inches thick. The upper 13 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown, stratified very gravelly coarse sand to very gravelly loamy sand.

Included in this unit is about 5 percent Aztec soils on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the content of pebbles in the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

187—Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on inset fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 85 percent of the surface is covered with a desert pavement of cobbles, stones, and pebbles. The surface layer is a light brown extremely cobbly fine sandy loam about 2 inches thick. The upper 12 inches of the underlying material is light brown and pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified material that averages very gravelly loamy coarse sand. In some areas of similar included soils, the surface layer is extremely stony fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels; 5 percent Pittman soils on erosional fan remnants; and 5 percent Aztec soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Caliza soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitation for lawns and landscaping is the stones, cobbles, and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

190—Dalian very gravelly fine sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on fan skirts. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 65 percent of the surface is covered with a weakly developed desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity of the Weiser soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

545—Weiser-Goodsprings complex, 2 to 4 percent slopes. This map unit is on erosional fan remnants.

This unit is 60 percent Weiser extremely gravelly fine sandy loam, 2 to 4 percent slopes, and 25 percent Goodsprings very gravelly fine sandy loam, 2 to 4 percent slopes. The Weiser and Goodsprings soils are on summits and shoulders of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 10 percent Skyhaven soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 90 percent of the surface layer is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Goodsprings soil is shallow and well drained. It formed in alluvium derived from various kinds of rock. Typically, 90 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the hardpan in areas of the Goodsprings soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Weiser soil is in horticultural group 2, and the Goodsprings soil is in horticultural group 6.

600—Slickens. Slickens consists of accumulations of fine-textured material such as that separated in ore-mill operations. It is largely freshly ground rock that commonly has undergone chemical treatment during the milling process. Slickens is commonly confined in specially constructed basins.

This map unit is in capability subclass VIIIs, nonirrigated.

605—Dumps. Dumps consists of areas of smoothed or uneven accumulations of waste rock and general refuse.

This map unit is in capability subclass VIIIs, nonirrigated.

610—Pits, gravel. Pits, gravel, consists of open excavations from which soil material and gravel have been removed, exposing rock, a hardpan, or other material.

This map unit is in capability subclass VIIIs, nonirrigated.

615—Urban land. Urban land consists of areas covered by asphalt, concrete, and buildings or other urban structures.

This map unit is in capability subclass VIIIs, nonirrigated.

630—Badland. Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

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 $I_a = 0.2S$.

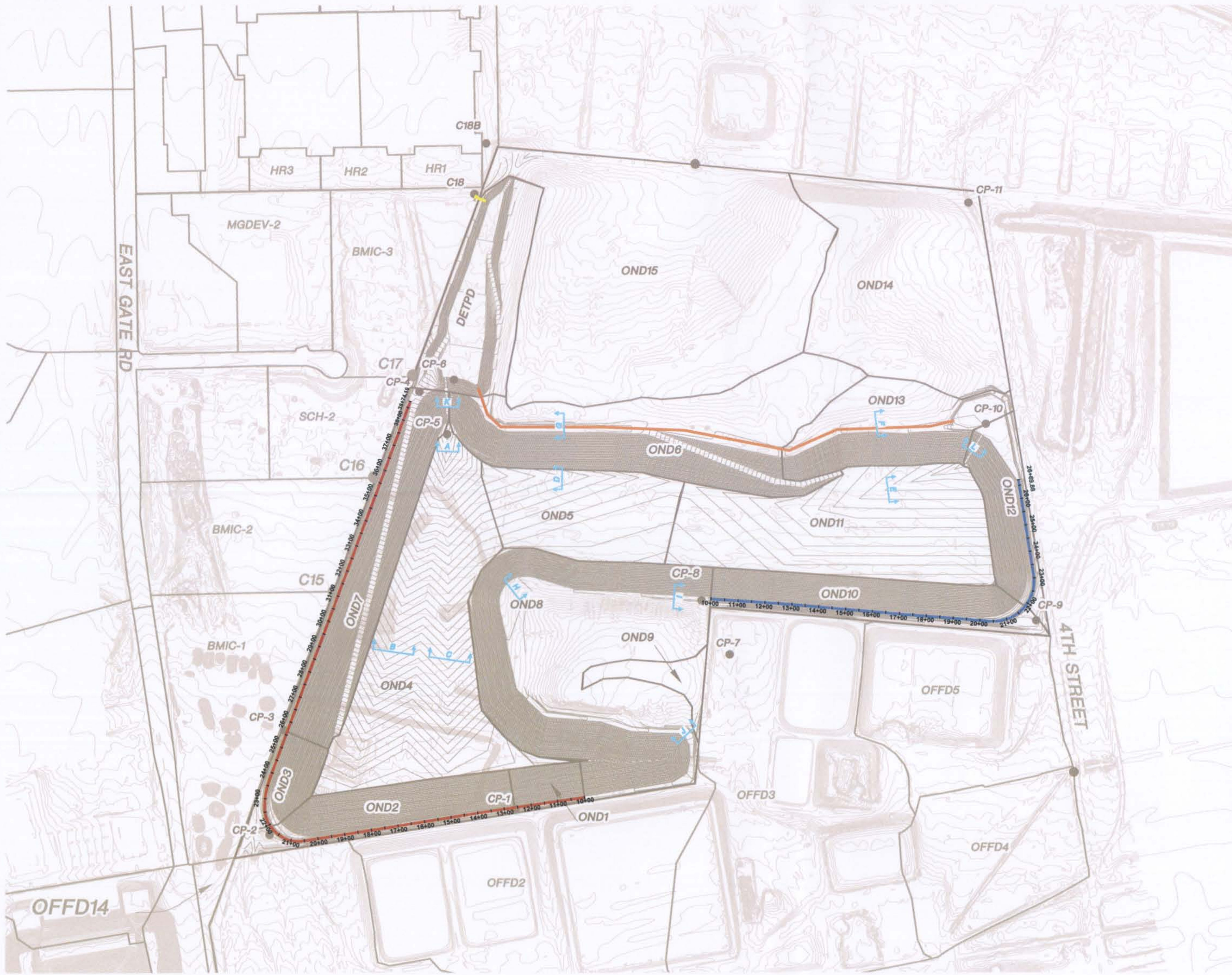
[2]*Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

Appendix C: Hydraulic Calculations

Appendix C-1: Cross Section and Drainage Facility Map (Figure 7)



LEGEND

- HEC-RAS CHANNEL (C-1)
- HEC-RAS CHANNEL (C-2)
- 42" RCP STORM DRAIN
- 60" RCP STORM DRAIN
- CROSS SECTION

NOTES

PLEASE REFER TO FIGURE 6 FOR THE DEVELOPED CONDITION BASIN DELINEATION

N

GRAPHIC SCALE

400 0 200 400

(IN FEET)
1 inch =400 ft.

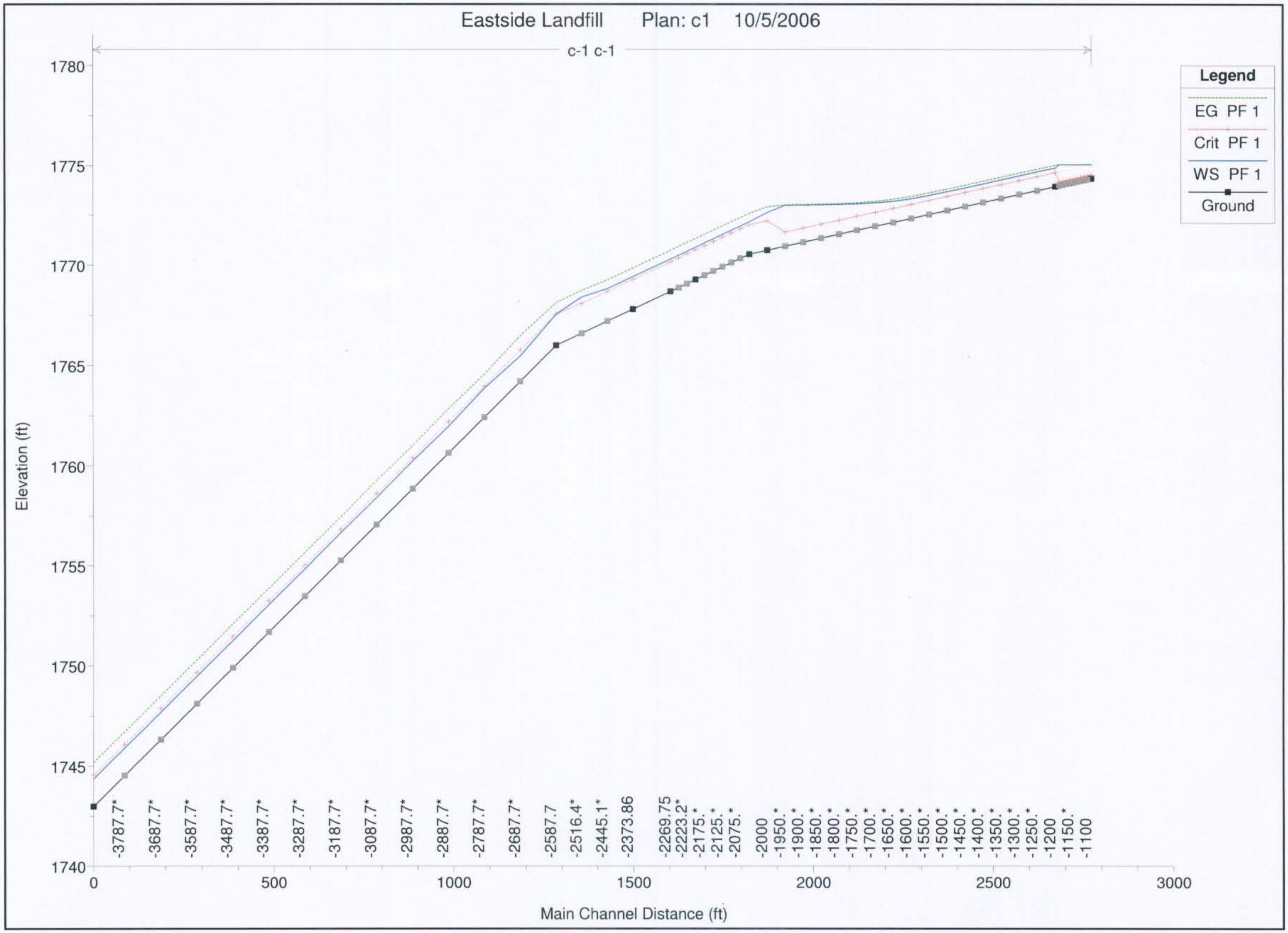
511963.19 OCTOBER 2006

FIGURE 7
CROSS-SECTION AND DRAINAGE FACILITY MAP

TECHNICAL DRAINGE STUDY FOR EAST MAP

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074-6382
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING PLANNING• SURVEYING CONSTRUCTION SERVICES

Appendix C-2: HEC-RAS Model for Channel C-1

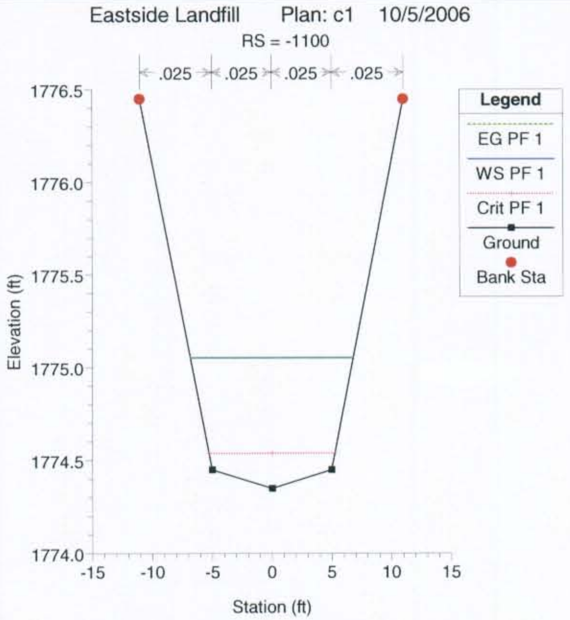

Eastside Landfill Plan: c1 10/5/2006
c-1 c-1
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Elevation (ft)
1740
1745
1750
1755
1760
1765
1770
1775
1780
Main Channel Distance (ft)
0
500
1000
1500
2000
2500
3000
-3787.7*
-3687.7*
-3587.7*
-3487.7*
-3387.7*
-3287.7*
-3187.7*
-3087.7*
-2987.7*
-2887.7*
-2787.7*
-2687.7*
-2587.7
-2516.4*
-2445.1*
-2373.86
-2269.75
-2223.2*
-2175.*
-2125.*
-2075.*
-2000
-1950.*
-1900.*
-1850.*
-1800.*
-1750.*
-1700.*
-1650.*
-1600.*
-1550.*
-1500.*
-1450.*
-1400.*
-1350.*
-1300.*
-1250.*
-1200
-1150.*
-1100

HEC-RAS Plan: c1 River: c-1 Reach: c-1 Profile: PF 1

Reach	River Sta	Profile	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	Max Chl Dpth	Frctn Slope
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft/ft)
c-1	-1100	PF 1	3.00	1774.35	1775.05	1774.54	1775.06	0.000097	0.39	7.62	13.62	0.09	0.70	0.000087
c-1	-1110.*	PF 1	3.00	1774.31	1775.05	1774.50	1775.05	0.000079	0.37	8.16	13.85	0.08	0.74	0.000072
c-1	-1120.*	PF 1	3.00	1774.27	1775.05	1774.46	1775.05	0.000065	0.34	8.71	14.09	0.08	0.78	0.000059
c-1	-1130.*	PF 1	3.00	1774.23	1775.05	1774.42	1775.05	0.000054	0.32	9.27	14.33	0.07	0.82	0.000049
c-1	-1140.*	PF 1	3.00	1774.19	1775.05	1774.38	1775.05	0.000045	0.30	9.84	14.56	0.07	0.86	0.000042
c-1	-1150.*	PF 1	3.00	1774.15	1775.05	1774.34	1775.05	0.000038	0.29	10.42	14.80	0.06	0.90	0.000035
c-1	-1160.*	PF 1	3.00	1774.11	1775.05	1774.30	1775.05	0.000033	0.27	11.02	15.04	0.06	0.94	0.000030
c-1	-1170.*	PF 1	3.00	1774.07	1775.05	1774.26	1775.05	0.000028	0.26	11.62	15.28	0.05	0.98	0.000026
c-1	-1180.*	PF 1	3.00	1774.03	1775.05	1774.22	1775.05	0.000024	0.25	12.23	15.52	0.05	1.02	0.000022
c-1	-1190.*	PF 1	3.00	1773.99	1775.05	1774.18	1775.05	0.000021	0.23	12.86	15.76	0.05	1.06	0.000930
c-1	-1200	PF 1	33.00	1773.95	1774.89	1774.66	1775.03	0.004001	3.01	10.96	15.02	0.62	0.94	0.003997
c-1	-1250.*	PF 1	33.00	1773.75	1774.69	1774.46	1774.83	0.003994	3.01	10.97	15.03	0.62	0.94	0.003997
c-1	-1300.*	PF 1	33.00	1773.55	1774.49	1774.26	1774.63	0.004001	3.01	10.96	15.01	0.62	0.94	0.004001
c-1	-1350.*	PF 1	33.00	1773.35	1774.29	1774.06	1774.43	0.004001	3.01	10.96	15.01	0.62	0.94	0.004001
c-1	-1400.*	PF 1	33.00	1773.15	1774.09	1773.86	1774.23	0.004001	3.01	10.96	15.02	0.62	0.94	0.003999
c-1	-1450.*	PF 1	33.00	1772.95	1773.89	1773.66	1774.03	0.003997	3.01	10.96	15.03	0.62	0.94	0.003991
c-1	-1500.*	PF 1	33.00	1772.75	1773.69	1773.46	1773.83	0.003984	3.01	10.98	15.03	0.62	0.94	0.003964
c-1	-1550.*	PF 1	33.00	1772.55	1773.49	1773.26	1773.63	0.003944	3.00	11.01	15.03	0.62	0.94	0.003872
c-1	-1600.*	PF 1	33.00	1772.35	1773.30	1773.06	1773.44	0.003802	2.96	11.15	15.09	0.61	0.95	0.003603
c-1	-1650.*	PF 1	33.00	1772.15	1773.13	1772.86	1773.25	0.003419	2.85	11.57	15.26	0.58	0.98	0.003045
c-1	-1700.*	PF 1	33.00	1771.95	1772.99	1772.66	1773.10	0.002729	2.64	12.49	15.61	0.52	1.04	0.002262
c-1	-1750.*	PF 1	33.00	1771.75	1772.89	1772.46	1772.98	0.001905	2.33	14.14	16.23	0.44	1.14	0.001510
c-1	-1800.*	PF 1	33.00	1771.55	1772.83	1772.26	1772.89	0.001227	2.00	16.48	17.08	0.36	1.28	0.000962
c-1	-1850.*	PF 1	33.00	1771.35	1772.79	1772.06	1772.84	0.000774	1.70	19.37	18.07	0.29	1.44	0.000611
c-1	-1900.*	PF 1	33.00	1771.15	1772.77	1771.86	1772.81	0.000495	1.46	22.68	19.14	0.24	1.62	0.000396
c-1	-1950.*	PF 1	33.00	1770.95	1772.76	1771.66	1772.78	0.000325	1.25	26.33	20.24	0.19	1.81	0.000318
c-1	-2000	PF 1	33.00	1770.75	1772.75	1771.46	1772.77	0.000311	1.09	30.25	21.38	0.16	2.00	0.002312
c-1	-2050	PF 1	120.00	1770.55	1772.18	1772.03	1772.61	0.008398	5.28	22.72	19.15	0.85	1.62	0.008406
c-1	-2075.*	PF 1	120.00	1770.34	1771.96	1771.82	1772.40	0.008413	5.28	22.71	19.14	0.86	1.62	0.008448
c-1	-2100.*	PF 1	120.00	1770.13	1771.75	1771.61	1772.19	0.008483	5.30	22.63	19.12	0.86	1.62	0.008522
c-1	-2125.*	PF 1	120.00	1769.92	1771.54	1771.40	1771.98	0.008562	5.32	22.55	19.09	0.86	1.62	0.008425
c-1	-2150.*	PF 1	120.00	1769.70	1771.33	1771.18	1771.76	0.008290	5.25	22.84	19.19	0.85	1.63	0.008248
c-1	-2175.*	PF 1	120.00	1769.49	1771.13	1770.97	1771.55	0.008207	5.23	22.93	19.21	0.84	1.64	0.008390
c-1	-2200	PF 1	121.00	1769.28	1770.90	1770.77	1771.35	0.008578	5.33	22.68	19.14	0.86	1.62	0.008570
c-1	-2223.2*	PF 1	121.00	1769.08	1770.70	1770.57	1771.15	0.008562	5.33	22.70	19.14	0.86	1.62	0.008546
c-1	-2246.5*	PF 1	121.00	1768.88	1770.51	1770.37	1770.95	0.008530	5.32	22.73	19.15	0.86	1.63	0.008505
c-1	-2269.75	PF 1	121.00	1768.68	1770.31	1770.17	1770.75	0.008480	5.31	22.79	19.17	0.86	1.63	0.008450
c-1	-2373.86	PF 1	121.00	1767.80	1769.43	1769.29	1769.87	0.008421	5.30	22.85	19.19	0.86	1.63	0.008410
c-1	-2445.1*	PF 1	121.00	1767.20	1768.83	1768.69	1769.27	0.008399	5.29	22.87	19.20	0.85	1.63	0.006934
c-1	-2516.4*	PF 1	121.00	1766.60	1768.42	1768.09	1768.74	0.005821	4.57	26.49	20.29	0.70	1.82	0.008089
c-1	-2587.7	PF 1	131.00	1766.00	1767.56	1767.56	1768.14	0.011604	6.12	21.42	18.73	1.01	1.56	0.011585
c-1	-2687.7*	PF 1	131.00	1764.21	1765.47	1765.77	1766.49	0.023359	8.09	16.19	16.98	1.46	1.26	0.015943
c-1	-2787.7*	PF 1	131.00	1762.42	1763.87	1763.98	1764.57	0.014617	6.71	19.53	18.12	1.14	1.45	0.018227
c-1	-2887.7*	PF 1	131.00	1760.64	1761.97	1762.20	1762.86	0.019865	7.58	17.27	17.36	1.34	1.33	0.016940
c-1	-2987.7*	PF 1	131.00	1758.85	1760.25	1760.41	1761.02	0.016441	7.03	18.63	17.82	1.21	1.40	0.018032

HEC-RAS Plan: c1 River: c-1 Reach: c-1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	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	Max Chl Dpth	Frctn Slope
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft/ft)
c-1	-3087.7*	PF 1	131.00	1757.06	1758.41	1758.62	1759.26	0.018674	7.40	17.70	17.51	1.30	1.35	0.017504
c-1	-3187.7*	PF 1	131.00	1755.27	1756.65	1756.83	1757.45	0.017258	7.17	18.27	17.70	1.24	1.38	0.017945
c-1	-3287.7*	PF 1	131.00	1753.48	1754.84	1755.04	1755.67	0.018132	7.31	17.91	17.58	1.28	1.36	0.017687
c-1	-3387.7*	PF 1	131.00	1751.70	1753.07	1753.26	1753.89	0.017639	7.23	18.11	17.65	1.26	1.37	0.017883
c-1	-3487.7*	PF 1	131.00	1749.91	1751.27	1751.47	1752.10	0.018164	7.32	17.90	17.57	1.28	1.36	0.017899
c-1	-3587.7*	PF 1	131.00	1748.12	1749.49	1749.68	1750.31	0.017788	7.26	18.05	17.62	1.26	1.37	0.017975
c-1	-3687.7*	PF 1	131.00	1746.33	1747.70	1747.89	1748.52	0.018000	7.29	17.97	17.60	1.27	1.37	0.017894
c-1	-3787.7*	PF 1	131.00	1744.54	1745.91	1746.10	1746.73	0.017975	7.29	17.98	17.60	1.27	1.37	0.017988
c-1	-3874.10	PF 1	131.00	1743.00	1744.37	1744.56	1745.19	0.017762	7.25	18.06	17.63	1.26	1.37	0.017868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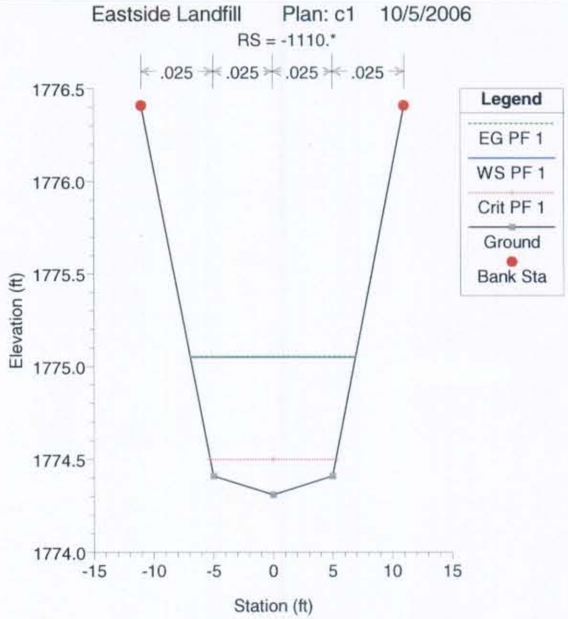
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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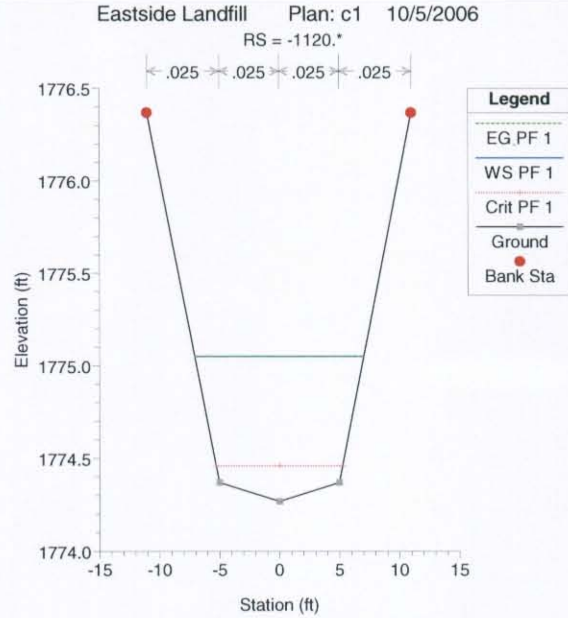
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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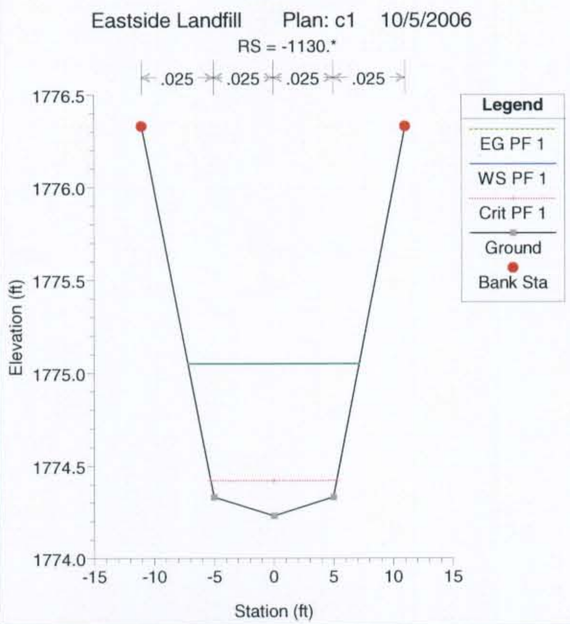
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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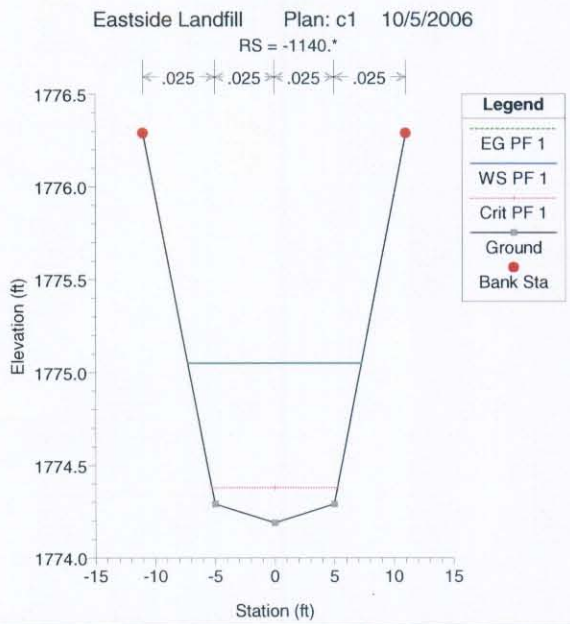
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
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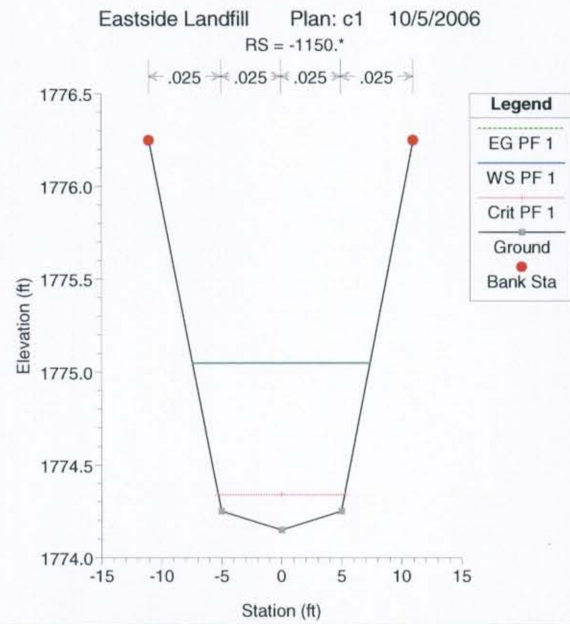
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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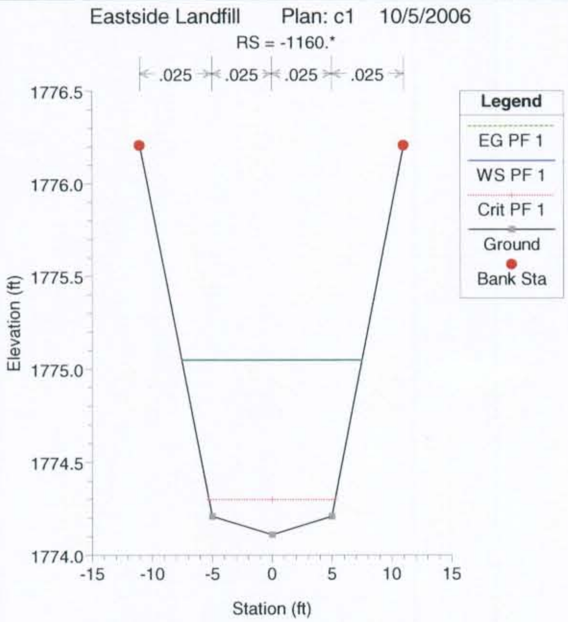
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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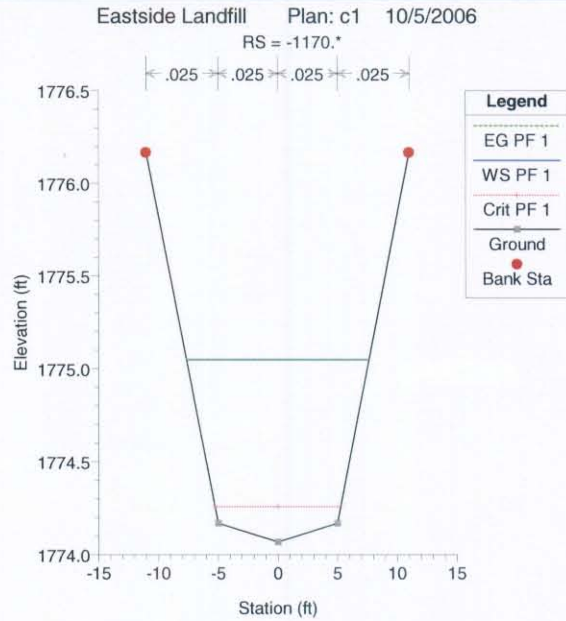
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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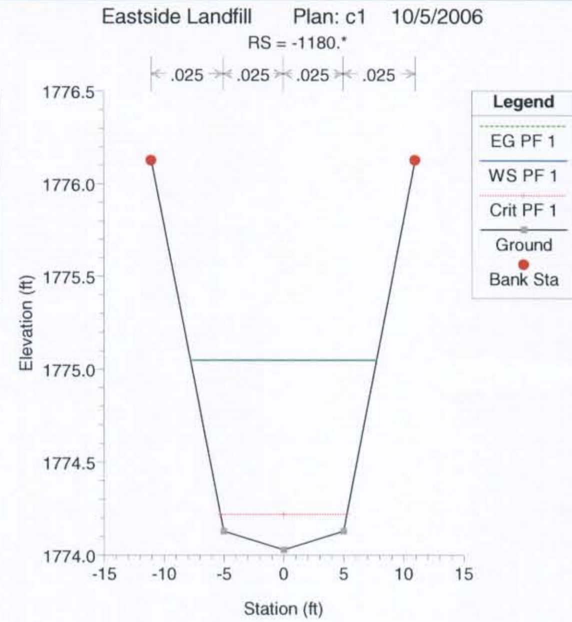
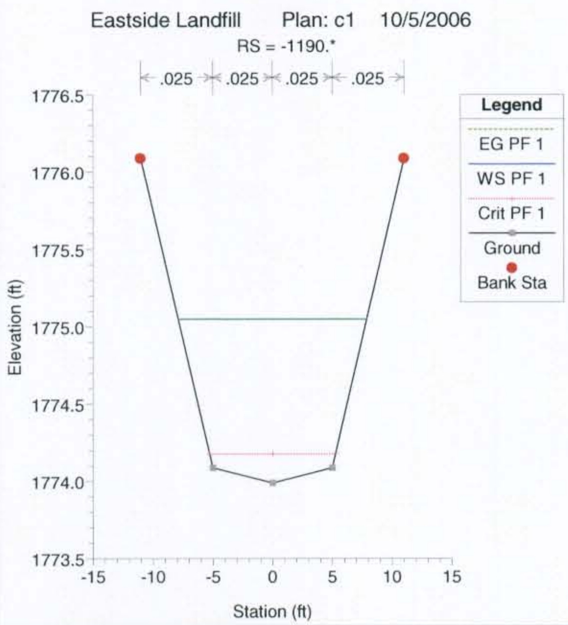
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Eastside Landfill Plan: c1 10/5/2006
RS = -1180.*
.025 .025 .025 .025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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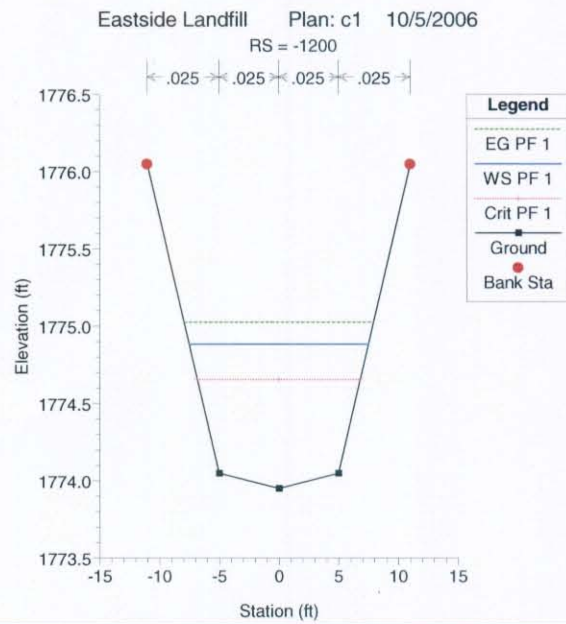
.025 .025 .025 .025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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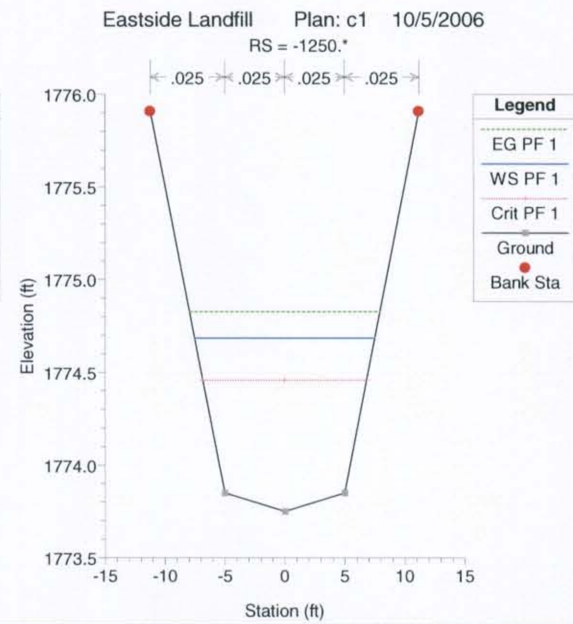
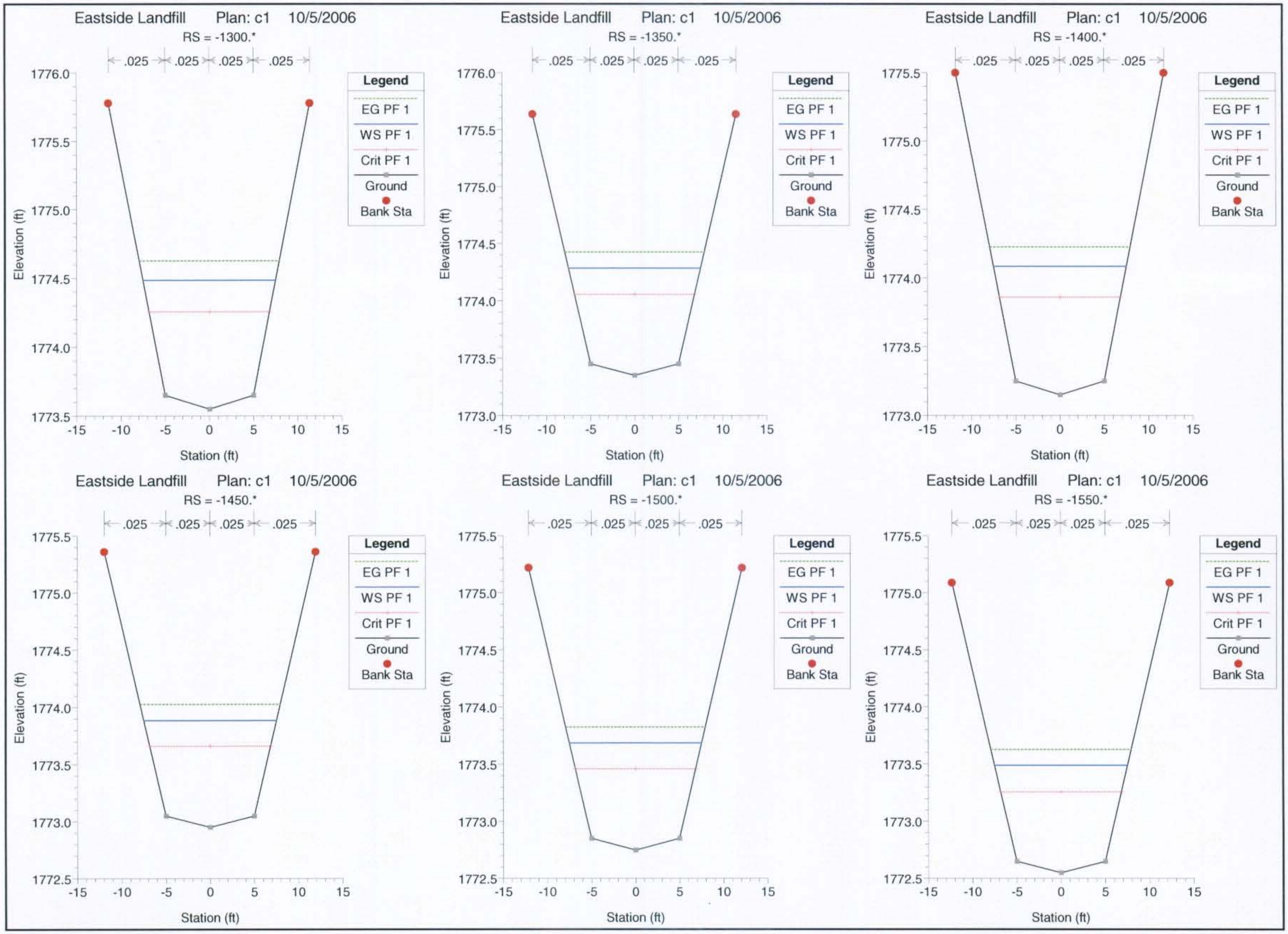
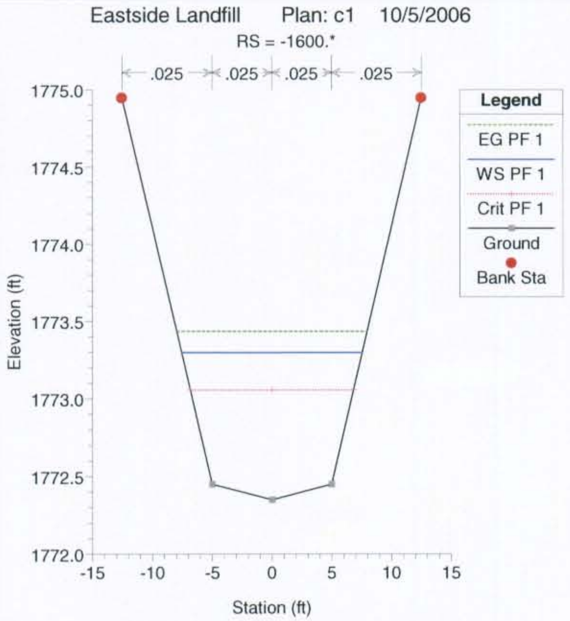
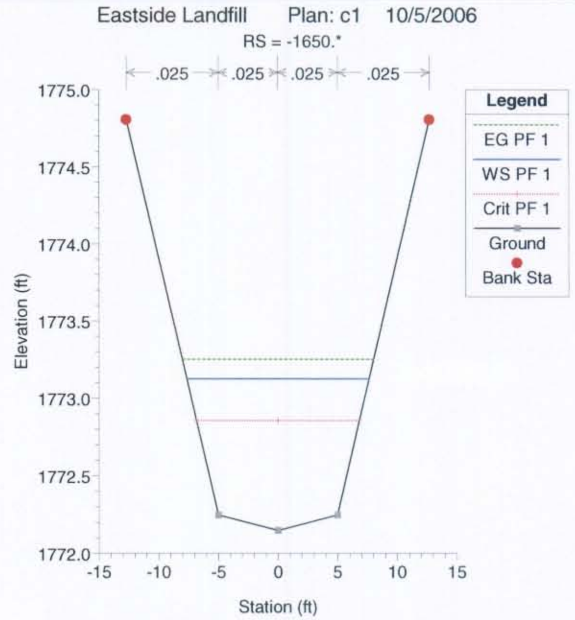
.025 .025 .025 .025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Eastside Landfill Plan: c1 10/5/2006
RS = -1250.*
.025 .025 .025 .025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Eastside Landfill Plan: c1 10/5/2006
RS = -1300.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1776.0
1775.5
1775.0
1774.5
1774.0
1773.5
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c1 10/5/2006
RS = -1350.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1776.0
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c1 10/5/2006
RS = -1400.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c1 10/5/2006
RS = -1450.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c1 10/5/2006
RS = -1500.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c1 10/5/2006
RS = -1550.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1775.5
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c1 10/5/2006
RS = -1600.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
-15 -10 -5 0 5 10 15
Station (ft)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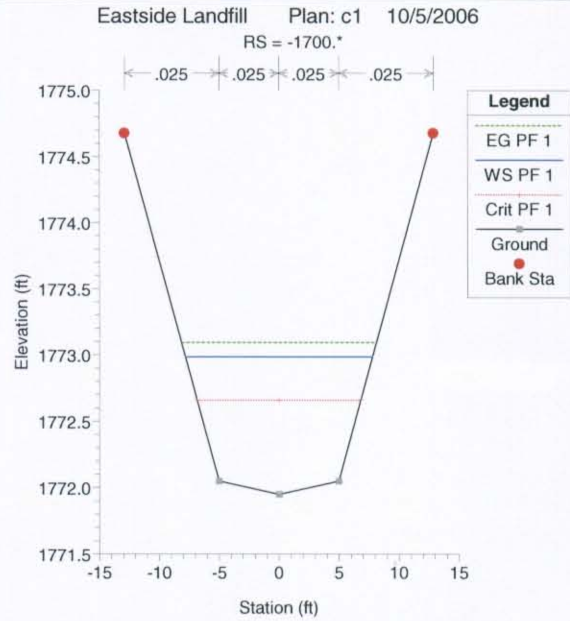
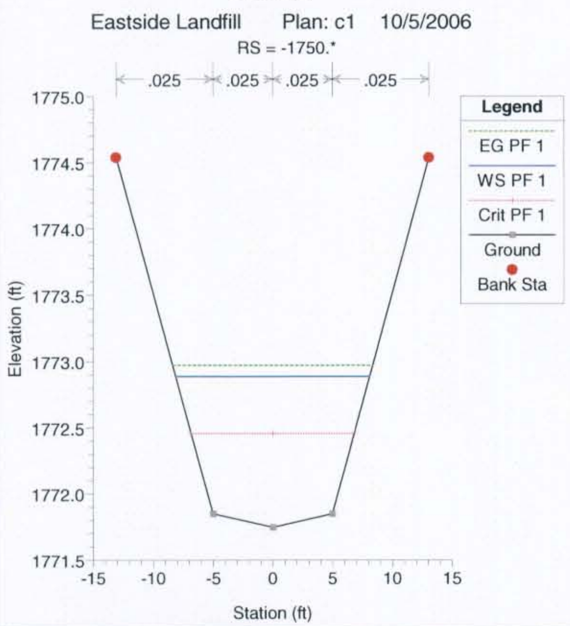
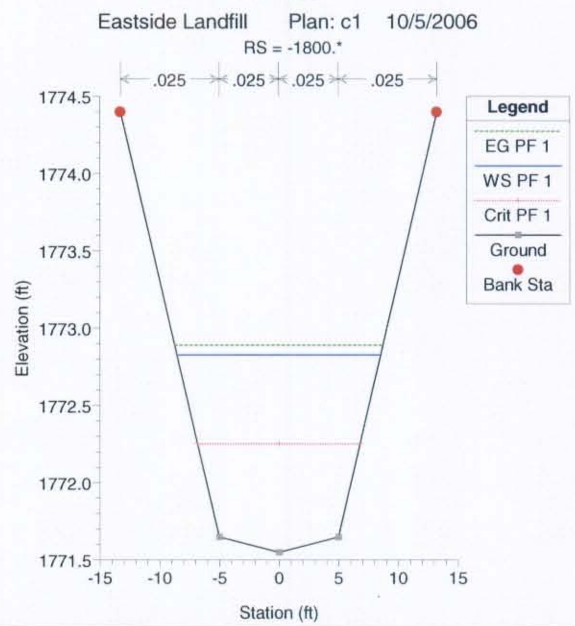
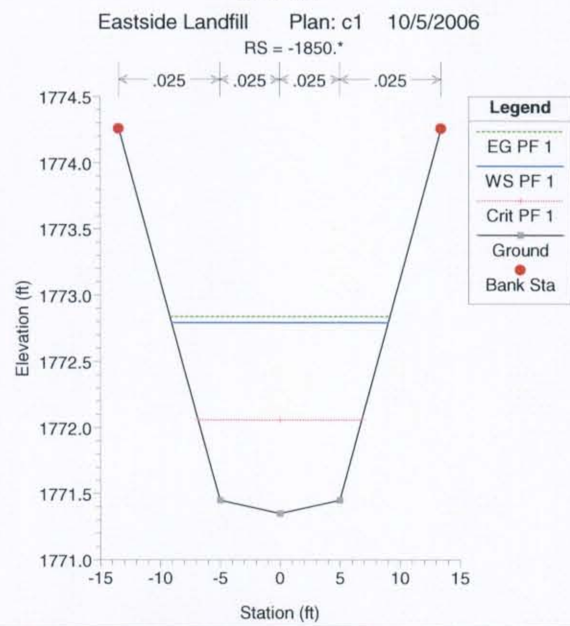
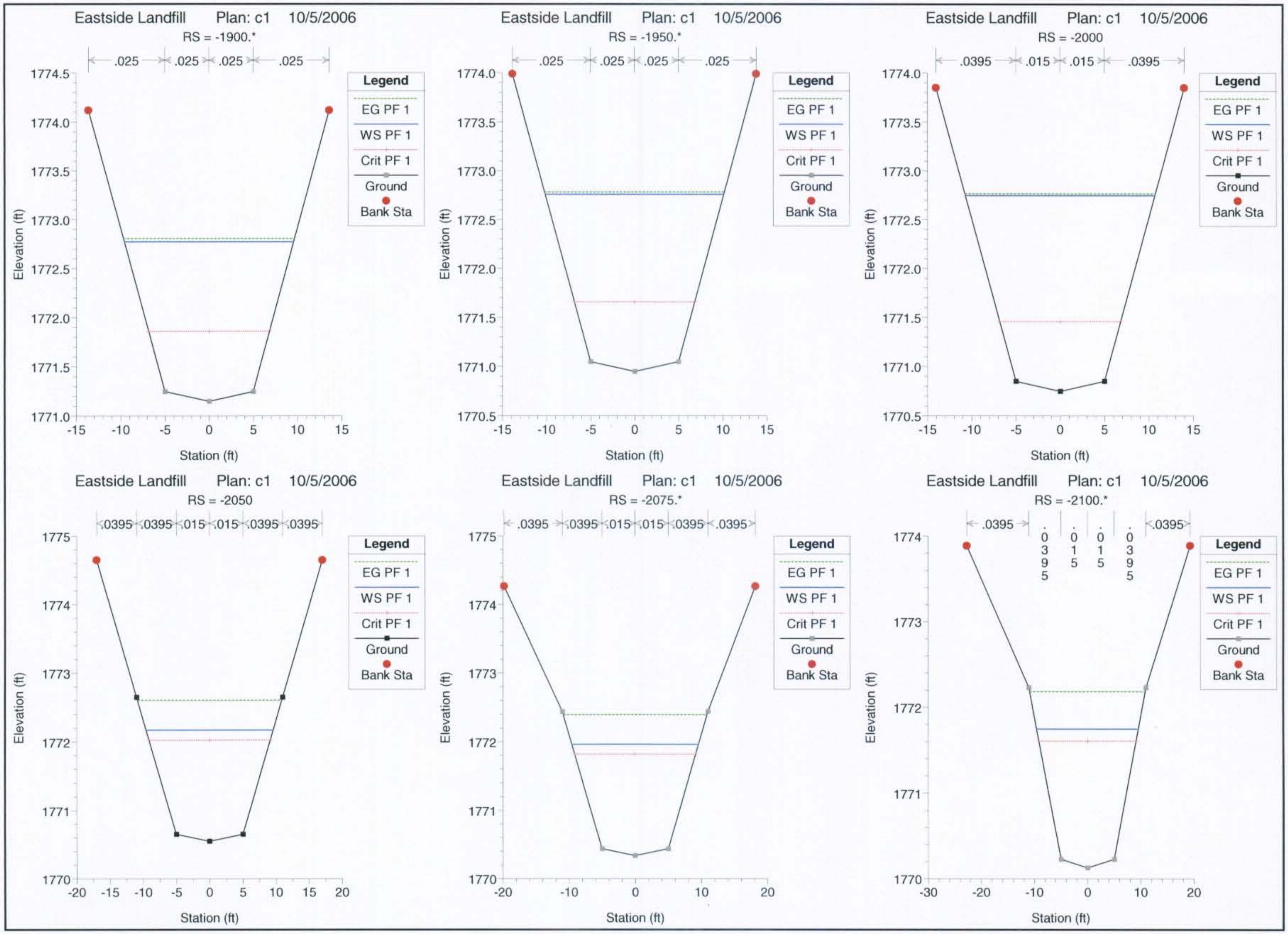
RS = -1650.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
-15 -10 -5 0 5 10 15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -1700.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
1771.5
-15 -10 -5 0 5 10 15
Station (ft)

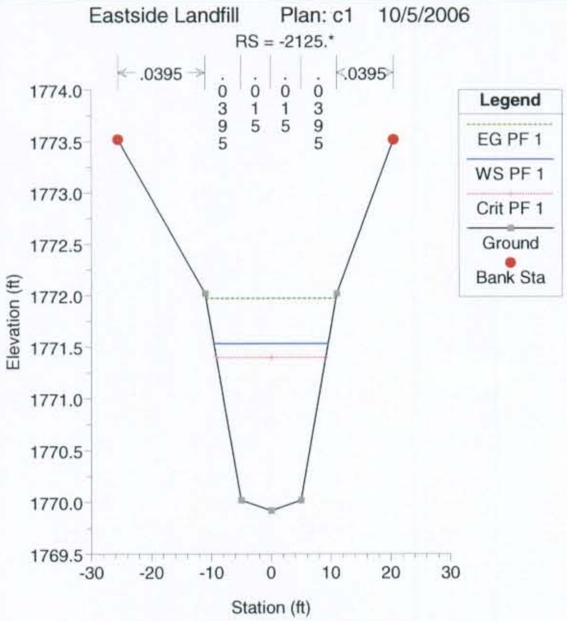

Eastside Landfill Plan: c1 10/5/2006
RS = -1750.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1775.0
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
1771.5
-15 -10 -5 0 5 10 15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -1800.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
1771.5
-15 -10 -5 0 5 10 15
Station (ft)

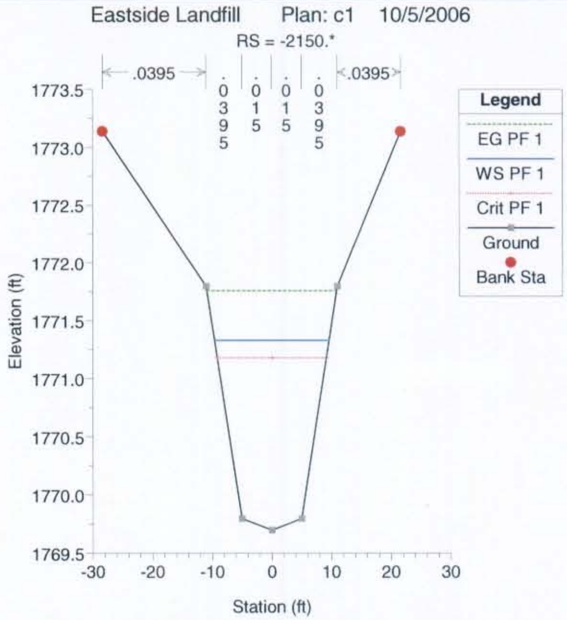

Eastside Landfill Plan: c1 10/5/2006
RS = -1850.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1774.5
1774.0
1773.5
1773.0
1772.5
1772.0
1771.5
1771.0
-15 -10 -5 0 5 10 15
Station (ft)



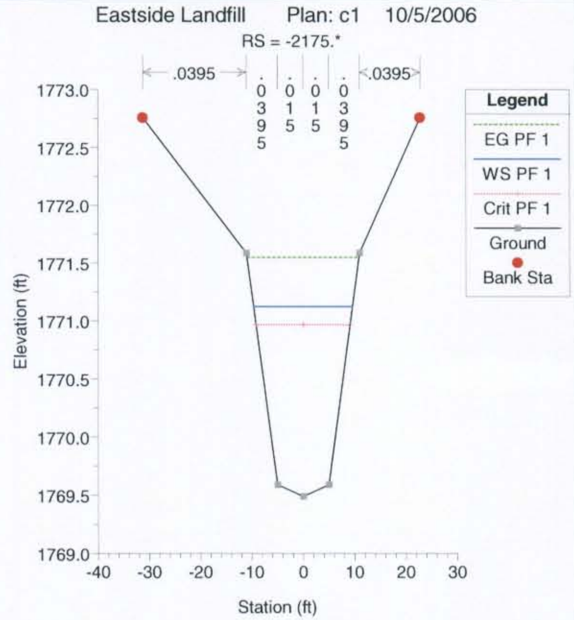
Eastside Landfill Plan: c1 10/5/2006
RS = -1900.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -1950.*
.025 .025 .025 .025
Eastside Landfill Plan: c1 10/5/2006
RS = -2000
.0395 .015 .015 .0395
Eastside Landfill Plan: c1 10/5/2006
RS = -2050
.0395 .0395 .015 .015 .0395 .0395
Eastside Landfill Plan: c1 10/5/2006
RS = -2075.*
.0395 .0395 .015 .015 .0395 .0395
Eastside Landfill Plan: c1 10/5/2006
RS = -2100.*
.0395 .0395 .015 .015 .0395 .0395



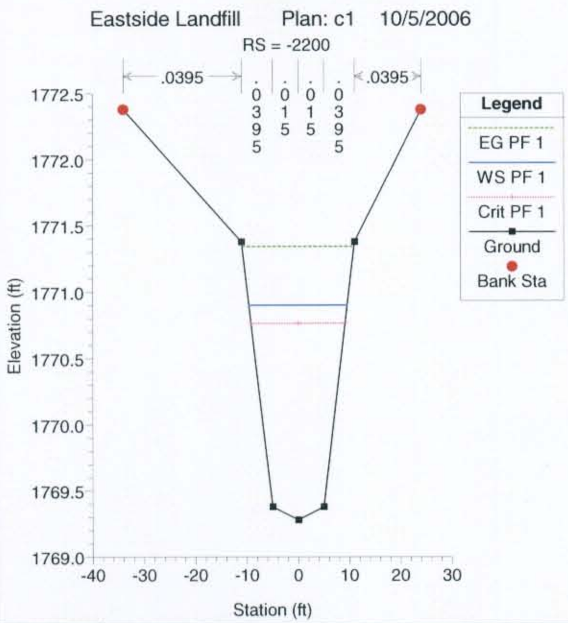
Eastside Landfill Plan: c1 10/5/2006
RS = -2125.*
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)



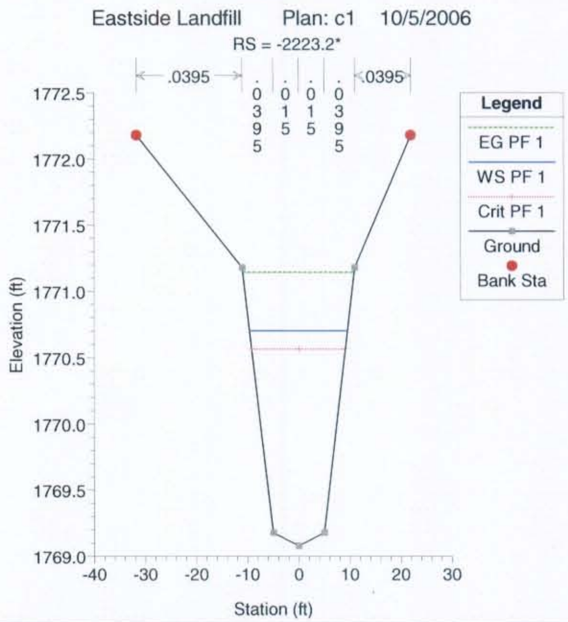
Eastside Landfill Plan: c1 10/5/2006
RS = -2150.*
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)



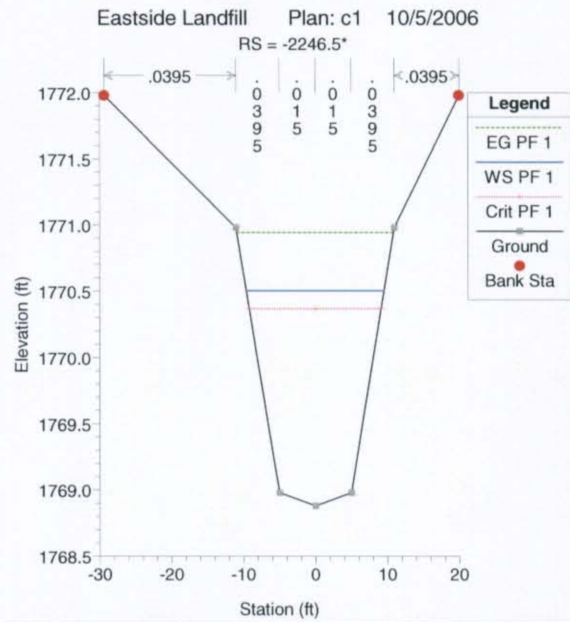
Eastside Landfill Plan: c1 10/5/2006
RS = -2175.*
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)



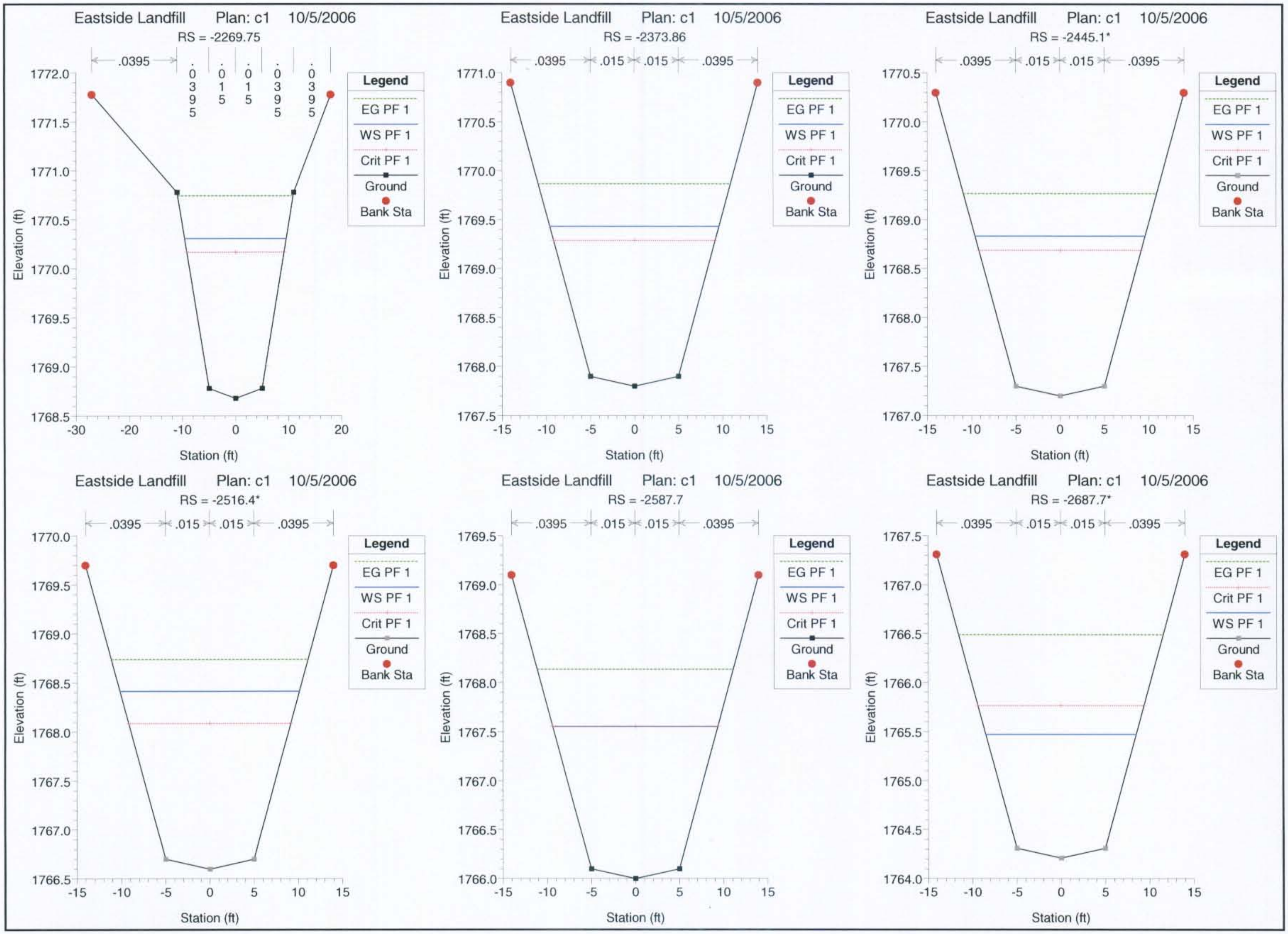
Eastside Landfill Plan: c1 10/5/2006
RS = -2200
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

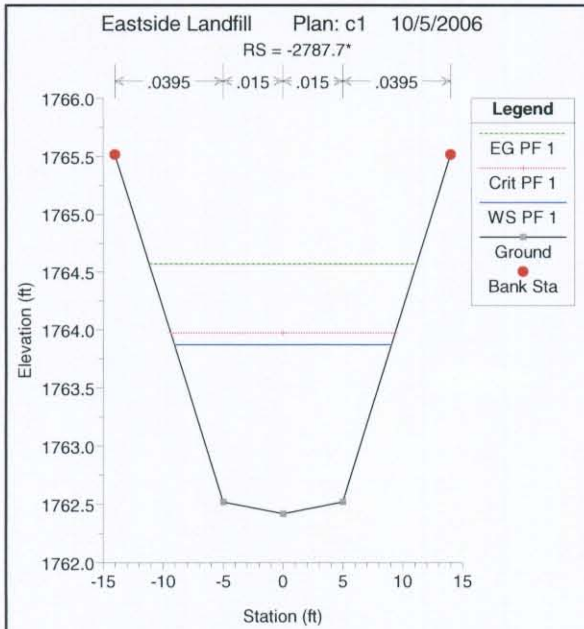


Eastside Landfill Plan: c1 10/5/2006
RS = -2223.2*
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)



Eastside Landfill Plan: c1 10/5/2006
RS = -2246.5*
.0395
.0395
.0395
.015
.015
.0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -2269.75
.0395
.0395 .015 .015 .0395 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -2373.86
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -2445.1*
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -2516.4*
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -2587.7
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -2687.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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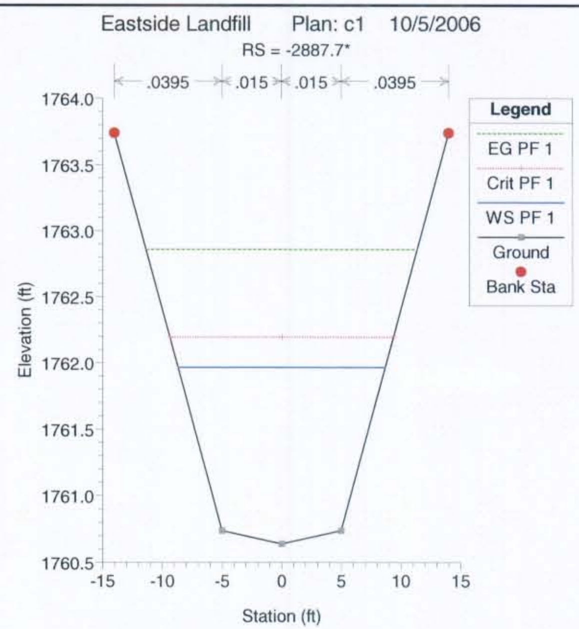
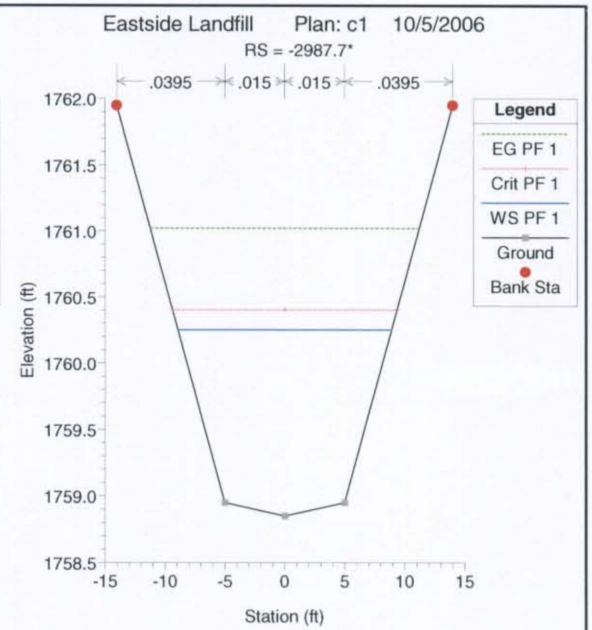
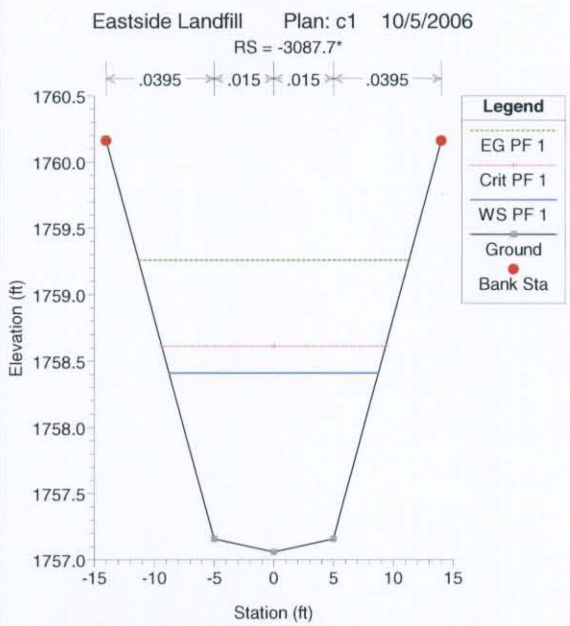
RS = -2787.7*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1766.0
1765.5
1765.0
1764.5
1764.0
1763.5
1763.0
1762.5
1762.0
-15
-10
-5
0
5
10
15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -2887.7*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1764.0
1763.5
1763.0
1762.5
1762.0
1761.5
1761.0
1760.5
-15
-10
-5
0
5
10
15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -2987.7*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1762.0
1761.5
1761.0
1760.5
1760.0
1759.5
1759.0
1758.5
-15
-10
-5
0
5
10
15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -3087.7*
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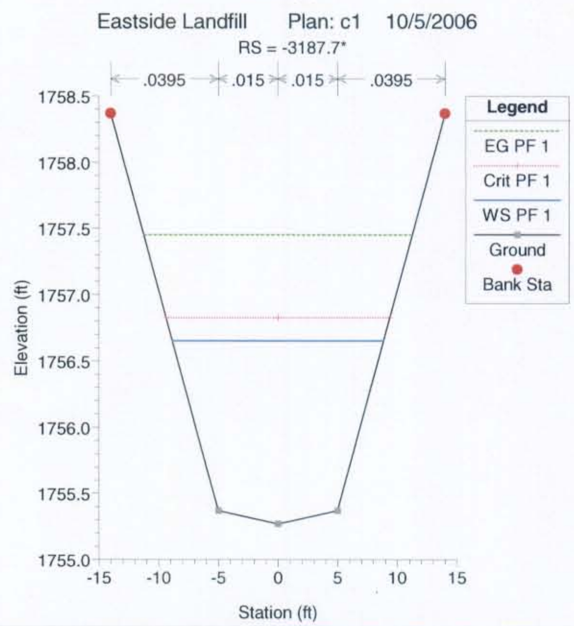
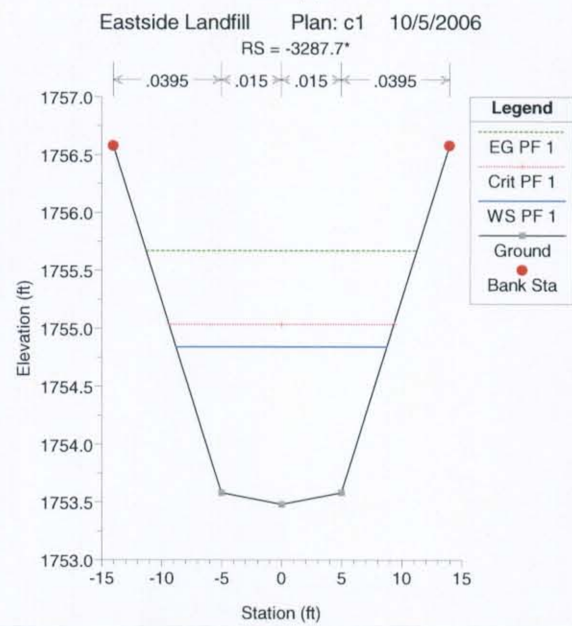
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1760.5
1760.0
1759.5
1759.0
1758.5
1758.0
1757.5
1757.0
-15
-10
-5
0
5
10
15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -3187.7*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1758.5
1758.0
1757.5
1757.0
1756.5
1756.0
1755.5
1755.0
-15
-10
-5
0
5
10
15
Station (ft)


Eastside Landfill Plan: c1 10/5/2006
RS = -3287.7*
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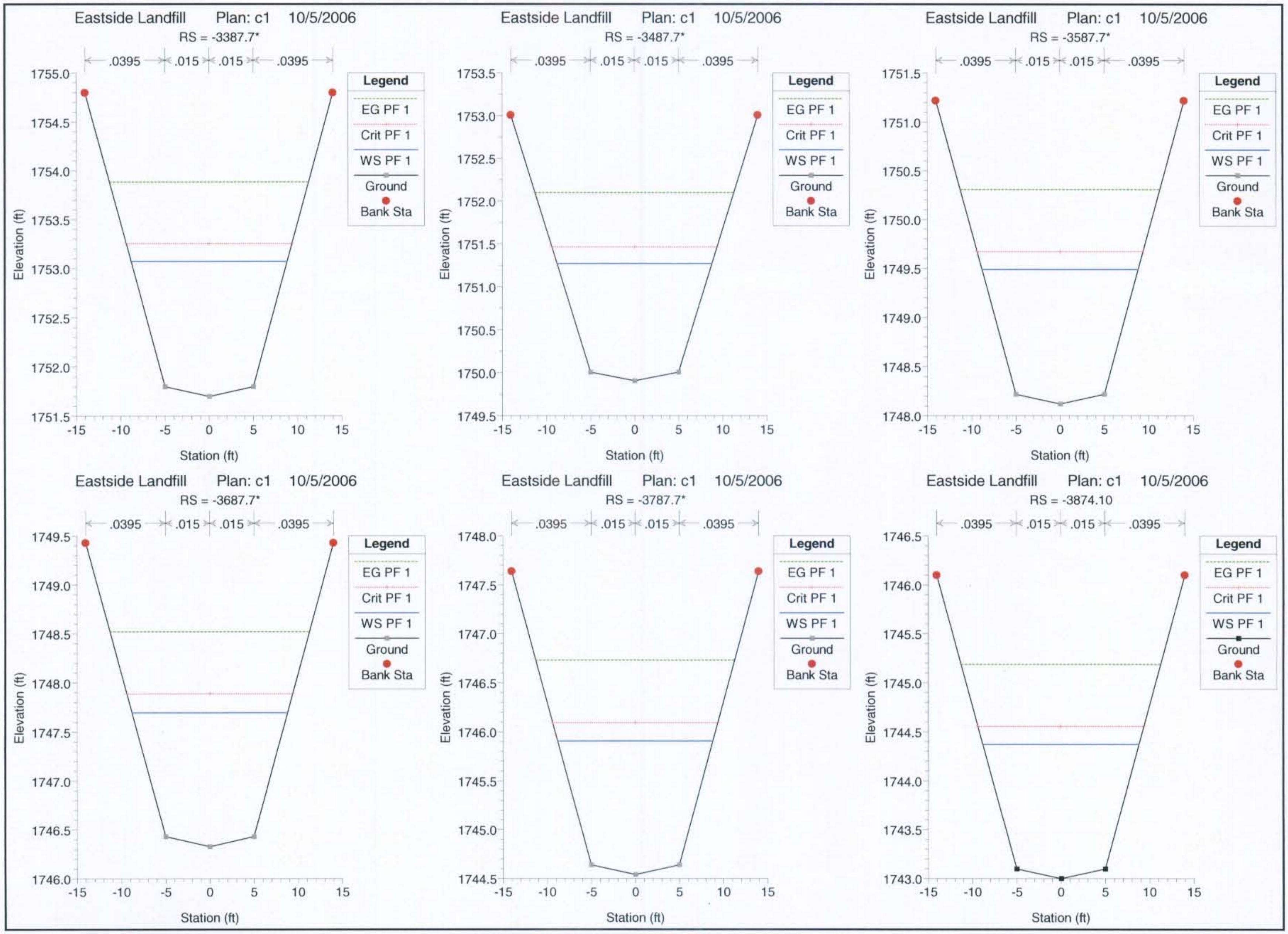
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1757.0
1756.5
1756.0
1755.5
1755.0
1754.5
1754.0
1753.5
1753.0
-15
-10
-5
0
5
10
15
Station (ft)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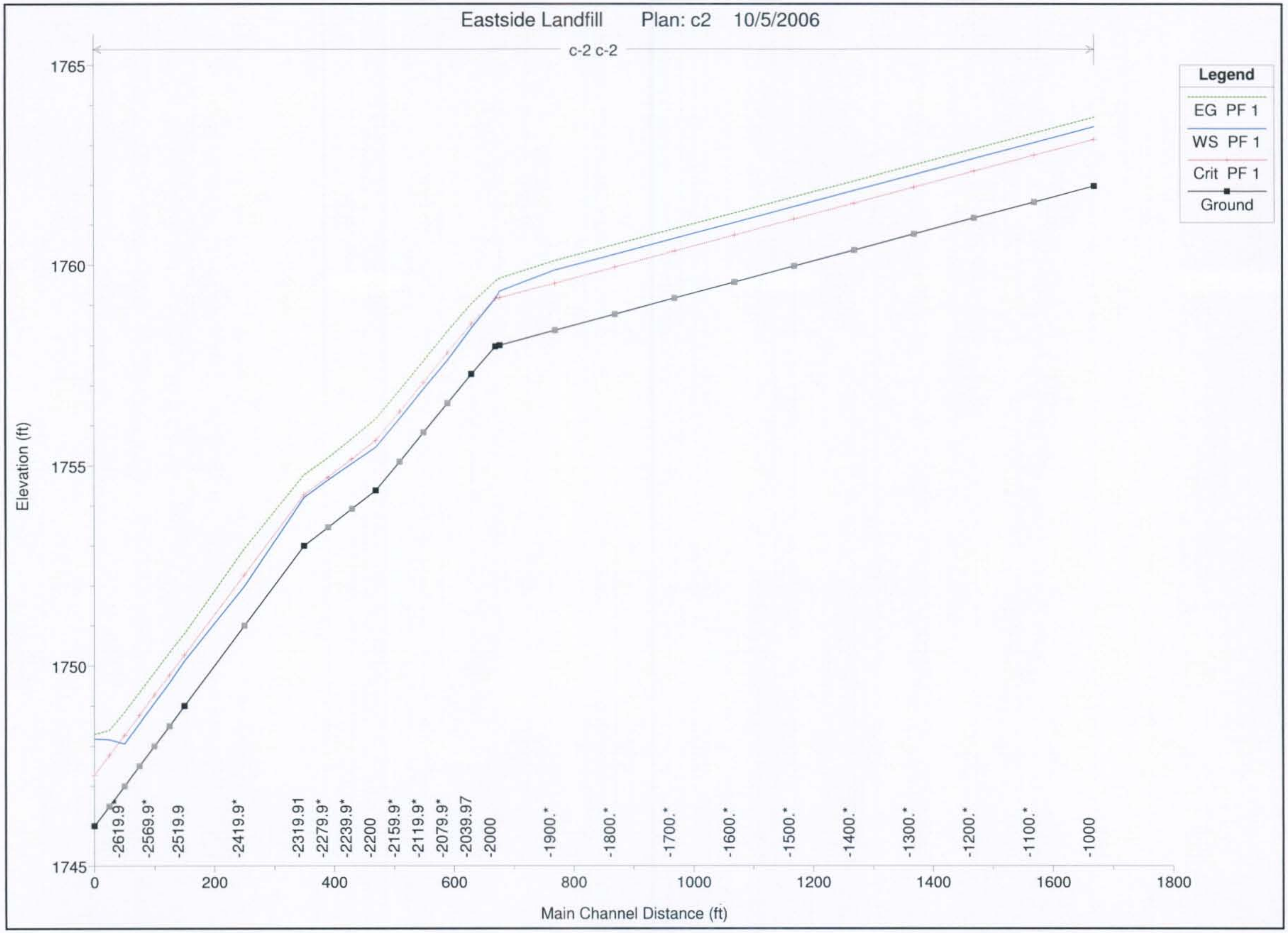
RS = -3387.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1755.0 1754.5 1754.0 1753.5 1753.0 1752.5 1752.0 1751.5
-15 -10 -5 0 5 10 15
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -3487.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1753.5 1753.0 1752.5 1752.0 1751.5 1751.0 1750.5 1750.0 1749.5
-15 -10 -5 0 5 10 15
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -3587.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1751.5 1751.0 1750.5 1750.0 1749.5 1749.0 1748.5 1748.0
-15 -10 -5 0 5 10 15
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -3687.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1749.5 1749.0 1748.5 1748.0 1747.5 1747.0 1746.5 1746.0
-15 -10 -5 0 5 10 15
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -3787.7*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1748.0 1747.5 1747.0 1746.5 1746.0 1745.5 1745.0 1744.5
-15 -10 -5 0 5 10 15
Station (ft)
Eastside Landfill Plan: c1 10/5/2006
RS = -3874.10
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1746.5 1746.0 1745.5 1745.0 1744.5 1744.0 1743.5 1743.0
-15 -10 -5 0 5 10 15
Station (ft)

An electronic copy of the HEC-RAS Report is provided in Appendix F.

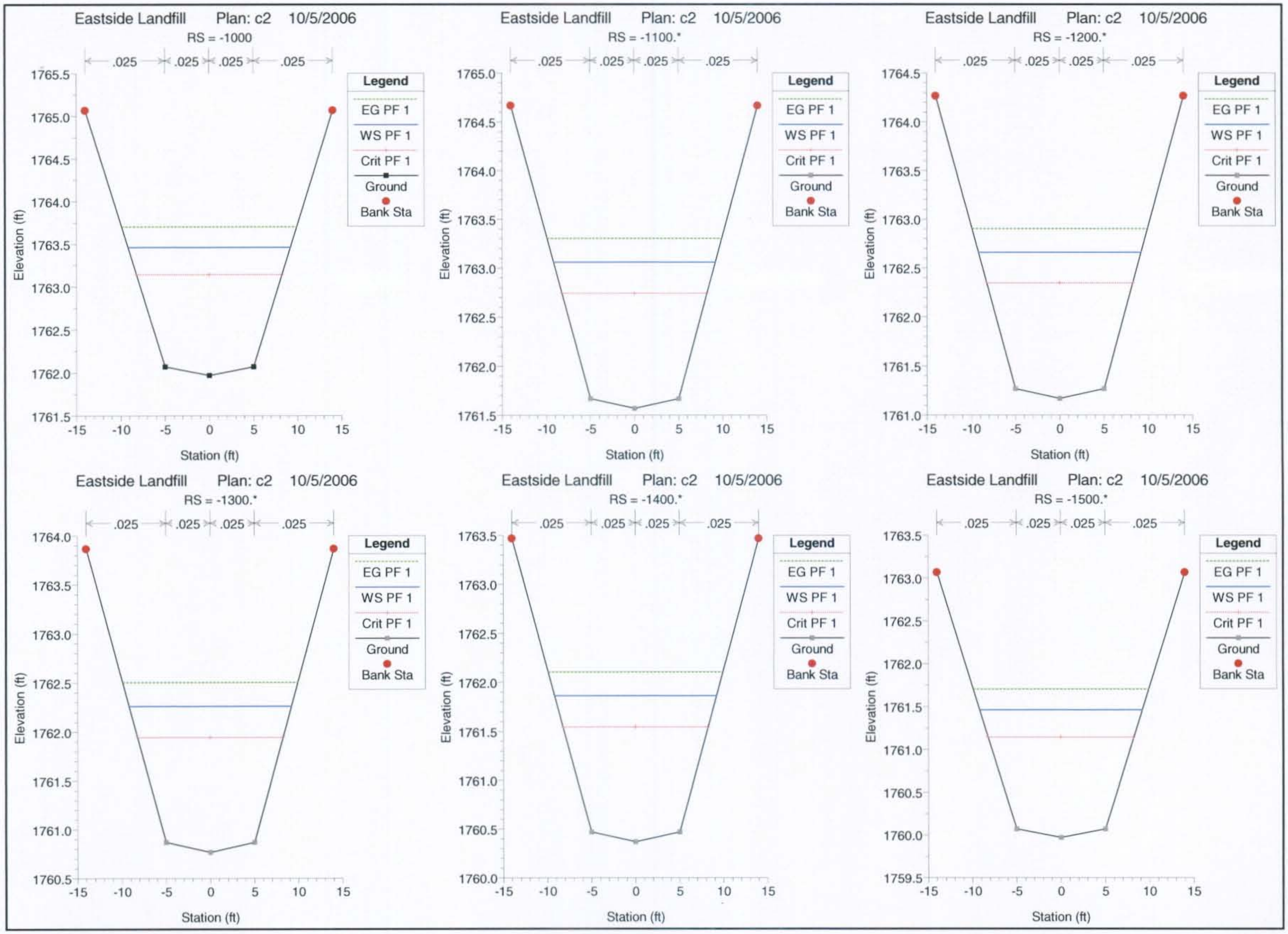
Appendix C-3: HEC-RAS Model for Channel C-2

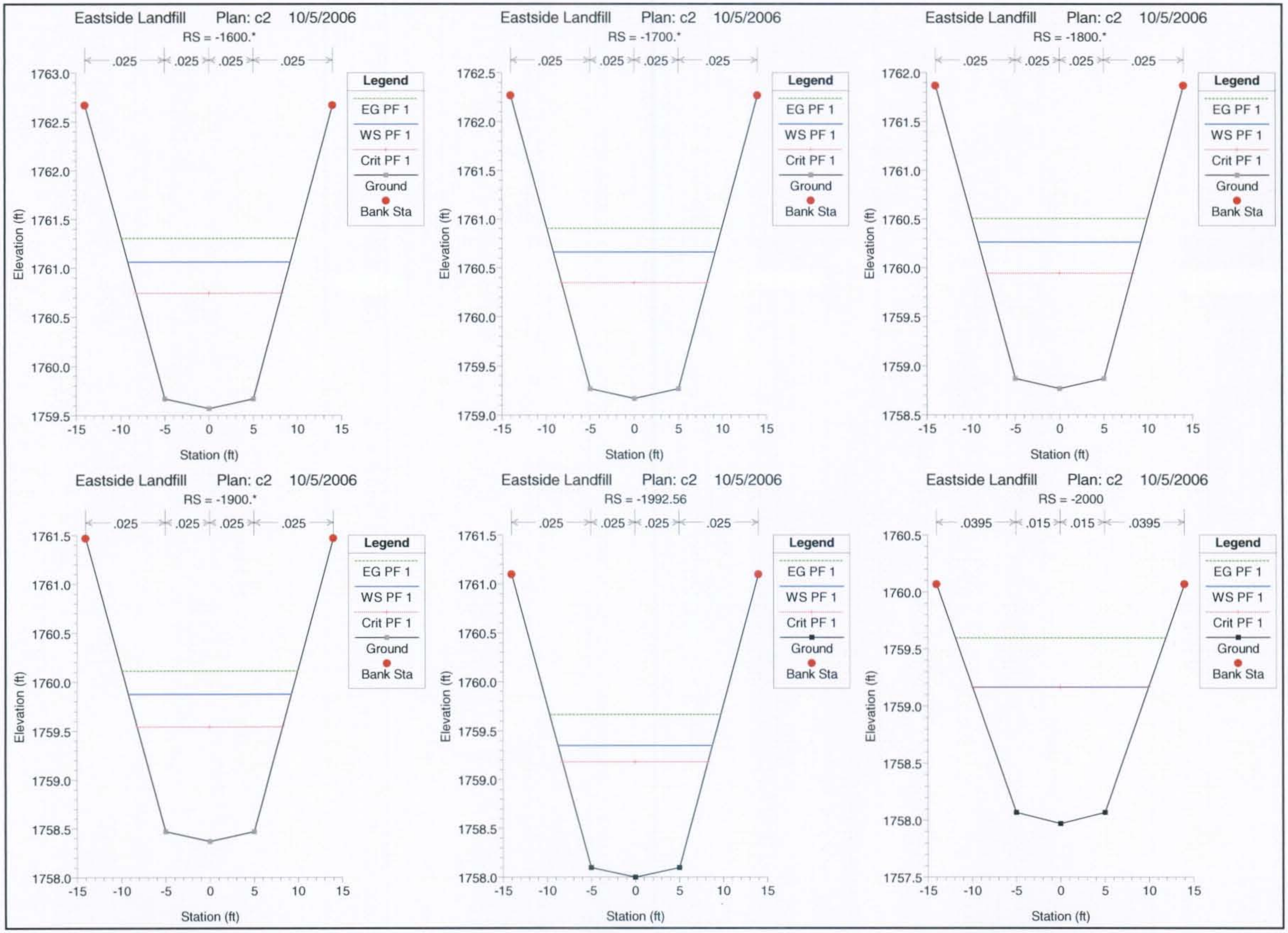


Eastside Landfill Plan: c2 10/5/2006
c-2 c-2
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
1765
1760
1755
1750
1745
-2619.9*
-2569.9*
-2519.9
-2419.9*
-2319.91
-2279.9*
-2239.9*
-2200
-2159.9*
-2119.9*
-2079.9*
-2039.97
-2000
-1900.*
-1800.*
-1700.*
-1600.*
-1500.*
-1400.*
-1300.*
-1200.*
-1100.*
-1000
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)

HEC-RAS Plan: c2 River: c-2 Reach: c-2 Profile: PF 1

Reach	River Sta	Profile	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	Max Chl Dpth	Frctn Slope
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft/ft)
c-2	-1000	PF 1	80.00	1761.97	1763.46	1763.15	1763.71	0.003999	3.95	20.26	18.36	0.66	1.49	0.004000
c-2	-1100.*	PF 1	80.00	1761.57	1763.06	1762.75	1763.31	0.004000	3.95	20.26	18.36	0.66	1.49	0.004000
c-2	-1200.*	PF 1	80.00	1761.17	1762.66	1762.35	1762.91	0.004001	3.95	20.26	18.36	0.66	1.49	0.004001
c-2	-1300.*	PF 1	80.00	1760.77	1762.26	1761.95	1762.51	0.004001	3.95	20.26	18.36	0.66	1.49	0.004001
c-2	-1400.*	PF 1	80.00	1760.37	1761.86	1761.55	1762.11	0.004001	3.95	20.26	18.36	0.66	1.49	0.004000
c-2	-1500.*	PF 1	80.00	1759.97	1761.46	1761.15	1761.71	0.003999	3.95	20.26	18.36	0.66	1.49	0.004000
c-2	-1600.*	PF 1	80.00	1759.57	1761.06	1760.75	1761.31	0.004000	3.95	20.26	18.36	0.66	1.49	0.004000
c-2	-1700.*	PF 1	80.00	1759.17	1760.66	1760.35	1760.91	0.004001	3.95	20.26	18.36	0.66	1.49	0.003989
c-2	-1800.*	PF 1	80.00	1758.77	1760.27	1759.95	1760.51	0.003977	3.94	20.30	18.37	0.66	1.50	0.003925
c-2	-1900.*	PF 1	80.00	1758.37	1759.88	1759.55	1760.11	0.003874	3.90	20.49	18.44	0.65	1.51	0.004716
c-2	-1992.56	PF 1	80.00	1758.00	1759.35	1759.18	1759.67	0.005867	4.52	17.71	17.51	0.79	1.35	0.008603
c-2	-2000	PF 1	89.00	1757.97	1759.17	1759.17	1759.60	0.013101	5.27	16.88	19.87	1.01	1.20	0.012058
c-2	-2039.97	PF 1	89.00	1757.28	1758.43	1758.53	1759.03	0.014778	6.23	14.28	16.29	1.17	1.15	0.013814
c-2	-2079.9*	PF 1	89.00	1756.56	1757.63	1757.81	1758.36	0.018603	6.83	13.03	15.82	1.33	1.07	0.016526
c-2	-2119.9*	PF 1	89.00	1755.83	1756.92	1757.08	1757.61	0.017629	6.69	13.31	15.93	1.29	1.09	0.018106
c-2	-2159.9*	PF 1	89.00	1755.10	1756.18	1756.35	1756.89	0.018146	6.77	13.16	15.87	1.31	1.08	0.017885
c-2	-2200	PF 1	89.00	1754.38	1755.46	1755.63	1756.17	0.017906	6.73	13.23	15.90	1.30	1.08	0.018026
c-2	-2239.9*	PF 1	89.00	1753.92	1755.06	1755.17	1755.67	0.015100	6.29	14.16	16.25	1.19	1.14	0.013937
c-2	-2279.9*	PF 1	89.00	1753.46	1754.64	1754.72	1755.20	0.013337	5.99	14.87	16.50	1.11	1.18	0.012804
c-2	-2319.91	PF 1	92.00	1753.00	1754.21	1754.28	1754.77	0.013470	6.05	15.21	16.63	1.11	1.20	0.012170
c-2	-2419.9*	PF 1	92.00	1751.00	1751.99	1752.28	1752.93	0.025420	7.79	11.81	15.35	1.56	0.99	0.018045
c-2	-2519.9	PF 1	92.00	1749.00	1750.13	1750.28	1750.81	0.016885	6.62	13.90	16.15	1.26	1.12	0.020503
c-2	-2544.9*	PF 1	92.00	1748.50	1749.58	1749.78	1750.34	0.019368	6.99	13.16	15.87	1.35	1.08	0.018063
c-2	-2569.9*	PF 1	92.00	1748.00	1749.07	1749.28	1749.84	0.019636	7.03	13.09	15.85	1.36	1.07	0.019502
c-2	-2594.9*	PF 1	92.00	1747.50	1748.57	1748.78	1749.34	0.019761	7.05	13.06	15.83	1.37	1.07	0.019698
c-2	-2619.9*	PF 1	92.00	1747.00	1748.06	1748.28	1748.85	0.020254	7.12	12.93	15.78	1.39	1.06	0.020005
c-2	-2644.9*	PF 1	92.00	1746.50	1748.17	1747.78	1748.41	0.004515	3.91	23.55	19.41	0.63	1.67	0.002647
c-2	-2669.88	PF 1	92.00	1746.00	1748.19	1747.28	1748.30	0.001737	2.67	34.50	22.54	0.38	2.19	


Eastside Landfill Plan: c2 10/5/2006
RS = -1000
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -1100.*
Eastside Landfill Plan: c2 10/5/2006
RS = -1200.*
Eastside Landfill Plan: c2 10/5/2006
RS = -1300.*
Eastside Landfill Plan: c2 10/5/2006
RS = -1400.*
Eastside Landfill Plan: c2 10/5/2006
RS = -1500.*


Eastside Landfill Plan: c2 10/5/2006
RS = -1600.*
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1763.0
1762.5
1762.0
1761.5
1761.0
1760.5
1760.0
1759.5
Station (ft)
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c2 10/5/2006
RS = -1700.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1762.5
1762.0
1761.5
1761.0
1760.5
1760.0
1759.5
1759.0
Station (ft)
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c2 10/5/2006
RS = -1800.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1762.0
1761.5
1761.0
1760.5
1760.0
1759.5
1759.0
1758.5
Station (ft)
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c2 10/5/2006
RS = -1900.*
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1761.5
1761.0
1760.5
1760.0
1759.5
1759.0
1758.5
1758.0
Station (ft)
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c2 10/5/2006
RS = -1992.56
.025 .025 .025 .025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1761.5
1761.0
1760.5
1760.0
1759.5
1759.0
1758.5
1758.0
Station (ft)
-15 -10 -5 0 5 10 15
Eastside Landfill Plan: c2 10/5/2006
RS = -2000
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
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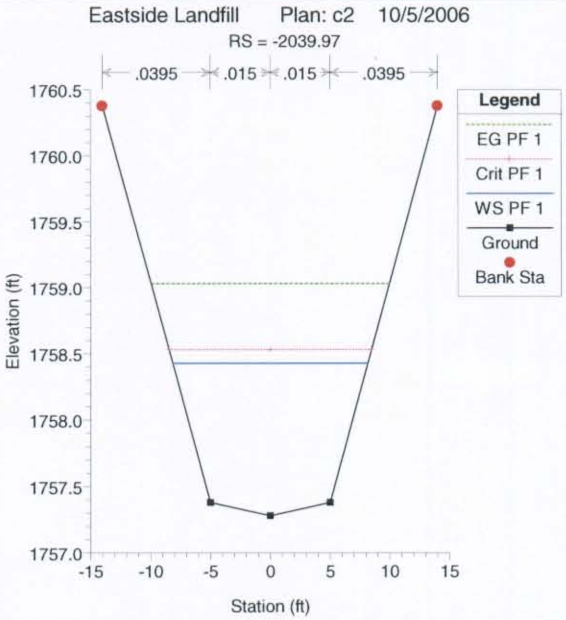
1759.5
1759.0
1758.5
1758.0
1757.5
Station (ft)
-15 -10 -5 0 5 10 15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.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1760.5
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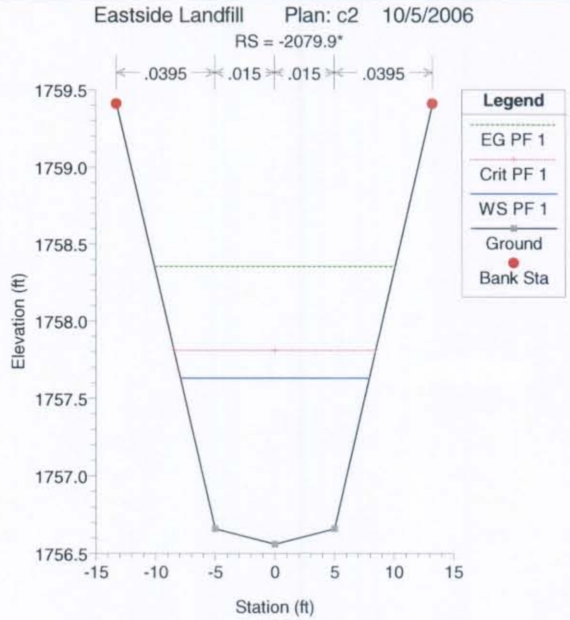
1759.5
1759.0
1758.5
1758.0
1757.5
1757.0
-15 -10 -5 0 5 10 15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RS = -2079.9*
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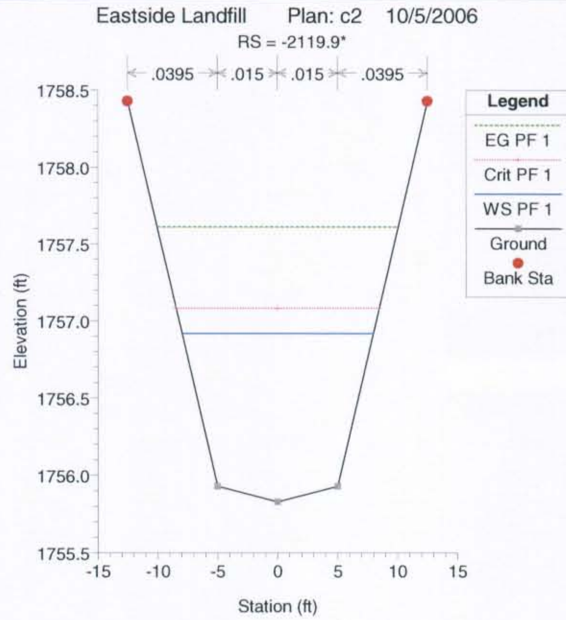
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1759.5
1759.0
1758.5
1758.0
1757.5
1757.0
1756.5
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c2 10/5/2006
RS = -2119.9*
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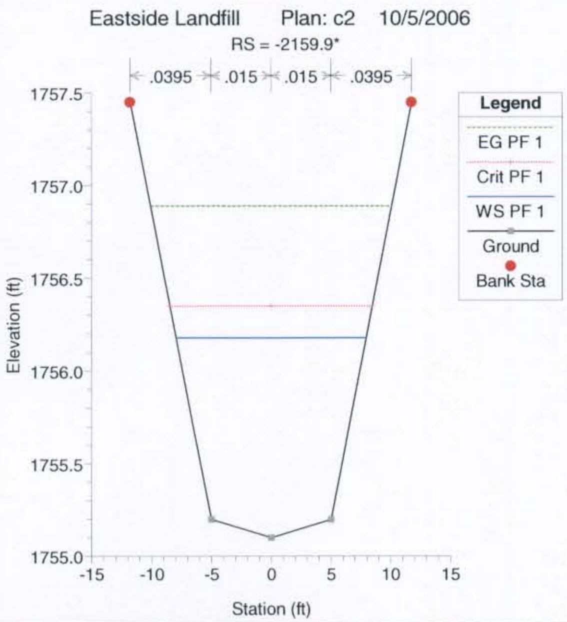
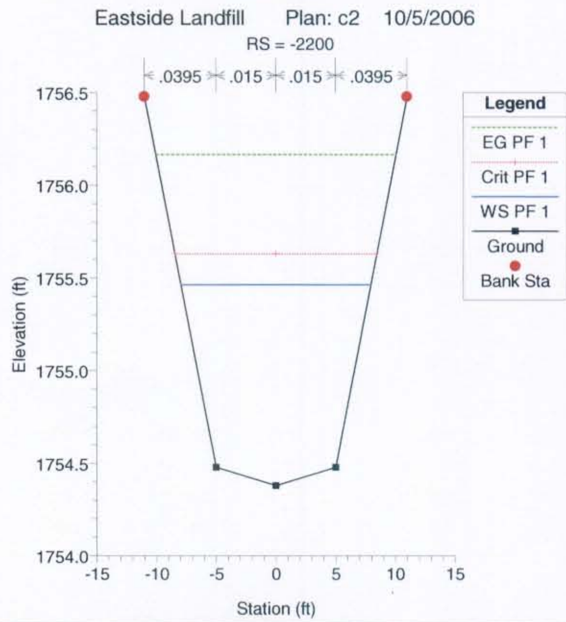
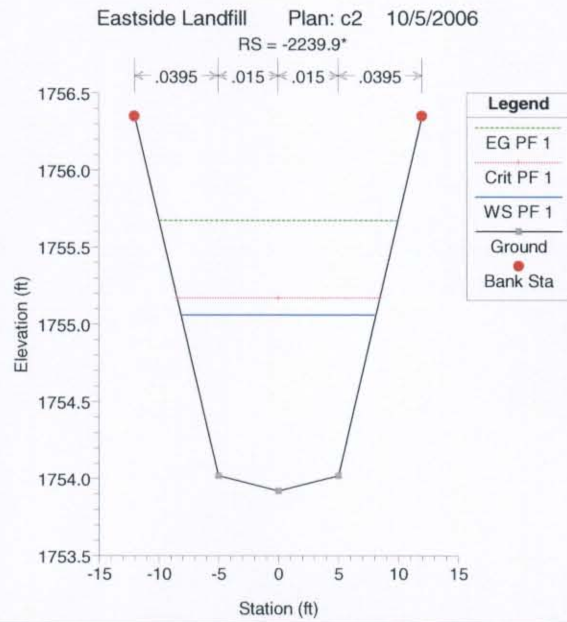
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1758.5
1758.0
1757.5
1757.0
1756.5
1756.0
1755.5
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c2 10/5/2006
RS = -2159.9*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1757.5
1757.0
1756.5
1756.0
1755.5
1755.0
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c2 10/5/2006
RS = -2200
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1756.5
1756.0
1755.5
1755.0
1754.5
1754.0
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c2 10/5/2006
RS = -2239.9*
.0395
.015
.015
.0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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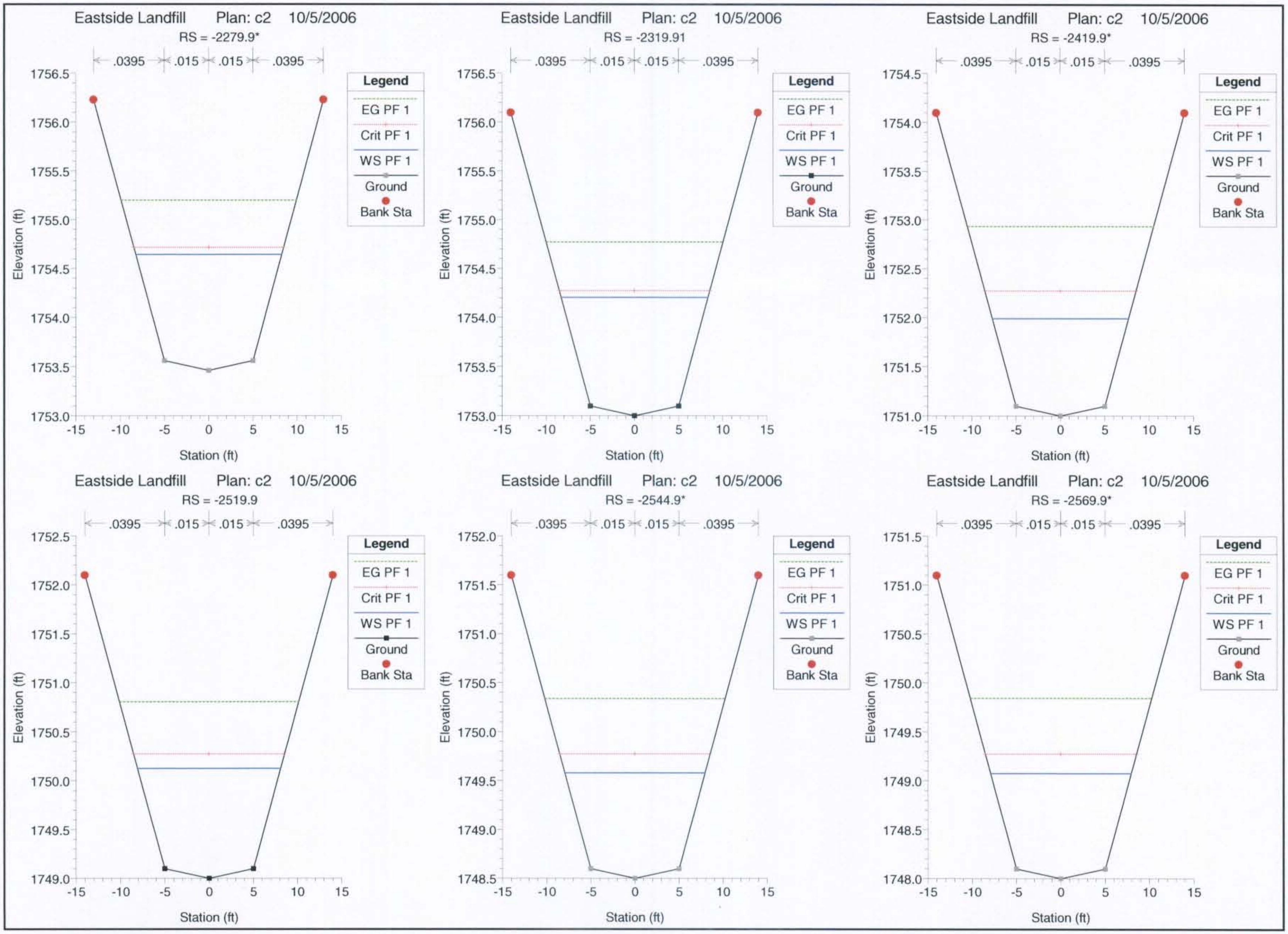
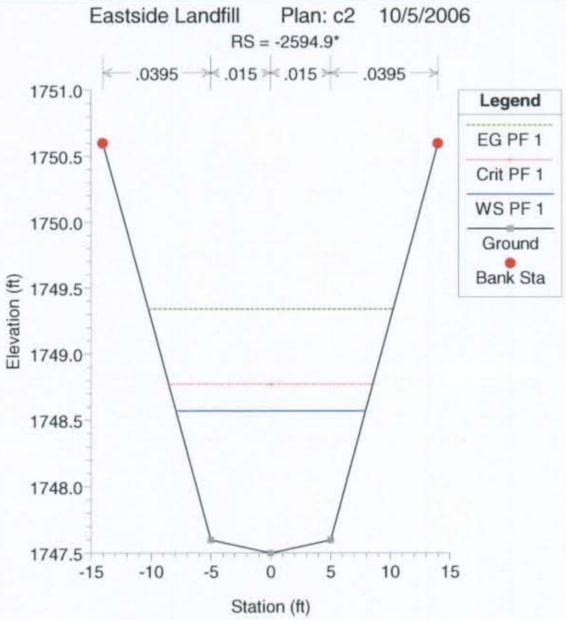
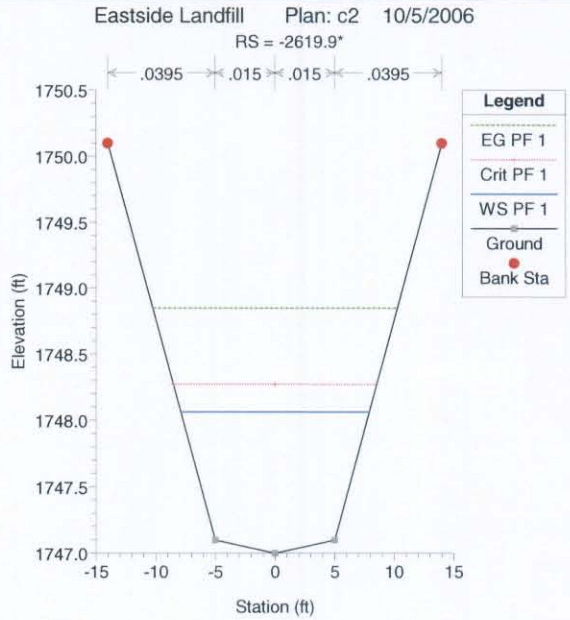
1756.0
1755.5
1755.0
1754.5
1754.0
1753.5
-15 -10 -5 0 5 10 15


Eastside Landfill Plan: c2 10/5/2006
RS = -2279.9*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -2319.91
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -2419.9*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -2519.9
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -2544.9*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Eastside Landfill Plan: c2 10/5/2006
RS = -2569.9*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c2 10/5/2006
RS = -2594.9*
.0395 .015 .015 .0395
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c2 10/5/2006
RS = -2619.9*
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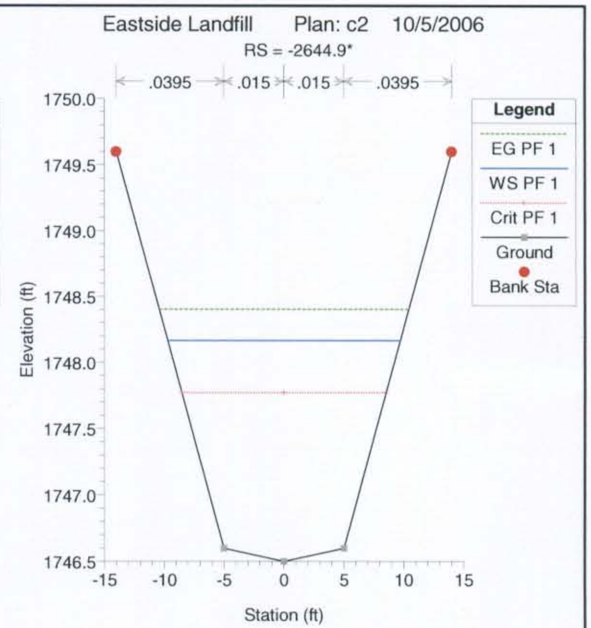
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c2 10/5/2006
RS = -2644.9*
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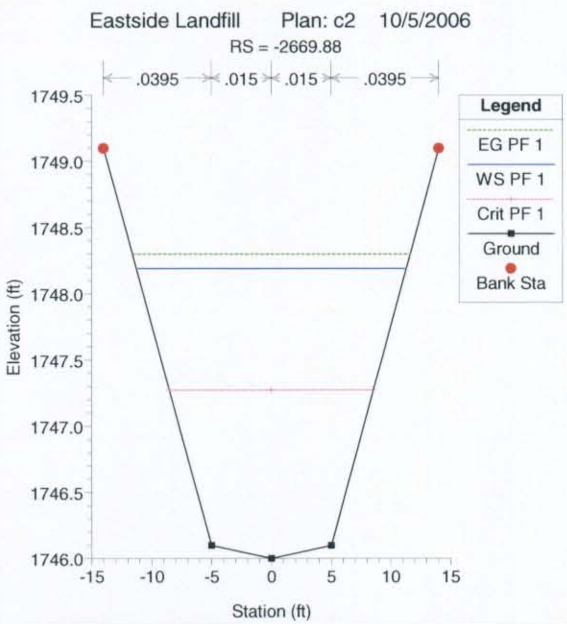
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Eastside Landfill Plan: c2 10/5/2006
RS = -2669.88
.0395 .015 .015 .0395
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

An electronic copy of the HEC-RAS Report is provided in Appendix F.

Appendix C-4: Freeboard Calculations for Channel C-1 and C-2

Channel 1 - (HEC-RAS Channel - C1)

Station	Depth of Water(ft)	Velocity (ft/s)	Channel Top Width (ft)	Froude No.	Subcrit/Supercrit	Freeboard (ft)	Super Elevation (ft)	Required Depth (ft)	Minimum Channel Depth (ft)
+1100	0.70	0.39	13.62	0.09	subcritical	1.0	0.00	1.70	3.00
+1110.*	0.74	0.37	13.85	0.08	subcritical	1.0	0.00	1.74	3.00
+1120.*	0.78	0.34	14.09	0.08	subcritical	1.0	0.00	1.78	3.00
+1130.*	0.82	0.32	14.33	0.07	subcritical	1.0	0.00	1.82	3.00
+1140.*	0.86	0.30	14.56	0.07	subcritical	1.0	0.00	1.86	3.00
+1150.*	0.90	0.29	14.80	0.06	subcritical	1.0	0.00	1.90	3.00
+1160.*	0.94	0.27	15.04	0.06	subcritical	1.0	0.00	1.94	3.00
+1170.*	0.98	0.26	15.28	0.05	subcritical	1.0	0.00	1.98	3.00
+1180.*	1.02	0.25	15.52	0.05	subcritical	1.0	0.00	2.02	3.00
+1190.*	1.06	0.23	15.76	0.05	subcritical	1.0	0.00	2.06	3.00
+1200	0.94	3.01	15.02	0.62	subcritical	1.0	0.00	1.94	3.00
+1250.*	0.94	3.01	15.03	0.62	subcritical	1.0	0.00	1.94	3.00
+1300.*	0.94	3.01	15.01	0.62	subcritical	1.0	0.00	1.94	3.00
+1350.*	0.94	3.01	15.01	0.62	subcritical	1.0	0.00	1.94	3.00
+1400.*	0.94	3.01	15.02	0.62	subcritical	1.0	0.00	1.94	3.00
+1450.*	0.94	3.01	15.03	0.62	subcritical	1.0	0.00	1.94	3.00
+1500.*	0.94	3.01	15.03	0.62	subcritical	1.0	0.00	1.94	3.00
+1550.*	0.94	3.00	15.03	0.62	subcritical	1.0	0.00	1.94	3.00
+1600.*	0.95	2.96	15.09	0.61	subcritical	1.0	0.00	1.95	3.00
+1650.*	0.98	2.85	15.26	0.58	subcritical	1.0	0.00	1.98	3.00
+1700.*	1.04	2.64	15.61	0.52	subcritical	1.0	0.00	2.04	3.00
+1750.*	1.14	2.33	16.23	0.44	subcritical	1.0	0.00	2.14	3.00
+1800.*	1.28	2.00	17.08	0.36	subcritical	1.0	0.00	2.28	3.00
+1850.*	1.44	1.70	18.07	0.29	subcritical	1.0	0.00	2.44	3.00
+1900.*	1.62	1.46	19.14	0.24	subcritical	1.0	0.00	2.62	3.00
+1950.*	1.81	1.25	20.24	0.19	subcritical	1.0	0.00	2.81	3.00
-2000	2.00	1.09	21.38	0.16	subcritical	1.0	0.00	3.00	3.00
-2050	1.62	5.28	19.15	0.85	subcritical	1.0	0.13	3.12	4.00
-2075.*	1.62	5.29	19.14	0.86	subcritical	1.0	0.13	3.12	4.00
-2100.*	1.62	5.30	19.12	0.86	subcritical	1.0	0.13	3.12	4.00
-2125.*	1.62	5.32	19.09	0.86	subcritical	1.0	0.13	3.12	4.00
-2150.*	1.63	5.25	19.19	0.85	subcritical	1.0	0.13	3.13	4.00
-2175.*	1.64	5.23	19.21	0.84	subcritical	1.0	0.13	3.14	4.00
-2200	1.62	5.33	19.14	0.86	subcritical	1.0	0.13	3.12	4.00
-2223.2*	1.62	5.33	19.14	0.86	subcritical	1.0	0.13	3.12	4.00
-2246.5*	1.63	5.32	19.15	0.86	subcritical	1.0	0.13	3.13	4.00
-2269.75	1.63	5.31	19.17	0.86	subcritical	1.0	0.13	3.13	4.00
-2373.86	1.63	5.30	19.19	0.86	subcritical	1.0	0.13	3.13	4.00
-2446.1*	1.63	5.29	19.20	0.85	subcritical	1.0	0.00	2.63	3.00
-2518.4*	1.82	4.87	20.29	0.7	subcritical	1.0	0.00	2.82	3.00
-2587.7	1.56	6.12	18.73	1.01	supercritical	1.2	0.00	2.74	3.00
-2687.7*	1.28	8.09	16.36	1.46	supercritical	1.2	0.00	2.48	3.00
-2787.7*	1.45	6.71	18.12	1.14	supercritical	1.2	0.00	2.64	3.00
-2887.7*	1.33	7.58	17.38	1.34	supercritical	1.2	0.00	2.54	3.00
-2987.7*	1.40	7.03	17.82	1.21	supercritical	1.2	0.00	2.60	3.00
-3087.7*	1.35	7.40	17.51	1.3	supercritical	1.2	0.00	2.56	3.00
-3187.7*	1.39	7.17	17.70	1.24	supercritical	1.2	0.00	2.58	3.00
-3287.7*	1.36	7.31	17.58	1.28	supercritical	1.2	0.00	2.56	3.00
-3387.7*	1.37	7.23	17.65	1.26	supercritical	1.2	0.00	2.57	3.00
-3487.7*	1.36	7.32	17.57	1.28	supercritical	1.2	0.00	2.56	3.00
-3587.7*	1.37	7.26	17.62	1.26	supercritical	1.2	0.00	2.57	3.00
-3687.7*	1.37	7.29	17.60	1.27	supercritical	1.2	0.00	2.57	3.00
-3787.7*	1.37	7.29	17.60	1.27	supercritical	1.2	0.00	2.57	3.00
-3874.1	1.37	7.25	17.63	1.26	supercritical	1.2	0.00	2.57	3.00

Notes: Super Elevation depths were applied from station -2050.00 through -2373.86 around the channel bend. Concrete/ Riprap material starts at station -2000.00 and continues through station -3874.10.

Subcritical Freeboard: $Fb = 0.5 + V^2/2g$
Supercritical Freeboard: $Fb = 1 + 0.025 {}^{*} V {}^{*} d^{1/3}$
Super Elevation: $Se = CV^2T_w/gr$ (C = 1.0, r = 127ft)
Required Depth = Depth of Flow + Freeboard + Super Elevation

Notes: A minimum of 1ft was added for subcritical freeboard if freeboard was less that 1ft. If subcritical super elevation was less that 0.5ft, 0.5ft was to the total channel depth around channel bends.

Channel 2 - (HEC-RAS Channel - C2)

Station	Depth of Water(ft)	Velocity (ft/s)	Channel Top Width (ft)	Froude No.	Subcrit/Supercrit	Freeboard (ft)	Super Elevation (ft)	Required Depth (ft)	Minimum Channel Depth (ft)
+1000	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1100 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1200 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1300 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1400 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1500 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1600 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1700 *	1.49	3.95	18.36	0.66	subcritical	1.00	0.00	2.49	3.00
+1800 *	1.50	3.94	18.37	0.66	subcritical	1.00	0.00	2.50	3.00
+1900 *	1.51	3.90	18.44	0.65	subcritical	1.00	0.00	2.51	3.00
+1992.56	1.35	4.52	17.51	0.78	subcritical	1.00	0.00	2.35	3.00
-2000	1.20	5.27	19.87	1.01	supercritical	1.14	0.00	2.34	3.00
-2039.97	1.15	6.23	16.29	1.17	supercritical	1.16	0.13	2.44	3.00
-2079.9*	1.07	6.83	15.62	1.33	supercritical	1.17	0.15	2.40	3.00
-2119.9*	1.09	6.69	15.93	1.29	supercritical	1.17	0.15	2.41	3.00
-2159.9*	1.08	6.77	15.87	1.31	supercritical	1.17	0.15	2.40	3.00
-2200	1.08	6.73	15.90	1.3	supercritical	1.17	0.15	2.40	3.00
-2239.9*	1.14	6.29	16.25	1.19	supercritical	1.16	0.13	2.44	3.00
-2279.9*	1.18	5.98	16.50	1.11	supercritical	1.16	0.12	2.46	3.00
-2319.91	1.20	6.05	16.63	1.11	supercritical	1.16	0.13	2.49	3.00
-2419.9*	0.99	7.79	15.35	1.56	supercritical	1.19	0.00	2.18	3.00
-2519.9	1.12	6.62	16.15	1.28	supercritical	1.17	0.00	2.29	3.00
-2544.9*	1.08	6.99	15.87	1.35	supercritical	1.18	0.00	2.26	3.00
-2569.9*	1.07	7.03	15.85	1.36	supercritical	1.18	0.00	2.25	4.00
-2594.9*	1.07	7.05	15.83	1.37	supercritical	1.18	0.00	2.25	4.00
-2619.9*	1.06	7.12	15.78	1.39	supercritical	1.18	0.00	2.24	4.00
-2644.9*	1.67	3.91	19.41	0.63	subcritical	1.00	0.00	2.67	4.00
-2669.88	2.19	2.67	22.54	0.38	subcritical	1.00	0.00	3.19	4.00

Notes: Super Elevation depths were applied from station -2039.97 through -2319.91 around the channel bend. Concrete/ Riprap material starts at station -2000.00 and continues through station -2269.88.

Subcritical Freeboard: $Fb = 0.5 + V^2/2g$
Supercritical Freeboard: $Fb = 1 + 0.025*V*d^{1/3}$
Super Elevation: $Se = CV^2T_w/gr$ (C = 1.0, r = 150ft)
Required Depth = Depth of Flow + Freeboard + Super Elevation

Notes: A minimum of 1ft was added for subcritical freeboard if freeboard was less that 1ft. If subcritical super elevation was less that 0.5ft, 0.5ft was to the total channel depth around channel bends.

Appendix C-5: Channel and other Hydraulic Cross Sections

Worksheet for Cross Section A

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Discharge	40.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	2.50
0+43	0.00
0+87	2.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.50)	(0+87, 2.50)	0.025

Results

Normal Depth	0.68	ft
Elevation Range	0.00 to 2.50 ft	
Flow Area	8.15	ft²
Wetted Perimeter	23.86	ft
Top Width	23.82	ft
Normal Depth	0.68	ft
Critical Depth	0.80	ft
Critical Slope	0.01239	ft/ft
Velocity	4.91	ft/s
Velocity Head	0.37	ft
Specific Energy	1.06	ft
Froude Number	1.48	
Flow Type	Supercritical	

Worksheet for Cross Section A

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.68	ft
Critical Depth	0.80	ft
Channel Slope	0.02850	ft/ft
Critical Slope	0.01239	ft/ft

Cross Section A

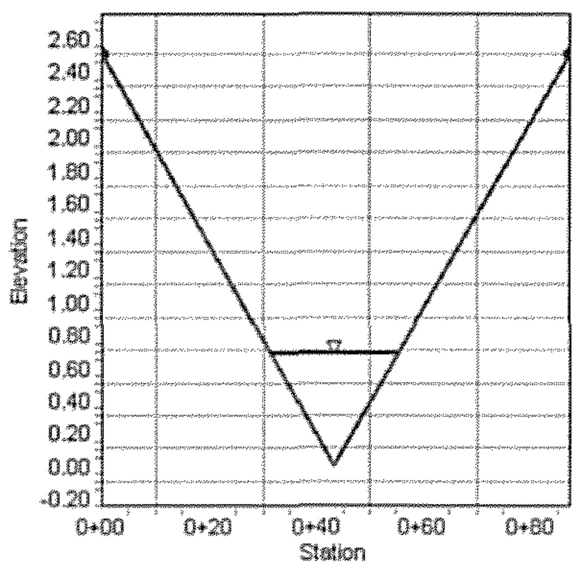
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Normal Depth	0.68	ft
Discharge	40.00	ft³/s

Cross Section Image



Q = 40 cfs = CP-5

Worksheet for Cross Section B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Discharge	13.50	ft^3/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	2.40
0+74	0.00
1+74	2.40

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.40)	(1+74, 2.40)	0.025

Results

Normal Depth	0.35	ft
Elevation Range	0.00 to 2.40 ft	
Flow Area	4.33	ft^2
Wetted Perimeter	25.08	ft
Top Width	25.07	ft
Normal Depth	0.35	ft
Critical Depth	0.39	ft
Critical Slope	0.01576	ft/ft
Velocity	3.11	ft/s
Velocity Head	0.15	ft
Specific Energy	0.50	ft
Froude Number	1.32	
Flow Type	Supercritical	

Worksheet for Cross Section B

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.39	ft
Channel Slope	0.02850	ft/ft
Critical Slope	0.01576	ft/ft

Cross Section B

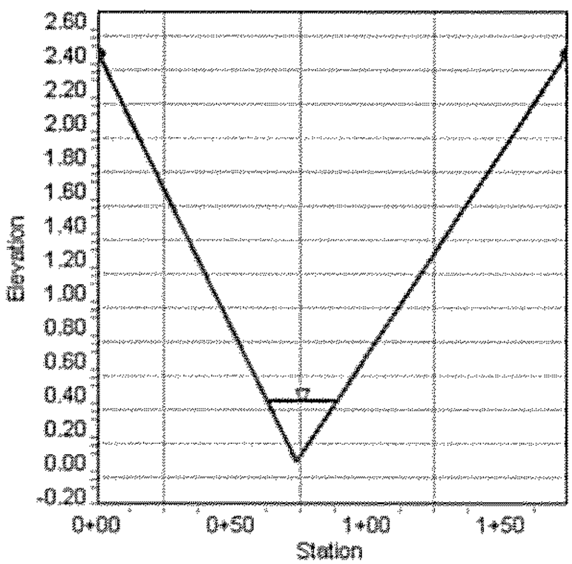
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Normal Depth	0.35	ft
Discharge	13.50	ft^3/s

Cross Section Image



Q = 13.50 cfs = ½ OND 4

Worksheet for Cross Section C

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Discharge	13.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.60
1+10	0.00
1+93	2.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.60)	(1+93, 2.60)	0.025

Results

Normal Depth	0.34	ft
Elevation Range	0.00 to 2.60 ft	
Flow Area	4.36	ft²
Wetted Perimeter	25.46	ft
Top Width	25.45	ft
Normal Depth	0.34	ft
Critical Depth	0.38	ft
Critical Slope	0.01581	ft/ft
Velocity	3.10	ft/s
Velocity Head	0.15	ft
Specific Energy	0.49	ft
Froude Number	1.32	
Flow Type	Supercritical	

Worksheet for Cross Section C

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.38	ft
Channel Slope	0.02850	ft/ft
Critical Slope	0.01581	ft/ft

Cross Section C

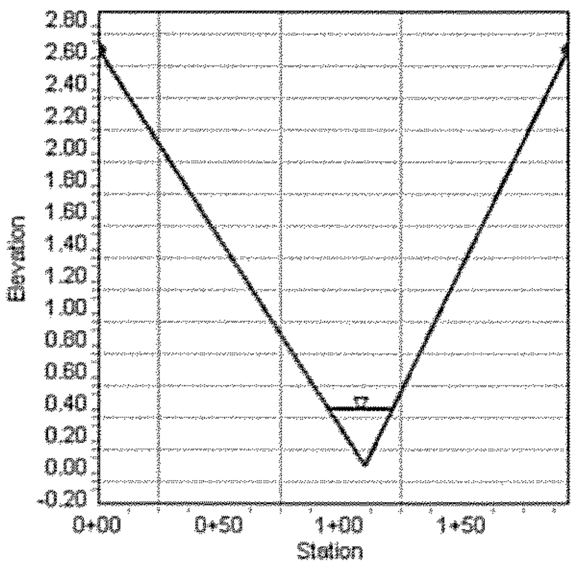
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.85000	%
Normal Depth	0.34	ft
Discharge	13.50	ft³/s

Cross Section Image



Q = 13.50 cfs = ½ OND4

Worksheet for Cross Section D

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00000	%
Discharge	12.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.00
0+35	0.00
0+57	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.00)	(0+57, 1.00)	0.025

Results

Normal Depth	0.44	ft
Elevation Range	0.00 to 1.00 ft	
Flow Area	5.54	ft^2
Wetted Perimeter	25.15	ft
Top Width	25.13	ft
Normal Depth	0.44	ft
Critical Depth	0.41	ft
Critical Slope	0.01551	ft/ft
Velocity	2.17	ft/s
Velocity Head	0.07	ft
Specific Energy	0.51	ft
Froude Number	0.81	
Flow Type	Subcritical	

Worksheet for Cross Section D

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft
Critical Depth	0.41	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.01551	ft/ft

Cross Section D

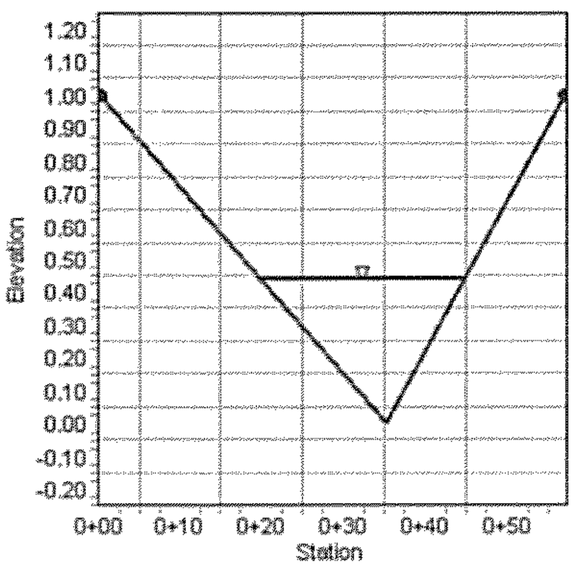
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00000	%
Normal Depth	0.44	ft
Discharge	12.00	ft³/s

Cross Section Image



Q = 12 cfs = OND5

Worksheet for Cross Section E

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00000	%
Discharge	24.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.00
0+51	0.00
0+89	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.00)	(0+89, 1.00)	0.025

Results

Normal Depth	0.48	ft
Elevation Range	0.00 to 1.00 ft	
Flow Area	10.40	ft^2
Wetted Perimeter	43.03	ft
Top Width	43.02	ft
Normal Depth	0.48	ft
Critical Depth	0.45	ft
Critical Slope	0.01500	ft/ft
Velocity	2.31	ft/s
Velocity Head	0.08	ft
Specific Energy	0.57	ft
Froude Number	0.83	
Flow Type	Subcritical	

Worksheet for Cross Section E

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.45	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.01500	ft/ft

Cross Section E

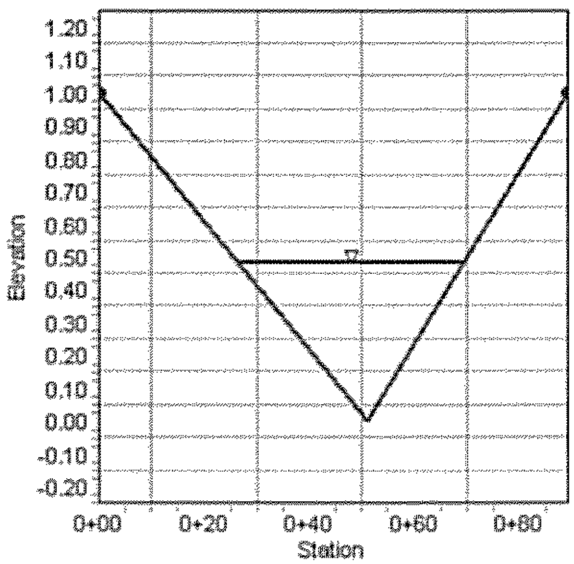
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00000	%
Normal Depth	0.48	ft
Discharge	24.00	ft³/s

Cross Section Image



Q = 24 cfs = ONDII

Worksheet for Cross Section F

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Discharge	12.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	2.30
0+25	0.49
0+48	0.00
0+73	0.00
0+80	2.30

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 2.30)	(0+80, 2.30)	0.025

Results

Normal Depth	0.27	ft
Elevation Range	0.00 to 2.30 ft	
Flow Area	8.65	ft^2
Wetted Perimeter	38.63	ft
Top Width	38.58	ft
Normal Depth	0.27	ft
Critical Depth	0.18	ft
Critical Slope	0.01690	ft/ft
Velocity	1.39	ft/s
Velocity Head	0.03	ft
Specific Energy	0.30	ft
Froude Number	0.52	
Flow Type	Subcritical	

Worksheet for Cross Section F

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.27	ft
Critical Depth	0.18	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.01690	ft/ft

Cross Section F

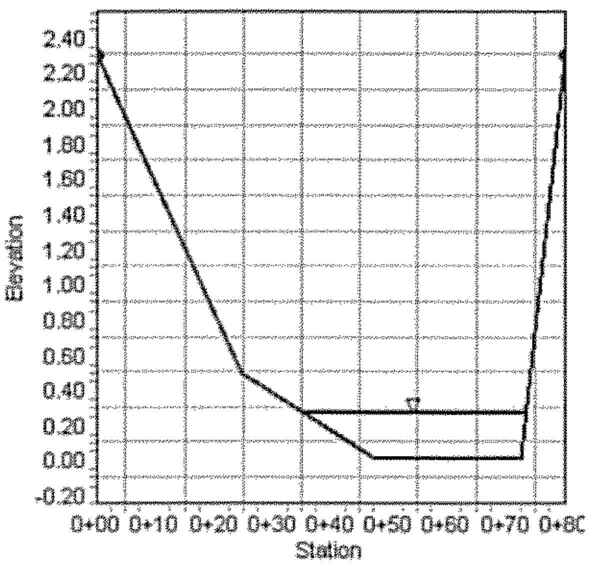
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.27	ft
Discharge	12.00	ft³/s

Cross Section Image



Q = 12 cfs = OND13

$F_b = 0.5 + V^2/2g = 0.5 + \frac{(1.39)^2}{2(32.2)} = 0.53 \quad \therefore F_b = 1\text{ ft}$

Total Depth = 1 + 0.27 = 1.27 ft.

Worksheet for Cross Section G

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Discharge	23.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	3.00
0+09	0.00
0+31	0.00
0+40	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.00)	(0+40, 3.00)	0.025

Results

Normal Depth		0.46	ft
Elevation Range	0.00 to 3.00 ft		
Flow Area		10.73	ft²
Wetted Perimeter		24.90	ft
Top Width		24.75	ft
Normal Depth		0.46	ft
Critical Depth		0.32	ft
Critical Slope		0.01359	ft/ft
Velocity		2.14	ft/s
Velocity Head		0.07	ft
Specific Energy		0.53	ft
Froude Number		0.57	
Flow Type	Subcritical		

Worksheet for Cross Section G

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.32	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.01359	ft/ft

Cross Section G

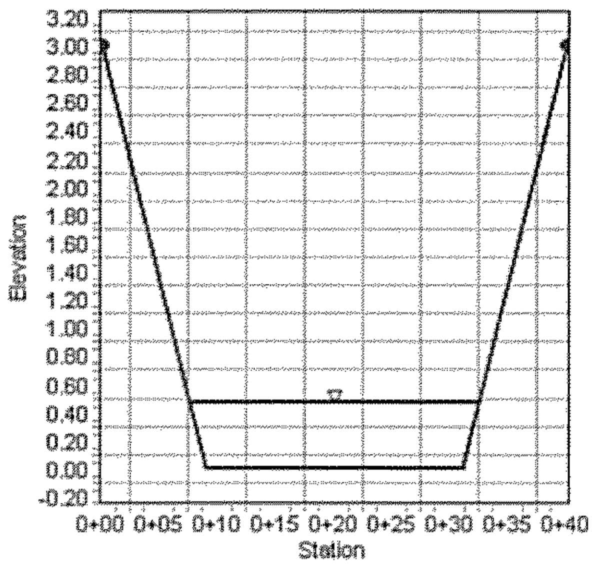
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.46	ft
Discharge	23.00	ft³/s

Cross Section Image



Q = 23 cfs = ONDG

$F_b = 0.5 + V^2/2g = 0.5 + \frac{(2.14)^2}{2(32.2)} = 0.57$ ft $\therefore F_b = 1$ ft

Total Depth = 1 + 0.46 ft = 1.46 ft.

Worksheet for Cross Section H

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Discharge	33.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+00	3.00
0+09	0.00
0+19	0.00
0+94	0.80
1+06	1.80
1+16	2.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.00)	(1+16, 2.80)	0.025

Results

Normal Depth	0.53	ft
Elevation Range	0.00 to 3.00 ft	
Flow Area	19.16	ft²
Wetted Perimeter	61.80	ft
Top Width	61.71	ft
Normal Depth	0.53	ft
Critical Depth	0.40	ft
Critical Slope	0.01464	ft/ft
Velocity	1.72	ft/s
Velocity Head	0.05	ft
Specific Energy	0.58	ft
Froude Number	0.54	

Worksheet for Cross Section H

Results

Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.40	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.01464	ft/ft

Cross Section H

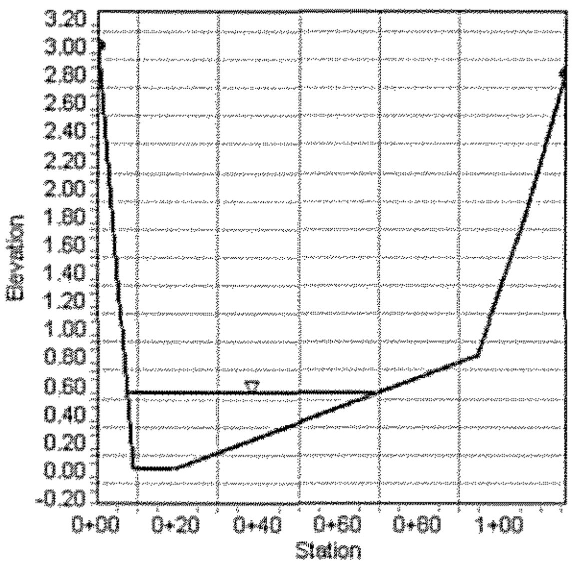
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.53	ft
Discharge	33.00	ft³/s

Cross Section Image



Q = 33 cfs = OND8

$F_b = 0.5 + V^2/2g = 0.5 + \frac{(1.72)^2}{2(32.2)} = 0.55$ ∴ $F_b = 1$ ft.

$S_e = \frac{C V^2 T_w}{gr} = \frac{1.0\,(1.72)^2\,(61.71)}{32.2\,(100)} = 0.06$ ft ∴ $S_e = 0.5$ ft.

Subcritical Superelevation

Total Depth = 1 + 0.5 + 0.53 = 2.03 ft

Worksheet for Cross Section I

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Discharge	33.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	3.00
0+09	0.00
0+19	0.00
0+25	1.52
0+36	1.65
0+46	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 3.00)	(0+46, 3.00)	0.025

Results

Normal Depth	0.87	ft
Elevation Range	0.00 to 3.00 ft	
Flow Area	11.20	ft^2
Wetted Perimeter	16.12	ft
Top Width	15.87	ft
Normal Depth	0.87	ft
Critical Depth	0.65	ft
Critical Slope	0.01133	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Energy	1.00	ft
Froude Number	0.62	

Worksheet for Cross Section I

Results

Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.87	ft
Critical Depth	0.65	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.01133	ft/ft

Cross Section I

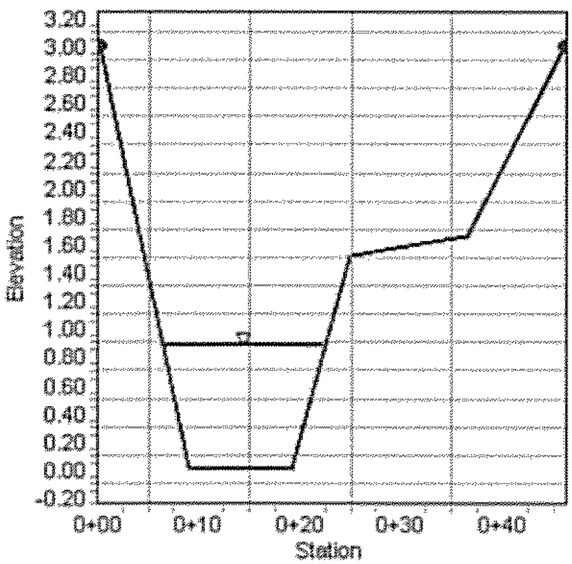
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.40000	%
Normal Depth	0.87	ft
Discharge	33.00	ft³/s

Cross Section Image



Q = 33 = OND8

$F_b = 0.5 + \frac{V^2}{2g} = 0.5 + \frac{(2.95)^2}{2(32.2)} = 0.64$ ft. $\therefore F_b = 1$ ft.

Total Depth = 1 + 0.87 = 1.87 ft.

Worksheet for Cross Section J

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.40000	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	24.00	ft
Discharge	33.00	ft³/s

Results

Normal Depth	0.37	ft
Flow Area	9.36	ft²
Wetted Perimeter	26.36	ft
Top Width	26.24	ft
Critical Depth	0.38	ft
Critical Slope	0.01281	ft/ft
Velocity	3.53	ft/s
Velocity Head	0.19	ft
Specific Energy	0.57	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.38	ft
Channel Slope	0.01400	ft/ft
Critical Slope	0.01281	ft/ft

Cross Section J

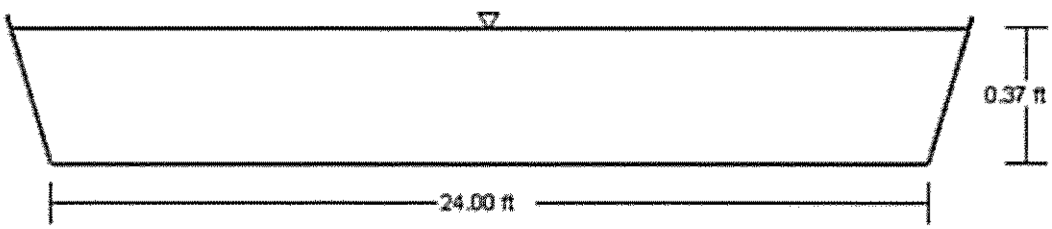
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	1.40000	%
Normal Depth	0.37	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	24.00	ft
Discharge	33.00	ft³/s

Cross Section Image



Q = 33 cfs = OND8

$$F_D = 1.0 + 0.025(V)(d)^{1/3} = 1.0 + 0.025(3.53)(0.37)^{1/3} = 1.06 \text{ ft.}$$

$$S_e = \frac{C V^2 T_w}{g r} = \frac{1(3.53)^2(26.24)}{(32.2)(55)} = 0.18 \text{ ft.}$$

Total Depth = 1.06 + 0.18 + 0.37 = 1.61 ft.

Worksheet for Cross Section K

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	33.33000	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	40.00	ft³/s

Results

Normal Depth	0.27	ft
Flow Area	2.93	ft²
Wetted Perimeter	11.72	ft
Top Width	11.63	ft
Critical Depth	0.73	ft
Critical Slope	0.01091	ft/ft
Velocity	13.63	ft/s
Velocity Head	2.89	ft
Specific Energy	3.16	ft
Froude Number	4.78	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.27	ft
Critical Depth	0.73	ft
Channel Slope	0.33330	ft/ft
Critical Slope	0.01091	ft/ft

Cross Section K

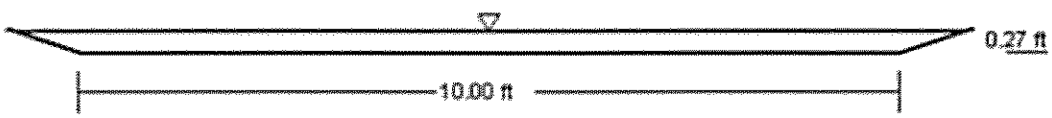
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

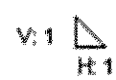
Input Data

Roughness Coefficient	0.025	
Channel Slope	33.33000	%
Normal Depth	0.27	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	40.00	ft³/s

Cross Section Image



Q = CP-5 = 40 cfs



Worksheet for Cross Section L

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	33.33000	%
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	24.00	ft³/s

Results

Normal Depth	0.20	ft
Flow Area	2.13	ft²
Wetted Perimeter	11.27	ft
Top Width	11.20	ft
Critical Depth	0.53	ft
Critical Slope	0.01193	ft/ft
Velocity	11.29	ft/s
Velocity Head	1.98	ft
Specific Energy	2.18	ft
Froude Number	4.57	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.53	ft
Channel Slope	0.33330	ft/ft
Critical Slope	0.01193	ft/ft

Cross Section L

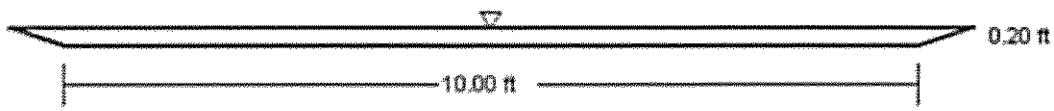
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

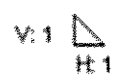
Input Data

Roughness Coefficient	0.025	
Channel Slope	33.33000	%
Normal Depth	0.20	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	10.00	ft
Discharge	24.00	ft³/s

Cross Section Image



Q = OND11 = 24 cfs



Appendix C-6: WSPG model for 42" Storm Drain

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STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works
Portions Copyrighted by CIVILSOFT, 1986, 1987, 1989

Version 1.20
Serial Number 07010310

Oct  5, 2006  21:55:52

Input file : 42rcp.dat
Output file: 42rcp.out

                                   INPUT FILE LISTING


T1 EASTSIDE LANDFILL
T2 42" STORM DRAIN
T3 100-YEAR FLOW
SO   1000.001734.00  1       .013                1733.80
WX   1000.001734.00  1
R    1101.201734.50  1       .013
R    1106.201734.70  1       .013                             11
R    1106.201734.70  1       .013                             15          1
R    1170.161735.03  1       .013
R    1175.161735.23  1       .013                             11
R    1175.161735.23  1       .013                             15
R    1175.161735.23  1       .013                             15          1
R    1555.331737.08  1       .013
R    1560.331737.28  1       .013                              3          1
R    1849.771738.69  1       .013
R    1854.771738.89  1       .013                              9          1
R    2245.811740.79  1       .013
R    2250.811740.99  1       .013                              3
R    2250.811740.99  1       .013                             15
R    2250.811740.99  1       .013                             15          1
R    2440.131741.92  1       .013
R    2445.131742.12  1       .013                              7
R    2445.131742.12  1       .013                             15          1
R    2783.601743.78  1       .013
R    2788.601743.98  1       .013                             11          1
R    2877.941744.50  1       .013
SH   2877.941744.50  1       .013                1748.19
1                                                             SP
                                   WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                PAGE    1
0 CARD   SECT   CHN    NO OF   AVE PIER   HEIGHT 1  BASE     ZL     ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
  CODE   NO     TYPE   PIERS   WIDTH      DIAMETER  WIDTH                 DROP

  CD      1     4                          3.50
1                                                                                                                    PAGE NO    1
0                              WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                                EASTSIDE LANDFILL
0HEADING LINE NO 2 IS -
0                                42" STORM DRAIN
0HEADING LINE NO 3 IS -
0                                100-YEAR FLOW
1                                                                                                                    PAGE NO    2
0                              WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO    1 IS A SYSTEM OUTLET      *          *     *
                        U/S DATA    STATION     INVERT   SECT                                        W S ELEV
                                    1000.00 1734.00     1                                            1733.80
0 ELEMENT NO    2 IS A  WALL  EXIT                         *
                        U/S DATA    STATION     INVERT   SECT
                                    1000.00 1734.00     1
0 ELEMENT NO    3 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1101.20 1734.50     1               .013                                     .00     .00     .00     0
0 ELEMENT NO    4 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1106.20 1734.70     1               .013                                     .00     .13     .00     0
0 ELEMENT NO    5 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1106.20 1734.70     1               .013                                     .00     .15     .00     1
0 ELEMENT NO    6 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1170.16 1735.03     1               .013                                     .00     .00     .00     0
0 ELEMENT NO    7 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1175.16 1735.23     1               .013                                     .00     .13     .00     0
0 ELEMENT NO    8 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1175.16 1735.23     1               .013                                     .00     .15     .00     0
0 ELEMENT NO    9 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1175.16 1735.23     1               .013                                     .00     .15     .00     1
0 ELEMENT NO   10 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1555.33 1737.08     1               .013                                     .00     .00     .00     0
0 ELEMENT NO   11 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1560.33 1737.28     1               .013                                     .00     .03     .00     1
0 ELEMENT NO   12 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1849.77 1738.69     1               .013                                     .00     .00     .00     0
0 ELEMENT NO   13 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    1854.77 1738.89     1               .013                                     .00     .09     .00     1
1                                                                                                                    PAGE NO    3
0                              WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   14 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2245.81 1740.79     1               .013                                     .00     .00     .00     0
0 ELEMENT NO   15 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2250.81 1740.99     1               .013                                     .00     .03     .00     0
0 ELEMENT NO   16 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2250.81 1740.99     1               .013                                     .00     .15     .00     0
0 ELEMENT NO   17 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2250.81 1740.99     1               .013                                     .00     .15     .00     1
0 ELEMENT NO   18 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2440.13 1741.92     1               .013                                     .00     .00     .00     0
0 ELEMENT NO   19 IS A REACH          *          *     *
                        U/S DATA    STATION     INVERT   SECT              N                                   RADIUS  ANGLE  ANG PT  MAN H
                                    2445.13 1742.12     1               .013                                     .00     .07     .00     0
```

```
0 ELEMENT NO  20 IS A REACH                  *           *     *
                  U/S DATA   STATION    INVERT  SECT                 N                                      RADIUS  ANGLE  ANG PT  MAN H
                              2445.13 1742.13    1                .013                                         .00    .13     .00     1
0 ELEMENT NO  21 IS A REACH                  *           *     *
                  U/S DATA   STATION    INVERT  SECT                 N                                      RADIUS  ANGLE  ANG PT  MAN H
                              2783.60 1743.78    1                .013                                         .00    .00     .00     0
0 ELEMENT NO  22 IS A REACH                  *           *     *
                  U/S DATA   STATION    INVERT  SECT                 N                                      RADIUS  ANGLE  ANG PT  MAN H
                              2798.60 1743.90    1                .013                                         .00    .11     .00     1
0 ELEMENT NO  23 IS A REACH                  *           *     *
                  U/S DATA   STATION    INVERT  SECT                 N                                      RADIUS  ANGLE  ANG PT  MAN H
                              2877.94 1744.50    1                .013                                         .00    .00     .00     0
0 ELEMENT NO  24 IS A SYSTEM HEADWORKS                     *                *
                  U/S DATA   STATION    INVERT  SECT                                        W S ELEV
                              2877.94 1744.50    1                                           1748.19
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

 ERROR MESSAGE NO. 2 - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN OTLTUG, W.S.ELEV = INV + DC
1                                                                                                                          PAGE    1
                                                    WATER SURFACE PROFILE LISTING
                        EASTSIDE LANDFILL
                        42" STORM DRAIN
                        100-YEAR FLOW
0 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
0 L/ELEM     SO                                           SF AVE     HF                     NORM DEPTH                 ZR
****************************************************************************************************************************
0  1000.00  1734.00     2.37   1736.37      67.0    8.86     1.22   1737.59    .00     2.37             3.50     .00    .00   0    .00
0  WALL EXIT                                                                                                         .00
0  1000.00  1734.00     2.37   1736.37      67.0    8.86     1.22   1737.59    .00     2.37             3.50     .00    .00   0    .00
0    25.27   .00494                                        .00534      .13                     2.71                 .00
0  1025.27  1734.12     2.69   1736.81      67.0    8.45     1.11   1737.92    .00     2.37             3.50     .00    .00   0    .00
0    17.58   .00494                                        .00504      .09                     2.71                 .00
0  1042.85  1734.21     2.69   1736.90      67.0    8.44     1.11   1738.01    .00     2.37             3.50     .00    .00   0    .00
0HYDRAULIC JUMP                                                                                                      .00
0  1042.85  1734.21     2.45   1736.66      67.0    9.33     1.35   1738.01    .00     2.37             3.50     .00    .00   0    .00
0    17.59   .00494                                        .00674      .12                     2.71                 .00
0  1060.44  1734.30     2.34   1736.64      67.0    9.78     1.49   1738.13    .00     2.37             3.50     .00    .00   0    .00
0    20.04   .00494                                        .00757      .15                     2.71                 .00
0  1080.48  1734.40     2.24   1736.64      67.0   10.26     1.64   1738.28    .00     2.37             3.50     .00    .00   0    .00
0    20.73   .00494                                        .00853      .18                     2.71                 .00
0  1101.21  1734.50     2.16   1736.66      67.0   10.76     1.80   1738.46    .00     2.37             3.50     .00    .00   0    .00
0      .21   .03999                                        .00901      .00                     1.39                 .00
0  1101.42  1734.51     2.16   1736.67      67.0   10.73     1.79   1738.46    .00     2.37             3.50     .00    .00   0    .00
0     2.30   .03999                                        .00846      .02                     1.39                 .00
0  1103.71  1734.60     2.25   1736.85      67.0   10.23     1.63   1738.48    .00     2.37             3.50     .00    .00   0    .00
0     1.26   .03999                                        .00751      .01                     1.39                 .00
0  1104.97  1734.66     2.35   1737.01      67.0    9.75     1.48   1738.49    .00     2.37             3.50     .00    .00   0    .00
0      .33   .03999                                        .00668      .01                     1.39                 .00
1                                                                                                                          PAGE    2
                                                    WATER SURFACE PROFILE LISTING
                        EASTSIDE LANDFILL
                        42" STORM DRAIN
                        100-YEAR FLOW
0 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
0 L/ELEM     SO                                           SF AVE     HF                     NORM DEPTH                 ZR
****************************************************************************************************************************
0  1105.30  1734.70     2.45   1737.15      67.0    9.30     1.34   1738.50    .00     2.37             3.50     .00    .00   0    .00
0    19.93   .00516                                        .00667      .13                     2.66                 .00
0  1125.23  1734.80     2.35   1737.16      67.0    9.74     1.47   1738.63    .00     2.37             3.50     .00    .00   0    .00
0    22.99   .00516                                        .00749      .17                     2.66                 .00
0  1148.22  1734.92     2.26   1737.17      67.0   10.21     1.62   1738.79    .00     2.37             3.50     .00    .00   0    .00
0    21.94   .00516                                        .00843      .18                     2.66                 .00
0  1170.16  1735.03     2.17   1737.20      67.0   10.71     1.78   1738.98    .00     2.37             3.50     .00    .00   0    .00
0      .00   .00516                                        .00894      .00                     2.66                 .00
0  1170.16  1735.03     2.17   1737.20      67.0   10.71     1.78   1738.98    .00     2.37             3.50     .00    .00   0    .00
0     3.19   .03999                                        .00845      .03                     1.39                 .00
0  1173.35  1735.13     2.25   1737.37      67.0   10.23     1.62   1739.00    .00     2.37             3.50     .00    .00   0    .00
0     1.57   .03999                                        .00752      .01                     1.39                 .00
0  1174.92  1735.18     2.35   1737.53      67.0    9.75     1.48   1739.01    .00     2.37             3.50     .00    .00   0    .00
0      .94   .03999                                        .00669      .01                     1.39                 .00
0  1175.86  1735.22     2.45   1737.67      67.0    9.30     1.34   1739.02    .00     2.37             3.50     .00    .00   0    .00
0      .30   .03999                                        .00597      .00                     1.39                 .00
0  1176.16  1735.23     2.37   1737.60      67.0    8.86     1.22   1739.02    .00     2.37             3.50     .00    .00   0    .00
0    21.24   .00487                                        .00534      .11                     2.73                 .00
0  1197.40  1735.33     2.69   1738.02      67.0    8.45     1.11   1739.13    .00     2.37             3.50     .00    .00   0    .00
0   107.19   .00487                                        .00496      .54                     2.73                 .00
0  1304.59  1735.86     2.73   1738.59      67.0    8.31     1.07   1739.67    .00     2.37             3.50     .00    .00   0    .00
0   201.25   .00487                                        .00487      .98                     2.73                 .00
1                                                                                                                          PAGE    3
                                                    WATER SURFACE PROFILE LISTING
                        EASTSIDE LANDFILL
                        42" STORM DRAIN
                        100-YEAR FLOW
0 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
0 L/ELEM     SO                                           SF AVE     HF                     NORM DEPTH                 ZR
****************************************************************************************************************************
0  1505.84  1736.84     2.73   1739.57      67.0    8.31     1.07   1740.65    .00     2.37             3.50     .00    .00   0    .00
0HYDRAULIC JUMP                                                                                                      .00
0  1505.84  1736.84     2.41   1739.24      67.0    9.50     1.40   1740.65    .00     2.37             3.50     .00    .00   0    .00
0     9.84   .00487                                        .00684      .07                     2.73                 .00
0  1515.68  1736.89     2.35   1739.24      67.0    9.74     1.47   1740.71    .00     2.37             3.50     .00    .00   0    .00
0    19.59   .00487                                        .00749      .15                     2.73                 .00
0  1535.27  1736.98     2.26   1739.24      67.0   10.21     1.62   1740.86    .00     2.37             3.50     .00    .00   0    .00
0    20.12   .00487                                        .00843      .17                     2.73                 .00
0  1555.39  1737.08     2.17   1739.25      67.0   10.71     1.78   1741.03    .00     2.37             3.50     .00    .00   0    .00
0     2.19   .04002                                        .00849      .02                     1.39                 .00
0  1557.58  1737.17     2.25   1739.42      67.0   10.23     1.63   1741.05    .00     2.37             3.50     .00    .00   0    .00
0     1.56   .04002                                        .00752      .01                     1.39                 .00
0  1559.14  1737.23     2.35   1739.58      67.0    9.75     1.48   1741.06    .00     2.37             3.50     .00    .00   0    .00
0      .94   .04002                                        .00669      .01                     1.39                 .00
0  1560.08  1737.27     2.45   1739.72      67.0    9.30     1.34   1741.07    .00     2.37             3.50     .00    .00   0    .00
0      .30   .04002                                        .00597      .00                     1.39                 .00
0  1560.38  1737.28     2.37   1739.65      67.0    8.86     1.22   1741.07    .00     2.37             3.50     .00    .00   0    .00
0    21.56   .00487                                        .00534      .12                     2.73                 .00
0  1581.95  1737.39     2.69   1740.07      67.0    8.42     1.11   1741.18    .00     2.37             3.50     .00    .00   0    .00
0   107.01   .00487                                        .00496      .53                     2.73                 .00
0  1688.95  1737.91     2.73   1740.64      67.0    8.31     1.07   1741.71    .00     2.37             3.50     .00    .00   0    .00
0   110.85   .00487                                        .00489      .54                     2.73                 .00
1                                                                                                                          PAGE    4
                                                    WATER SURFACE PROFILE LISTING
                        EASTSIDE LANDFILL
                        42" STORM DRAIN
                        100-YEAR FLOW
0 STATION    INVERT   DEPTH     W.S.        Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                        HEAD   GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
0 L/ELEM     SO                                           SF AVE     HF                     NORM DEPTH                 ZR
****************************************************************************************************************************
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0  1799.85  1738.45      2.73   1741.18       67.0     8.31      1.07   1742.25    .00      2.37                 3.50       .00    .00   0     .00
HYDRAULIC JUMP                                                                                                                   .00
0  1799.85  1738.45      2.41   1740.86       67.0     9.36      1.40   1742.25    .00      2.37                 3.50       .00    .00   0     .00
0    10.17   .00487                                             .00684      .07                       2.73                       .00
0  1809.97  1738.50      2.35   1740.85       67.0     9.74      1.47   1742.32    .00      2.37                 3.50       .00    .00   0     .00
0    19.65   .00487                                             .00749      .15                       2.73                       .00
0  1829.61  1738.59      2.26   1740.85       67.0    10.21      1.62   1742.47    .00      2.37                 3.50       .00    .00   0     .00
0    20.16   .00487                                             .00843      .17                       2.73                       .00
0  1849.77  1738.69      2.17   1740.86       67.0    10.71      1.78   1742.64    .00      2.37                 3.50       .00    .00   0     .00
0     2.19   .04002                                             .00845      .02                       1.39                       .00
0  1851.96  1738.78      2.25   1741.03       67.0    10.23      1.63   1742.66    .00      2.37                 3.50       .00    .00   0     .00
0     1.56   .04002                                             .00752      .01                       1.39                       .00
0  1853.52  1738.84      2.35   1741.19       67.0     9.75      1.48   1742.67    .00      2.37                 3.50       .00    .00   0     .00
0      .94   .04002                                             .00669      .01                       1.39                       .00
0  1854.47  1738.88      2.45   1741.33       67.0     9.30      1.34   1742.68    .00      2.37                 3.50       .00    .00   0     .00
0      .30   .04002                                             .00597      .00                       1.39                       .00
0  1854.77  1738.89      2.57   1741.46       67.0     8.86      1.22   1742.68    .00      2.37                 3.50       .00    .00   0     .00
0    20.97   .00486                                             .00534      .11                       2.74                       .00
0  1875.74  1738.99      2.69   1741.68       67.0     8.45      1.11   1742.79    .00      2.37                 3.50       .00    .00   0     .00
0   110.44   .00486                                             .00496      .55                       2.74                       .00
0  1986.19  1739.53      2.74   1742.27       67.0     8.30      1.07   1743.34    .00      2.37                 3.50       .00    .00   0     .00
0   210.47   .00486                                             .00486     1.02                       2.74                       .00
1                                                                                                                                  PAGE    5
                                                  WATER SURFACE PROFILE LISTING
                              EASTSIDE LANDFILL
                              42" STORM DRAIN
                              100-YEAR FLOW
0 STATION      INVERT    DEPTH      W.S.          Q        VEL.      VEL.      ENERGY    SUPER   CRITICAL               HGT/      BASE/     ZL    NO  AVBPR
                ELEV    OF FLOW     ELEV                             HEAD     GRD.EL.    ELEV     DEPTH                 DIA      ID NO.          PIER
0 L/ELEM        SO                                                  SF AVE      HF                        NORM DEPTH                       ZR
***************************************************************************************************************************************************
0  2196.66  1740.55      2.74   1743.29       67.0     8.30      1.07   1744.36    .00      2.37                 3.50       .00    .00   0     .00
HYDRAULIC JUMP                                                                                                                   .00
0  2196.66  1740.55      2.40   1742.95       67.0     9.31      1.41   1744.36    .00      2.37                 3.50       .00    .00   0     .00
0     9.52   .00486                                             .00685      .07                       2.74                       .00
0  2206.18  1740.60      2.35   1742.95       67.0     9.74      1.47   1744.42    .00      2.37                 3.50       .00    .00   0     .00
0    19.55   .00486                                             .00749      .15                       2.74                       .00
0  2225.73  1740.69      2.26   1742.95       67.0    10.21      1.62   1744.57    .00      2.37                 3.50       .00    .00   0     .00
0    20.08   .00486                                             .00843      .17                       2.74                       .00
0  2245.81  1740.79      2.17   1742.96       67.0    10.71      1.78   1744.74    .00      2.37                 3.50       .00    .00   0     .00
0     2.19   .03999                                             .00845      .02                       1.39                       .00
0  2248.00  1740.88      2.25   1743.13       67.0    10.23      1.63   1744.76    .00      2.37                 3.50       .00    .00   0     .00
0     1.57   .03999                                             .00752      .01                       1.39                       .00
0  2249.57  1740.94      2.35   1743.29       67.0     9.75      1.48   1744.77    .00      2.37                 3.50       .00    .00   0     .00
0      .94   .03999                                             .00669      .01                       1.39                       .00
0  2250.51  1740.98      2.45   1743.43       67.0     9.30      1.34   1744.78    .00      2.37                 3.50       .00    .00   0     .00
0      .30   .03999                                             .00597      .00                       1.39                       .00
0  2250.81  1740.99      2.57   1743.56       67.0     8.86      1.22   1744.78    .00      2.37                 3.50       .00    .00   0     .00
0    23.62   .00491                                             .00534      .13                       2.73                       .00
0  2274.43  1741.11      2.69   1743.79       67.0     8.45      1.11   1744.90    .00      2.37                 3.50       .00    .00   0     .00
0   102.89   .00491                                             .00499      .51                       2.73                       .00
0  2377.30  1741.61      2.73   1744.33       67.0     8.35      1.08   1745.42    .00      2.37                 3.50       .00    .00   0     .00
0    10.49   .00491                                             .00493      .05                       2.73                       .00
1                                                                                                                                  PAGE    6
                                                  WATER SURFACE PROFILE LISTING
                              EASTSIDE LANDFILL
                              42" STORM DRAIN
                              100-YEAR FLOW
0 STATION      INVERT    DEPTH      W.S.          Q        VEL.      VEL.      ENERGY    SUPER   CRITICAL               HGT/      BASE/     ZL    NO  AVBPR
                ELEV    OF FLOW     ELEV                             HEAD     GRD.EL.    ELEV     DEPTH                 DIA      ID NO.          PIER
0 L/ELEM        SO                                                  SF AVE      HF                        NORM DEPTH                       ZR
***************************************************************************************************************************************************
0  2387.80  1741.66      2.72   1744.39       67.0     8.35      1.08   1745.47    .00      2.37                 3.50       .00    .00   0     .00
HYDRAULIC JUMP                                                                                                                   .00
0  2387.80  1741.66      2.42   1744.08       67.0     9.46      1.39   1745.47    .00      2.37                 3.50       .00    .00   0     .00
0    11.97   .00491                                             .00680      .08                       2.73                       .00
0  2399.77  1741.72      2.35   1744.07       67.0     9.74      1.47   1745.55    .00      2.37                 3.50       .00    .00   0     .00
0    19.96   .00491                                             .00749      .15                       2.73                       .00
0  2419.73  1741.82      2.26   1744.08       67.0    10.21      1.62   1745.70    .00      2.37                 3.50       .00    .00   0     .00
0    20.39   .00491                                             .00843      .17                       2.73                       .00
0  2440.12  1741.92      2.17   1744.09       67.0    10.71      1.78   1745.87    .00      2.37                 3.50       .00    .00   0     .00
0     2.19   .03999                                             .00845      .02                       1.39                       .00
0  2442.31  1742.01      2.25   1744.26       67.0    10.23      1.63   1745.89    .00      2.37                 3.50       .00    .00   0     .00
0     1.57   .03999                                             .00752      .01                       1.39                       .00
0  2443.88  1742.07      2.35   1744.42       67.0     9.75      1.48   1745.90    .00      2.37                 3.50       .00    .00   0     .00
0      .94   .03999                                             .00669      .01                       1.39                       .00
0  2444.82  1742.11      2.45   1744.56       67.0     9.30      1.34   1745.91    .00      2.37                 3.50       .00    .00   0     .00
0      .30   .03999                                             .00597      .00                       1.39                       .00
0  2445.12  1742.13      2.57   1744.69       67.0     8.86      1.22   1745.91    .00      2.37                 3.50       .00    .00   0     .00
0    23.13   .00490                                             .00534      .12                       2.73                       .00
0  2468.25  1742.23      2.69   1744.92       67.0     8.45      1.11   1746.03    .00      2.37                 3.50       .00    .00   0     .00
0   107.12   .00490                                             .00498      .53                       2.73                       .00
0  2575.37  1742.76      2.72   1745.48       67.0     8.34      1.08   1746.56    .00      2.37                 3.50       .00    .00   0     .00
0   160.12   .00490                                             .00491      .79                       2.73                       .00
1                                                                                                                                  PAGE    7
                                                  WATER SURFACE PROFILE LISTING
                              EASTSIDE LANDFILL
                              42" STORM DRAIN
                              100-YEAR FLOW
0 STATION      INVERT    DEPTH      W.S.          Q        VEL.      VEL.      ENERGY    SUPER   CRITICAL               HGT/      BASE/     ZL    NO  AVBPR
                ELEV    OF FLOW     ELEV                             HEAD     GRD.EL.    ELEV     DEPTH                 DIA      ID NO.          PIER
0 L/ELEM        SO                                                  SF AVE      HF                        NORM DEPTH                       ZR
***************************************************************************************************************************************************
0  2735.49  1743.54      2.72   1746.27       67.0     8.34      1.08   1747.35    .00      2.37                 3.50       .00    .00   0     .00
HYDRAULIC JUMP                                                                                                                   .00
0  2735.49  1743.54      2.41   1745.96       67.0     9.47      1.39   1747.35    .00      2.37                 3.50       .00    .00   0     .00
0     8.37   .00490                                             .00674      .06                       2.73                       .00
0  2743.86  1743.59      2.37   1745.96       67.0     9.66      1.45   1747.41    .00      2.37                 3.50       .00    .00   0     .00
0    19.31   .00490                                             .00733      .14                       2.73                       .00
0  2763.18  1743.68      2.27   1745.95       67.0    10.13      1.59   1747.55    .00      2.37                 3.50       .00    .00   0     .00
0    20.42   .00490                                             .00835      .17                       2.73                       .00
0  2783.60  1743.78      2.18   1745.96       67.0    10.62      1.75   1747.72    .00      2.37                 3.50       .00    .00   0     .00
0      .00   .00490                                             .00879      .00                       2.73                       .00
0  2783.60  1743.78      2.18   1745.96       67.0    10.62      1.75   1747.72    .00      2.37                 3.50       .00    .00   0     .00
0     1.13   .02856                                             .00850      .01                       1.53                       .00
0  2784.73  1743.81      2.21   1746.02       67.0    10.49      1.71   1747.73    .00      2.37                 3.50       .00    .00   0     .00
0     3.01   .02856                                             .00798      .02                       1.53                       .00
0  2787.74  1743.90      2.30   1746.20       67.0     9.99      1.55   1747.75    .00      2.37                 3.50       .00    .00   0     .00
0     1.95   .02856                                             .00709      .01                       1.53                       .00
0  2789.69  1743.95      2.40   1746.35       67.0     9.53      1.41   1747.76    .00      2.37                 3.50       .00    .00   0     .00
0      .91   .02856                                             .00632      .01                       1.53                       .00
0  2790.60  1743.98      2.51   1746.49       67.0     9.08      1.28   1747.77    .00      2.37                 3.50       .00    .00   0     .00
0      .00   .02856                                             .00596      .00                       1.53                       .00
0  2790.60  1743.98      2.51   1746.49       67.0     9.08      1.28   1747.77    .00      2.37                 3.50       .00    .00   0     .00
0    75.03   .00575                                             .00556      .42                       2.51                       .00
1                                                                                                                                  PAGE    8
                                                  WATER SURFACE PROFILE LISTING
                              EASTSIDE LANDFILL
                              42" STORM DRAIN
                              100-YEAR FLOW
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0 STATION    INVERT   DEPTH      W.S.         Q       VEL      VEL     ENERGY   SUPER  CRITICAL          HGT/    BASE/    ZL   NO  AVBPR
             ELEV    OF FLOW     ELEV                          HEAD   GRD.EL.   ELEV    DEPTH           DIA     ID NO.        PIER
0 L/ELEM      SO                                              SF AVE    HF                      NORM DEPTH                  ZR
*****************************************************************************************************************************************
0  2860.63  1744.40     2.51   1746.91     67.0     9.08      1.28   1748.19    .00     2.57             3.00      .00   .00   0     .00
0    17.31   .00578                                          .00578      .10                     2.51                       .00
0  2877.94  1744.50     2.57   1747.07     67.0     8.86      1.22   1748.29    .00     2.57             3.00      .00   .00   0     .00
1
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Appendix C-7: WSPG model for Detention Basin Outlet

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STORM DRAIN ANALYSIS F1200

Original version by Los Angeles County Public Works
Portions Copyrighted by CIVILSOFT, 1986, 1987, 1989

Version  1.20
Serial Number 07010218

Oct  5, 2004   8:23:14

Input file : dp_b.dat
Output file: dp_b.out

                                   INPUT FILE LISTING


T1 EASTSIDE LANDFILL
T2 OUTLET FROM DETENTION POND WITH 60" HARSCH SD
T3 100 YR FLOW
SD   1144.631699.87  4                          1702.59
WE                   1
R    1144.631699.87  1      .013
R    1165.681700.17  1      .013                                  15.0
R    1165.681700.17  1      .013                                  15.0
R    1165.681700.17  1      .013                                  15.0  1
JX   1169.181700.30  1  6   .013    45.0        1700.30       45.0
R    1194.701700.59  1      .013
R    1198.301700.65  1      .013                                  15.0
R    1198.301700.65  1      .013                                  15.0
R    1198.301700.65  1      .013                                  15.0  1
R    1203.301700.72  1      .013
R    1328.961702.54  1      .013                                  15.0
R    1328.961702.54  1      .013                                  15.0
R    1328.961702.54  1      .013                                  15.0  1
R    1333.961702.61  1      .013
R    1373.481703.19  1      .013
JX   1375.481703.21  1  2   .013    10.0        1704.26       90.0
R    1386.951703.38  1      .013                                  15.0
R    1386.951703.38  1      .013                                  15.0
R    1386.951703.38  1      .013                                  15.0  1
R    1391.951703.45  1      .013
R    1752.061708.66  1      .013                                        1
JX   1757.061708.74  1  2  5.013    20.0     3.01708.701708.70 90.0  90.0
R    2277.811715.52  1      .013                                        1
JX   2282.811715.57  1  7  5.013    44.0     3.01715.541715.54 90.0  90.0
R    2731.781719.30  1      .013                                   15.0
R    2731.781719.38  1      .013                                   15.0 1
R    2736.781719.45  1      .013
R    2798.981721.52  1      .013                                        1
JX   2803.981721.60  1  3   .013    10.0        1721.60       60.0
R    2894.201724.64  1      .013                                        1
JX   2899.201724.75  1      .013    81.0
R    2912.091724.91  1      .013
R    2919.091725.11  1      .013                                  15.0
R    2919.091725.11  1      .013                                  15.0
R    2919.091725.11  1      .013                                  15.0
R    2919.091725.11  1      .013                                  15.0
R    2919.091725.11  1      .013                                  15.0
R    2919.091725.11  1      .013                                  15.0  1
R    2955.241725.31  1      .013
SH   2955.241725.31  1      .013                1731.80
1                                                             SP
                                   WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                        PAGE    1
0 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL     ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
  CODE   NO   TYPE  PIERS   WIDTH   DIAMETER  WIDTH               DROP

  CD      1    4                      5.00
  CD      2    4                      2.00
  CD      3    4                      1.50
  CD      4    3      0       .00     5.00   10.00    .00   .00   .00
  CD      5    4                      1.00
  CD      6    4                      1.50
  CD      7    4                      3.50
1                                                                                                        PAGE NO    1
0                            WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                              EASTSIDE LANDFILL
0HEADING LINE NO 2 IS -
0                              OUTLET FROM DETENTION POND WITH 60" HARSCH SD
0HEADING LINE NO 3 IS -
0                              100 YR FLOW
1                                                                                                        PAGE NO    2
0                            WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO    1 IS A SYSTEM OUTLET      *          *    *
                         U/S DATA   STATION    INVERT  SECT                                     W S ELEV
                                    1144.63 1699.87    4                                        1702.59
0 ELEMENT NO    2 IS A  WALL  EXIT                         *
                         U/S DATA   STATION    INVERT  SECT
                                    1144.63 1699.87    1
0 ELEMENT NO    3 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1144.63 1699.87    1               .013                            .00    .00     .00     0
0 ELEMENT NO    4 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1165.68 1700.17    1               .013                            .00    .00   15.00     0
0 ELEMENT NO    5 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1165.68 1700.17    1               .013                            .00    .00   15.00     0
0 ELEMENT NO    6 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1165.68 1700.17    1               .013                            .00    .00   15.00     1
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
                                    1169.18 1700.30    1     6     0     .013     45.0        .0  1700.30       .00  45.00     .00
0 ELEMENT NO    8 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1194.70 1700.59    1               .013                            .00    .00     .00     0
0 ELEMENT NO    9 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1198.30 1700.65    1               .013                            .00    .00   15.00     0
0 ELEMENT NO   10 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1198.30 1700.65    1               .013                            .00    .00   15.00     0
0 ELEMENT NO   11 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
                                    1198.30 1700.65    1               .013                            .00    .00   15.00     1
0 ELEMENT NO   12 IS A REACH              *          *    *
                         U/S DATA   STATION    INVERT  SECT              N                          RADIUS  ANGLE  ANG PT  MAN H
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                             1303.30 1700.73    1                .013                                                       .00     .00     .00      0
1                                                                                                                                          PAGE NO   3
0                           WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   13 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1328.96 1702.54    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   14 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1328.96 1702.54    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   15 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1328.96 1702.54    1                .013                                                       .00     .00   15.00      1
0 ELEMENT NO   16 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1333.96 1703.41    1                .013                                                       .00     .00     .00      0
0 ELEMENT NO   17 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1373.45 1703.13    1                .013                                                       .00     .00     .00      0
0 ELEMENT NO   18 IS A JUNCTION       *              *      *      *              *                      *           *
                   U/S DATA    STATION      INVERT   SECT LAT-1 LAT-2    N        Q3         Q4     INVERT-3 INVERT-4   PHI 3    PHI 4
                             1375.45 1703.31    1      2      0    .013     10.0           .0  1706.36      .00   90.00      .00
0 ELEMENT NO   19 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1386.95 1703.38    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   20 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1386.95 1703.38    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   21 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1386.95 1703.38    1                .013                                                       .00     .00   15.00      1
0 ELEMENT NO   22 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1391.95 1703.45    1                .013                                                       .00     .00     .00      0
0 ELEMENT NO   23 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             1732.06 1708.66    1                .013                                                       .00     .00     .00      1
0 ELEMENT NO   24 IS A JUNCTION       *              *      *      *              *                      *           *
                   U/S DATA    STATION      INVERT   SECT LAT-1 LAT-2    N        Q3         Q4     INVERT-3 INVERT-4   PHI 3    PHI 4
                             1737.06 1708.74    1      3      5    .013     20.0          3.0  1708.78  1708.78   90.00    90.00
1                                                                                                                                          PAGE NO   4
0                           WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   25 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2277.83 1715.53    1                .013                                                       .00     .00     .00      1
0 ELEMENT NO   26 IS A JUNCTION       *              *      *      *              *                      *           *
                   U/S DATA    STATION      INVERT   SECT LAT-1 LAT-2    N        Q3         Q4     INVERT-3 INVERT-4   PHI 3    PHI 4
                             2282.83 1715.57    1      7      5    .013     44.0          3.0  1715.54  1715.54   90.00    90.00
0 ELEMENT NO   27 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2731.78 1719.38    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   28 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2731.78 1719.38    1                .013                                                       .00     .00   15.00      1
0 ELEMENT NO   29 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2736.78 1719.48    1                .013                                                       .00     .00     .00      0
0 ELEMENT NO   30 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2798.99 1721.53    1                .013                                                       .00     .00     .00      1
0 ELEMENT NO   31 IS A JUNCTION       *              *      *      *              *                      *           *
                   U/S DATA    STATION      INVERT   SECT LAT-1 LAT-2    N        Q3         Q4     INVERT-3 INVERT-4   PHI 3    PHI 4
                             2803.99 1721.60    1      1      0    .013     10.0           .0  1721.60      .00   60.00      .00
0 ELEMENT NO   32 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2884.20 1724.64    1                .013                                                       .00     .00     .00      1
0 ELEMENT NO   33 IS A JUNCTION       *              *      *      *              *                      *           *
                   U/S DATA    STATION      INVERT   SECT LAT-1 LAT-2    N        Q3         Q4     INVERT-3 INVERT-4   PHI 3    PHI 4
                             2889.20 1724.73    1      0      5    .013     81.0           .0      .00      .00     .00      .00
0 ELEMENT NO   34 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2913.09 1724.91    1                .013                                                       .00     .00     .00      0
1                                                                                                                                          PAGE NO   5
0                           WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   35 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   36 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   37 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   38 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   39 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      0
0 ELEMENT NO   40 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2919.09 1725.11    1                .013                                                       .00     .00   15.00      1
0 ELEMENT NO   41 IS A REACH          *              *      *
                   U/S DATA    STATION      INVERT   SECT               N                                              RADIUS   ANGLE   ANG PT   MAN H
                             2955.24 1725.21    1                .013                                                       .00     .00     .00      0
0 ELEMENT NO   42 IS A SYSTEM HEADWORKS                     *                          *
                   U/S DATA    STATION      INVERT   SECT                                           W S ELEV
                             2955.24 1725.21    1                                                    1733.00
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

1                                                                                                                                          PAGE    1
                                                            WATER SURFACE PROFILE LISTING
                       EASTSIDE LANDFILL
                       OUTLET FROM DETENTION POND WITH 60" HARBCH RD
                       100 YR FLOW
0 STATION     INVERT   DEPTH     W.S.        Q       VEL     VEL    ENERGY   SUPER  CRITICAL           HGT/    BASE/    ZL   NO  AVBPR
              ELEV    OF FLOW    ELEV                        HEAD   GRD.EL.  ELEV    DEPTH             DIA     ID NO.        PIER
0 L/ELEM      SO                                             SF AVE   HF                    NORM DEPTH                  ZR
*************************************************************************************************************************************
0  1144.65  1699.87     1.49   1701.36     361.0   17.48     4.86  1706.32    .00     3.77              5.00   10.00   .00   0    .00
0  WALL EXIT                                                                                                            .00
0  1144.65  1699.87     4.12   1703.99     361.0   18.09     3.54  1707.53    .00     4.49              5.00     .00   .00   0    .00
0    11.57   .01427                                         .00978     .11                     3.31                     .00
0  1156.22  1700.04     4.33   1704.34     361.0   14.74     3.38  1707.64    .00     4.49              5.00     .00   .00   0    .00
0     9.46   .01427                                         .00930     .09                     3.31                     .00
0  1165.68  1702.17     4.49   1704.66     361.0   14.05     3.07  1707.73    .00     4.49              5.00     .00   .00   0    .00
OJUNCT STR   .01196                                         .00787     .02                                              .00
0  1168.18  1700.20     6.25   1706.45     316.0   11.88     1.88  1708.33    .00     4.18              5.00     .00   .00   0    .00
0    26.53   .01471                                         .00688     .18                     3.04                     .00
0  1194.70  1700.59     6.04   1706.63     316.0   11.88     1.88  1708.51    .00     4.18              5.00     .00   .00   0    .00
0     3.00   .01716                                         .00688     .02                     2.89                     .00
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	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	1198.20	1700.65	6.10	1706.75	216.0	11.00	1.88	1708.63	.00	4.18		5.00	.00	.00	0	.00
0	1198.20	1700.65	6.19	1706.84	216.0	11.00	1.88	1708.72	.00	4.18		5.00	.00	.00	0	.00
0	1198.20	1700.65	6.38	1707.03	216.0	11.00	1.88	1708.91	.00	4.18		5.00	.00	.00	0	.00
0	5.00	.01399					.00688	.03			3.09			.00		
0	1203.20	1700.72	6.34	1707.06	216.0	11.00	1.88	1708.94	.00	4.18		5.00	.00	.00	0	.00
0	125.76	.01447					.00688	.87			3.03			.00		
0	1328.96	1702.54	5.48	1708.02	216.0	11.00	1.88	1709.90	.00	4.18		5.00	.00	.00	0	.00
0	1328.96	1702.54	5.57	1708.11	216.0	11.00	1.88	1709.99	.00	4.18		5.00	.00	.00	0	.00
0	1328.96	1702.54	5.76	1708.30	216.0	11.00	1.88	1710.18	.00	4.18		5.00	.00	.00	0	.00
0	5.00	.01399					.00688	.03			3.09			.00		

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WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	1333.96	1702.61	5.73	1708.34	216.0	11.00	1.88	1710.22	.00	4.18		5.00	.00	.00	0	.00
0	39.49	.01449					.00688	.27			3.04			.00		
0	1373.45	1703.19	5.42	1708.61	216.0	11.00	1.88	1710.49	.00	4.18		5.00	.00	.00	0	.00
JUNCT STR		.01001					.00657	.01						.00		
0	1375.45	1703.21	5.75	1708.96	206.0	10.49	1.71	1710.67	.00	4.09		5.00	.00	.00	0	.00
0	11.50	.01479					.00636	.07			2.94			.00		
0	1386.95	1703.38	5.74	1709.12	206.0	10.49	1.71	1710.83	.00	4.09		5.00	.00	.00	0	.00
0	1386.95	1703.38	5.82	1709.20	206.0	10.49	1.71	1710.91	.00	4.09		5.00	.00	.00	0	.00
0	1386.95	1703.38	5.99	1709.37	206.0	10.49	1.71	1711.08	.00	4.09		5.00	.00	.00	0	.00
0	5.00	.01399					.00636	.03			2.99			.00		
0	1391.95	1703.45	5.95	1709.40	206.0	10.49	1.71	1711.11	.00	4.09		5.00	.00	.00	0	.00
0	86.68	.01447					.00636	.54			2.96			.00		
0	1478.63	1704.70	5.26	1709.96	206.0	10.49	1.71	1711.67	.00	4.09		5.00	.00	.00	0	.00
HYDRAULIC JUMP														.00		
0	1478.63	1704.70	3.06	1707.76	206.0	16.36	4.16	1711.92	.00	4.09		5.00	.00	.00	0	.00
0	94.47	.01447					.01364	1.29			2.96			.00		
0	1573.10	1706.07	3.13	1709.20	206.0	15.95	3.95	1713.15	.00	4.09		5.00	.00	.00	0	.00
0	78.24	.01447					.01155	.90			2.96			.00		
0	1651.34	1707.20	3.26	1710.46	206.0	15.31	3.59	1714.05	.00	4.09		5.00	.00	.00	0	.00
0	44.09	.01447					.01026	.45			2.96			.00		
0	1695.43	1707.84	3.40	1711.24	206.0	14.50	3.27	1714.50	.00	4.09		5.00	.00	.00	0	.00
0	27.55	.01447					.00913	.25			2.96			.00		

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WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	1722.98	1708.24	3.55	1711.79	206.0	13.82	2.97	1714.76	.00	4.09		5.00	.00	.00	0	.00
0	16.85	.01447					.00816	.14			2.96			.00		
0	1739.83	1708.48	3.71	1712.19	206.0	13.18	2.70	1714.89	.00	4.09		5.00	.00	.00	0	.00
0	9.28	.01447					.00732	.07			2.96			.00		
0	1749.11	1708.62	3.89	1712.51	206.0	12.57	2.45	1714.96	.00	4.09		5.00	.00	.00	0	.00
0	2.95	.01447					.00668	.02			2.96			.00		
0	1752.06	1708.66	4.09	1712.75	206.0	11.99	2.23	1714.98	.00	4.09		5.00	.00	.00	0	.00
JUNCT STR		.01998					.00581	.03						.00		
0	1757.06	1708.76	5.31	1714.07	183.0	9.32	1.35	1715.42	.00	3.87		5.00	.00	.00	0	.00
0	28.05	.01383					.00484	.14			2.84			.00		
0	1785.11	1709.11	5.10	1714.21	183.0	9.32	1.35	1715.56	.00	3.87		5.00	.00	.00	0	.00
HYDRAULIC JUMP														.00		
0	1785.11	1709.11	2.85	1711.96	183.0	15.82	3.88	1715.84	.00	3.87		5.00	.00	.00	0	.00
0	144.79	.01383					.01334	1.93			2.84			.00		
0	1929.90	1710.99	2.88	1713.87	183.0	15.66	3.81	1717.68	.00	3.87		5.00	.00	.00	0	.00
0	183.43	.01383					.01176	2.14			2.84			.00		
0	2113.33	1713.37	2.99	1716.36	183.0	14.93	3.46	1719.82	.00	3.87		5.00	.00	.00	0	.00
0	70.38	.01383					.01040	.76			2.84			.00		
0	2183.71	1714.32	3.11	1717.43	183.0	14.23	3.15	1720.58	.00	3.87		5.00	.00	.00	0	.00
0	43.15	.01383					.00922	.38			2.84			.00		
0	2226.86	1714.86	3.24	1718.10	183.0	13.57	2.86	1720.96	.00	3.87		5.00	.00	.00	0	.00
0	25.10	.01383					.00819	.21			2.84			.00		

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WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	2251.96	1715.19	3.38	1718.57	183.0	12.94	2.60	1721.17	.00	3.87		5.00	.00	.00	0	.00
0	15.11	.01383					.00729	.11			2.84			.00		
0	2267.07	1715.38	3.53	1718.91	183.0	12.34	2.37	1721.28	.00	3.87		5.00	.00	.00	0	.00
0	8.30	.01383					.00651	.05			2.84			.00		
0	2275.38	1715.49	3.69	1719.18	183.0	11.76	2.15	1721.33	.00	3.87		5.00	.00	.00	0	.00
0	2.45	.01383					.00583	.01			2.84			.00		
0	2277.83	1715.52	3.87	1719.39	183.0	11.21	1.95	1721.35	.00	3.87		5.00	.00	.00	0	.00
JUNCT STR		.00998					.00412	.02						.00		
0	2282.83	1715.57	5.76	1721.33	136.0	6.93	.75	1722.08	.00	3.34		5.00	.00	.00	0	.00
0	138.85	.00849					.00271	.38			2.69			.00		
0	2421.68	1716.75	5.00	1721.75	136.0	6.93	.75	1722.49	.00	3.34		5.00	.00	.00	0	.00
0	65.19	.00849					.00254	.17			2.69			.00		
0	2486.87	1717.30	4.54	1721.84	136.0	7.26	.82	1722.66	.00	3.34		5.00	.00	.00	0	.00
0	16.99	.00849					.00243	.04			2.69			.00		
0	2503.87	1717.45	4.39	1721.84	136.0	7.44	.86	1722.70	.00	3.34		5.00	.00	.00	0	.00
HYDRAULIC JUMP														.00		
0	2503.87	1717.45	2.50	1719.95	136.0	13.86	2.98	1722.93	.00	3.34		5.00	.00	.00	0	.00
0	.33	.00849					.01092	.00			2.69			.00		
0	2504.20	1717.45	2.50	1719.95	136.0	13.86	2.98	1722.93	.00	3.34		5.00	.00	.00	0	.00
0	45.13	.00849					.01166	.76			2.69			.00		
0	2549.33	1718.00	2.41	1720.41	136.0	14.53	3.28	1723.69	.00	3.34		5.00	.00	.00	0	.00
0	80.71	.00849					.01374	.67			2.69			.00		

1 PAGE 5

WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	2630.04	1718.42	2.33	1720.75	136.0	15.24	3.61	1724.36	.00	3.34		5.00	.00	.00	0	.00
0	42.30	.00849					.01506	.64			2.69			.00		
0	2672.34	1718.79	2.24	1721.03	136.0	15.99	3.97	1725.00	.00	3.34		5.00	.00	.00	0	.00
0	26.68	.00849					.01714	.63			2.69			.00		
0	2699.02	1719.10	2.14	1721.24	136.0	16.77	4.37	1725.61	.00	3.34		5.00	.00	.00	0	.00
0	32.76	.00849					.01951	.64			2.69			.00		
0	2731.78	1719.38	2.08	1721.46	136.0	17.39	4.81	1726.27	.00	3.34		5.00	.00	.00	0	.00
0	5.00	.03000					.02079	.10			3.10			.00		

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	2736.73	1719.48	2.08	1721.56	136.0	17.60	4.81	1726.37	.00	3.34		5.00	.00	.00	0	.00
0	25.66	.03280					.01961	.50			1.84			.00		
0	2762.42	1720.32	2.15	1722.47	136.0	16.93	4.45	1726.92	.00	3.34		5.00	.00	.00	0	.00
0	20.44	.03280					.01730	.35			1.84			.00		
0	2782.86	1720.99	2.23	1723.23	136.0	16.04	4.00	1727.23	.00	3.34		5.00	.00	.00	0	.00
0	15.92	.03280					.01520	.24			1.84			.00		
0	2798.78	1721.52	2.31	1723.83	136.0	15.30	3.64	1727.47	.00	3.34		5.00	.00	.00	0	.00
0JUNCT STR		.03201					.01664	.08						.00		
0	2803.98	1721.68	2.04	1723.72	136.0	16.69	4.33	1728.05	.00	3.21		5.00	.00	.00	0	.00
0JUNCT STR		.03201					.01905	.00						.00		
0	2803.98	1721.68	2.04	1723.72	136.0	16.69	4.33	1728.05	.00	3.21		5.00	.00	.00	0	.00
0	19.64	.03201					.01798	.35			1.76			.00		
0	2823.62	1722.31	2.11	1724.42	136.0	15.99	3.97	1728.39	.00	3.21		5.00	.00	.00	0	.00
0	16.70	.03201					.01588	.27			1.76			.00		

WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	2840.32	1722.87	2.19	1725.06	136.0	15.26	3.61	1728.67	.00	3.21		5.00	.00	.00	0	.00
0	13.09	.03201					.01395	.18			1.76			.00		
0	2853.41	1723.30	2.27	1725.57	136.0	14.53	3.28	1728.85	.00	3.21		5.00	.00	.00	0	.00
0	10.38	.03201					.01237	.13			1.76			.00		
0	2863.79	1723.64	2.36	1726.00	136.0	13.85	2.98	1728.98	.00	3.21		5.00	.00	.00	0	.00
0	8.27	.03201					.01079	.09			1.76			.00		
0	2872.06	1723.91	2.44	1726.36	136.0	13.21	2.71	1729.07	.00	3.21		5.00	.00	.00	0	.00
0	6.58	.03201					.00950	.06			1.76			.00		
0	2878.64	1724.13	2.54	1726.67	136.0	12.59	2.46	1729.13	.00	3.21		5.00	.00	.00	0	.00
0	5.15	.03201					.00837	.04			1.76			.00		
0	2883.79	1724.30	2.64	1726.93	136.0	12.01	2.24	1729.17	.00	3.21		5.00	.00	.00	0	.00
0	3.96	.03201					.00738	.03			1.76			.00		
0	2887.75	1724.43	2.74	1727.17	136.0	11.45	2.04	1729.20	.00	3.21		5.00	.00	.00	0	.00
0	2.93	.03201					.00651	.02			1.76			.00		
0	2890.68	1724.52	2.85	1727.37	136.0	10.91	1.85	1729.22	.00	3.21		5.00	.00	.00	0	.00
0	2.01	.03201					.00575	.01			1.76			.00		
0	2892.69	1724.59	2.96	1727.55	136.0	10.41	1.68	1729.23	.00	3.21		5.00	.00	.00	0	.00
0	1.15	.03201					.00509	.01			1.76			.00		
0	2893.84	1724.63	3.08	1727.71	136.0	9.93	1.53	1729.24	.00	3.21		5.00	.00	.00	0	.00
0	.36	.03201					.00451	.00			1.76			.00		
0	2894.20	1724.64	3.21	1727.85	136.0	9.46	1.39	1729.24	.00	3.21		5.00	.00	.00	0	.00
0JUNCT STR		.02100					.00237	.01						.00		

WATER SURFACE PROFILE LISTING

EASTSIDE LANDFILL
OUTLET FROM DETENTION POND WITH 60" MARSCH SD
100 YR FLOW

	STATION / L/ELEM	INVERT ELEV / SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD / SF AVE	ENERGY GRD.EL. / HF	SUPER ELEV	CRITICAL DEPTH	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL / ZR	NO PIER	AVBPR
0	2899.30	1724.78	5.14	1729.92	45.0	2.29	.08	1730.00	.00	1.88		5.00	.00	.00	0	.00
0	12.89	.01242					.00030	.00			1.33			.00		
0	2912.19	1724.91	5.01	1729.92	45.0	2.29	.08	1730.00	.00	1.88		5.00	.00	.00	0	.00
0	.46	.02856					.00030	.00			1.09			.00		
0	2912.65	1724.92	5.00	1729.92	45.0	2.29	.08	1730.00	.00	1.88		5.00	.00	.00	0	.00
0	6.54	.02856					.00028	.00			1.09			.00		
0	2919.19	1725.11	4.81	1729.92	45.0	2.33	.08	1730.01	.00	1.88		5.00	.00	.00	0	.00
0	36.15	.00277					.00026	.01			1.97			.00		
0	2955.34	1725.21	4.72	1729.93	45.0	2.34	.09	1730.02	.00	1.88		5.00	.00	.00	0	.00

Appendix C-8: Riprap Calculations for C-1 and C-2

Critical Shear Stress Calculations for Channel 1 (HEC-RAS Channel - C1)

Density of Water	62.4	(lb/ft^3)	Angle of Repose (12")	39.5	Bank Side Slope (H:V)	3
Specific Gravity of Riprap	2.4		Angle of Repose (18")	39.8	Bank Side Slope (degrees)	18.43
Density of Riprap	149.76	(lb/ft^3)	Angle of Repose (24")	40.2		

HEC-RAS River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Froude # Chl	Frctn Slope (ft/ft)	Rip-Rap Size Used (in)	Shear Stress on banks & side slopes (lb/ft^2)	Critical Shear Stress on banks & side slopes (lb/ft^2)	Factor of Safety (Banks & Side Slopes)
-2000	33	1770.75	1772.75	0.00031	1.09	0.16	0.00231	12	0.22	3.75	17.32
-2050	120	1770.55	1772.18	0.00840	5.28	0.85	0.00841	12	0.64	3.75	5.85
-2075.*	120	1770.34	1771.96	0.00841	5.28	0.86	0.00845	12	0.64	3.75	5.85
-2100.*	120	1770.13	1771.75	0.00848	5.30	0.86	0.00852	12	0.65	3.75	5.80
-2125.*	120	1769.92	1771.54	0.00856	5.32	0.86	0.00843	12	0.64	3.75	5.87
-2150.*	120	1769.70	1771.33	0.00829	5.25	0.85	0.00825	12	0.63	3.75	5.96
-2175.*	120	1769.49	1771.13	0.00821	5.23	0.84	0.00839	12	0.64	3.75	5.82
-2200	121	1769.28	1770.90	0.00858	5.33	0.86	0.00857	12	0.65	3.75	5.77
-2223.2*	121	1769.08	1770.70	0.00856	5.33	0.86	0.00855	12	0.65	3.75	5.79
-2246.5*	121	1768.88	1770.51	0.00853	5.32	0.86	0.00851	12	0.65	3.75	5.78
-2269.75	121	1768.68	1770.31	0.00848	5.31	0.86	0.00845	12	0.64	3.75	5.82
-2373.88	121	1767.80	1769.43	0.00842	5.30	0.86	0.00841	12	0.64	3.75	5.84
-2445.1*	121	1767.20	1768.83	0.00840	5.29	0.85	0.00693	12	0.53	3.75	7.09
-2516.4*	121	1766.60	1768.42	0.00582	4.57	0.70	0.00909	12	0.69	3.75	5.44
-2587.7	131	1766.00	1767.56	0.01160	6.12	1.01	0.01159	12	0.85	3.75	4.43
-2687.7*	131	1764.21	1765.47	0.02336	8.09	1.46	0.01594	12	0.94	3.75	3.99
-2787.7*	131	1762.42	1763.87	0.01462	6.71	1.14	0.01823	12	1.24	3.75	3.03
-2887.7*	131	1760.64	1761.97	0.01987	7.58	1.34	0.01694	12	1.05	3.75	3.56
-2987.7*	131	1758.85	1760.25	0.01644	7.03	1.21	0.01603	12	1.18	3.75	3.17
-3087.7*	131	1757.06	1758.41	0.01867	7.40	1.30	0.01750	12	1.11	3.75	3.39
-3187.7*	131	1755.27	1756.65	0.01726	7.17	1.24	0.01795	12	1.16	3.75	3.23
-3287.7*	131	1753.48	1754.84	0.01813	7.31	1.28	0.01769	12	1.13	3.75	3.33
-3387.7*	131	1751.70	1753.07	0.01764	7.23	1.26	0.01788	12	1.15	3.75	3.27
-3487.7*	131	1749.91	1751.27	0.01816	7.32	1.28	0.01790	12	1.14	3.75	3.29
-3587.7*	131	1748.12	1749.49	0.01779	7.26	1.26	0.01798	12	1.15	3.75	3.25
-3687.7*	131	1746.33	1747.70	0.01800	7.29	1.27	0.01789	12	1.15	3.75	3.27
-3787.7*	131	1744.54	1745.91	0.01798	7.29	1.27	0.01799	12	1.15	3.75	3.25
-3874.1	131	1743.00	1744.37	0.01776	7.25	1.26	0.01787	12	1.15	3.75	3.27

Notes: Riprap design applies to stations -2000 through -3874.10.

Critical Shear Stress Calculations for Channel 2 (HEC-RAS Channel - C2)

Density of Water	62.4	(lb/ft^3)	Angle of Repose (12")	39.5	Bank Side Slope (H:V)	3
Specific Gravity of Riprap	2.4		Angle of Repose (18")	39.8	Bank Side Slope (degrees)	18.43
Density of Riprap	149.76	(lb/ft^3)	Angle of Repose (24")	40.2		

HEC-RAS River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Froude # Chl	Frctn Slope (ft/ft)	Rip-Rap Size Used (in)	Shear Stress on banks & side slopes (lb/ft^2)	Critical Shear Stress on banks & side slopes (lb/ft^2)	Factor of Safety (Banks & Side Slopes)
-2000	89	1757.97	1759.17	0.01310	5.27	1.01	0.01206	12	0.68	3.75	5.54
-2039.97	89	1757.28	1758.43	0.01478	6.23	1.17	0.01381	12	0.74	3.75	5.04
-2079.9*	89	1756.56	1757.63	0.01860	6.83	1.33	0.01653	12	0.83	3.75	4.53
-2119.9*	89	1755.83	1756.92	0.01763	6.69	1.29	0.01811	12	0.92	3.75	4.06
-2159.9*	89	1755.10	1756.18	0.01815	6.77	1.31	0.01789	12	0.90	3.75	4.15
-2200	89	1754.38	1755.46	0.01791	6.73	1.30	0.01803	12	0.91	3.75	4.11
-2239.9*	89	1753.92	1755.06	0.01510	6.29	1.19	0.01394	12	0.74	3.75	5.04
-2279.9*	89	1753.46	1754.64	0.01334	5.99	1.11	0.01280	12	0.71	3.75	5.30
-2319.91	92	1753.00	1754.21	0.01347	6.05	1.11	0.01217	12	0.69	3.75	5.44
-2419.9*	92	1751.00	1751.99	0.02542	7.79	1.56	0.01805	12	0.84	3.75	4.48
-2519.9	92	1749.00	1750.13	0.01689	6.62	1.26	0.02050	12	1.08	3.75	3.48
-2544.9*	92	1748.50	1749.58	0.01937	6.99	1.35	0.01806	12	0.91	3.75	4.11
-2569.9*	92	1748.00	1749.07	0.01964	7.03	1.36	0.01950	12	0.98	3.75	3.84
-2594.9*	92	1747.50	1748.57	0.01976	7.05	1.37	0.01970	12	0.99	3.75	3.80
-2619.9*	92	1747.00	1748.06	0.02025	7.12	1.39	0.02001	12	0.99	3.75	3.78
-2644.9*	92	1746.50	1748.17	0.00452	3.91	0.63	0.00265	12	0.21	3.75	18.12
-2669.88	92	1746.00	1748.19	0.00174	2.67	0.38					

Notes: Riprap design applies to stations -2000.00 through -2669.88.

Appendix D: Reference Material

"Addendum #1 to the Technical Drainage Study for Henderson Commerce Center Two (Formerly known as Harsch)", Prepared by PBS&J (February 2003)

ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY FOR HENDERSON COMMMERCE CENTER TWO (FORMERLY KNOWN AS HARSCH)

Prepared for:

Harsch Investment Properties LLC
1121 SW Salmon Street
Portland, Oregon 97205

Prepared by:

PBS&J
2770 Corporate Circle, Suite 100
Henderson, Nevada 89074

PBS&J Reference Number: 511434
February 18, 2003

PBSJ

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1***************************************                              ***************************************
 *                                     *                              *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                              *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998             *                              *    HYDROLOGIC ENGINEERING CENTER    *
 *           VERSION 4.1               *                              *         609 SECOND STREET           *
 *                                     *                              *      DAVIS, CALIFORNIA 95616        *
 * RUN DATE   07JAN03  TIME  16:37:43  *                              *        (916) 756-1104               *
 *                                     *                              *                                     *
 ***************************************                              ***************************************


                    X     X  XXXXXXX   XXXXX          X
                    X     X  X        X     X        XX
                    X     X  X        X               X
                    XXXXXXX  XXXX     X        XXXXX  X
                    X     X  X        X               X
                    X     X  X        X     X         X
                    X     X  XXXXXXX   XXXXX         XXX


THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                       HEC-1 INPUT                                                   PAGE  1

          LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

             1        ID   TECHNICAL DRAINAGE STUDY FOR HARSCH
             2        ID   FILE - HADEV_R1.DAT
             3        ID   HEC-1 FOR HARSCH
             4        ID   PROJECT NUMBER: 511434
             5        ID
             6        ID   OFFSITE BASINS REFERENCED FROM THE UPDATE TO THE
             7        ID   TECHNICAL DRAINAGE STUDY FOR EASTGATE ROAD (EG02)
             8        ID   PREPARED BY PBS&J, MAY 2002
             9        ID
            10        ID
            11        ID
                      *DIAGRAM
 *** FREE ***
            12        IT       3       0       0     300
            13        IO       5       0       0
            14        IN       5       0       0
            15        JR    PREC    0.59    1.00
                      *

            16        KK OFFD-1A
            17        KM   OFFSITE DEVELOPED BASIN OFFD-1A
            18        KM   REFERENCED FROM EG02
            19        BA  0.0281
            20        PB    2.79
            21        PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
            22        PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
            23        PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
            24        PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
            25        PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
            26        PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
            27        PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
            28        PC    .998    .999    1.00
            29        LS       0      89
            30        UD   0.125
                      *

            31        KK OFFD-1B
            32        KM   OFFSITE DEVELOPED BASIN OFFD-1B
            33        KM   REFERENCED FROM EG02
            34        BA  0.0321
            35        PB    2.79
            36        LS       0      89
            37        UD   0.108
                      *

            38        KK OFFD-M1
            39        KM   OFFSITE DEVELOPED BASIN OFFD-M1
            40        KM   REFERENCED FROM EG02
            41        BA  0.0064
            42        PB    2.79
            43        LS       0      88
            44        UD   0.084
                      *
1                                       HEC-1 INPUT                                                   PAGE  2

          LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
KK    RT-1
KM   ROUTE OFFD-M1 THROUGH COMMERCIAL WAY
RK     420  0.0108   0.015       0    TRAP      15      10
*

KKOFFD-BMIOC
KM   OFFSITE DEVELOPED BASIN OFFD-BMIOC
KM   REFERENCED FROM EG02
BA  0.0052
PB    2.79
LS      0       88
UD   0.105
*

KK      C1
KM   COMBINE OFFD-BMIOC, DIV-1 AND RT-1
HC       3
*

KK    RT-2
KM   ROUTE C1 THROUGH WARM SPRINGS
RK     700   0.004   0.015       0    TRAP      15      10
*

KK  OFFD-2
KM   OFFSITE DEVELOPED BASIN OFFD-2
KM   REFERENCED FROM EG02
BA  0.0060
PB    2.79
LS      0       86
UD   0.063
*

KK      C2
KM   COMBINE OFFD-2 AND RT-2
HC       2
*

KK    RT-3
KM   ROUTE C2 THROUGH WARM SPRINGS
RK     420   0.004   0.015       0    TRAP      15      10
*

KK  OFFD-3
KM   OFFSITE DEVELOPED BASIN OFFD-3
KM   REFERENCED FROM EG02
BA  0.0040
PB    2.79
LS      0       88
UD   0.052
*
```



```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK     CWS
KM   COMBINE OFFD-3 AND RT-3
HC       2
*

KK  DIV-WS
KM   FLOWS DIVERTED INTO WARM SPRINGS ROAD
KM   STORM DRAIN SYSTEM
DTDIV-SDWS
DI       0      36      84
DQ       0      36      75
*

KK OFFD-12
KM   OFFSITE DEVELOPED BASIN OFFD-12
KM   REFERENCED FROM EG02
BA  0.0129
PB    2.79
LS      0       97
UD   0.113
*

KK    ONDS
KM   OFFSITE BASIN 5
KM   REFERENCED FROM EG02
BA  0.0012
PB    2.79
LS      0       98
UD   0.066
*

KK      CX
KM   COMBINE OFFD-12 AND ONDS
HC       2
*

KK   DIV-X
KM   DIVERT FLOW FROM CX INTO EASTGATE SD
```

```
DT DIV-SDX
DI        0       16       28
DQ        0       15       21
*

KK    RT-X
KM   ROUTE DIV-X THROUGH OND-4
RK      600   0.011   0.015        0     TRAP       15       10
*

KK   OND-4
KM   ONSITE DEVELOPED BASIN OND-4
KM   REFERENCED FROM EG02
BA  0.0013
PB    2.79
LS       0       98
```

1 HEC-1 INPUT PAGE 4

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

UD   0.065
*

KK  OND-11
KM   ONSITE DEVELOPED BASIN OND-11
KM   REFERENCED FROM EG02
BA  0.0270
PB    2.79
LS       0       92
UD   0.101
*

KK      C4
KM   COMBINE RT-X, OND-4 AND OND-11
HC       3
*

KK   OND-3
KM   ONSITE DEVELOPED BASIN OND-3
KM   REFERENCED FROM EG02
BA  0.0027
PB    2.79
LS       0       98
UD   0.094
*

KK CULON-2
KM   COMMERCIAL CULDESAC BASIN
KM   REFERENCED FROM EG02
BA  0.0003
PB    2.79
LS       0       98
UD   0.034
*

KK      C5
KM   COMBINE COMB-4 OND-3 AND CULON-2
HC       3
*

KK   DIV-5
KM   DIVERT FLOW FROM C5 INTO EASTGATE SD
DT DIV-SD5
DI        0       30       64
DQ        0       30       64
*

KK  OND-10
KM   ONSITE DEVELOPED BASIN OND-10
KM   REFERENCED FROM EG02
BA  0.0265
PB    2.79
LS       0       92
UD   0.088
*
```

1 HEC-1 INPUT PAGE 5

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK      C14
KM   COMBINE DIV-5, C5, and OND-10
HC       2
*

KK    RT-6
KM   ROUTE C14 THROUGH OND-2
RK      870  0.0146   0.015        0     TRAP       15       10
*

KK MGDEV-1
KM   MILGARD ONSITE BASIN
KM   REFERENCED FROM EG02
BA  0.0061
PB    2.79
```

```
172          LS       0      92
173          UD   0.084
             *

174          KK   OND-2
175          KM   ONSITE DEVELOPED BASIN OND-2
176          KM   REFERENCED FROM EG02
177          BA  0.0028
178          PB    2.79
179          LS       0      98
180          UD   0.077
             *

181          KK     C3A
182          KM   COMBINE RT-6, MODEV-1 AND OND-2
183          HC       3
             *

184          KK OFFD-OS
185          KM   OFFSITE DEVELOPED BASIN OFFD-OS
186          KM   REFERENCED FROM EG02
187          BA  0.0253
188          PB    2.79
189          LS       0      98
190          UD   0.061
             *

191          KK      C6
192          KM   COMBINE C3A AND OFFD-OS
193          HC       2
             *

194          KK   DIV-6
195          KM   DIVERT FLOW FROM C6 INTO EASTGATE SD
196          DT DIV-SD6
197          DI       0      63     120
198          DQ       0      62      88
             *
1                                       HEC-1 INPUT                                              PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


199          KK    RT-7
200          KM   ROUTE DIV-6 THROUGH PART OF OND-1
201          RK     740  0.0146   0.015       0    TRAP      15      10
             *

202          KK     HR7
203          KM   HARSCH ONSITE BASIN
204          BA  0.0025
205          PB    2.79
206          LS       0      92
207          UD   0.086
             *

208          KK     C6A
209          KM   COMBINE RT-7 AND HR7
210          HC       2
             *

211          KK    HR13
212          KM   HARSCH ONSITE BASIN
213          BA  0.0048
214          PB    2.79
215          LS       0      92
216          UD   0.064
             *

217          KK     C6B
218          KM   COMBINE C6A AND HR13 IN EASTGATE ROAD
219          HC       2
             *

220          KK OFFD-M2
221          KM   OFFSITE DEVELOPED BASIN OFFD-M2
222          KM   REFERENCED FROM EG02
223          BA  0.0083
224          PB    2.79
225          LS       0      98
226          UD   0.069
             *

227          KK   RT-10
228          KM   ROUTE OFFD-M2 THROUGH OFFD-4
229          RK     520   0.016   0.015       0    TRAP      15      10
             *

230          KK  OFFD-4
231          KM   OFFSITE DEVELOPED BASIN OFFD-4
232          KM   REFERENCED FROM EG02
233          BA  0.0148
234          PB    2.79
235          LS       0      92
236          UD   0.082
```

```
                        *
1                                       HEC-1 INPUT                                     PAGE  7

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  237         KK      C7
  238         KM   COMBINE OFFD-M2 AND OFFD-4
  239         HC       2
              *

  240         KK     C11
  241         KM   COMBINE C7, C6B
  242         HC       2
              *

  243         KK   RT-11
  244         KM   ROUTE C11 THROUGH PART OF OND-1
  245         RK     400  0.0146   0.015       0    TRAP      15      10
              *

  246         KK   OND-1
  247         KM   ONSITE DEVELOPED BASIN OND-1
  248         KM   REFERENCED FROM EG02
  249         BA  0.0034
  250         PB    2.79
  251         LS       0      98
  252         UD   0.058
              *

  253         KK    HR16
  254         KM   HARSCH ONSITE BASIN
  255         BA  0.0036
  256         PB    2.79
  257         LS       0      92
  258         UD   0.065
              *

  259         KK      C8
  260         KM   COMBINE OND-1, RT-11 AND HR16
  261         HC       3
              *

  262         KK   DIV-8
  263         KM   DIVERT FLOW FROM C8 INTO SD
  264         DT DIV-SD8
  265         DI       0      38     100
  266         DQ       0      11      18
              *

  267         KK      C3
  268         KM   COMBINE DIV-8 AND DIV-WS
  269         HC       2
              *
1                                       HEC-1 INPUT                                     PAGE  8

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  270         KK   RT-12
  271         KM   ROUTE C3 THROUGH WARM SPRINGS
  272         RK     700   0.004   0.015       0    TRAP      88      10
              *

  273         KK    HR18
  274         KM   HARSCH ONSITE BASIN
  275         BA  0.0047
  276         PB    2.79
  277         LS       0      92
  278         UD   0.090
              *

  279         KK     C3B
  280         KM   COMBINE RT-12 AND HR18
  281         HC       2
              *

  282         KK   RT-3B
  283         KM   ROUTE C3B THROUGH WARM SPRINGS
  284         RK     500   0.004   0.015       0    TRAP      88      10
              *

  285         KK OFFD-14
  286         KM   OFFSITE DEVELOPED BASIN OFFD-14
  287         KM   REFERENCED FROM EG02
  288         BA  0.0028
  289         PB    2.79
  290         LS       0      88
  291         UD   0.200
              *

  292         KK  RT-B14
  293         KM   ROUTE OFFD-14 THROUGH BMIC-1
  294         RK    1050   0.014   0.013       0    TRAP      15      10
              *
```

```
 295          KK  BMIC-1
 296          KM   ONSITE DEVELOPED BASIN BMIC-1
 297          KM   REFERENCED FROM EG02
 298          BA  0.0141
 299          PB    2.79
 300          LS       0      92
 301          UD   0.081
              *

 302          KK     C15
 303          KM   COMBINE RT-B14, AND BMIC-1
 304          HC       2
              *
1                                         HEC-1 INPUT                                          PAGE  9

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 305          KK   RT-14
 306          KM   ROUTE C15 THROUGH BMIC-2
 307          RK     450   0.018   0.013       0    TRAP      15      10
              *

 308          KK  BMIC-2
 309          KM   ONSITE DEVELOPED BASIN BMIC-2
 310          KM   REFERENCED FROM EG02
 311          BA  0.0118
 312          PB    2.79
 313          LS       0      92
 314          UD   0.073
              *

 315          KK     C16
 316          KM   COMBINE RT-14, AND BMIC-2
 317          HC       2
              *

 318          KK   RT-15
 319          KM   ROUTE C16 THROUGH SCH-2
 320          RK     400   0.019   0.013       0    TRAP      15      10
              *

 321          KK   SCH-2
 322          KM   ONSITE DEVELOPED BASIN SCH-2
 323          KM   REFERENCED FROM EG02
 324          BA  0.0065
 325          PB    2.79
 326          LS       0      92
 327          UD   0.060
              *

 328          KK     C17
 329          KM   COMBINE RT-15 AND SCH-2
 330          HC       2
              *

 331          KK   RT-16
 332          KM   ROUTE C17 THROUGH BMIC-3
 333          RK     750   0.013   0.013       0    TRAP      15      10
              *

 334          KK  BMIC-3
 335          KM   ONSITE DEVELOPED BASIN BMIC-3
 336          KM   REFERENCED FROM EG02
 337          BA  0.0106
 338          PB    2.79
 339          LS       0      92
 340          UD   0.062
              *
1                                         HEC-1 INPUT                                          PAGE 10

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 341          KK MGDEV-2
 342          KM   MILGARD MANUFACTURING ONSITE BASIN
 343          KM   REFERENCED FROM EG02
 344          BA  0.0093
 345          PB    2.79
 346          LS       0      92
 347          UD   0.075
              *

 348          KK   OFFD1
 349          KM   OFFSITE BASIN 1
 350          BA  0.1080
 351          PB    2.79
 352          LS       0      77
 353          UD   0.417
              *

 354          KK     C18
 355          KM   COMBINE RT-16, BMIC-3, MGDEV-2, & OFFD1
 356          HC       4
```

```
                  *
   357            KK     HR3
   358            KM   HARSCH ONSITE BASIN
   359            BA  0.0014
   360            PB    2.79
   361            LS       0      92
   362            UD   0.049
                  *
   363            KK     HR2
   364            KM   HARSCH ONSITE BASIN
   365            BA  0.0016
   366            PB    2.79
   367            LS       0      98
   368            UD   0.037
                  *
   369            KK     HR1
   370            KM   HARSCH ONSITE BASIN
   371            BA  0.0015
   372            PB    2.79
   373            LS       0      92
   374            UD    0.05
                  *
   375            KK    CHR1
   376            KM   COMBINE HR3, HR2, HR1,
   377            KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
   378            KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H1"
   379            KM   ON FIGURE 7
   380            HC       3
                  *
1                                          HEC-1 INPUT                                        PAGE 11

 LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   381            KK    C18B
   382            KM   COMBINE C18 AND CHR1 IN MAIN STORM DRAIN
   383            KM   SYSTEM LABELED H7 ON FIGURE 7
   384            HC       2
                  *
   385            KK     HR6
   386            KM   HARSCH ONSITE BASIN
   387            BA  0.0027
   388            PB    2.79
   389            LS       0      92
   390            UD   0.047
                  *
   391            KK     HR5
   392            KM   HARSCH ONSITE BASIN
   393            BA  0.0078
   394            PB    2.79
   395            LS       0      98
   396            UD   0.034
                  *
   397            KK     HR4
   398            KM   HARSCH ONSITE BASIN
   399            BA  0.0078
   400            PB    2.79
   401            LS       0      98
   402            UD   0.034
                  *
   403            KK    CHR2
   404            KM   COMBINE HR4, HR5, HR6
   405            KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
   406            KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H2"
   407            KM   ON FIGURE 7
   408            HC       3
                  *
   409            KK    C18C
   410            KM   COMBINE C18B AND CHR2 IN MAIN STORM DRAIN
   411            KM   SYSTEM LABELED H7 ON FIGURE 7
   412            HC       2
                  *
   413            KK    HR10
   414            KM   HARSCH ONSITE BASIN
   415            BA  0.0050
   416            PB    2.79
   417            LS       0      92
   418            UD   0.046
                  *
1                                          HEC-1 INPUT                                        PAGE 12

 LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   419            KK     HR9
```

```
420          KM   HARSCH ONSITE BASIN
421          BA  0.0048
422          PB    2.79
423          LS       0       92
424          UD   0.046
             *

425          KK     CHR3
426          KM   COMBINE HR10 AND HR9
427          KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
428          KM   STORM DRAIN SYSTEM LABELED ALIGNMENT *H6*
429          KM   ON FIGURE 7
430          HC       2
             *

431          KK      HR8
432          KM   HARSCH ONSITE BASIN
433          BA  0.0031
434          PB    2.79
435          LS       0       92
436          UD   0.061
             *

437          KK     C18D
438          KM   COMBINE C18C, CHR3 AND HR8 IN MAIN STORM DRAIN
439          KM   SYSTEM LABELED H7 ON FIGURE 7
440          HC       3
             *

441          KK  BMIC-4
442          KM   ONSITE DEVELOPED BASIN BMIC-4
443          KM   REFERENCED FROM EG02
444          BA  0.0098
445          PB    2.79
446          LS       0       92
447          UD   0.057
             *

448          KK     C18E
449          KM   COMBINE C18D AND BMIC-4 IN MAIN STORM DRAIN
450          KM   SYSTEM LABELED H7 ON FIGURE 7
451          HC       2
             *

452          KK     HR14
453          KM   HARSCH ONSITE BASIN
454          BA  0.0021
455          PB    2.79
456          LS       0       98
457          UD   0.034
             *
```

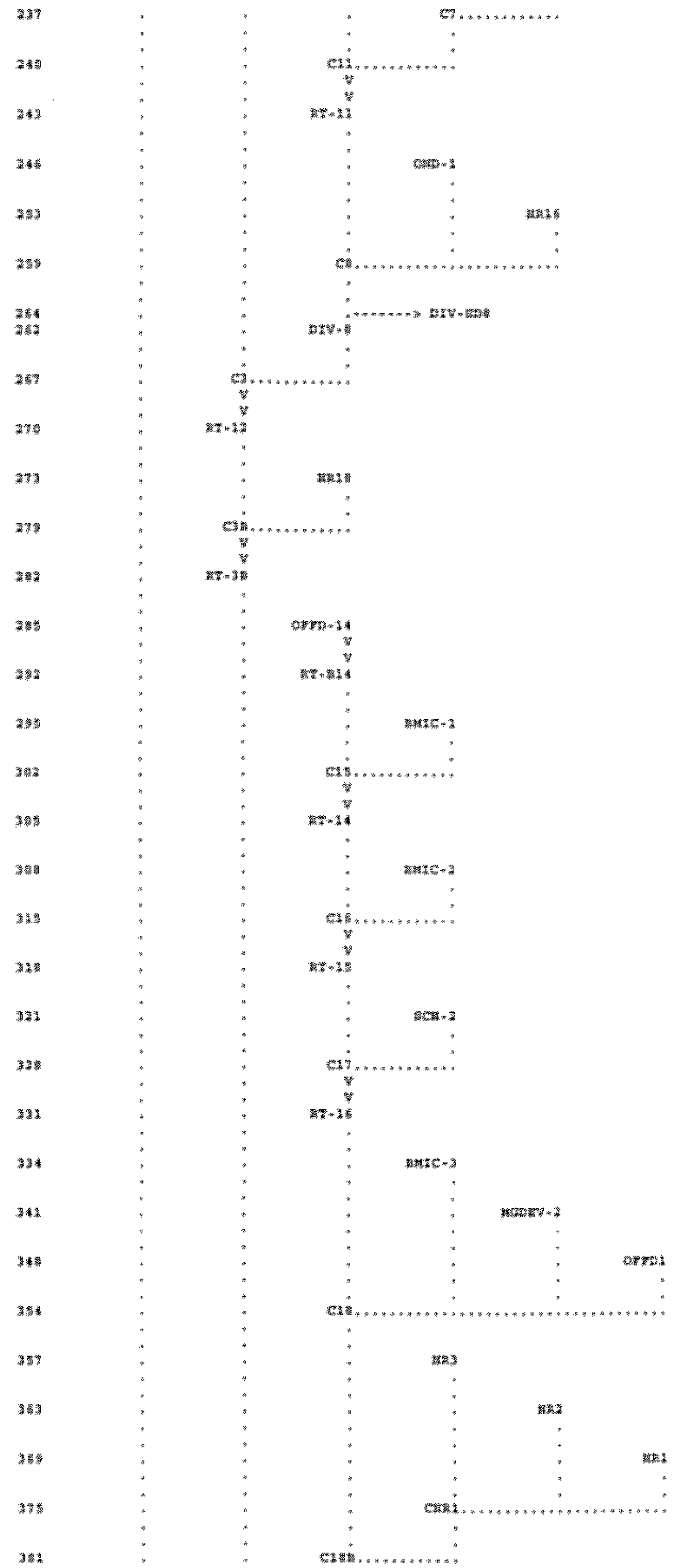


```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

458          KK     HR11
459          KM   HARSCH ONSITE BASIN
460          BA  0.0046
461          PB    2.79
462          LS       0       98
463          UD   0.034
             *

464          KK     CHR4
465          KM   COMBINE HR14 AND HR11
466          KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
467          KM   STORM DRAIN SYSTEM LABELED ALIGNMENT *H8*
468          KM   ON FIGURE 7
469          HC       2
             *

470          KK     HR12
471          KM   HARSCH ONSITE BASIN
472          BA  0.0028
473          PB    2.79
474          LS       0       98
475          UD   0.035
             *

476          KK     HR17
477          KM   HARSCH ONSITE BASIN
478          BA  0.0035
479          PB    2.79
480          LS       0       98
481          UD   0.030
             *

482          KK     HR15
483          KM   HARSCH ONSITE BASIN
484          BA  0.0014
485          PB    2.79
486          LS       0       98
487          UD   0.032
             *
```

```
        488          KK    CHR5
        489          KM   COMBINE CHR4, HR12, HR17 AND HR15
        490          KM   THESE FLOWS ARE DISCHARGED INTO THE ONSITE
        491          KM   STORM DRAIN SYSTEM LABELED ALIGNMENT "H3"
        492          KM   ON FIGURE 7
        493          HC       4
                     *

        494          KK     C22
        495          KM   COMBINE C18E AND CHR5 AT ENTRANCE TO
        496          KM   EXISTING RCB'S UNDER WARM SPRINGS
        497          HC       2
                     *
1                                          HEC-1 INPUT                                          PAGE 14

       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


        498          KK OFFD-13
        499          KM   OFFSITE DEVELOPED BASIN OFFD-13
        500          KM   REFERENCED FROM EG02
        501          KM   DISCHARGES INTO EASTGATE STORM DRAIN SYSTEM
        502          BA  0.0044
        503          PB    2.79
        504          LS       0      96
        505          UD   0.050
                     *

        506          KK   SCH-1
        507          KM   ONSITE DEVELOPED BASIN SCH-1
        508          KM   REFERENCED FROM EG02
        509          BA  0.0073
        510          PB    2.79
        511          LS       0      92
        512          UD   0.062
                     *

        513          KK CULON-1
        514          KM   COMMERCIAL WAY CULDESAC ONSITE BASIN 1
        515          KM   REFERENCED FROM EG02
        516          BA  0.0013
        517          PB    2.79
        518          LS       0      98
        519          UD   0.043
                     *

        520          KK     C23
        521          KM   COMBINE SCH-1 AND CULON-1
        522          KM   TOTAL FLOW ENTERING CULDESAC DROP INLETS
        523          HC       2
                     *
        524          ZZ
```

```
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

  16     OFFD-1A
                .
                .
  31            .    OFFD-1B
                .          .
                .          .
  38            .          .     OFFD-M1
                .          .           V
                .          .           V
  45            .          .        RT-1
                .          .           .
                .          .           .
  48            .          .           .    OFFD-BM1
                .          .           .           .
                .          .           .           .
  55            .         C1.........................
                .          V
                .          V
  58            .       RT-2
                .          .
                .          .
  61            .          .      OFFD-2
                .          .           .
                .          .           .
  68            .         C2............
                .          V
                .          V
  71            .       RT-3
                .          .
                .          .
  74            .          .      OFFD-3
                .          .           .
                .          .           .
  81            .        CMB............
                .          .
```

```
 87       .         .-------->DIV-SDNS
 84       .      DIV-NS
 90       .         .       OFFD-12
 97       .         .          .          OND5
104       .         .          CX............
109       .         .          .--------> DIV-SDX
107       .         .       DIV-X
                               V
                               V
112       .         .        RT-X
115       .         .          .         OND-4
122       .         .          .             .         OND-11
129       .         .          C4........................
132       .         .          .         OND-3
139       .         .          .             .         CULON-3
146       .         .          C5........................
151       .         .          .--------> DIV-SD5
149       .         .       DIV-5
154       .         .          .        OND-10
161       .         .         C14............
                               V
                               V
164       .         .        RT-6
167       .         .          .       MODEV-1
174       .         .          .             .          OND-2
181       .         .         C3A........................
184       .         .          .       OFFD-O8
191       .         .          C6............
196       .         .          .--------> DIV-SD6
194       .         .       DIV-6
                               V
                               V
199       .         .        RT-7
202       .         .          .           MR7
208       .         .         C6A............
211       .         .          .           MR13
217       .         .         C6B............
220       .         .          .       OFFD-M2
                                             V
                                             V
227       .         .          .         RT-10
230       .         .          .             .          OFFD-4
```


C7
C11
RT-11
GHD-1
HR16
C8
DIV-SD8
DIV-8
C3
RT-12
HR18
C3B
RT-3B
OFFD-14
RT-B14
BMIC-1
C15
RT-14
BMIC-2
C16
RT-15
SCH-2
C17
RT-16
BMIC-3
MODEV-2
OFFD1
C18
HR3
HR2
HR1
CHR1
C18B

```
                .           .           .
                .           .           .
  385           .           .           .         HR6
                .           .           .           .
                .           .           .           .
  391           .           .           .           .         HR5
                .           .           .           .           .
                .           .           .           .           .
  397           .           .           .           .           .         HR4
                .           .           .           .           .           .
                .           .           .           .           .           .
  403           .           .           .        CHR2........................
                .           .           .           .
                .           .           .           .
  409           .           .        C18C............
                .           .           .
                .           .           .
  413           .           .           .        HR10
                .           .           .           .
                .           .           .           .
  419           .           .           .           .         HR9
                .           .           .           .           .
                .           .           .           .           .
  425           .           .           .        CHR3............
                .           .           .           .
                .           .           .           .
  431           .           .           .           .         HR8
                .           .           .           .           .
                .           .           .           .           .
  437           .           .        C18D........................
                .           .           .
                .           .           .
  441           .           .           .      BHIC-4
                .           .           .           .
                .           .           .           .
  448           .           .        C18E............
                .           .           .
                .           .           .
  452           .           .           .        HR14
                .           .           .           .
                .           .           .           .
  458           .           .           .           .        HR11
                .           .           .           .           .
                .           .           .           .           .
  464           .           .           .        CHR4............
                .           .           .           .
                .           .           .           .
  470           .           .           .           .        HR12
                .           .           .           .           .
                .           .           .           .           .
  476           .           .           .           .           .        HR17
                .           .           .           .           .           .
                .           .           .           .           .           .
  482           .           .           .           .           .           .        HR15
                .           .           .           .           .           .           .
                .           .           .           .           .           .           .
  488           .           .           .        CHR5....................................
                .           .           .           .
                .           .           .           .
  494           .           .         C22............
                .           .           .
                .           .           .
  498           .           .           .     OFFD-13
                .           .           .           .
                .           .           .           .
  506           .           .           .           .       SCH-1
                .           .           .           .           .
                .           .           .           .           .
  513           .           .           .           .           .     CULCH-1
                .           .           .           .           .           .
                .           .           .           .           .           .
  520           .           .           .           .         C23............

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *            VERSION 4.1               *
 *                                      *
 * RUN DATE   07JAN03  TIME  16:37:43   *
 *                                      *
 ****************************************

 ****************************************
 *                                      *
 *   U.S. ARMY CORPS OF ENGINEERS       *
 *   HYDROLOGIC ENGINEERING CENTER      *
 *          609 SECOND STREET           *
 *       DAVIS, CALIFORNIA 95616        *
 *          (916) 756-1104              *
 *                                      *
 ****************************************

                  TECHNICAL DRAINAGE STUDY FOR HARSCH
                  FILE - HADEV_R1.DAT
                  HEC-1 FOR HARSCH
                  PROJECT NUMBER: 511434

                  OFFSITE BASINS REFERENCED FROM THE UPDATE TO THE
                  TECHNICAL DRAINAGE STUDY FOR EASTGATE ROAD (EG03)
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                         PREPARED BY FBS&J, MAY 2002


  13 IO         OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                      NMIN           3  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1    0  ENDING DATE
                    NDTIME        1457  ENDING TIME
                    ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .05 HOURS
                       TOTAL TIME BASE   14.95 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

     JP         MULTI-PLAN OPTION
                     NPLAN           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                      .58     1.00

        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


1

               PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                               FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                              TIME TO PEAK IN HOURS


                                                                 RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                         .58     1.00

 HYDROGRAPH AT
+                OFFD-1A      .03      1    FLOW         19.      43.
                                            TIME        3.55     3.55

 HYDROGRAPH AT
+                OFFD-1B      .03      1    FLOW         23.      52.
                                            TIME        3.55     3.55

 HYDROGRAPH AT
+                OFFD-M1      .01      1    FLOW          4.      10.
                                            TIME        3.55     3.55

 ROUTED TO
+                   RT-1      .01      1    FLOW          4.      10.
                                            TIME        3.55     3.55

 HYDROGRAPH AT
+               OFFD-BMI      .01      1    FLOW          3.       8.
                                            TIME        3.55     3.55

  3 COMBINED AT
+                     C1      .04      1    FLOW         31.      73.
                                            TIME        3.55     3.55

 ROUTED TO
+                   RT-2      .04      1    FLOW         29.      68.
                                            TIME        3.60     3.55

 HYDROGRAPH AT
+                 OFFD-2      .01      1    FLOW          4.      10.
                                            TIME        3.50     3.50

  2 COMBINED AT
+                     C2      .05      1    FLOW         33.      77.
                                            TIME        3.55     3.55

 ROUTED TO
+                   RT-3      .05      1    FLOW         32.      76.
                                            TIME        3.60     3.55

 HYDROGRAPH AT
+                 OFFD-3      .01      1    FLOW          5.      11.
                                            TIME        3.50     3.50
```

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  2 COMBINED AT
+                CW8        .06     1   FLOW        36.      84.
                                        TIME       3.55     3.55

 DIVERSION TO
+            DIV-SDW8       .06     1   FLOW        36.      75.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+              DIV-W8       .06     1   FLOW         0.       9.
                                        TIME        .00     3.55

 HYDROGRAPH AT
+             OFFD-12       .01     1   FLOW        14.      26.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+                OND5       .00     1   FLOW         2.       3.
                                        TIME       3.50     3.50

  2 COMBINED AT
+                  CX       .01     1   FLOW        16.      28.
                                        TIME       3.55     3.55

 DIVERSION TO
+              DIV-SDX      .01     1   FLOW        15.      21.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+               DIV-X       .01     1   FLOW         1.       7.
                                        TIME       3.55     3.55

 ROUTED TO
+                RT-X       .01     1   FLOW         1.       7.
                                        TIME       3.60     3.55

 HYDROGRAPH AT
+               OND-4       .00     1   FLOW         2.       3.
                                        TIME       3.50     3.50

 HYDROGRAPH AT
+              OND-11       .03     1   FLOW        24.      49.
                                        TIME       3.55     3.55

  3 COMBINED AT
+                  C4       .04     1   FLOW        26.      58.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+               OND-3       .00     1   FLOW         3.       6.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+             CULON-2       .00     1   FLOW         0.       1.
                                        TIME       3.50     3.50

  3 COMBINED AT
+                  C5       .05     1   FLOW        30.      64.
                                        TIME       3.55     3.55

 DIVERSION TO
+             DIV-SD5       .05     1   FLOW        30.      64.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+               DIV-5       .05     1   FLOW         0.       0.
                                        TIME        .00      .00

 HYDROGRAPH AT
+              OND-10       .03     1   FLOW        24.      48.
                                        TIME       3.55     3.55

  2 COMBINED AT
+                 C14       .07     1   FLOW        24.      48.
                                        TIME       3.55     3.55

 ROUTED TO
+                RT-6       .07     1   FLOW        23.      48.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+             MODEV-1       .01     1   FLOW         5.      11.
                                        TIME       3.55     3.50

 HYDROGRAPH AT
+               OND-2       .00     1   FLOW         3.       6.
                                        TIME       3.50     3.50

  3 COMBINED AT
+                 C3A       .08     1   FLOW        32.      65.
                                        TIME       3.55     3.55

 HYDROGRAPH AT
+             OFFD-08       .03     1   FLOW        33.      57.
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                                                  TIME         3.50      3.50

  2 COMBINED AT
+                        C6        .11     1    FLOW          63.       120.
                                                TIME         3.50      3.50

 DIVERSION TO
+                   DIV-SD6        .11     1    FLOW          62.        88.
                                                TIME         3.50      3.50

 HYDROGRAPH AT
+                     DIV-6        .11     1    FLOW           1.        32.
                                                TIME         3.50      3.50

 ROUTED TO
+                      RT-7        .11     1    FLOW           1.        30.
                                                TIME         3.55      3.55

 HYDROGRAPH AT
+                       HR7        .00     1    FLOW           2.         5.
                                                TIME         3.55      3.55

  2 COMBINED AT
+                       C6A        .11     1    FLOW           3.        35.
                                                TIME         3.55      3.55

 HYDROGRAPH AT
+                      HR13        .00     1    FLOW           5.         9.
                                                TIME         3.50      3.50

  2 COMBINED AT
+                       C6B        .11     1    FLOW           8.        43.
                                                TIME         3.50      3.55

 HYDROGRAPH AT
+                   OFFD-H2        .01     1    FLOW          10.        18.
                                                TIME         3.50      3.50

 ROUTED TO
+                     RT-10        .01     1    FLOW          10.        18.
                                                TIME         3.50      3.50

 HYDROGRAPH AT
+                    OFFD-4        .01     1    FLOW          13.        27.
                                                TIME         3.55      3.50

  2 COMBINED AT
+                        C7        .02     1    FLOW          23.        45.
                                                TIME         3.50      3.50

  2 COMBINED AT
+                       C11        .14     1    FLOW          31.        88.
                                                TIME         3.50      3.50

 ROUTED TO
+                     RT-11        .14     1    FLOW          30.        87.
                                                TIME         2.55      3.55

 HYDROGRAPH AT
+                     GWD-1        .00     1    FLOW           4.         8.
                                                TIME         3.50      3.50

 HYDROGRAPH AT
+                      HR16        .00     1    FLOW           3.         7.
                                                TIME         3.50      3.50

  3 COMBINED AT
+                        C8        .14     1    FLOW          38.       100.
                                                TIME         3.50      3.55

 DIVERSION TO
+                   DIV-SD8        .14     1    FLOW          11.        18.
                                                TIME         3.50      3.55

 HYDROGRAPH AT
+                     DIV-8        .14     1    FLOW          27.        82.
                                                TIME         3.50      3.55

  2 COMBINED AT
+                        C3        .20     1    FLOW          27.        91.
                                                TIME         3.50      3.55

 ROUTED TO
+                     RT-12        .20     1    FLOW          27.        91.
                                                TIME         3.55      3.55

 HYDROGRAPH AT
+                      HR18        .00     1    FLOW           4.         9.
                                                TIME         3.55      3.55

  2 COMBINED AT
+                       C3B        .20     1    FLOW          31.        99.
                                                TIME         3.55      3.55

 ROUTED TO
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```
*              RT-3B      .20     1   FLOW         30.        95.
                                      TIME        3.60       3.55

 HYDROGRAPH AT
*            OFFD-14      .00     1   FLOW          1.         4.
                                      TIME        3.65       3.60

 ROUTED TO
*             RT-B14      .00     1   FLOW          1.         3.
                                      TIME        3.70       3.65

 HYDROGRAPH AT
*             BNIC-1      .01     1   FLOW         13.        26.
                                      TIME        3.55       3.50

  2 COMBINED AT
*                C15      .02     1   FLOW         14.        28.
                                      TIME        3.55       3.55

 ROUTED TO
*              RT-14      .02     1   FLOW         14.        28.
                                      TIME        3.55       3.55

 HYDROGRAPH AT
*             BNIC-2      .01     1   FLOW         11.        22.
                                      TIME        3.50       3.50

  2 COMBINED AT
*                C16      .03     1   FLOW         24.        50.
                                      TIME        3.55       3.50

 ROUTED TO
*              RT-15      .03     1   FLOW         24.        50.
                                      TIME        3.55       3.55

 HYDROGRAPH AT
*              SCH-2      .01     1   FLOW          6.        13.
                                      TIME        3.50       3.50

  2 COMBINED AT
*                C17      .04     1   FLOW         29.        62.
                                      TIME        3.55       3.50

 ROUTED TO
*              RT-16      .04     1   FLOW         29.        61.
                                      TIME        3.55       3.55

 HYDROGRAPH AT
*             BNIC-3      .01     1   FLOW         10.        21.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*            MGCRV-2      .01     1   FLOW          8.        18.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*              OFFD1      .11     1   FLOW         14.        56.
                                      TIME        3.95       3.90

  4 COMBINED AT
*                C18      .16     1   FLOW         50.       120.
                                      TIME        3.55       3.55

 HYDROGRAPH AT
*                HR3      .00     1   FLOW          1.         3.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*                HR2      .00     1   FLOW          2.         4.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*                HR1      .00     1   FLOW          2.         3.
                                      TIME        3.50       3.50

  3 COMBINED AT
*               CHR1      .00     1   FLOW          5.        10.
                                      TIME        3.50       3.50

  2 COMBINED AT
*               C18B      .17     1   FLOW         54.       127.
                                      TIME        3.55       3.55

 HYDROGRAPH AT
*                HR6      .00     1   FLOW          3.         6.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*                HR5      .01     1   FLOW         11.        19.
                                      TIME        3.50       3.50

 HYDROGRAPH AT
*                HR4      .01     1   FLOW         11.        19.
                                      TIME        3.50       3.50
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  3 COMBINED AT
+                   CHR2       .02      1    FLOW          24.       44.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                   C18C       .19      1    FLOW          78.      169.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR10       .00      1    FLOW           5.       10.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                    HR9       .00      1    FLOW           5.       10.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                   CHR3       .01      1    FLOW          10.       20.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                    HR8       .00      1    FLOW           3.        6.
                                             TIME         3.50      3.50

  3 COMBINED AT
+                   C18D       .20      1    FLOW          91.      195.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                 BHIC-4       .01      1    FLOW          10.       20.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                   C18E       .21      1    FLOW         100.      215.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR14       .00      1    FLOW           3.        5.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR11       .00      1    FLOW           6.       11.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                   CHR4       .01      1    FLOW           9.       16.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR12       .00      1    FLOW           4.        7.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR17       .00      1    FLOW           5.        9.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                   HR15       .00      1    FLOW           2.        3.
                                             TIME         3.50      3.50

  4 COMBINED AT
+                   CHR5       .01      1    FLOW          20.       35.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                    C22       .22      1    FLOW         120.      250.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                OFFD-13       .00      1    FLOW           5.       10.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                  SCH-1       .01      1    FLOW           7.       14.
                                             TIME         3.50      3.50

 HYDROGRAPH AT
+                CULGN-1       .00      1    FLOW           2.        3.
                                             TIME         3.50      3.50

  2 COMBINED AT
+                    C23       .01      1    FLOW           9.       18.
                                             TIME         3.50      3.50
1
                                             SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                                 (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                     INTERPOLATED TO
                                                                                  COMPUTATION INTERVAL
            ISTAQ    ELEMENT      DT        PEAK    TIME TO     VOLUME       DT       PEAK    TIME TO     VOLUME
                                                      PEAK                                      PEAK

                                 (MIN)     (CFS)     (MIN)       (IN)      (MIN)     (CFS)     (MIN)       (IN)

           FOR PLAN = 1  RATIO=  .58
               RT-1  MANE          .62      4.44    214.19        .67       3.00      4.38    213.00         .67
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2281E+00 EXCESS= .0000E+00 OUTFLOW= .2284E+00 BASIN STORAGE= .4808E-08 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
              RT-1  MANE          .61      10.20     213.12       1.63       3.00      10.19     213.00         1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5573E+00 EXCESS= .0000E+00 OUTFLOW= .5578E+00 BASIN STORAGE= .4890E-09 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
              RT-2  MANE          .87      30.66     214.70        .71       3.00      29.28     216.00          .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1648E+01 EXCESS= .0000E+00 OUTFLOW= .1651E+01 BASIN STORAGE= .1019E-06 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO= 1.00
              RT-2  MANE          .85      69.07     213.95       1.69       3.00      67.93     213.00         1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3940E+01 EXCESS= .0000E+00 OUTFLOW= .3945E+01 BASIN STORAGE= .1082E-06 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
              RT-3  MANE          .61      32.92     214.58        .70       3.00      32.39     216.00          .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1864E+01 EXCESS= .0000E+00 OUTFLOW= .1865E+01 BASIN STORAGE= .1875E-06 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
              RT-3  MANE          .40      77.01     213.87       1.69       3.00      75.58     213.00         1.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4467E+01 EXCESS= .0000E+00 OUTFLOW= .4469E+01 BASIN STORAGE= .2059E-06 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
              RT-X  MANE         1.35        .98     215.44        .08       3.00        .96     216.00          .08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6142E-01 EXCESS= .0000E+00 OUTFLOW= .6159E-01 BASIN STORAGE= .1340E-07 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO= 1.00
              RT-X  MANE          .83       7.02     214.44        .27       3.00       6.88     213.00          .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2048E+00 EXCESS= .0000E+00 OUTFLOW= .2057E+00 BASIN STORAGE= .1172E-07 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .58
              RT-6  MANE          .86      23.42     213.70        .33       3.00      23.30     213.00          .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1274E+01 EXCESS= .0000E+00 OUTFLOW= .1276E+01 BASIN STORAGE= .4200E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
              RT-6  MANE          .65      48.13     213.75        .72       3.00      48.09     213.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2775E+01 EXCESS= .0000E+00 OUTFLOW= .2778E+01 BASIN STORAGE= .3022E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
              RT-7  MANE         1.49        .98     212.80        .01       3.00        .98     213.00          .01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5812E-01 EXCESS= .0000E+00 OUTFLOW= .5834E-01 BASIN STORAGE= .2055E-07 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO= 1.00
              RT-7  MANE          .69      31.47     211.26        .11       3.00      29.95     213.00          .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6002E+00 EXCESS= .0000E+00 OUTFLOW= .6035E+00 BASIN STORAGE= .2260E-07 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .58
             RT-10  MANE          .57      10.32     210.92       1.40       3.00       9.99     210.00         1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6183E+00 EXCESS= .0000E+00 OUTFLOW= .6190E+00 BASIN STORAGE= .5310E-08 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
             RT-10  MANE          .55      18.20     210.94       2.56       3.00      17.73     210.00         2.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1133E+01 EXCESS= .0000E+00 OUTFLOW= .1134E+01 BASIN STORAGE= .6385E-08 PERCENT ERROR=   -.1
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          FOR PLAN = 1  RATIO=  .58
            RT-11  MANE          .40     30.70    211.00       .24      3.00     30.47    213.00         .24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1740E+01 EXCESS= .0000E+00 OUTFLOW= .1740E+01 BASIN STORAGE= .3737E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
            RT-11  MANE          .28     87.73    210.66       .56      3.00     87.15    213.00         .56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4051E+01 EXCESS= .0000E+00 OUTFLOW= .4052E+01 BASIN STORAGE= .3888E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
            RT-12  MANE         1.33     26.66    213.92       .15      3.00     26.61    213.00         .15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1540E+01 EXCESS= .0000E+00 OUTFLOW= .1546E+01 BASIN STORAGE= .7279E-05 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO= 1.00
            RT-12  MANE          .95     90.85    214.01       .37      3.00     90.61    213.00         .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3862E+01 EXCESS= .0000E+00 OUTFLOW= .3878E+01 BASIN STORAGE= .1004E-04 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .58
            RT-3B  MANE         1.02     30.32    215.52       .16      3.00     30.03    216.00         .16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1771E+01 EXCESS= .0000E+00 OUTFLOW= .1774E+01 BASIN STORAGE= .1707E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO= 1.00
            RT-3B  MANE          .64     98.33    214.07       .40      3.00     94.93    213.00         .40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4366E+01 EXCESS= .0000E+00 OUTFLOW= .4374E+01 BASIN STORAGE= .1547E-04 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .58
           RT-B14  MANE         1.81      1.48    221.29       .67      3.00      1.47    222.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E-01 EXCESS= .0000E+00 OUTFLOW= .9993E-01 BASIN STORAGE= .6325E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO= 1.00
           RT-B14  MANE         1.49      3.52    219.64      1.63      3.00      3.50    219.00        1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2435E+00 EXCESS= .0000E+00 OUTFLOW= .2441E+00 BASIN STORAGE= .6533E-07 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .58
            RT-14  MANE          .51     13.53    213.16       .86      3.00     13.52    213.00         .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7779E+00 EXCESS= .0000E+00 OUTFLOW= .7781E+00 BASIN STORAGE= .5333E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
            RT-14  MANE          .38     28.40    212.96      1.91      3.00     28.40    213.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1721E+01 EXCESS= .0000E+00 OUTFLOW= .1721E+01 BASIN STORAGE= .5714E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
            RT-15  MANE          .35     23.91    213.26       .88      3.00     23.90    213.00         .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1346E+01 EXCESS= .0000E+00 OUTFLOW= .1346E+01 BASIN STORAGE= .6782E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
            RT-15  MANE          .38     49.80    211.09      1.93      3.00     49.66    213.00        1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2958E+01 EXCESS= .0000E+00 OUTFLOW= .2958E+01 BASIN STORAGE= .7275E-07 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .58
            RT-16  MANE          .67     39.34    213.15       .88      3.00     39.34    213.00         .88

*** NORMAL END OF HEC-1 ***
```

FLOW SUMMARY TABLE FOR DEVELOPED CONDITIONS

BASIN ID	10-YEAR (cfs)	100-YEAR (CFS)	VELOCITY (ft/s)	AREA (acre)	BASIN ID	10-YEAR (cfs)	100-YEAR (CFS)	VELOCITY (ft/s)	AREA (acre)
OFFD-1A	19.0	43.0	4.4	18.0	BMIC-1	13.0	26.0	4.2	9.0
OFFD-1B	23.0	52.0	6.2	20.6	C15	14.0	28.0	N/A	N/A
OFFD-M1	4.0	10.0	2.5	4.1	BMIC-2	11.0	22.0	3.6	7.5
OFFD-BMIOC	3.0	8.0	2.2	3.3	C16	24.0	50.0	N/A	N/A
C1	31.0	70.0	N/A	N/A	SCH-2	6.0	13.0	3.4	4.2
OFFD-2	4.0	10.0	3.5	3.9	C17	29.0	62.0	N/A	N/A
C2	33.0	77.0	N/A	N/A	BMIC-3	10.0	21.0	4.1	6.8
OFFD-3	5.0	11.0	4.1	3.8	MGDEV-2	8.0	18.0	3.4	5.9
CWS	36.0	84.0	N/A	N/A	OFFD1	14.0	56.0	6.6	69.1
OFFD-12	14.0	26.0	3.9	8.2	C18	50.0	120.0	N/A	N/A
OND5	2.0	3.0	1.7	0.8	HR3	1.0	3.0	2.8	0.9
CX	16.0	28.0	N/A	N/A	HR2	2.0	4.0	3.1	1.0
OND-4	2.0	3.0	2.1	0.8	HR1	2.0	3.0	2.6	1.0
OND-11	24.0	49.0	6.4	17.3	CHR1	5.0	10.0	N/A	N/A
C4	26.0	58.0	N/A	N/A	C18B	54.0	127.0	N/A	N/A
OND-3	3.0	6.0	2.0	1.7	HR6	3.0	6.0	3.3	1.7
CULON-2	<1	1.0	1.3	0.2	HR5	11.0	19.0	4.7	5.0
C5	30.0	54.0	N/A	N/A	HR4	11.0	19.0	4.7	5.0
OND-10	24.0	48.0	0.7	17.0	CHR2	24.0	44.0	N/A	N/A
C14	24.0	48.0	N/A	N/A	C18C	78.0	169.0	N/A	N/A
MGDEV-1	5.0	11.0	2.4	3.9	HR10	5.0	10.0	3.3	3.2
OND-2	3.0	6.0	2.7	1.8	HR9	5.0	10.0	3.3	3.1
C3A	32.0	65.0	N/A	N/A	CHR3	10.0	20.0	N/A	N/A
OFFD-OS	33.0	57.0	6.2	16.2	HR8	3.0	6.0	3.0	2.0
C6	63.0	120.0	N/A	N/A	C18D	91.0	195.0	N/A	N/A
HR7	2.0	6.0	2.3	1.6	BMIC-4	10.0	20.0	4.3	6.3
C6A	3.0	35.0	N/A	N/A	HR14	3.0	6.0	3.6	1.3
HR13	5.0	9.0	3.0	3.1	HR11	6.0	11.0	3.3	2.9
C6B	8.0	43.0	N/A	N/A	CHR4	9.0	16.0	N/A	N/A
OFFD-M2	10.0	18.0	3.6	5.3	HR12	4.0	7.0	3.4	1.8
OFFD-4	13.0	27.0	4.8	9.5	HR17	5.0	9.0	5.5	2.3
C7	23.0	45.0	N/A	N/A	HR15	2.0	3.0	2.9	0.9
C11	31.0	88.0	N/A	N/A	CHR5	20.0	35.0	N/A	N/A
OND-1	4.0	8.0	2.9	2.2	C22	120.0	250.0	N/A	N/A
HR16	3.0	7.0	3.0	2.3	OFFD-13	5.0	10.0	4.0	2.8
C8	38.0	100.0	N/A	N/A	SCH-1	7.0	14.0	3.3	4.7
C3	27.0	91.0	N/A	N/A	CULON-1	2.0	3.0	1.9	0.8
HR18	4.0	9.0	2.8	3.0	C23	9.0	18.0	N/A	N/A
C3B	31.0	99.0	N/A	N/A					
OFFD-14	1.0	4.0	2.1	1.8					

FIGURE 6 REVISED DRAINAGE BASIN MAP FOR DEVELOPED CONDITION

Harsch Addendum #1 – 511434

PBS&J
901 N. Green Valley Pkwy
Suite 100
Henderson, Nevada 89014
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Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

"Update to the Technical Drainage Study for Henderson Commerce Center (Formerly known as Harsch)", Prepared by PBS&J (February 2005)

UPDATE TO THE
TECHNICAL DRAINAGE STUDY
FOR
HENDERSON COMMERCE CENTER
(FORMERLY KNOWN AS HARSCH)
Permit Number: 2002740088

Prepared for:

Harsch Investment Properties, LLC
1121 SW Salmon Street
Portland, Oregon 97205

Prepared by:
PBS&J
2270 Corporate Circle, Suite 100
Henderson, Nevada 89074

Reference Number 511434.00
February 22, 2005

PBSJ

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STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works
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Version
Serial Number

Feb 22, 2005  11:12:52

Input file : DEV-272.DAT
Output file: DEV-272.OUT

                                  INPUT FILE LISTING


T1 STORM DRAIN ANALYSIS FOR HARSCH H-7
T2 60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
T3 Q100=255 CFS
SO    1144.651699.87  4                         1702.59
WX                    1
R     1144.651699.87  1      .013
R     1165.681700.17  1      .013                                    15.0
R     1165.681700.17  1      .013                                    15.0
R     1165.681700.17  1      .013                                    15.0  1
JX    1168.181700.20  1  6   .013     45.0      1700.20      45.0
R     1194.701700.59  1      .013
R     1198.201700.65  1      .013                                    15.0
R     1198.201700.65  1      .013                                    15.0
R     1198.201700.65  1      .013                                    15.0  1
R     1203.201700.72  1      .013
R     1328.961702.54  1      .013                                    15.0
R     1328.961702.54  1      .013                                    15.0
R     1328.961702.54  1      .013                                    15.0  1
R     1333.961702.61  1      .013
R     1373.451703.19  1      .013
JX    1375.451703.21  1  3   .013     10.0      1706.26      90.0
R     1386.951703.38  1      .013                                    15.0
R     1386.951703.38  1      .013                                    15.0
R     1386.951703.38  1      .013                                    15.0  1
R     1391.951703.45  1      .013
R     1752.061708.66  1      .013                                          1
JX    1757.061708.74  1  2  5.013     20.0     3.01708.701708.70 90.0  90.0
R     2277.831715.52  1      .013                                          1
JX    2282.831715.57  1  7  5.013     44.0     3.01715.541715.54 90.0  90.0
R     2731.781719.38  1      .013                                    15.0
R     2731.781719.38  1      .013                                    15.0 1
R     2736.781719.48  1      .013
R     2798.981721.52  1      .013                                          1
JX    2803.981721.68  1  3   .013     10.0      1721.60      60.0
R     2894.201724.64  1      .013                                          1
R     2899.201724.75  1      .013
SH                    1
1                                                            SP
                         WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                          PAGE    1
0 CARD   SECT   CHN   NO OF  AVE PIER  HEIGHT 1  BASE     ZL    ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
  CODE   NO     TYPE  PIERS  WIDTH     DIAMETER  WIDTH                DROP

  CD      1     4                        5.00
  CD      2     4                        2.00
  CD      3     4                        1.50
  CD      4     3      0       .00       5.00   10.00    .00   .00   .00
  CD      5     4                        1.00
  CD      6     4                        3.00
  CD      7     4                        3.50
1                                                                                                    PAGE NO   1
0                         WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                           STORM DRAIN ANALYSIS FOR HARSCH H-7
0HEADING LINE NO 2 IS -
0                           60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
0HEADING LINE NO 3 IS -
0                           Q100=255 CFS
1                                                                                                    PAGE NO   2
0                         WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   1 IS A SYSTEM OUTLET    *        *     *
                    U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                               1144.65 1699.87   4                                         1702.59
0 ELEMENT NO   2 IS A  WALL  EXIT                     *
                    U/S DATA   STATION    INVERT  SECT
                               1144.65 1699.87   1
0 ELEMENT NO   3 IS A REACH             *        *     *
                    U/S DATA   STATION    INVERT  SECT             N                                RADIUS  ANGLE  ANG PT  MAN H
                               1144.65 1699.87   1               .013                                  .00    .00     .00     0
0 ELEMENT NO   4 IS A REACH             *        *     *
                    U/S DATA   STATION    INVERT  SECT             N                                RADIUS  ANGLE  ANG PT  MAN H
                               1165.68 1700.17   1               .013                                  .00    .00   15.00     0
0 ELEMENT NO   5 IS A REACH             *        *     *
                    U/S DATA   STATION    INVERT  SECT             N                                RADIUS  ANGLE  ANG PT  MAN H
                               1165.68 1700.17   1               .013                                  .00    .00   15.00     0
0 ELEMENT NO   6 IS A REACH             *        *     *
                    U/S DATA   STATION    INVERT  SECT             N                                RADIUS  ANGLE  ANG PT  MAN H
                               1165.68 1700.17   1               .013                                  .00    .00   15.00     1
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
                               1168.18 1700.20   1     6     0    .013    45.0       .0  1700.20      .00   45.00     .00
0 ELEMENT NO   8 IS A REACH             *        *     *
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                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1194.70 1700.59    1               .013                                             .00     .00     .00     0
0 ELEMENT NO    9 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1198.20 1700.65    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   10 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1198.20 1700.65    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   11 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1198.20 1700.65    1               .013                                             .00     .00   15.00     1
0 ELEMENT NO   12 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1203.20 1700.72    1               .013                                             .00     .00     .00     0
1                                                                                                                               PAGE NO    3
0                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   13 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1328.96 1702.54    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   14 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1328.96 1702.54    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   15 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1328.96 1702.54    1               .013                                             .00     .00   15.00     1
0 ELEMENT NO   16 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1333.96 1702.61    1               .013                                             .00     .00     .00     0
0 ELEMENT NO   17 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1373.45 1703.19    1               .013                                             .00     .00     .00     0
0 ELEMENT NO   18 IS A JUNCTION      *            *    *    *               *                     *        *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N       Q3         Q4     INVERT-3 INVERT-4  PHI 3   PHI 4
                             1375.45 1703.21    1     2     0   .013     10.0          .0  1706.26      .00  90.00     .00
0 ELEMENT NO   19 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1386.95 1703.38    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   20 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1386.95 1703.38    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   21 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1386.95 1703.38    1               .013                                             .00     .00   15.00     1
0 ELEMENT NO   22 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1391.95 1703.45    1               .013                                             .00     .00     .00     0
0 ELEMENT NO   23 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             1752.06 1708.66    1               .013                                             .00     .00     .00     1
0 ELEMENT NO   24 IS A JUNCTION      *            *    *    *               *                     *        *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N       Q3         Q4     INVERT-3 INVERT-4  PHI 3   PHI 4
                             1757.06 1708.74    1     2     5   .013     20.0         3.0  1708.70  1708.70  90.00   90.00
1                                                                                                                               PAGE NO    4
0                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   25 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2277.83 1715.52    1               .013                                             .00     .00     .00     1
0 ELEMENT NO   26 IS A JUNCTION      *            *    *    *               *                     *        *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N       Q3         Q4     INVERT-3 INVERT-4  PHI 3   PHI 4
                             2282.83 1715.57    1     7     5   .013     44.0         3.0  1718.54  1715.54  90.00   90.00
0 ELEMENT NO   27 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2731.78 1719.38    1               .013                                             .00     .00   15.00     0
0 ELEMENT NO   28 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2731.78 1719.38    1               .013                                             .00     .00   15.00     1
0 ELEMENT NO   29 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2736.78 1719.48    1               .013                                             .00     .00     .00     0
0 ELEMENT NO   30 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2798.98 1721.52    1               .013                                             .00     .00     .00     1
0 ELEMENT NO   31 IS A JUNCTION      *            *    *    *               *                     *        *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N       Q3         Q4     INVERT-3 INVERT-4  PHI 3   PHI 4
                             2803.98 1721.60    1     3     0   .013     10.0          .0  1721.60      .00  60.00     .00
0 ELEMENT NO   32 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2894.20 1724.64    1               .013                                             .00     .00     .00     1
0 ELEMENT NO   33 IS A REACH         *            *    *
                 U/S DATA   STATION    INVERT  SECT              N                                             RADIUS  ANGLE  ANG PT  MAN H
                             2899.20 1724.75    1               .013                                             .00     .00     .00     0
0 ELEMENT NO   34 IS A SYSTEM HEADWORKS                *                   *
                 U/S DATA   STATION    INVERT  SECT                                   W S ELEV
                             2899.20 1724.75    1                                          .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
1                                                                                                                               PAGE    1
                                          WATER SURFACE PROFILE LISTING
                    STORM DRAIN ANALYSIS FOR HARSCH H-7
                    60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                    Q100=255 CFS
0 STATION     INVERT   DEPTH    W.S.        Q       VEL      VEL     ENERGY   SUPER  CRITICAL           HGT/    BASE/     ZL   NO  AVBPR
              ELEV    OF FLOW   ELEV                         HEAD    GRD.EL.  ELEV    DEPTH             DIA     ID NO.        PIER
0 L/ELEM      SO                                             SF AVE    HF                      NORM DEPTH                     ZR
******************************************************************************************************************************************
0  1144.65  1699.87     1.46   1701.33     255.0   17.50     4.76   1706.08    .00     2.73             5.00    10.00    .00    0     .00
0  WALL EXIT                                                                                                                .00
0  1144.65  1699.87     4.07   1703.94     255.0   14.91     3.46   1707.39    .00     4.45             5.00      .00    .00    0     .00
```

```
0     13.02   .01427                                                    .00946      .12                                3.44                                   .00
0   1157.67  1700.06        4.20    1704.26       255.0    14.48         3.26    1707.51     .00        4.45                        5.00         .00      .00    0       .00
0      8.01   .01427                                                    .00885      .07                                3.44                                   .00
0   1165.68  1700.17        4.45    1704.62       255.0    13.80         2.96    1707.59     .00        4.45                        5.00         .00      .00    0       .00
0JUNCT STR    .01196                                                    .00751      .02                                                                       .00
0   1168.18  1700.20        6.19    1706.39       210.0    10.70         1.78    1708.17     .00        4.13                        5.00         .00      .00    0       .00
0     26.52   .01471                                                    .00650      .17                                2.98                                   .00
0   1194.70  1700.59        5.97    1706.56       210.0    10.70         1.78    1708.34     .00        4.13                        5.00         .00      .00    0       .00
0      3.50   .01716                                                    .00650      .02                                2.84                                   .00
0   1198.20  1700.65        6.02    1706.67       210.0    10.70         1.78    1708.45     .00        4.13                        5.00         .00      .00    0       .00
0   1198.20  1700.65        6.11    1706.76       210.0    10.70         1.78    1708.54     .00        4.13                        5.00         .00      .00    0       .00
0   1198.20  1700.65        6.29    1706.94       210.0    10.70         1.78    1708.72     .00        4.13                        5.00         .00      .00    0       .00
0      5.00   .01399                                                    .00650      .03                                3.03                                   .00
0   1203.20  1700.72        6.25    1706.97       210.0    10.70         1.78    1708.75     .00        4.13                        5.00         .00      .00    0       .00
0    125.76   .01447                                                    .00650      .82                                2.99                                   .00
0   1328.96  1702.54        5.34    1707.88       210.0    10.70         1.78    1709.65     .00        4.13                        5.00         .00      .00    0       .00
0   1328.96  1702.54        5.42    1707.96       210.0    10.70         1.78    1709.74     .00        4.13                        5.00         .00      .00    0       .00
0   1328.96  1702.54        5.60    1708.14       210.0    10.70         1.78    1709.92     .00        4.13                        5.00         .00      .00    0       .00
0      5.00   .01399                                                    .00650      .03                                3.03                                   .00
1                                                                                                                                                               PAGE     2
                                                                WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=255 CFS
0 STATION      INVERT   DEPTH      W.S.          Q          VEL       VEL      ENERGY    SUPER  CRITICAL                 HGT/     BASE/     ZL    NO  AVBPR
               ELEV.   OF FLOW     ELEV                               HEAD    GRD.EL.    ELEV    DEPTH                   DIA      ID NO.          PIER
0 L/ELEM       SO                                                     SF AVE     HF                             NORM DEPTH                          ZR
*****************************************************************************************************************************************************
0   1333.96  1702.61        5.56    1708.17       210.0    10.70         1.78    1709.95     .00        4.13                        5.00         .00      .00    0       .00
0     39.49   .01469                                                    .00650      .26                                2.98                                   .00
0   1373.45  1703.19        5.24    1708.43       210.0    10.70         1.78    1710.21     .00        4.13                        5.00         .00      .00    0       .00
0JUNCT STR    .01001                                                    .00620      .01                                                                       .00
0   1375.45  1703.21        5.56    1708.77       200.0    10.19         1.61    1710.39     .00        4.04                        5.00         .00      .00    0       .00
0     11.50   .01479                                                    .00590      .07                                2.88                                   .00
0   1386.95  1703.38        5.54    1708.92       200.0    10.19         1.61    1710.53     .00        4.04                        5.00         .00      .00    0       .00
0   1386.95  1703.38        5.62    1709.00       200.0    10.19         1.61    1710.61     .00        4.04                        5.00         .00      .00    0       .00
0   1386.95  1703.38        5.78    1709.16       200.0    10.19         1.61    1710.77     .00        4.04                        5.00         .00      .00    0       .00
0      5.00   .01399                                                    .00590      .03                                2.93                                   .00
0   1391.95  1703.45        5.74    1709.19       200.0    10.19         1.61    1710.80     .00        4.04                        5.00         .00      .00    0       .00
0     55.71   .01447                                                    .00590      .33                                2.90                                   .00
0   1447.66  1704.26        5.27    1709.53       200.0    10.19         1.61    1711.14     .00        4.04                        5.00         .00      .00    0       .00
0HYDRAULIC JUMP                                                                                                                                               .00
0   1447.66  1704.26        2.97    1707.23       200.0    16.45         4.21    1711.43     .00        4.04                        5.00         .00      .00    0       .00
0      1.32   .01447                                                    .01346      .02                                2.90                                   .00
0   1448.98  1704.28        2.97    1707.25       200.0    16.44         4.20    1711.45     .00        4.04                        5.00         .00      .00    0       .00
0    144.99   .01447                                                    .01267     1.84                                2.90                                   .00
0   1593.97  1706.37        3.09    1709.47       200.0    15.68         3.82    1713.28     .00        4.04                        5.00         .00      .00    0       .00
0     66.99   .01447                                                    .01123      .75                                2.90                                   .00
0   1660.96  1707.34        3.22    1710.57       200.0    14.95         3.47    1714.04     .00        4.04                        5.00         .00      .00    0       .00
0     39.68   .01447                                                    .00997      .40                                2.90                                   .00
1                                                                                                                                                               PAGE     3
                                                                WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=255 CFS
0 STATION      INVERT   DEPTH      W.S.          Q          VEL       VEL      ENERGY    SUPER  CRITICAL                 HGT/     BASE/     ZL    NO  AVBPR
               ELEV    OF FLOW     ELEV                               HEAD    GRD.EL.    ELEV    DEPTH                   DIA      ID NO.          PIER
0 L/ELEM       SO                                                     SF AVE     HF                             NORM DEPTH                          ZR
*****************************************************************************************************************************************************
0   1700.64  1707.92        3.36    1711.28       200.0    14.25         3.16    1714.43     .00        4.04                        5.00         .00      .00    0       .00
0     24.80   .01447                                                    .00887      .22                                2.90                                   .00
0   1725.44  1708.28        3.51    1711.78       200.0    13.59         2.87    1714.65     .00        4.04                        5.00         .00      .00    0       .00
0     15.38   .01447                                                    .00792      .12                                2.90                                   .00
0   1740.83  1708.50        3.67    1712.17       200.0    12.95         2.61    1714.77     .00        4.04                        5.00         .00      .00    0       .00
0      8.55   .01447                                                    .00709      .06                                2.90                                   .00
0   1749.38  1708.62        3.84    1712.46       200.0    12.35         2.37    1714.83     .00        4.04                        5.00         .00      .00    0       .00
0      2.68   .01447                                                    .00639      .02                                2.90                                   .00
0   1752.06  1708.66        4.04    1712.70       200.0    11.77         2.15    1714.85     .00        4.04                        5.00         .00      .00    0       .00
0JUNCT STR    .01599                                                    .00534      .03                                                                       .00
0   1757.06  1708.74        5.27    1714.01       177.0     9.01         1.26    1715.28     .00        3.81                        5.00         .00      .00    0       .00
0     25.83   .01302                                                    .00462      .12                                2.78                                   .00
0   1782.89  1709.08        5.06    1714.13       177.0     9.01         1.26    1715.40     .00        3.81                        5.00         .00      .00    0       .00
0HYDRAULIC JUMP                                                                                                                                               .00
0   1782.89  1709.08        2.79    1711.87       177.0    15.69         3.83    1715.70     .00        3.81                        5.00         .00      .00    0       .00
0    206.14   .01302                                                    .01248     2.57                                2.78                                   .00
0   1989.03  1711.76        2.84    1714.60       177.0    15.39         3.68    1718.28     .00        3.81                        5.00         .00      .00    0       .00
0    141.95   .01302                                                    .01146     1.63                                2.78                                   .00
0   2130.98  1713.61        2.95    1716.56       177.0    14.67         3.34    1719.90     .00        3.81                        5.00         .00      .00    0       .00
0     63.49   .01302                                                    .01014      .64                                2.78                                   .00
0   2194.47  1714.43        3.07    1717.51       177.0    13.99         3.04    1720.55     .00        3.81                        5.00         .00      .00    0       .00
0     36.75   .01302                                                    .00898      .33                                2.78                                   .00
1                                                                                                                                                               PAGE     4
                                                                WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=255 CFS
0 STATION      INVERT   DEPTH      W.S.          Q          VEL       VEL      ENERGY    SUPER  CRITICAL                 HGT/     BASE/     ZL    NO  AVBPR
               ELEV    OF FLOW     ELEV                               HEAD    GRD.EL.    ELEV    DEPTH                   DIA      ID NO.          PIER
0 L/ELEM       SO                                                     SF AVE     HF                             NORM DEPTH                          ZR
*****************************************************************************************************************************************************
0   2231.22  1714.91        3.20    1718.11       177.0    13.34         2.76    1720.88     .00        3.81                        5.00         .00      .00    0       .00
0     22.84   .01302                                                    .00797      .18                                2.78                                   .00
0   2254.06  1715.21        3.34    1718.55       177.0    12.72         2.51    1721.06     .00        3.81                        5.00         .00      .00    0       .00
0     13.90   .01302                                                    .00709      .10                                2.78                                   .00
0   2267.96  1715.39        3.48    1718.87       177.0    12.12         2.28    1721.16     .00        3.81                        5.00         .00      .00    0       .00
0      7.87   .01302                                                    .00632      .05                                2.78                                   .00
0   2275.83  1715.49        3.64    1719.13       177.0    11.56         2.08    1721.21     .00        3.81                        5.00         .00      .00    0       .00
0      2.00   .01302                                                    .00566      .01                                2.78                                   .00
0   2277.83  1715.52        3.81    1719.33       177.0    11.02         1.89    1721.22     .00        3.81                        5.00         .00      .00    0       .00
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0JUNCT STR   .00998                                                 .00397      .02                                                         .00
0  2282.83  1715.57     5.68   1721.25      130.0     6.62            .68   1721.93     .00      3.26                   5.00       .00      .00    0      .00
0   118.92   .00849                                                 .00248      .29                             2.62                        .00
0  2401.76  1716.58     5.00   1721.58      130.0     6.62            .68   1722.26     .00      3.26                   5.00       .00      .00    0      .00
0    64.02   .00849                                                 .00232      .15                             2.62                        .00
0  2465.78  1717.12     4.34   1721.46      130.0     6.94            .75   1722.41     .00      3.26                   5.00       .00      .00    0      .00
0    28.51   .00849                                                 .00225      .06                             2.62                        .00
0  2494.29  1717.36     4.29   1721.66      130.0     7.25            .82   1722.47     .00      3.26                   5.00       .00      .00    0      .00
0HYDRAULIC JUMP                                                                                                                             .00
0  2494.29  1717.36     2.44   1719.80      130.0    13.68           2.91   1722.71     .00      3.26                   5.00       .00      .00    0      .00
0    17.96   .00849                                                 .01094      .20                             2.62                        .00
0  2512.25  1717.52     2.43   1719.94      130.0    13.75           2.94   1722.88     .00      3.26                   5.00       .00      .00    0      .00
0    62.67   .00849                                                 .01177      .74                             2.62                        .00
1                                                                                                                                                 PAGE    5
                                                          WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=355 CFS
0 STATION     INVERT   DEPTH      W.S.          Q         VEL       VEL      ENERGY    SUPER  CRITICAL              HGT/    BASE/      EL    NO  AVBPR
              ELEV    OF FLOW     ELEV                              HEAD    GRD.EL.    ELEV   DEPTH                DIA     ID NO.           PIER
0 L/ELEM      SO                                                    SF AVE     HF                        NORM DEPTH                   ZR
**********************************************************************************************************************************************
0  2574.92  1718.06     2.34   1720.39      130.0    14.42           3.23   1723.62     .00      3.26                   5.00       .00      .00    0      .00
0    48.85   .00849                                                 .01338      .65                             2.62                        .00
0  2623.78  1718.46     2.26   1720.72      130.0    15.13           3.55   1724.27     .00      3.26                   5.00       .00      .00    0      .00
0    40.75   .00849                                                 .01522      .62                             2.62                        .00
0  2664.52  1718.81     2.17   1720.98      130.0    15.86           3.91   1724.89     .00      3.26                   5.00       .00      .00    0      .00
0    35.53   .00849                                                 .01733      .62                             2.62                        .00
0  2700.05  1719.11     2.10   1721.21      130.0    16.64           4.30   1725.51     .00      3.26                   5.00       .00      .00    0      .00
0    31.73   .00849                                                 .01973      .63                             2.62                        .00
0  2731.78  1719.38     2.02   1721.40      130.0    17.45           4.73   1726.13     .00      3.26                   5.00       .00      .00    0      .00
0     5.00   .02000                                                 .02104      .11                             2.05                        .00
0  2736.78  1719.48     2.02   1721.50      130.0    17.46           4.74   1726.24     .00      3.26                   5.00       .00      .00    0      .00
0    25.46   .03280                                                 .01986      .51                             1.79                        .00
0  2762.24  1720.32     2.09   1722.41      130.0    16.71           4.34   1726.74     .00      3.26                   5.00       .00      .00    0      .00
0    20.78   .03280                                                 .01753      .36                             1.79                        .00
0  2783.02  1721.00     2.17   1723.16      130.0    15.93           3.94   1727.11     .00      3.26                   5.00       .00      .00    0      .00
0    15.96   .03280                                                 .01540      .25                             1.79                        .00
0  2798.98  1721.52     2.25   1723.77      130.0    15.19           3.58   1727.35     .00      3.26                   5.00       .00      .00    0      .00
0JUNCT STR   .03201                                                 .01698      .08                                                         .00
0  2803.98  1721.68     1.98   1723.66      120.0    16.63           4.30   1727.96     .00      3.13                   5.00       .00      .00    0      .00
0     8.78   .03281                                                 .01909      .17                             1.72                        .00
0  2812.76  1721.97     2.00   1723.97      120.0    16.34           4.15   1728.12     .00      3.13                   5.00       .00      .00    0      .00
0    19.86   .03281                                                 .01749      .35                             1.72                        .00
1                                                                                                                                                 PAGE    6
                                                          WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=355 CFS
0 STATION     INVERT   DEPTH      W.S.          Q         VEL       VEL      ENERGY    SUPER  CRITICAL              HGT/    BASE/      EL    NO  AVBPR
              ELEV    OF FLOW     ELEV                              HEAD    GRD.EL.    ELEV   DEPTH                DIA     ID NO.           PIER
0 L/ELEM      SO                                                    SF AVE     HF                        NORM DEPTH                   ZR
**********************************************************************************************************************************************
0  2832.62  1722.62     2.07   1724.69      120.0    15.58           3.77   1728.47     .00      3.13                   5.00       .00      .00    0      .00
0    15.29   .03281                                                 .01535      .23                             1.72                        .00
0  2847.91  1723.12     2.15   1725.27      120.0    14.86           3.43   1728.70     .00      3.13                   5.00       .00      .00    0      .00
0    12.00   .03281                                                 .01349      .16                             1.72                        .00
0  2859.91  1723.52     2.23   1725.75      120.0    14.16           3.12   1728.86     .00      3.13                   5.00       .00      .00    0      .00
0     9.57   .03281                                                 .01184      .11                             1.72                        .00
0  2869.48  1723.83     2.31   1726.14      120.0    13.50           2.83   1728.98     .00      3.13                   5.00       .00      .00    0      .00
0     7.63   .03281                                                 .01043      .08                             1.72                        .00
0  2877.10  1724.08     2.40   1726.48      120.0    12.88           2.58   1729.06     .00      3.13                   5.00       .00      .00    0      .00
0     6.06   .03281                                                 .00918      .06                             1.72                        .00
0  2883.16  1724.28     2.49   1726.77      120.0    12.28           2.34   1729.11     .00      3.13                   5.00       .00      .00    0      .00
0     4.77   .03281                                                 .00808      .04                             1.72                        .00
0  2887.93  1724.43     2.59   1727.02      120.0    11.71           2.13   1729.15     .00      3.13                   5.00       .00      .00    0      .00
0     3.60   .03281                                                 .00712      .03                             1.72                        .00
0  2891.54  1724.55     2.69   1727.24      120.0    11.16           1.94   1729.18     .00      3.13                   5.00       .00      .00    0      .00
0     2.66   .03281                                                 .00628      .02                             1.72                        .00
0  2894.20  1724.64     2.79   1727.43      120.0    10.64           1.76   1729.19     .00      3.13                   5.00       .00      .00    0      .00
0     2.67   .02200                                                 .00559      .01                             1.91                        .00
0  2896.87  1724.70     2.89   1727.59      120.0    10.21           1.62   1729.21     .00      3.13                   5.00       .00      .00    0      .00
0     1.77   .02200                                                 .00498      .01                             1.91                        .00
0  2898.64  1724.74     3.01   1727.74      120.0     9.73           1.47   1729.22     .00      3.13                   5.00       .00      .00    0      .00
0      .56   .02200                                                 .00440      .00                             1.91                        .00
1                                                                                                                                                 PAGE    7
                                                          WATER SURFACE PROFILE LISTING
                                  STORM DRAIN ANALYSIS FOR HARSCH H-7
                                  60" STORM DRAIN - FUTURE CONDITION STORM DRAIN
                                  Q100=355 CFS
0 STATION     INVERT   DEPTH      W.S.          Q         VEL       VEL      ENERGY    SUPER  CRITICAL              HGT/    BASE/      EL    NO  AVBPR
              ELEV    OF FLOW     ELEV                              HEAD    GRD.EL.    ELEV   DEPTH                DIA     ID NO.           PIER
0 L/ELEM      SO                                                    SF AVE     HF                        NORM DEPTH                   ZR
**********************************************************************************************************************************************
0  2899.20  1724.75     3.13   1727.88      120.0     9.27           1.34   1729.22     .00      3.13                   5.00       .00      .00    0      .00
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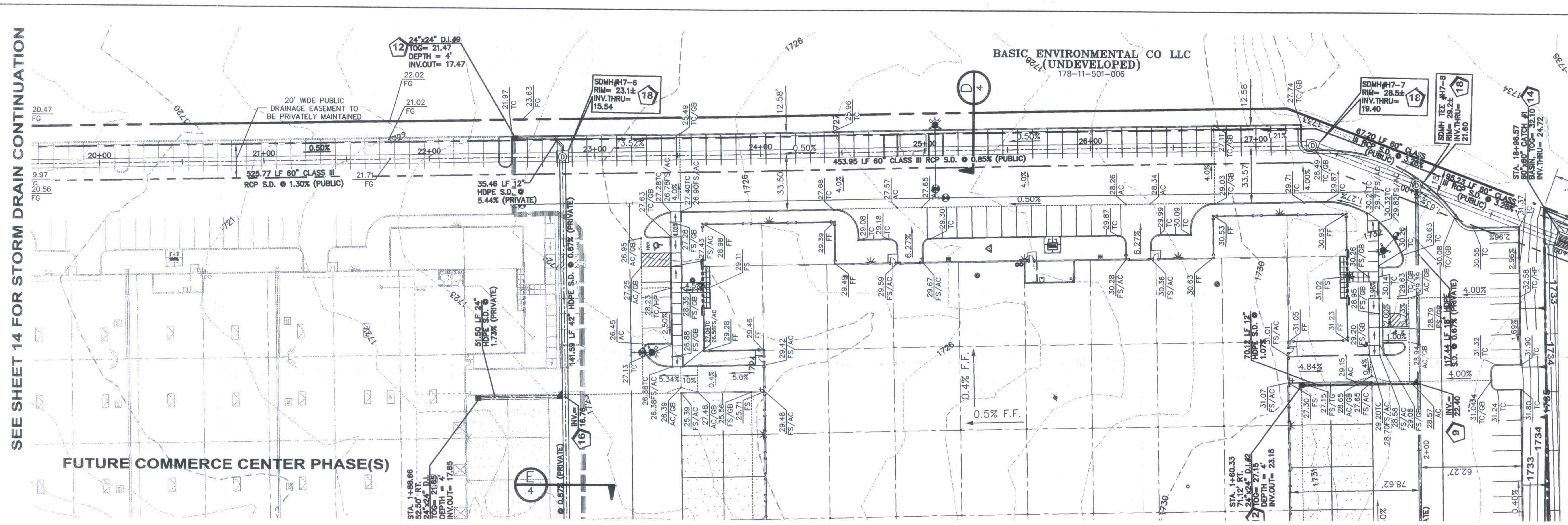


STORM DRAIN - PLAN VIEW

HORIZONTAL SCALE: 1" = 40'.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

STORM DRAIN CONSTRUCTION NOTES

- (9) INSTALL 12"x18" WYE
- (12) INSTALL 24"x24" DROP INLET PER DETAIL "C" ON SHEET 3.
- (14) INSTALL 60"x60" CATCH BASIN PER DETAIL "U" ON SHEET 4.
- (16) INSTALL 24"x42" WYE
- (18) INSTALL 60" STORM DRAIN TEE RISER PER C.C.A.U.S.D. DWG # 407.
- (20) INSTALL CAP FOR FUTURE EXTENTION. SIZE ACCORDING TO PIPE DIAMETER.
- (21) INSTALL 60" RCP HEADWALL PER NDOT DWG. No. R-2.5.2.

BENCHMARK

CITY OF HENDERSON BENCHMARK # 5
DESCRIPTION: BOLT AND WASHER IN THE TOP OF THE CURB ON THE EAST SIDE OF HIGHWAY 93, 100 FEET +/- NORTHWEST OF THE CENTERLINE OF KING STREET.
ELEVATION IN FEET = 1702.82 (NAVD '88)
ELEVATION IN METERS = 519.021 (NAV '88)

BASIS OF BEARINGS

NORTH 89°58'43" EAST – BEING THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 11, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA AS SHOWN BY A MAP ON FILE IN THE OFFICE OF THE CLARK COUNTY RECORDER IN BOOK 97, PAGE 99 OF PLATS, OFFICIAL RECORDS.

APPROVAL

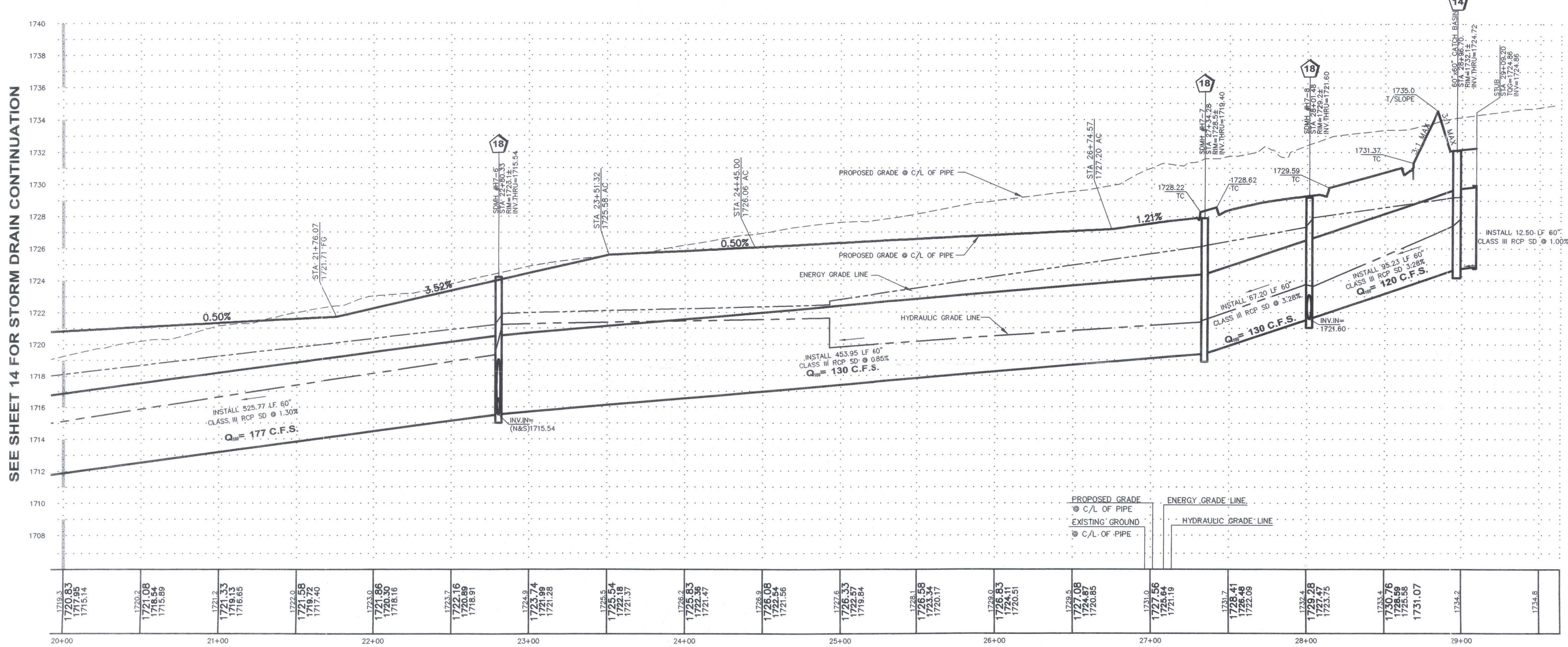
NEW DEVELOPMENT ENGINEER, CITY OF HENDERSON – KEN Y. KOSHIRO, P.E. DATE

CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY ________ 20 ____.

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call before you Dig.
1-800-227-2600

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY.
Call before you OVERHEAD
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Call before you dig Underground
1-702-455-7511
1-702-229-6611



STORM DRAIN - PROFILE VIEW

HORIZONTAL SCALE: 1" = 40', VERTICAL SCALE: 1"=4'

WE CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF HENDERSON KIVA# 2002740088

VERNON R. HARKINS P.E. NO. 9898 DATE

KIVA # 2004870065

PROFESSIONAL ENGINEER - STATE OF NEVADA
VERNON R. HARKINS
CIVIL
No. 009898

PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

A DEVELOPMENT BY: HARSCH INVESTMENT PROPERTIES LLC

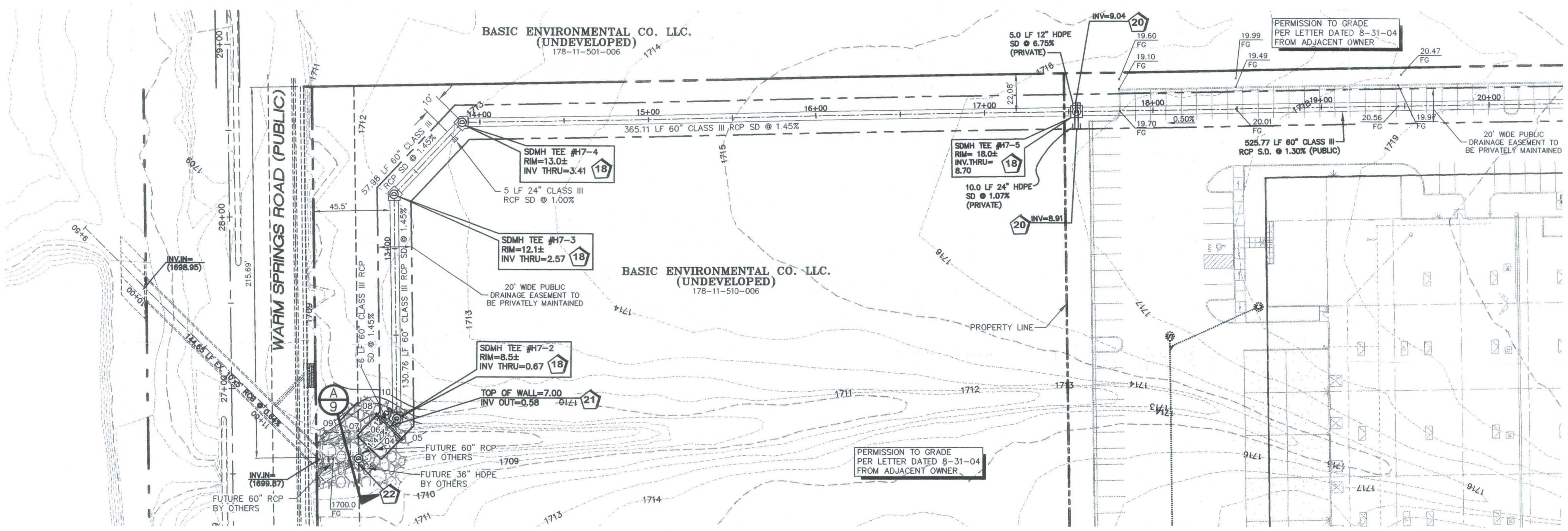
HENDERSON COMMERCE CENTER IV – PHASE 1

WARM SPRINGS ROAD AND EASTGATE ROAD
HENDERSON, NEVADA

STORM DRAIN PLAN AND PROFILE

NO.	DATE	REVISIONS

DATE: AUGUST 2004
SCALE: 1"=40'
PROJ. NO. 202022
DRAWN
CHECKED
SHEET NO



PUBLIC STORM DRAIN - PLAN VIEW

HORIZONTAL SCALE: 1" = 40'.

STORM DRAIN CONSTRUCTION NOTES

- (9) INSTALL 12"x18" WYE
- (12) INSTALL 24"x24" DROP INLET PER DETAIL "C" ON SHEET 3
- (14) INSTALL 60"x60" CATCH BASIN PER DETAIL "U" ON SHEET 4.
- (16) INSTALL 24"x42" WYE
- (18) INSTALL 60" STORM DRAIN TEE RISER PER C.C.A.U.S.D. DWG # 407.
- (20) INSTALL CAP FOR FUTURE EXTENTION. SIZE ACCORDING TO PIPE DIAMETER.
- (21) INSTALL 60" RCP HEADWALL PER NDOT DWG. No. R-2.5.2.
- (22) FUTURE 60" STORM DRAIN TEE RISER BY OTHERS.

BENCHMARK

CITY OF HENDERSON BENCHMARK # 5
DESCRIPTION: BOLT AND WASHER IN THE TOP OF THE CURB ON THE EAST SIDE OF HIGHWAY 93, 100 FEET +/- NORTHWEST OF THE CENTERLINE OF KING STREET.
ELEVATION IN FEET = 1702.82 (NAVD '88)
ELEVATION IN METERS = 519.021 (NAV '88)

BASIS OF BEARINGS

NORTH 89°58'43" EAST - BEING THE NORTH LINE OF THE NORTHEAST QUARTER (NE 1/4) OF SECTION 11, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA AS SHOWN BY A MAP ON FILE IN THE OFFICE OF THE CLARK COUNTY RECORDER IN BOOK 97, PAGE 99 OF PLATS, OFFICIAL RECORDS.

APPROVAL

NEW DEVELOPMENT ENGINEER, CITY OF HENDERSON - KEN Y. KOSHIRO, P.E. DATE

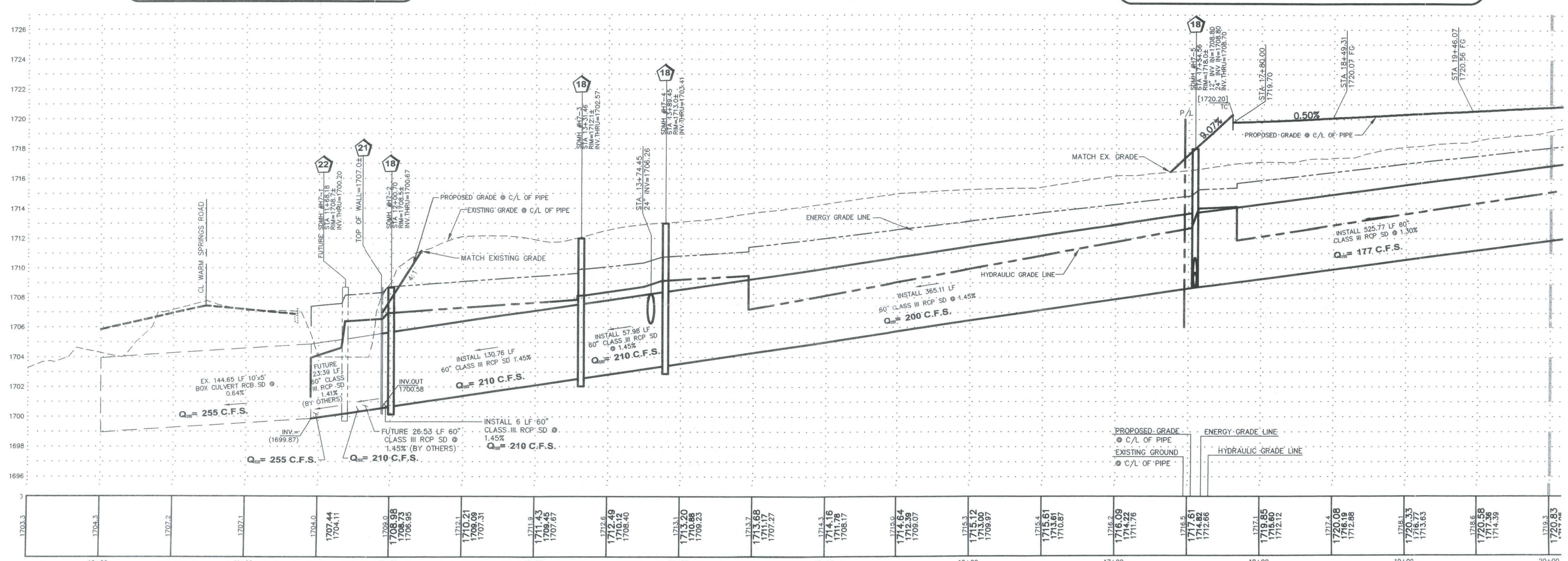
CITY APPROVAL OF THE IMPROVEMENT PLANS IS GRANTED FOR ONE (1) YEAR ONLY. PLANS MUST BE RESUBMITTED FOR REVIEW AND APPROVAL TO THE DEPARTMENT OF PUBLIC WORKS, CITY OF HENDERSON, IF WORK IS NOT COMPLETED BY ________ 20 ______.

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. **Call before you Dig.** 1-800-227-2600

AVOID OVERHEAD POWER LINE CONTACT. IT'S COSTLY. **Call before you OVERHEAD** 1-702-227-2929

Call before you UnderGround 1-702-455-7511 / 1-702-229-6611

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.



PUBLIC STORM DRAIN - PROFILE VIEW

HORIZONTAL SCALE: 1" = 40', VERTICAL SCALE: 1"=4'

WE CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF HENDERSON
KIVA# 2002740088

VERNON R. HARKINS P.E. NO. 9898 DATE

KIVA # 2004870065

PROFESSIONAL ENGINEER STATE OF NEVADA — VERNON R. HARKINS — EXP. 6/30/05 — CIVIL — No.009898 — 2/22/05

PBS&J
2270 Corporate Circle
Suite 300
Henderson, Nevada 89074
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

A DEVELOPMENT BY: HARSCH INVESTMENT PROPERTIES LLC

HENDERSON COMMERCE CENTER IV - PHASE 1

WARM SPRINGS ROAD AND EASTGATE ROAD
HENDERSON, NEVADA

STORM DRAIN PLAN AND PROFILE

NO.	DATE	REVISIONS

DATE	AUGUST 2004		
SCALE	1"=40'	PROJ. NO.	202022
DRAWN		CHECKED	
SHEET NO	14 OF 16		

Please refer to Volume II for Appendix E and Appendix F.

Appendix E: Grading Plans

Appendix F: Electronic CD