90% DESIGN SUBMITTAL
FOR THE
LONE MOUTAIN/BELTWAY DETENTION BASINS
AND THE
GOWAN BELTWAY WEST CHANNEL
(UPDATE TO ORIGINAL DESIGN REPORT)

WESTERN CLARK COUNTY 215
BRUCE WOODBURY BELTWAY
CRAIG ROAD TO HUALAPAI WAY

451.002.001

August 2008

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451-002-001

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August 1, 2008

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Re: Lone Mountain/Beltway Detention Basins and the Gowan Beltway West Channel 90% Design Report (Update to the Original Design Report)

Dear Ms. Stammetti:

This report is provided for the 90% Design Submittal for the Lone Mountain/Beltway Detention Basins (hereinafter referred to as the LMBW Detention Basins) and the Gowan Beltway West Channel (hereinafter referred to as the Beltway Channel). This report is an update to the original design report. Changes to the original design report include revised hydrologic analyses, revised hydraulic analyses, and revised designs of drainage facilities. This report will discuss the changes implemented since the original design report that are included with this submittal.

Hydrology

Interim Condition Hydrologic Analysis

An interim condition hydrologic analysis has been provided with this report to show the impacts of the interim flows to the Beltway Channel between Centennial Parkway and LMBW North Detention Basin (see Figure 6, *Interim Conditions Drainage Map*). This model illustrates the interim condition flow patterns and quantifies the flows impacting the Beltway Channel at different locations along the Shaumber Road and the Beltway alignment. The interim conditions assume the drainage basins west of Shaumber Road are generally undeveloped except for basin CDMNA2 (existing Cliff's Edge development). The interim drainage basins are delineated based on the existing 5-foot contour topographies. The following table summarizes the interim flows shown on Figure 6.

SUMMARY OF HEC-1 MODEL INTERIM CONDITIONS		
BASIN ID	AREA (acres)	Q_{100} (cfs)
CAMDK2	215.7	558
CAMDK3	202.2	531
CCAMDK3	417.9	1045
CAM-10A	810.2	2270
CAM-10B	1157.8	2953
DETCAM10	29.4	77
CAM10IN	2415.4	6024
CAM10DB	2415.4	158
INT6	148.2	258
CTROP	2563.5	339
CDMNA3	215.7	428
CDMNA2	80.0	218
CMNA2	295.7	624
INT1	12.4	40
INT2	48.7	113
INT3	40.4	88
COM1	397.2	822
INT4	9.2	23
INT5	11.6	20
COM2	2833.4	1106
INT7	77.2	158
INT8	18.1	43
INT9	37.7	84
W3	200.1	453
COM3	3166.5	1737
HLBW1-CA	251.5	589
COM4	3418.0	2254
HLBW1-CB	75.0	154
COM5	3492.9	2373
WRBW1	208.4	417
COM6	3701.3	2686

See Figure 6, *Interim Conditions Drainage Map.*

The interim condition model allows for the identifications of the inflow locations of the Beltway Channel and the sizing of the interim interceptor facilities (inlets and laterals) for the interim flows. Also, the interim condition model provides a comparison to the ultimate condition model to allow the drainage facilities to be designed under the worst condition between the two models.

Ultimate Condition Hydrologic Analysis

The ultimate condition hydrologic analyses have been revised from the original design report to reflect current hydrology using refined detention basin parameters and most current information available for the future Sheep Mountain Parkway, the Ann Road Interchange, and the ultimate land-use conditions. In addition, G.C. Wallace has coordinated with PBS&J to incorporate the 2008 MPU

hydrology (yet to be published) into the ultimate condition hydrologic analyses so both models are in agreement in terms of ultimate land-use conditions (curve numbers), drainage patterns, detention basins parameters, and overall tributary watershed boundary. Based on the 2008 MPU, the Cliffs Edge Master Plan and the future Sheep Mountain Parkway, basin boundaries from the original report have been revised or re-delineated to reflect the future conditions. The new and revised drainage basins are shown on revised Figure 5, *Ultimate Conditions Drainage Map*.

Basins CDMNA2 and CDMNA3 north of Centennial Parkway were part of Cliff's Edge Master Plan that previously were not part of the LMBW Detention Basins watershed according to the Cliff's Edge Master Plan Drainage Study. The Cliff's Edge Master Plan shows that in the ultimate drainage condition Centennial Parkway will intercept flows from the north and prevent those flows from impacting this project. The Cliff's Edge Master Plan shows a facility within Centennial Parkway and its right-of-way that conveys the northern flows east to a north beltway channel that will convey the flows north. The flows from basins CDMNA2 and CDMNA3 were to remain north of Centennial Parkway and not impact this project. However, after discussion with PBS&J in the coordinated effort to reconcile the 2008 MPU hydrology with the hydrology for this project, it was concluded that the flows from basins CDMNA2 and CDMNA3 needed to be routed south and be part of the LMBW Detention Basins watershed. According to PBS&J the 2008 MPU hydrologic analysis shows that the Fort Apache Detention Basin (RCBC 0000) north of Centennial Parkway did not have the capacity to accommodate flows from basins CDMNA2 and CDMNA3, whereas the LMBW Detention Basins did have the additional capacity to accommodate those flows. Therefore, basins CDMNA2 and CDMNA3 are included in the ultimate condition hydrology as part of the LMBW Detention Basins watershed. Discussion of the proposed facilities needed within Centennial Parkway and Shaumber Road to capture and route the basins CDMNBA2 and CDMNA3 flows south is provided below.

Basins W1, W2 and W3 are drainage basins delineated west of the future Sheep Mountain Parkway alignment, and flows from these basins will be collected by an anticipated future drainage facility along the Sheep Mountain Parkway alignment and will be conveyed south to concentration point CP1. Basin W3 is the re-delineated basin EFPOB2 with additional drainage area. Basins EFPOA1, EFOPA2 and EFPOB1 are drainage basins delineated east of the future Sheep Mountain Parkway alignment, flows from these basins will be collected by the Beltway Channel along the Shaumber Road alignment. The flows from basins W1, W2, W3, CDMNA2, CDMNA3, EFPOA1, EFPOA2, EFPOB1, WBCA, HLBW1-CA, HLBW1-CB and WBAW will be collected by the Beltway Channel and conveyed south and discharged into the LMBW North Detention Basin. Further discussion of the Beltway Channel is provided below. Other changes to the ultimate condition drainage basins from the original design report include the basin boundaries upstream of the Ann Road Detention Basin and Box Canyon Detention Basin and the basin boundaries of basins LWBW1A and WRBW1. These basin boundaries have been revised to match the basin boundaries of the 2008 MPU.

The ultimate condition curve numbers for most basins have been revised from the original design report to match the curve numbers used in the 2008 MPU for the corresponding basins. Per PBS&J the 2008 MPU curve numbers are based on land use changes (to mostly dense residential future developments) with the new application of drought ordinance that resulted in a larger percentage of impervious areas. Therefore, the revised curve numbers are generally higher. As the result of higher curve numbers the drainage basins are generating higher flows. Discussion of the impacts of the higher flows to the drainage facilities is provided below.

As in the original design report, two hydrologic models (Model #1 and Model #2) of the ultimate conditions have been provided in this report. Model #1 includes the Ann Road and Box Canyon Detention Basins (more tributary area with lower DARF), whereas Model #2 does not (less tributary area with higher DARF). Due to the differences in DARF, the higher flows of the two models are used for the facilities' designs. In addition, two Model #1s have been provided for this report, one using SDN3 and the other using SDN4. The Model #1 with SDN4 is provided for the design of the

LMBW Detention Basins since the total watershed area of the LMBW Detention Basin is 10.80 square miles, greater than the 8 square miles limit for SDN3. All other facilities are designed based on flows from the SDN3 models (Model #1 and Model #2). The following flow summary table shows the results of the revised ultimate condition HEC-1 models.

SUMMARY OF HEC-1 MODEL ULTIMATE CONDITIONS			
BASIN ID	AREA (acres)	Q_{100} (cfs)	MODEL #
CAMDK2	215.68	558	1
CAMDK3	202.24	531	1
CCAMDK3	417.92	1045	1
CAM-10A	810.24	2270	1
CAM-10B	1157.76	2953	1
DETCAM10	29.44	77	1
CAM10IN	2415.36	6024	1
CAM10DB	2415.36	158	1
W1	94.1	268	1
W2	108.06	331	1
CP1	2517.52	626	1
CDMNA3	193.09	505	1
CDMNA2	80	218	1
CMNA2	273.09	702	1
EFPOA1	95	264	1
COM1	368.09	900	1
EFPOA2	91.6	239	1
COM2	459.69	1114	1
EFPOB1	42.1	116	1
W3	200.14	630	1
COM3	3219.45	2311	2
WBCA	38.18	80	1
HLBW1-CA	251.5	673	1
COM4	3509.13	2938	2
HLBW1-CB	74.95	222	1
COM5	3584.08	3132	2
WBAW	36.46	80	1
WRBW1	208.37	554	1
COM6	3828.91	3619	2
LWBW1C	36.49	113	1
LMDBN	15.17	33	1
CLMDBN	3880.57	3703	2

SUMMARY OF HEC-1 MODEL ULTIMATE CONDITIONS			
BASIN ID	AREA (acres)	Q_{100} (cfs)	MODEL #
BOXCANYO	2182.4	4334	1
BOXDET	2182.4	40	1
LWBW1A	153.69	436	1
UVB1-2A	157	467	1
EDIV2A	157	363	1
NDIV2A	157	185	1
COM7	2493.09	535	2
UVB1-2B	12.28	41	1
LWBW1B	48.34	149	1
COM8	2553.71	693	2
UVB1-2C	20.65	64	1
COM9	2574.36	1095	2
COM10	20.65	420	1
UVB1-1C	11.86	39	1
UVB1-1B	7.92	26	1
COM11	19.78	62	1
UVB1-1A	140.66	421	1
UVB1-1D	22.72	72	1
COM12	163.38	482	1
UVB1-1E	17.89	58	1
COM13	201.05	590	1
WBCL	19.98	59	1
LMBW1	53.84	149	1
COM14	274.87	790	1
LMDBS	37.69	91	1
CLMDBS	2886.92	1896	2
CLMBWCDB	6767.49	4302	SDN4
LMBWCDB	6767.49	116	SDN4
WBLM	51.55	127	1
COM15	6819.04	145	SDN4

See Figure 5, *Ultimate Conditions Drainage Map.*

Due to the higher curve numbers and additional drainage areas to the watershed as a result of coordinating with the 2008 MPU, the revised ultimate condition HEC-1 models yield significantly higher flows impacting most of the facilities than what they were designed for in the original design report. All facilities have been re-evaluated based on the higher flows and re-designed accordingly to accommodate the increased flows. The following table shows a comparison for flows (at concentration points) between the original design report (based on the 2002 MPU) and this report (based on the 2008 MPU).

Concentration Pt.	Original Flows, cfs (Based on 2002 MPU)	Current Flows, cfs (Based on 2008 MPU)
COM1A / CMNA2	518	702
COM1B / COM1	729	900
COM2	1000	1114
COM3	1294	2311
COM4	1785	2938
COM5	1897	3132
COM6	2182	3619
CLMDBN	2239	3703
COM7	458	535
COM8	582	693
COM9	905	1095
COM10	341	420
COM11	62	62
COM12	474	482
COM13	580	590
COM14	753	790
CLMDBS	1669	1896
CLMBWCDB	3671	4302
COM15	149	145

LMBW Detention Basins Drain Time HEC-1 Analysis

An additional HEC-1 model (Model #1 with SDN4) with 15-minute interval hydrograph output has been provided with this report to have the duration in the hydrograph extended long enough to the show the time it will take to drain 90 percent of the Peak Storage (527 ac-ft). The required drain time for the Detention Basin Storage to get to 10 percent of Peak Storage (52.7 ac-ft) is approximately 7-days, 5 hours and 48 minutes (from the start of storm), which is under the limit of the maximum drain time allowable for a Regional Facility (7-days from the end of a 6-hour storm – Drainage Design Manual 1201.1). As discussed in the original design report, the outfall from the detention basins is controlled by orifice plates to reduce the amount of outfall discharge and to maximize the drain time so the impact to the downstream Gowan North Detention Basin is minimized. Further discussion of the LMBW Detention Basins, detention basin outfall and downstream impacts is provided below.

PMF Analysis

The PMF analysis for the North Detention Basin tributary watershed has been revised to account for additional area that impact the North Detention Basin. The total area has been revised from 3.85 to 3.97 square miles, resulting in an increase to the PMF flow of the North Detention Basin tributary watershed from 19,620 cfs to 20,247 cfs. Using the higher PMF flow a new Flo2D analysis using the most current 5-foot contours has been provided to determine how much of the 20,247 cfs will actually impact the North Detention Basin and South Detention Basin. The Flo2D analysis shows 8,783 cfs of the 20,247 cfs will enter the North Detention Basin and 5,393 cfs of the 20,247 cfs will enter the South Detention Basin with the rest bypassing both detention basins to the north of Washburn Road (see Exhibit A in Appendix A). The PMF analysis for the South Detention Basin tributary watershed did not change and it yields a PMF flow of 8,205 cfs. In the original design report both the North Detention Basin Spillway and the South Detention Basin Spillway have been designed for PMF flow of 8,300 cfs. Based on the new analyses, the South Detention Basin Spillway will still be designed for the PMF flow of 8,300 cfs but the North Detention Basin Spillway will be designed for PMF flow of 8,800 cfs. Further discussion of the Spillways is provided below.

Hydraulics

Due to the revised hydrologic analyses and revised design of the drainage facilities, some of the hydraulic analyses from the original design report have been revised to reflect the latest changes. Revised hydraulic calculations provided for this report in Appendix B include:

- Stage Outfall Discharges (Orifice and Drop Inlet Calculations)
- Stage Storage Volumes (North Basin, South Basin and Combined)
- PMF Spillway Stage Discharges (North Basin and South Basin)
- HEC-RAS Model of the North Detention Basin Inflow Channels and Stepped Spillway
- HEC-RAS Model of the Beltway Channel – Open Channel Sections (from stations 734+60 to 741+00)
- WSPGW Model of the Beltway Channel (from stations 736+50 to 838+30)
- WSPGW Model of the Facility SDLM-1 - South Detention Basin Lone Mountain Collector & Stepped Spillway
- WSPGW Model of the Facility SDPD-1 - South Detention Basin Peaceful Dawn Collector & Stepped Spillway
- WSPGW Model of the Facility SDTR-1 - South Detention Basin Rip-rap Trapezoidal Channel
- WSPGW Model of the Facility SBD-54-1 - South Detention Basin 54" RCP Inflow Pipe
- WSPGW Model of the Facility SBD-54-2 - South Detention Basin 54" RCP Inflow Pipe
- USBR Type-VI Impact Basin Analyses
- Beltway Channel Collection Facilities Calculations

The results and impacts of the revised hydraulic analyses corresponding to the drainage facilities are discussed below.

Facilities

The designs of the following facilities have been modified or changed from the original design submittal.

- LMBW Detention Basins
- Detention Basin Outfall
- North and South Detention Basin Emergency Spillways
- Beltway Channel
- Beltway Channel Collection Systems
- South Detention Basin Collection Systems
- North Detention Basin Collection Systems

LMBW Detention Basins

The design of the LMBW Detention Basins is based on analysis of the ultimate condition HEC-1 Model #1 with SDN4, since the total tributary watershed area is 10.80 square miles. The detention basin parameters included in the revised HEC-1 model for the LMBW Detention Basins are based on the latest stage-outfall discharge and stage-storage volume calculations included in Appendix B of this report. The hydraulic calculations of the stage-outfall discharge reflect the latest detention basins design and the stage storage volumes of the detention basins have been verified and refined with the proposed design contours for the detention basins. The stage-outfall discharge relationship of the LMBW Detention Basins has changed significantly from the original design report because the orifices design has changed. Further detail discussion of the Detention Basin Outfall is provided

elow. The stage-storage volume relationship of the LMBW Detention Basins is essentially unchanged because there has been no significant re-grading to either the North Detention Basin or South Detention Basin. The table below shows the comparison between the original and current outfall discharges and storage volumes at incremental stages.

	Original		Current	
Stage	Outfall Flow	Storage Volume	Outfall Flow	Storage Volume
2700	0	0	0	0
2705	18	9	26.9	7.4
2710	26	32	37.8	29.8
2715	32	84	46.1	81.0
2720	37	154	53.2	150.8
2725	41	235	59.4	233.1
2730	45	355	65.0	352.9
2735	152	496	114.0	493.7
2738	157	587	118.8	585.4

The table below shows the comparison of results of the revised HEC-1 model of the peak inflow, outfall flow, storage, stage and time of the LMBW Detention Basins.

	Original	Current
Peak Inflow (cfs)	3671	4302
Peak Outfall Flow (cfs)	104	116
Peak Storage (ac-ft)	433	527
Peak Stage (ft)	2732.75	2736.08
Peak Time (hr)	30.85	40.58

Due to the higher curve numbers and additional drainage area of the LMBW Detention Basins watershed tributary, as discussed above, the peak inflow, outfall flow, storage, stage and time have all increased from the original design report. The LMBW Detention Basins have been designed to accommodate the additional flows. The peak stage elevation of 2736.08 is still below the North Detention Basin minimum spillway elevation of 2738.27 and South Detention Basin minimum spillway elevation of 2739.63.

Detention Basin Outfall

As discussed in the original design report the detention basin outfall is a dual level outfall; a lower level outfall (below elevation 2730) and a second level outfall (above elevation 2730). In the current design, the dual outfall is controlled by two orifice plates, with a 23-inch orifice opening plate for the lower level orifice placed at the entrance of the 72-inch outfall RCP and a 26-inch orifice opening plate for the second level placed approximately 100-feet downstream. The second level orifice is placed downstream of a 48-inch riser RCP that is connected to the 72-inch RCP and extended vertically, where a 6.0-feet by 6.0-feet grate inlet structure is placed on top of the riser pipe at elevation 2730. The 6.0-feet by 6.0-feet grate inlet will intercept additional flow into the 72-inch RCP when the water surface elevation within the detention basins rises above elevation 2730. The lower level orifice allows outfall discharge up to 65 cfs into the 72-inch RCP at water surface elevation 2730. Once the water surface elevation reaches above 2730 the second level orifice becomes the control of the amount of outfall discharge flow allowed into the 72-inch outfall RCP and the lower level orifice will no longer have any affect. The 6.0-feet by 6.0-feet grate inlet is appropriately sized to allow the riser pipe to fill quickly, therefore, the stage water surface elevation within the detention

basins determines the headwater for the second level orifice. If the total flow entering the lower level orifice and the grate inlet above the riser pipe is less than the outflow of the second level orifice, then the riser will never fill, but in this case the total flow of the lower level orifice and grate inlet is larger than the outflow of the second level orifice, which allows the riser pipe to fill. The peak outfall discharge passing through the second level orifice is 116 cfs when the water surface elevation within the detention basins reaches the peak stage elevation of 2736.08. The purpose of the dual outfall is to reduce the amount of outfall discharge and to maximize the drain time so the impact to the downstream Gowan North Detention Basin is minimized.

In regards to the revised hydraulic calculations of the outfall discharge, the lower level orifice is affected by the headwater of the second level orifice when the water surface elevation is below 2730. When the outfall flow enters the lower level orifice at stages below elevation 2730, the headwater of the second level orifice becomes the tailwater for the lower level orifice. Therefore, headwater for the lower level orifice is the stage water surface elevation of the lower level 23-inch orifice minus headwater elevation of the second level 26-inch orifice at the balance of approximate equivalent flows passing both orifices when stages are the below elevation 2730. Please see outfall discharge calculations provided in the Appendix B of this report.

North & South Detention Basin Emergency Spillways

The Emergency Spillways for both the North and South Detention Basins have been refined to provide the stage-weir discharge relationship. The original design report provided PMF stage elevation based on the PMF flow of 8,300 cfs for each spillway using FlowMaster broad-crested weir method. Provided in this report is the same calculation using the broad-crested weir equation ($Q=C*L*H^{3/2}$) in a spreadsheet that calculates the weir discharges at incremental stages over the spillways. Since neither of the spillways are horizontal, a series of weir sections (grade-break segments) are analyzed with varying crest elevations at each section to determine more accurately the total weir discharge at each stage. An Emergency Spillway Stage-Discharge curves graph for the North and South Spillways has been provided. As discussed above the design PMF flow for the North Detention Basin has been revised to 8,800 cfs for this report while the design PMF flow for the South Detention Basin is still 8,300 cfs. The North Detention Basin minimum spillway elevation is 2738.27 with a maximum weir elevation of 2743.06 for PMF flow of 8,800 cfs. The South Detention Basin minimum spillway elevation is 2739.63 with a maximum weir elevation of 2744.23 for PMF flow of 8,300 cfs.

Beltway Channel

Due to the revised hydrology and with the incorporation of the Beltway and Ann Road Interchange design by CH2MHill, the Beltway Channel (facility GBWC) mainline design has changed from that of the original design report. The revised hydrology discussed above resulted in increased flows entering and conveyed by the Beltway Channel. The horizontal and vertical alignments of the Beltway Channel have been revised to accommodate the design of the Ann Road Interchange and the Beltway. Based on the revised horizontal and vertical alignments the Beltway Channel mainline has been re-sized to accommodate the revised flows. In the original design the open channel section of the Beltway Channel started at station 762+00.00. The current design the RCB portion of the Beltway Channel has been extended and the start of the open channel portion of the Beltway Channel has been shifted further downstream to station 741+00.00. Much of the Beltway Channel mainline facility sizes have been revised. Also, at the intersection of Centennial Parkway and Shaumber Road, the Beltway Channel mainline along the Shaumber alignment that previously terminated at Centennial Parkway will turn and extend west in Centennial Parkway by approximately 350-feet. The Beltway Channel facilities at the Centennial and Shaumber intersection have been designed to connect to the existing facilities within Shaumber Road and Centennial Parkway to route all flows within those facilities into the Beltway Channel. Addition inlets within Shaumber Road and

Centennial Parkway have also been provided to intercept the remaining surface flows that are not conveyed by the existing facilities. The design is to ensure all flows impacting the intersection of Shaumber Road and Centennial Parkway will be routed south by the Beltway Channel instead of allowing the flows to convey east in Centennial Parkway as intended in the Cliff's Edge Master Plan Study. Per discussion above in the Hydrologic Section the flows from basins CDMNA2 and CDMNA3 impacting the Shaumber Road and Centennial Parkway intersection will need to be routed south to alleviate the impact to Fort Apache Detention Basin to the north since the LMBW Detention Basins have the additional capacity to accommodate the additional flows.

The table below summarizes the revised Beltway Channel mainline sizes and the flows that are being conveyed by the different sections of the channel. Detailed discussion of the Beltway Channel Collection System is provided below.

Beltway Channel Mainline		
Inflow Location	**Main Channel Q_{ULT} (cfs)**	**Main Channel Size**
Centennial	834 (CMNA2 + ½*EFPOA1)	8-ft x 6-ft RCB
Azure	1020 (COM1 + ½*EFPOA2)	9-ft x 7-ft RCB
Tropical	1230 (COM2 + EFPOB1)	10-ft x 8-ft RCB/ 12-ft x 8-ft RCB
La Mancha	2063 (COM2 + CP1 + EFPOB1 + W3A-U)	14-ft x 8-ft RCB/ 14-ft x 8-ft RCB
Ann	2728 (COM3 + WBCA + ½*HLBW1-CA)	14-ft x 8-ft RCB
Hammer	3132 (COM5)	14-ft x 8-ft RCB
Washburn	3443 (COM5 + WBAW + W1A-U)	14-ft x 8-ft RCB/ 14-ft x 10.5-ft Channel/ 20-ft x 10-ft Channel

A HEC-RAS model and a WSPGW model of revised Beltway Channel have been included in the Appendix B of this report. The HEC-RAS model analyzed the open channel sections of the Beltway Channel from stations 734+60 to 741+00. The WSPGW model analyzed the enclosed channel sections of the Beltway Channel from stations 736+50.32 to the start of the channel.

Beltway Channel Collection System

The following is a summary of planned collection of flows into the storm drain system from Centennial Parkway to the North Detention Basin. Flow patterns and quantities for both developed and undeveloped tributary basins were considered. Locations of facilities are labeled according to the street names or approximate stationing (please also refer to Figure 7, *Shaumber Storm Drain Collection Facilities Map*). A more comprehensive explanation for sections of the storm drain follows the tables.

Ultimate Conditions Collection Facilities Summary						
Facility	**Location**	**Q_{ult} (cfs)**	**$Q_{intercept}$ (cfs)**	**Q_{bypass} (cfs)**	**Facility**	**Tributary**
U1	Shaumber	8	8	-	(2) 12' Type "CM" Drop Inlets	Bypass from Facility E1 (8 cfs)
U2	Centennial	357	357	-	(2) 27.5' & (2) 25' Type "CM" Drop Inlets	CDMNA3 (505 cfs) - 10-Yr Storm Drain (148 cfs)*
U3	Sta. 829+50	50	30	20	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOA1 (264 cfs)

U4	Sta. 824+00	50	34	16	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOA1 (264 cfs)
U5	Sta. 822+00	50	34	16	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOA1 (264 cfs)
U6	Azure	230	220	10	(2) 25' Type "CM" Drop Inlets + Trench Drain	Portion of EFPOA1 (264 cfs)
U7	Sta. 817+00	50	31	19	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOA2 (239 cfs)
U8	Sta. 812+50	50	31	19	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOA2 (239 cfs)
U9	Sta. 809+00	100	100	-	(1) 25' & (1) 20' Type "CM" Drop Inlets	Portion of EFPOA2 (239 cfs)
U10	Tropical	239	237	2	(2) 30' Type "CM" Drop Inlets + Mod. Trench Drain	EFPOA2 (239 cfs)
U11	Sta. 805+50	50	38	12	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOB1 (116 cfs)
U12	Sta. 795+00	116	116	-	(1) 27.5' & (1) 20' Type "CM" Drop Inlets	EFPOB1 (116 cfs)
U13	Sta. 792+50	50	38	12	(1) 15' & (1) 5' Type "CM" Drop Inlets	Portion of EFPOB1 (116 cfs)
U14	La Mancha	210	198	12	(2) 30' Type "CM" Drop Inlets + Trench Drain	Portion of W2 (331 cfs) + Portion of W3A-U (207 cfs)
U15	La Mancha	538	-	-	78" RCP Lateral	W2 (331 cfs) + W3A-U (207 cfs)
U16	Sta. 787+50	100	100	-	(1) 17.5' & (1) 10' Type "CM" Drop Inlets in sump	Bypass DIs/ Trench Drains
U17	Sta. 785+00	50	40	10	(1) 20' & (1) 15' Type "CM" Drop Inlets	Portion of W3 (630 cfs)
U18	Sta. 785+00	423	-	-	78" RCP Lateral	W3B-U (423 cfs)
U19	W. of SB On-ramp	673	-	-	8'-Wide X 6'-Deep Rect. Concrete Channel	HLBW1-CA (673 cfs)
U20	Sta. 762+00 to Sta. 745+00	222	-	-	3' Wide X 2' Deep Rect. Concrete Channel	HLBW1-CB
U21	Washburn	298	-	-	48" RCP Lateral	CB2-U (67 cfs) + W1A-U (231 cfs)

Interim Conditions Collection Facilities Summary

Facility	Location	Q_{int} (cfs)	$Q_{intercept}$ (cfs)	Q_{bypass} (cfs)	Facility	Tributary
I1	Shaumber	8	8	-	(2) 12' Mod. Type "C" Drop Inlets	Bypass from Facility E1 (8 cfs)
I2	Centennial	280	280	-	(2) 27.5' & (2) 25' Type "CM" Drop Inlets	CDMNA3 (428 cfs) - 10-Yr Storm Drain (148 cfs)*
I3	Sta. 829+50	40	-	-	36" Block-out on DI	INT1 (40 cfs)
I4	Sta. 824+00	113	-	-	3'-High X 5'-Wide Block-out on DI	INT2 (113 cfs)
I5	Azure	88	88	-	(2) 25' Mod. Type "C" Drop Inlets + Trench Drain	INT3 (88 cfs)
I6	Sta. 817+00	23	-	-	36" Block-out on DI	INT4 (23 cfs)
I7	Sta. 812+50	20	-	-	36" Block-out on DI	INT5 (20 cfs)
I8	Tropical	339	315	24	(2) 30' Mod. Type "C" Drop Inlets + Mod. Trench Drain	CTROP (339 cfs)

I9	Sta. 795+00	158	-	-	3'-High X 8'-Wide Block-out on DI	INT7 (158 cfs)
I10	Sta. 792+50	43	-	-	36" Block-out on DI	INT8 (43 cfs)
I11	La Mancha (North DI)	84	-	-	3'-High X 8'-Wide Block-out on DI	INT9 (84 cfs)
I12	Sta. 785+00	453	-	-	5'-High X 15'-Wide Block-out on DI	W3 (453 cfs)
I13	W. of SB On-ramp	589	-	-	8'-Wide X 6'-Deep Rect. Concrete Channel	HLBW1-CA (589 cfs)
I14	Barden	107	-	-	3' Wide X 3' Deep Channel with 48" Lateral	CB1-I (107 cfs)
I15	Sta. 762+00 to Sta. 745+00	154	-	-	3' Wide X 2' Deep Channel with 36" Laterals	HLBW1-CB (154 cfs)
I16	Washburn	119	-	-	3' Wide X 2' Deep Channel with 36" Laterals	W1B-I (119 cfs)

Existing Collection Facilities Summary						
Facility	Location	Q_{int} (cfs)	$Q_{intercept}$ (cfs)	Q_{bypass} (cfs)	Facility	Tributary
E1	Shaumber North of Centennial	81	-	-	42" RCP	Referenced from Cliffs Edge
E2	Shaumber North of Centennial	137	129	8	(2) 21' and (2) 12' Type "CM-2" Drop Inlets	CDMNA2 (218) - Fac. E1 (81)
E3	Centennial	63	-	-	36" RCP	Referenced from Cliffs Edge

Ultimate Conditions

North of Centennial: The future Cliffs Edge development has planned a collection system for the 10-year flow only (existing Facilities E1-E3). In addition, GCW has calculated higher 100-year flows than those shown in the Cliffs Edge Study due to higher curve numbers associated with anticipated development. RCP laterals and drop inlets within Centennial west of Shaumber and Shaumber north of Centennial are proposed to provide adequate capacity for the calculated 100-year flows near the intersection of Shaumber Road and Centennial Parkway (proposed Facilities U1-U2).

Centennial to Ann: A combination of drop inlets and trench drains will be provided within the major cross street alignments connecting to Shaumber Road between Ann Road and Centennial Parkway (Azure Street, Tropical Parkway, and La Mancha Avenue; Facilities U6, U10, and U14, respectively). In each case, the system was designed to collect the anticipated street flow capacity with minimal bypass. In addition, a stub is proposed in Tropical Parkway to provide for anticipated future flows (Facility U15). A series of drop inlets will also be provided in Shaumber Road between Centennial Parkway and Ann Road (Facilities U3-U5, U7-U9, U11-U13, and U16-U17). As exact ultimate discharge locations are unknown, the collection has been conservatively designed. Although no lateral is provided for the future Sheep Mountain Parkway due to the exact alignment of the crossing being unknown, the mainline storm drain has been adequately sized for

an anticipated storm drain connection. The RCP lateral (Facility U18) near Station 785+00 of the mainline has been sized to allow for future extension to Ann Road, should future drainage studies find it necessary.

Ann to Barden: A concrete open channel (Facility U19) is proposed on the west side of the southbound on-ramp between Ann Road and Hammer. The channel will combine with the mainline at approximately station 762+00.

Barden to Washburn: A small concrete U-channel (Facility U20) will collect flow generated on the western side of the Beltway and discharge to the mainline via RCP laterals located approximately every 400 feet. An RCP lateral will also be provided at Washburn (Facility U21) to collect the anticipated future flows impacting the street.

Interim Conditions

North of Centennial: Proposed drop inlets (Facilities I1-I2) within Centennial and Shaumber will collect the 100-year flows bypassed by the Cliffs Edge 10-year system, the same as in ultimate conditions.

Centennial to Ann: Where existing washes convey interim, block-outs will be provided in the back of drop inlets along Shaumber to collect those flows into the system (Facilities I3-I4, I6-I7, and I9-I12). Interim berms will be provided at Azure and Tropical to direct flows into the drop inlet/trench drain systems (Facilities I5 and I8, respectively). The drop inlets in Shaumber will collect bypass flows from the side streets and ponded flows at block-out locations that spill over into the street as well as the flows that collect directly to the street.

Ann to Barden: The 8-foot wide concrete open channel (Facility I13) will convey flows similar to the patterns described in ultimate conditions. The 3-foot wide U-channel (I14) will be extended to the downstream end of Facility I13 to protect 2:1 side slopes of the Beltway from any potential flows.

Barden to Washburn: The small concrete U-channel will collect flows similar to the patterns described in ultimate conditions (Facility I15). The U-channel will also be extended (Facility I16) to the open channel portion of the Beltway Channel.

<u>South Detention Basin Collection Systems</u>

The South Detention Basin Collection Systems consist mainly of facilities SBD-54-1, SBD-54-2, SDPD-1, SDLM-1 and SDTR-1.

Facilities SBD-54-1 and SBD-54-2 are dual 54-inch RCPs that connect to and split from a Beltway facility and discharge a total of 790 cfs (concentration point COM14) into the South Detention Basin from the southeast. The original design report flow at COM14 was 753 cfs. Each of the 54-inch

RCP conveys 395 cfs, half of the 790 cfs. The flow from the each of the 54-inch RCP discharges into a 20-foot wide USBR Type-VI impact basin that serves as an energy dissipater. The invert elevations at the outlets of both 54-inch RCPs have been raised to match the bottom elevation of the baffle wall within the impact basins, and the end sections of the pipes have been flatten to ensure the discharged flows will impact the baffle walls to allow for the energy to be dissipated behind the baffle walls before entering into the South Detention Basin. Revised WSPG models of both facilities SBD-54-1 and SBD-54-2 reflecting the higher flow and the change in design are included in Appendix B of this report.

Facility SDPD-1 is the Peaceful Dawn collection system that collects and conveys 420 cfs (concentration point COM10) from the Peaceful Dawn cul-de-sac into the South Detention Basin. The original design report flow at COM10 was 341 cfs. The 54-inch RCP of this facility in the original design report has been upsized to a 60-inch RCP to accommodate the higher flow. The end section of this facility connecting to the 20-foot wide USBR Type-VI impact basin has been modified in the same fashion as discussed for facilities SBD-54-1 and SBD-54-2. Revised WSPG model of facility SDPD-1 reflecting the higher flow and the change in design is included in Appendix B of this report.

Facility SDLM-1 is the Lone Mountain collection system that collects and conveys 693 cfs (concentration point COM8) from Lone Mountain Road into the South Detention Basin. The original design report flow at COM8 was 582 cfs and the system was designed to convey only 508 cfs of the 582 cfs with 74 cfs bypassing the system. The difference in flow at COM8 between the original design report and this report is 111 cfs (693-582=111). In the original design report this system has a 110-foot long open channel on the each side of Lone Mountain Road behind the sidewalk with depressed curb that allows for flows within the Lone Mountain right-of-way to weir into the channel, with each side channel capturing 187 cfs. Along with the 374 cfs (2X187) captured by the two side channels an existing storm drain within the south side of Lone Mountain Road also conveying 134 cfs into the system for the total of 508 cfs. For this submittal the system has been modified to accommodate the higher flow and has been designed to convey the entire 693 cfs in the ultimate conditions. A 48-inch RCP lateral stub has been added to the system on the north half of Lone Mountain Road. This 48-inch RCP lateral is provided to allow future upstream developments to extend and capture the necessary flows upstream to meet criteria and to allow the flow to convey to the Lone Mountain collection system. The existing improvements upstream of the facilities show Lone Mountain Road has a slope of 5.0% and it is a 80-foot right-of-way. Therefore, the 100-year storm capacity of Lone Mountain Road at a 5.0% slope is 250 cfs for a D X V=8.0. Since 134 cfs of the 693 cfs will be conveyed by the existing storm drain, there will be 559 cfs remain as surface flow. In order for the 100-year storm capacity of Lone Mountain Road to be met, the 48-inch RCP lateral will need to intercept a minimum of 309 cfs (559-250=309). In the ultimate conditions it is assumed that the future upstream developments will extend the 48-inch RCP and capture a minimum of 309 cfs into the storm drain. The remaining 250 cfs can be intercepted by the two 110-foot long side channels without any bypass flow. A 20-foot modified Type-C inlet with a 30-inch RCP lateral on the north of Lone Mountain Road just east of Barden Road has also been added to the Lone Mountain collection system. This inlet is provided to capture potential bypass flow on the north side of Lone Mountain Road. In order to accommodate the increased flow impacting the Lone Mountain collection system the upstream section of the 66-inch RCP has been upsized to a 72-inch RCP to reduce the headwater at the downstream end of the step spillway. Revised WSPG model of facility SDLM-1 reflecting the higher flow and the change in design is included in Appendix B of this report.

The end section of this facility connecting to the 20-foot wide USBR Type-VI impact basin has been modified in the same fashion as discussed above. Due to the higher flow of this facility, an opening has been provided within the chamber wall that separates the impact basins of facilities SDPD-1 and SDLM-1. This allows for the flows discharged from facilities SDPD-1 and SDLM-1 to mix behind the baffle walls before discharging under the baffle walls and into the South Detention Basin. The wall opening connecting the two chambers that allows the flows to mix creates the condition similar to a

single chamber with 40-foot width instead of two separate chambers of 20-foot width. According to the USBR Type-VI impact basin general design guideline, the higher the discharged flow the wider the chamber width is required. This modification with the wall opening will better accommodate the higher combined flows to allow the impact basins to function more efficiently of dissipating the energy of the discharged flows. Analyses of two different methods in determinate the desired design widths of the USBR Type-VI impact basins are included in Appendix B of this report.

There are additional collectors downstream of facility SDLM-1 to capture any potential bypass flows within Lone Mountain Road. Those include the 65-foot depressed curb that allows flows on the north side of Lone Mountain Road to weir into the North Detention Basin south inflow channel (facility SDNDB-B1), the 60-foot depressed curb that allows flows on the south side of Lone Mountain Road to weir into the 5-feet wide X 2-feet deep concrete U-channel (facility SDLM-4), and two additional 20-foot modified Type-C inlets of facility SDLM-7.

Facility SDTR-1 is the trapezoidal riprap channel that conveys the discharged flows from facilities SDPD-1 and SDLM-1 down to the lower portion of the South Detention Basin from the elevated portion. Facility SDTR-1 conveys 1095 cfs, the flow at concentration point COM9 of the hydrologic model and is an increase of the 905 cfs from the original design report. There are no significant changes in design of this facility. Revised WSPG model of facility SDTR-1 reflecting the higher flow is included in Appendix B of this report. The revised analysis of this facility shows that velocities of the channel before the drop (from the elevated portion to the lower portion of the South Detention Basin) are relative low and the flow does overtop the channel slightly. The overtopping of channel flow should not be an issue since the channel is inside the South Detention Basin and the side weir velocity of the overtopping flow is low and non-erosive.

North Detention Basin Collection Systems

The North Detention Basin Collection Systems consist of facilities SDNDB-B1, SDNDB-B2 and SDNDB-B3.

Facility SDNDB-B1 is the North Detention Basin north inflow channel (10-feet bottom width, 2-feet depth, 3:1 side slope). The design change of this facility consists of changing the beginning section (from station 6+02.10 to station 7+39.18) of this channel from earth-lined to grouted rip-rap (d50= 12-inches and thickness = 24-inches) and adding a 16-foot access along the west bank of the channel (see grading plan Sheets RSD-3A & RSD-29). Design flow for this facility is based on 175 cfs, the same flow used in the original design report. The original design report had accounted for the bypass flow (74 cfs) from Lone Mountain Road along with the flow from basin LWBW1C (98 cfs) to be conveyed by facility SDNDB-B1. For this report the flow from basin LWBW1C has increased to 113 cfs (due to higher curve number). With the additional 48-inch lateral stub and 20-foot inlet added to facility SDLM-1 upstream within Lone Mountain Road as described above, the bypass flow from Lone Mountain Road that will impact facility SDNDB-B1 is reduced from what was anticipated in the original design report. Therefore, the design flow of 175 cfs used for facility SDNDB-B1 is conservative. It is noted that the analysis shows the channel will have minimum freeboard but any overtopping flows will just ran down the slope of the North Detention Basin.

Facility SDNDB-B2 is the North Detention Basin south inflow channel. This facility has been changed from an earth-lined channel (5-feet bottom width, 2-feet depth, 3:1 side slope) to a concrete-lined channel (5-feet bottom width, 3-feet depth, 2:1 side slope). Also, a berm has been provided north of the start of the channel to direct the flows impacting north of the channel into the channel (see grading plan Sheets RSD-4A & RSD-30). Design flow for this facility is based on 323 cfs, an increase from the 175 cfs used in the original design report. The flows that impact facility SDNDB-B2 are from the prorated area of basin WRBW1 and the increased flow is due to the increased drainage area of basin WRBW1 and the higher curve number of basin WRBW1. In the

original design report basin WRBW1 was 156.42 acres that generated 309 cfs. In this report basin WRBW1 has been revised to 208.37 acres that generates 554 cfs. The flow calculated from the prorated drainage area of basin WRBW1 that impacts facility SDNDB-B2 is 323 cfs (see Figure 5). As with facility SDNDB-B1, the freeboard of this channel will be minimum and any overtopping flows will just ran down the slope of the North Detention Basin.

Facility SDNDB-B3 is the North Detention Basin stepped spillway. This facility has been shifted forward slightly along the same alignment with a design flow of 498 cfs (175+323=498), instead of the 350 cfs used in the original design report.

The HEC-RAS analysis that models facilities SDNDB-B1, SDNDB-B2 and SDNDB-B3has been revised to reflect the revised design and is included Appendix B of this report. The revised HGL of the inflow channels and stepped spillway are reflected on the new plan profiles.

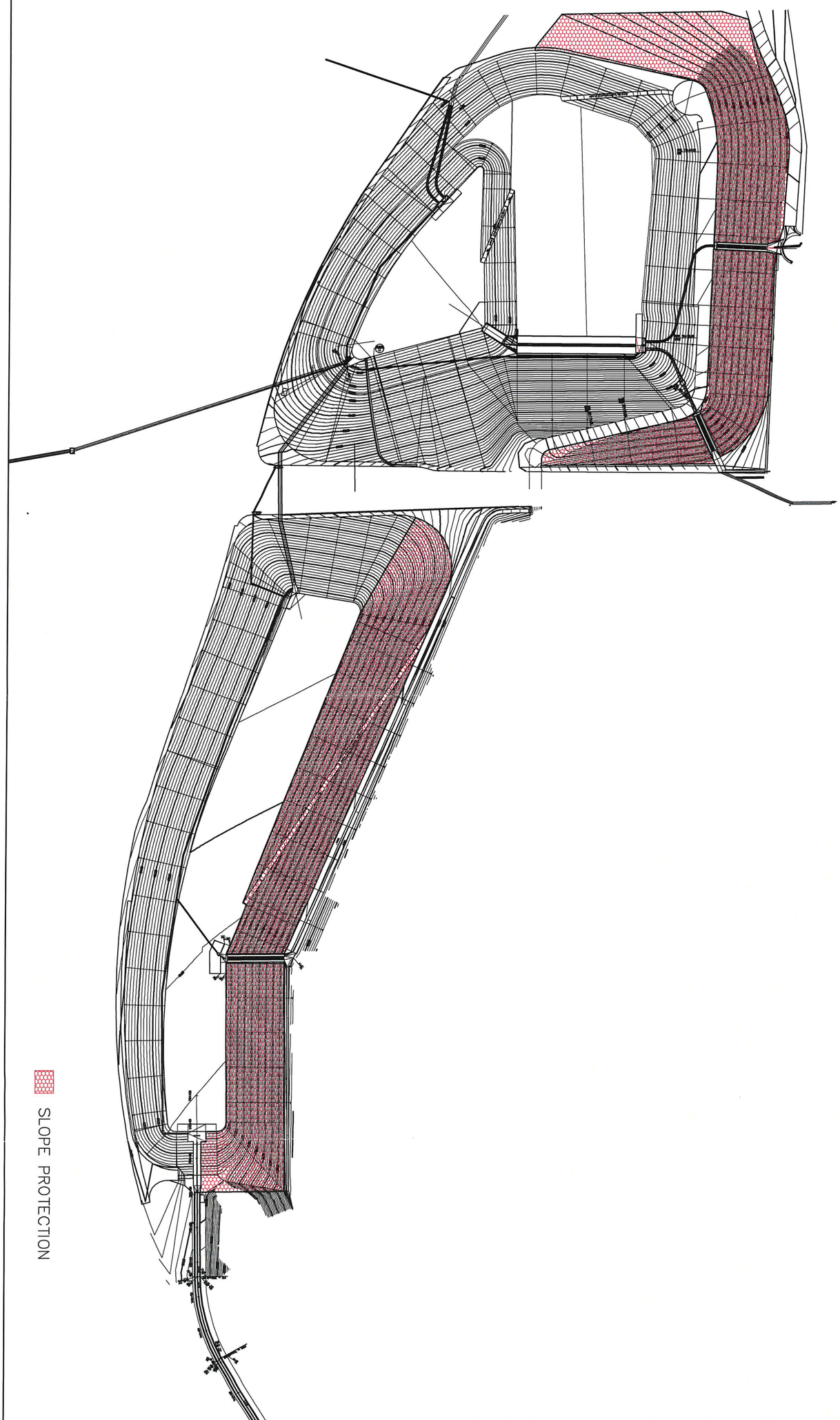
Gowan North Detention Basin (Downstream Impacts)

In the original design report the 2002 MPU HEC-1 model were updated to check the impact to the Gowan North Detention Basin. In the original design report it was determined that the required storage at the Gowan North Detention Basin increased from approximately 767 acre-feet to 864 acre-feet. To check the impact to the Gowan North Detention Basin using on the latest information, the HEC-1 model of the 2008 MPU was obtained from PBS&J. With the updated outfall discharges and revised hydrology provided for this report incorporated into the latest 2008 MPU HEC-1 model the results show that the required storage at the Gowan North Detention Basin has increased (another 36 acre-feet from the original design report analysis) to 900 acre-feet. The revisions of this report resulted in an increase of the peak storage to 900 ac-ft and the peak stage to 2327.73 for the downstream Gowan North Detention Basin. Much of the increase impact to the Gowan North Detention Basin is due to the 2008 MPU hydrology since the stage-outfall discharges for the LMBW Detention Basins have been designed for the maximum allowable drain time.

Slope Protection

As requested by the County, a cost evaluation was performed to provide slope protection along the banks of the proposed detention basin with slopes of 2:1, to protect from rainfall directly on the slopes. Rainfall that fall directly on the slopes can produce rills over time if they are not treated. If these rills are undesirable, periodic maintenance, or a slope surface treatment would be required. The slope surface treatment would consist of 4-inch rip rap, similar to what is proposed on the Beltway side slopes. Please refer to figure EX-1 for proposed slope protection area.

The area of slope surface treatment and cost estimate have been separated into the North Detention Basin and South Detention Basin slope area. The following table summarizes the square footage and estimated cost for the slope surface treatment.



SLOPE PROTECTION

SCALE 1" = 300'

NORTH

WESTERN BELTWAY

NORTH AND SOUTH DETETNTION BASIN

SLOPE PROTECTION

SHEET EX-1 1 OF 1 SHTS

G. C. WALLACE COMPANIES
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Area	Coverage Area (sq. ft)	Volume (Cu. Yds)	Unit Cost	Cost
North Detention Basin	358,016	8840	$25	$220,997
South Detention Basin	332,433	8208	$25	$205,205

The total cost of slope protection is $426,200.

Nuisance flow conveyance is not intended to drain over this surface treatment. Nuisance flows are conveyed through the detention basin via concrete facilities and a nuisance storm drain system.

Conclusions and Recommendations

The LMBW Detention Basins, Beltway Channel and all other facilities have been revised accordingly to adjust to the Western Beltway design by CH2MHill and to accommodate the higher flows yield from the revised hydrologic analyses. The proposed modifications and revisions of the LMBW Detention Basins and Beltway Channel conform to the 2008 MPU and all Drainage Design Manual Criteria. The tables below summarize the characteristics of the LMBW Detention Basins from impacts of the 100-year flows and PMF.

100-Year Flow

North Detention Basin

Peak Inflow:	3703 cfs
Balancing Conduit:	8'x 8' RCB
Invert Elevation at Balancing Conduit:	2701.11
Peak Stage Elevation:	2736.08
Maximum Water Depth at Peak Stage:	34.97 ft
Sediment Storage:	7.4 ac-ft

South Detention Basin

Peak Inflow:	1896 cfs
Orifice Dimension:	23" and 26"
Outfall Conduit:	72" RCP
Invert Elevation at Outlet:	2699.04
Peak Stage Elevation:	2736.08
Maximum Water Depth at Peak Stage:	37.04 ft
Sediment Storage:	4.4 ac-ft

Combined Basin Parameters

Tributary Area:	10.80 sq mi
Peak Inflow:	4302 cfs
Peak Outflow:	116 cfs
Peak Storage:	527 ac-ft
Time to Drain:	173.8 hours

APPENDIX LAYOUT

Appendix A: Hydrology

1) Interim Conditions Hydrology
   a) Soils and Precipitation Maps
   b) Curve Number Calculations
   c) Standard Form 4
   d) HEC-1 Analysis
2) Ultimate Conditions Hydrology
   a) Standard Form 4
   b) HEC-1 Analysis Model #1 – SDN3
   c) HEC-1 Analysis Model #1 – SDN4
   d) HEC-1 Analysis Model #2 – SDN3
   e) LMBW Detention Basins Drain Time HEC-1 Analysis
   f) LMBW Detention Basins Stage/Volumes/Discharges Summary
   g) LMBW Detention Basins Inflow-Outflow Hydrographs
3) Revised PMF Analysis (North Detention Basin Tributary Watershed)

Appendix B: Hydraulics

1) Detention Basin Calculations
   a) Stage-Storage Volumes (North Basin, South Basin and Combined)
   b) PMF Spillway Stage-Discharges (North Basin and South Basin)
   c) Stage-Outfall Discharges
2) Drop Inlet Calculations (Second Level Outfall Inlet & Riser Pipe)
3) HEC-RAS Models
   a) North Detention Basin Inflow Channels and Stepped Spillway
   b) Beltway Channel Sta. 734+60 to 741+00 (Open Channel)
4) WSPGW Models
   a) Gowan Beltway West Channel Sta. 736+50 to 838+30 (RCB)
   b) Facility SDPD-1 – Peaceful Dawn Collection System
   c) Facility SDLM-1 - Lone Mountain Collection System
   d) Facility SDTR-1 - South Detention Basin Trapezoidal Riprap Channel
   e) Facility SBD-54-1 – 54" RCP
   f) Facility SBD-54-2 – 54" RCP
5) Revised Flow Split Calculation (At Peaceful Dawn & Cliff Shadows)
6) Lone Mountain 48" RCP Normal Depth Calculation
7) USBR Type VI Impact Basin Analysis
8) Gowan Beltway West Channel Collection Facilities Calculations
   a) Normal Depth Street Section Calculations
   b) Drop Inlet Calculations
   c) Inlet Control Calculations
   d) Normal Depth Facility Calculations
   e) Standard Form 6 Calculations
   f) Interim Berm Calculations

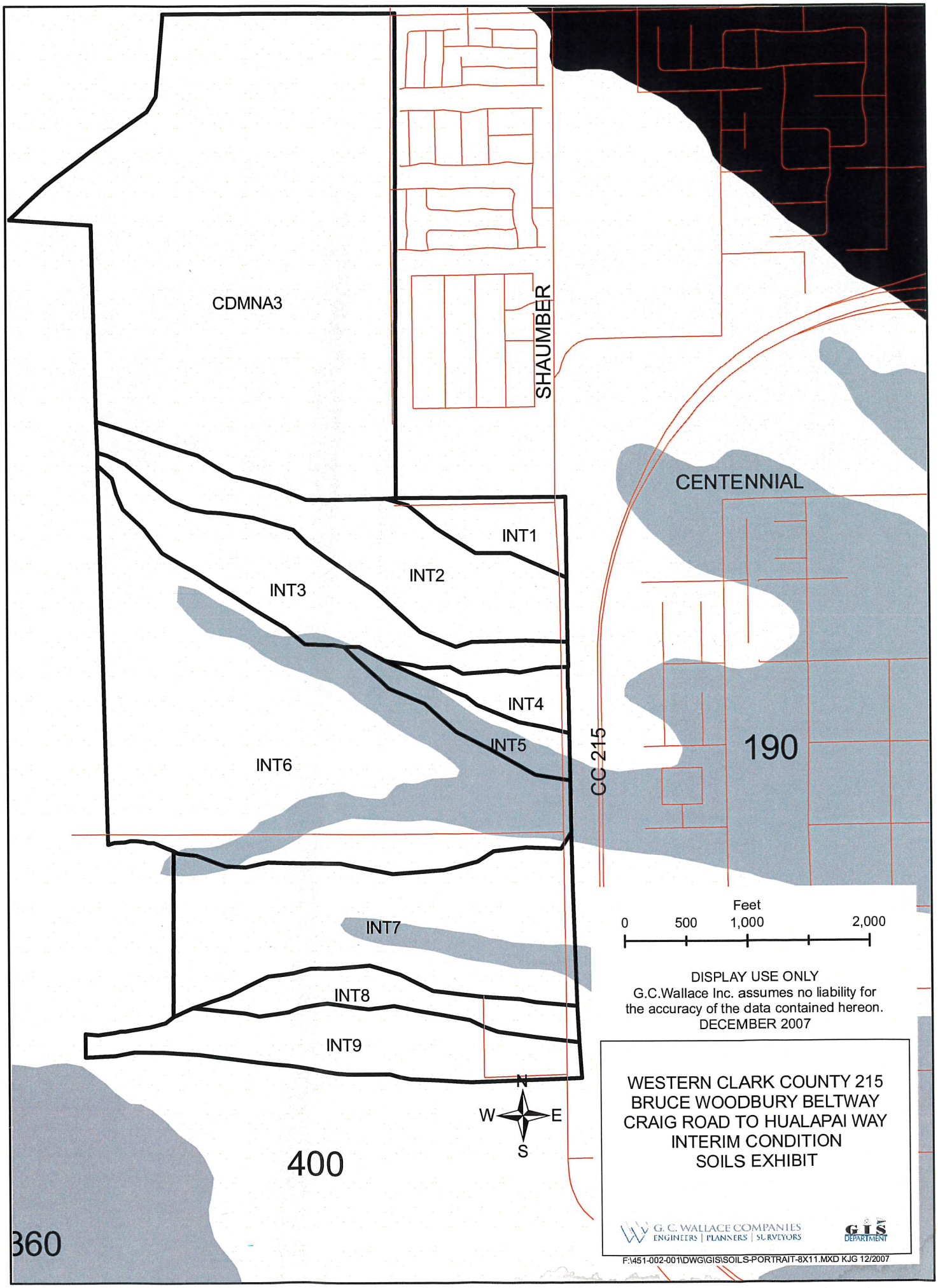
Appendix C: Reference

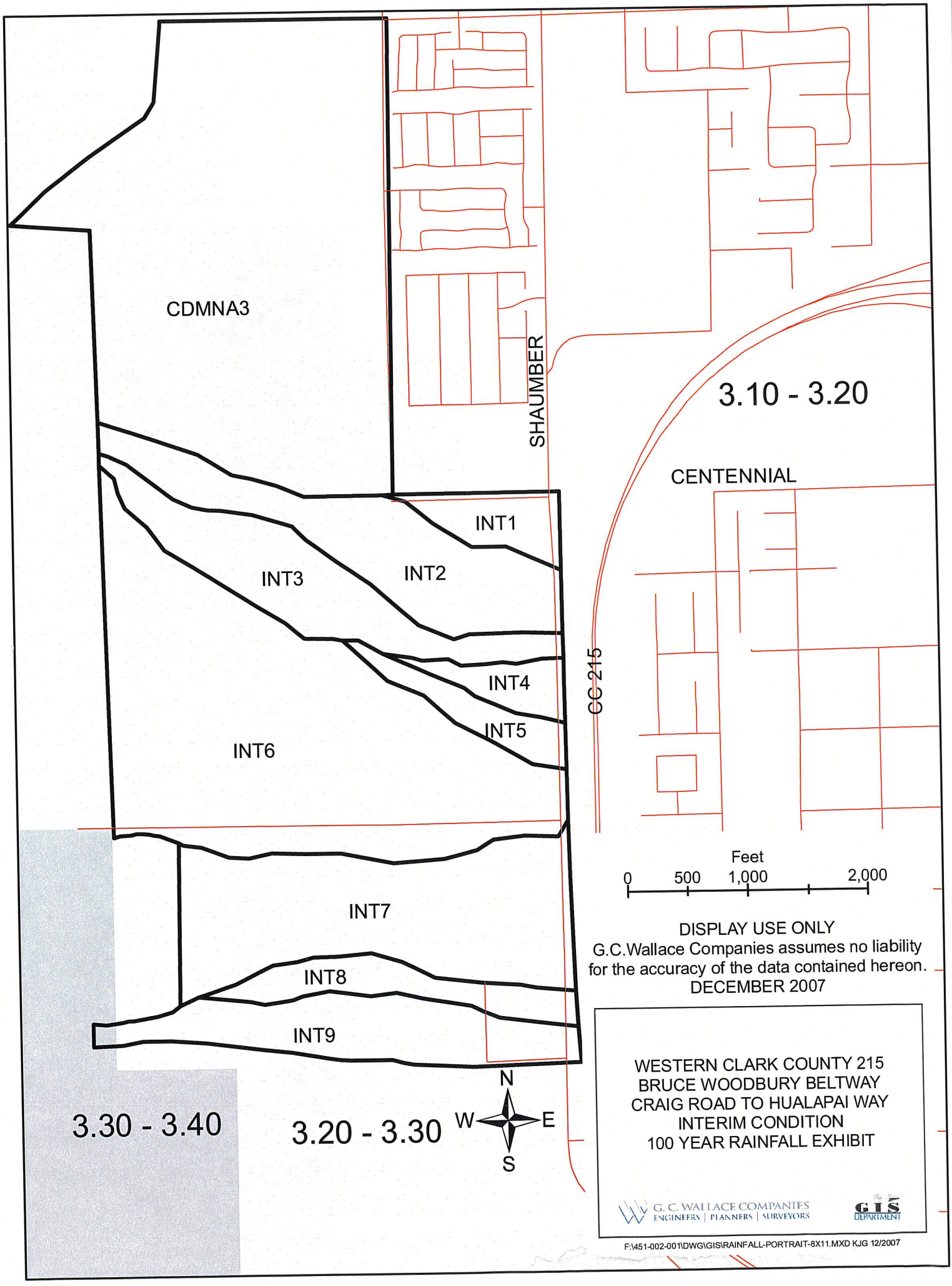
- Original Design Report
- Cliff's Edge : Infrastructure Phase 2
- 2008 MPU

Appendix D: Cost Estimate

Appendix E: Improvement Plans

INTERIM CONDITIONS HYDROLOGY


CDMNA3
SHAUMBER
CENTENNIAL
INT1
INT2
INT3
INT4
INT5
INT6
INT7
INT8
INT9
CC 215
190
400
360
Feet
0
500
1,000
2,000
N
W
E
S
DISPLAY USE ONLY
G.C.Wallace Inc. assumes no liability for the accuracy of the data contained hereon.
DECEMBER 2007
WESTERN CLARK COUNTY 215
BRUCE WOODBURY BELTWAY
CRAIG ROAD TO HUALAPAI WAY
INTERIM CONDITION
SOILS EXHIBIT
G. C. WALLACE COMPANIES
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GIS DEPARTMENT
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CDMNA3
SHAUMBER
3.10 - 3.20
CENTENNIAL
INT1
INT2
INT3
INT4
INT5
INT6
CC 215
INT7
INT8
INT9
3.30 - 3.40
3.20 - 3.30
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DISPLAY USE ONLY
G.C.Wallace Companies assumes no liability
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WESTERN CLARK COUNTY 215
BRUCE WOODBURY BELTWAY
CRAIG ROAD TO HUALAPAI WAY
INTERIM CONDITION
100 YEAR RAINFALL EXHIBIT
G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
GIS DEPARTMENT
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CURVE NUMBER CALCULATIONS

INTERIM CONDITIONS CURVE NUMBERS

CONDITION 1:	---------->	Desert Shrub: Poor Hydrologic Condition
CONDITION 2:	---------->	Open Space: Good Condition
CONDITION 3:	---------->	Urban District: Commercial and business
CONDITION 4:	---------->	Graded

CN VALUES

		HYDROLOGIC SOIL GROUP				
CONDITION		A	B	C	D	ROCK
1	---------->	63	77	85	88	90
2	---------->	39	61	74	80	90
3	---------->	89	92	94	95	90
4	---------->	77	86	91	94	90

MAP	HYDROLOGIC SOIL GROUP					COMPOSITE
UNIT	%A	%B	%C	%D	%ROCK	GROUP
190	10	85	0	5	0	B
191	5	85	0	10	0	B
360	0	15	0	35	50	D
400	0	10	0	90	0	D

	Composite Curve Number			
Soil Type	Cond. 1	Cond. 2	Cond. 3	Cond. 4
190	76.2	59.8	91.9	85.5
191	77.4	61.8	92.2	86.4
360	87.4	82.2	92.1	90.8
400	86.9	78.1	94.7	93.2

	Percentage Soil Type					Composite
Basin	190 C1	191 C1	360 C1	400 C1	400 C3	CN
INT1	0.0%	0.0%	0.0%	45.0%	55.0%	91.2
INT2	0.0%	0.0%	0.0%	70.0%	30.0%	89.2
INT3	2.0%	0.0%	0.0%	88.0%	10.0%	87.4
INT4	1.2%	0.0%	0.0%	98.8%	0.0%	86.8
INT5	76.1%	0.0%	0.0%	23.9%	0.0%	78.7
INT6	26.7%	0.0%	0.0%	73.3%	0.0%	84.0
INT7	12.9%	0.0%	0.0%	87.1%	0.0%	85.5
INT8	0.0%	0.0%	0.0%	100.0%	0.0%	86.9
INT9	0.0%	0.0%	0.0%	100.0%	0.0%	86.9
W3	0.0%	0.0%	43.1%	56.9%	0.0%	87.1

	Percentage Soil Type				Composite
Basin	190 C4	191 C4	360 C4	400 C4	CN
HLBW1-CA	1.8%	0.8%	85.0%	12.4%	91.0
HLBW1-CB	98.5%	0.0%	0.0%	1.5%	85.6
WRBW1	85.7%	0.0%	0.0%	14.3%	86.6

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

WESTERN SEGMENT OF THE LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY
INTERIM CONDITIONS

Project No: 451.002.001
Date: 3-Jun-08
Calculated by: REH

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN (16)	K (2)	AREA Ac (3)	AREA Sq Mi (4)	INITIAL LENGTH Feet (5)	SLOPE % (6)	Ti Min (7)	TRAVEL LENGTH Feet (8)	SLOPE % (9a)	V1 VELOCITY fps (9b)	V2 VELOCITY fps (10)	Tt Min (11)	TOTAL LENGTH Feet (12)	Tc = (L/180)+10 Min (13)	Min (14)	Tlag = 0.6Tc/60 Hours (15)	Remarks: RAINFALL
																		3.21
CDMNA3	E	86.9	0.7571	215.7	0.3370	500	10.0	6.4	5100	2.5	2.3	4.7	20.0	5600	N/A	26.4	0.264	3.19
INT1	D	91.2	0.8138	12.37	0.0193	300	8.3	4.4	1170	4.7	4.4	6.6	3.6	1470	18.2	8.0	0.080	3.22
INT2	D	89.2	0.7874	48.71	0.0761	500	6.0	6.9	3780	2.4	3.1	4.7	14.3	4280	33.8	21.2	0.212	3.23
INT3	D	87.4	0.7637	40.44	0.0632	500	6.0	7.4	3775	2.3	3.0	4.6	14.6	4275	33.8	22.1	0.221	3.21
INT4	E	86.8	0.7558	9.16	0.0143	500	4.6	8.3	1035	4.7	3.2	6.4	4.0	1535	N/A	12.3	0.123	3.22
INT5	E	78.7	0.6488	11.61	0.0181	500	4.0	11.4	1550	4.5	3.1	6.3	5.4	2050	N/A	16.9	0.169	3.25
INT6	E	84.0	0.7188	148.17	0.2315	500	7.0	8.0	4540	2.1	2.1	4.3	19.7	5040	N/A	27.8	0.278	3.25
INT7	E	85.5	0.7386	77.22	0.1207	500	3.0	10.1	3310	3.0	2.6	5.1	12.4	3810	N/A	22.5	0.225	3.25
INT8	E	86.9	0.7571	18.12	0.0283	500	4.0	8.7	2610	4.0	3.0	5.9	8.8	3110	N/A	17.5	0.175	3.26
INT9	E	86.9	0.7571	37.66	0.0588	500	4.4	8.4	3640	4.1	3.0	6.0	11.5	4140	N/A	20.0	0.200	3.29
W3	E	87.1	0.7597	200.14	0.3127	100	1.0	6.1	5769	6.2	3.7	7.3	14.2	5869	N/A	20.3	0.203	3.30
HLBW1-CA	D	91.0	0.8112	251.50	0.3930	100	1.0	5.2	9000	5.3	4.7	7.0	21.9	9100	60.6	27.1	0.271	3.22
HLBW1-CB	D	85.6	0.7399	74.95	0.1171	100	1.0	6.5	5700	5.0	4.5	6.8	14.5	5800	42.2	21.0	0.210	3.23
WRBW1	D	86.6	0.7531	208.37	0.3256	100	1.0	6.2	8100	5.4	4.7	7.1	19.6	8200	55.6	25.8	0.258	

$Tc = Ti + Tt$ $Tlag = 0.6\ Tc$

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

$K = 0.0132\ (CN) - 0.39$

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

Existing: $V1 = 14.8*(S/100)^{1/2}$ $V2 = 29.4*(S/100)^{1/2}$

Developed: $V1 = 20.2*(S/100)^{1/2}$ $V2 = 30.6*(S/100)^{1/2}$

REFERENCE:

STANDARD FORM 4

HEC-1 ANALYSIS

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998             *
*           VERSION 4.1             *
*                                   *
*  RUN DATE   03JUN08  TIME  08:34:14   *
*                                   *
*************************************
```

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

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

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

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


```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
*** FREE ***
               1    ID    LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
               2    ID    DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
               3    ID    DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
               4    ID    INPUT FILE = WBMOD1-SDN3.H1
               5    ID    LAST MODIFIED = 05/13/08
               6    ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
               7    ID    STORM DISTRIBUTION = SDN3
               8    ID    MODELED BY = JTL/JYL/MGK
               9    ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
              10    ID
              11    ID                          AREA    DARF
              12    ID                          SQ. MI.
              13    ID                          0-0.5   0.99
              14    ID                          0.5-1   0.975
              15    ID                          1-2     0.95
              16    ID                          2-3     0.925
              17    ID                          3-4     0.915
              18    ID                          4-5     0.908
              19    ID                          5-6     0.903
              20    ID                          6-7     0.895
              21    ID                          7-8     0.885
              22    ID
              23    ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
              24    ID
              25    IT       5       0       0     500
              26    IO       5       0       0
              27    IN       5       0       0
              28    JR     PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
                    *
              29    KK  CAMDK2
              30    KM   BASIN PARAMETERS TAKEN FROM CAM-10 ALTERNATIVES SUMMARY, APPENDIX A-3 BY LBG
              31    BA   0.337
              32    PB    3.28
              33    PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              34    PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              35    PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              36    PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              37    PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              38    PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              39    PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              40    PC   0.998   0.999   1.000
              41    LS       0    92.1
              42    UD0.213342
                    *
              43    KK RCAMDK2
              44    KM  ROUTE RCAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
              45    KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
              46    KM  FACILITY # = GOAN 0065, 0067, 0068, 0070
              47    KM  LINING = SOIL CEMENT
              48    RD    1400  0.0321    0.025       0    TRAP      10       4
                    *
```



```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
              49    KK  CAMDK3
              50    BA   0.316
              51    PB    3.32
              52    LS       0    90.3
              53    UD0.193556
                    *
              54    KK CCAMDK3
              55    KM  COMBINE RCAMDK2 AND CAMDK3
              56    HC       2
                    *
              57    KK CAM-10A
              58    BA   1.266
              59    PB    3.41
```

```
 60          LS       0    94.8
 61          UD0.209967
             *

 62          KK CAM-10B
 63          BA   1.809
 64          PB    3.39
 65          LS       0    91.8
 66          UD0.211495
             *

 67          KKDETCAM10
 68          BA   0.046
 69          PB   3.294
 70          LS       0    86.9
 71          UD0.137401
             *

 72          KK CAM10IN
 73          KM  COMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
 74          KM  TOTAL INFLOW TO CAM10 DETENTION BASIN
 75          HC       4
             *

 76          KK CAM10DB
 77          KM  DETENTION BASIN PARAMETERS FROM 2008 MPU BY PBS&J
 78          KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
 79          KM  FACILITY # = GOAN 0058
 80          KM  STORAGE VOLUME = 429.52 AC-FT (BERGER 5-05 VOLUME = 364 AC-FT; 18% INCREASE)
 81          KM  OUTLET = 33" ORIFICE WITH 54" RCP
 82          KM  100-YEAR DISCHARGE = 156 CFS
 83          KM  SPILLWAY LENGTH = 1360 FT
 84          KM  SPILLWAY HEIGHT = 27.7 FT
 85          KM  SPILLWAY CREST ELEVATION = 3000'
 86          KM  SPILLWAY TYPE =
 87          KM  PMF DISCHARGE = 24,614 CFS
 88          KM  TOP OF EMBANKMENT ELEVATION = 3004.5'
 89          KM  INFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
 90          KM  BY THE LOUIS BERGER GROUP (5-05)
1                                      HEC-1 INPUT                                          PAGE  3

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

 91          RS       1    STOR      -1
             *        0       0       0    0.67    3.33    8.33   26.67   43.33     110       2
             *      280   347.2     364     396
 92          SV    0.00    0.00    0.00    0.79    3.93    9.83   31.47   51.13  129.80  236.00
 93          SV  330.40  409.70  429.52  467.28
 94          SE  2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
 95          SE  2995.0  2999.0  3000.0  3003.4
 96          SQ    0.00    6.67   17.78   27.78   45.56   54.44   64.44   82.22   93.33  117.78
 97          SQ  138.39  156.00  160.40   24614
             *

 98          KK  RCAM10
 99          RD    3200    .019   0.013       0    CIRC     4.0
             *
             * END BASINS AND PARAMETERS TAKEN FROM 2008 MPU
             *

100          KK    INT6
101          PB    3.25
102          BA  .23151
103          LS       0    84.0
104          UD   0.278
             *

105          KK   CTROP
106          KM  COMBINE DB OUTFALL AND INT6 AT TROP
107          HC       2
             *

108          KK  CDMNA3
109          BA  0.3370
110          PB    3.21
111          LS       0    86.9
112          UD   0.264
             *

113          KK   RMNA3
114          KM  ROUTE CDMNA3 TO CMNA2
115          KM  FACILITY = GOWAN BELTWAY WEST
116          KM  FACILITY ID-MILE = GOBW 0322, 0326
117          KM  LINING = RCB
118          RD    1615    0.01   0.015       0    TRAP      10       0
             *

119          KK  CDMNA2
120          BA  0.1250
121          PB    3.18
122          LS       0    92.8
123          UD   0.188
             *
1                                      HEC-1 INPUT                                          PAGE  4

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

124          KK   CMNA2
125          KM  COMBINE RMNA3 AND CDMNA2
126          KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
127          HC       2
             *

128          KK   RMNA2
129          KM  ROUTE CMNA2 TO COM1
130          KM  FACILITY = GOWAN BELTWAY WEST
131          RD    1400   0.015   0.015       0    TRAP      10       0
             *

132          KK    INT1
133          PB    3.19
134          BA  .01933
```

```
135          LS       0    91.2
136          UD   0.080
             *

137          KK    INT2
138          PB    3.22
139          BA  .07611
140          LS       0    89.2
141          UD   0.212
             *

142          KK    INT3
143          PB    3.23
144          BA  .06319
145          LS       0    87.4
146          UD   0.221
             *

147          KK    COM1
148          HC       4
             *

149          KK    INT4
150          PB    3.21
151          BA  .01431
152          LS       0    86.8
153          UD   0.123
             *

154          KK    INT5
155          PB    3.22
156          BA  .01814
157          LS       0    78.7
158          UD   0.169
             *
```



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

159          KK    COM2
160          HC       4
             *

161          KK    INT7
162          PB    3.25
163          BA  .12065
164          LS       0    85.5
165          UD   0.225
             *

166          KK    INT8
167          PB    3.25
168          BA  .02831
169          LS       0    86.9
170          UD   0.175
             *

171          KK    INT9
172          PB    3.26
173          BA  .05884
174          LS       0    86.9
175          UD   0.200
             *

176          KK      W3
177          PB    3.29
178          BA  .31272
179          LS       0    87.1
180          UD   0.203
             *

181          KK    COM3
182          HC       5
             *

183          KK   RCOM3
184          KM  ROUTE COM3 TO COM4
185          KM  FACILITY = GOWAN BELTWAY WEST
186          RD    1080    0.01   0.015       0    TRAP      14       0
             *

187          KKHLBW1-CA
188          BA  0.3930
189          PB    3.30
190          LS       0    91.0
191          UD   0.271
             *
```



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

192          KK    COM4
193          KM  COMBINE COM3 AND HLBW1-CA
194          KM  LAS VEGAS BELTWAY @ ANN ROAD
195          HC       2
             *

196          KK   RCOM4
197          KM  ROUTE COM4 TO HLBW1-CB
198          RD    1800  0.0250   0.015       0    TRAP      14       0
             *

199          KKHLBW1-CB
200          BA  0.1171
201          PB    3.22
202          LS       0    85.6
203          UD   0.210
             *

204          KK    COM5
205          KM  COMBINE RCOM4 & HLBW1-CB
```

```
206          HC       2
             *
207          KK   RCOM5
208          KM  ROUTE COM5 TO WRBW1
209          RD    2000   0.050   0.015       0    TRAP      14       0
             *
210          KK   WRBW1
211          BA  0.3256
212          PB    3.23
213          LS       0    86.6
214          UD   0.258
             *
215          KK    COM6
216          KM  COMBINE RCOM5 & WRBW1
217          KM  LAS VEGAS BELTWAY @ WASHBURN ROAD
218          HC       2
             *
219          ZZ
```

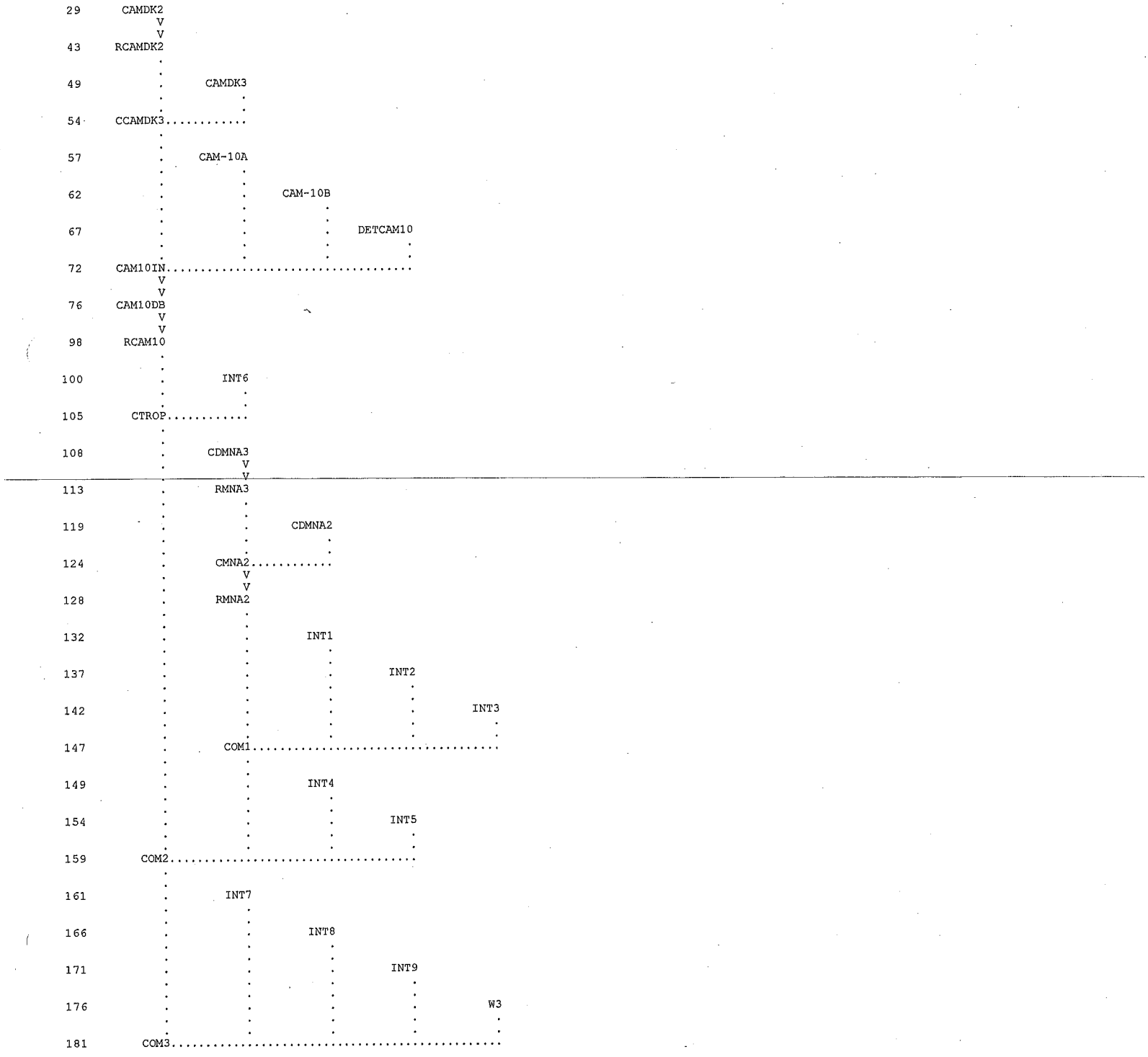
1

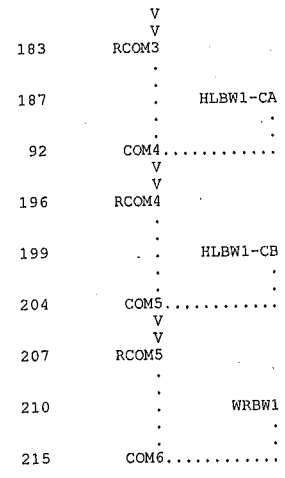
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   03JUN08  TIME  08:34:14   *
*                                       *
*****************************************
```

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

LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
INPUT FILE = WBMOD1-SDN3.H1
LAST MODIFIED = 05/13/08
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
MODELED BY = JTL/JYL/MGK
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ. MI.	DARF
0-0.5	0.99
0.5-1	0.975
1-2	0.95
2-3	0.925
3-4	0.915
4-5	0.908
5-6	0.903
6-7	0.895
7-8	0.885

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

```
 26 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        500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     2    0  ENDING DATE
                    NDTIME      1735  ENDING TIME
                     ICENT        19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    41.58 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
                  .99      .98      .95      .93      .92      .91      .90      .89      .88
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 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	CAMDK2	.34	1	FLOW	558.	547.	531.	514.	507.	502.	499.	494.	487.

				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCAMDK2	.34	1	FLOW	556.	546.	529.	512.	505.	501.	496.	492.	485.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
	CAMDK3	.32	1	FLOW	531.	521.	504.	487.	480.	475.	472.	466.	459.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CCAMDK3	.65	1	FLOW	1065.	1045.	1012.	979.	966.	957.	949.	940.	926.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	CAM-10A	1.27	1	FLOW	2377.	2337.	2270.	2204.	2177.	2158.	2145.	2123.	2097.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	CAM-10B	1.81	1	FLOW	3106.	3049.	2953.	2857.	2819.	2792.	2773.	2742.	2704.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	DETCAM10	.05	1	FLOW	77.	75.	73.	70.	69.	68.	67.	67.	66.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT													
+	CAM10IN	3.77	1	FLOW	6621.	6502.	6303.	6104.	6024.	5968.	5929.	5865.	5785.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	CAM10DB	3.77	1	FLOW	1585.	1346.	648.	159.	158.	157.	156.	155.	154.
				TIME	4.92	5.00	5.25	5.67	5.67	5.67	5.67	5.67	5.67
			**	PEAK STAGES IN FEET **									
			1	STAGE	3000.20	3000.16	3000.07	2999.74	2999.43	2999.22	2999.06	2998.82	2998.51
				TIME	4.92	5.00	5.25	5.67	5.67	5.67	5.67	5.67	5.67
ROUTED TO													
+	RCAM10	3.77	1	FLOW	1299.	1124.	636.	159.	158.	157.	156.	155.	154.
				TIME	5.00	5.08	5.25	5.67	5.67	5.67	5.67	5.67	5.67
HYDROGRAPH AT													
+	INT6	.23	1	FLOW	258.	252.	242.	232.	228.	226.	224.	221.	217.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CTROP	4.01	1	FLOW	1364.	1181.	673.	347.	343.	339.	337.	333.	328.
				TIME	5.00	5.08	5.25	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	CDMNA3	.34	1	FLOW	428.	419.	403.	388.	382.	377.	374.	369.	363.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
	RMNA3	.34	1	FLOW	419.	409.	394.	379.	373.	369.	365.	360.	355.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT													
+	CDMNA2	.13	1	FLOW	218.	214.	207.	201.	198.	196.	195.	193.	190.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CMNA2	.46	1	FLOW	624.	610.	589.	568.	559.	554.	549.	542.	533.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RMNA2	.46	1	FLOW	618.	605.	583.	562.	553.	548.	543.	536.	528.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	INT1	.02	1	FLOW	40.	40.	38.	37.	37.	36.	36.	36.	35.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	INT2	.08	1	FLOW	113.	111.	107.	103.	102.	101.	100.	99.	97.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	INT3	.06	1	FLOW	88.	86.	83.	80.	79.	78.	77.	76.	75.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
4 COMBINED AT													
+	COM1	.62	1	FLOW	840.	822.	793.	765.	753.	745.	739.	730.	718.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	INT4	.01	1	FLOW	23.	23.	22.	21.	21.	21.	20.	20.	20.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	INT5	.02	1	FLOW	20.	19.	18.	17.	17.	17.	17.	16.	16.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT													
+	COM2	4.66	1	FLOW	1553.	1344.	1176.	1135.	1118.	1106.	1097.	1084.	1067.
				TIME	5.00	5.08	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	INT7	.12	1	FLOW	158.	154.	148.	142.	140.	139.	137.	136.	133.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
	INT8	.03	1	FLOW	43.	42.	41.	39.	39.	38.	38.	37.	37.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	INT9	.06	1	FLOW	84.	82.	79.	76.	75.	74.	74.	73.	71.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	W3	.31	1	FLOW	453.	443.	427.	411.	404.	400.	397.	391.	385.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58

5 COMBINED AT	COM3	5.18	1	FLOW	1973.	1932.	1864.	1797.	1770.	1751.	1737.	1715.	1689.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM3	5.18	1	FLOW	1966.	1924.	1857.	1789.	1762.	1743.	1730.	1709.	1681.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROGRAPH AT	HLBW1-CA	.39	1	FLOW	589.	578.	559.	540.	533.	528.	524.	518.	510.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	COM4	5.57	1	FLOW	2555.	2502.	2416.	2330.	2295.	2271.	2254.	2227.	2191.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM4	5.57	1	FLOW	2540.	2486.	2399.	2315.	2279.	2255.	2239.	2210.	2176.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	HLBW1-CB	.12	1	FLOW	154.	150.	145.	139.	137.	135.	134.	132.	130.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	COM5	5.69	1	FLOW	2693.	2636.	2544.	2454.	2416.	2391.	2373.	2343.	2307.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM5	5.69	1	FLOW	2677.	2619.	2527.	2438.	2398.	2374.	2356.	2326.	2290.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	WRBW1	.33	1	FLOW	417.	408.	393.	378.	372.	368.	365.	360.	354.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT	COM6	6.01	1	FLOW	3094.	3027.	2920.	2816.	2770.	2741.	2721.	2686.	2644.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.54	559.87	217.41	2.40	5.00	556.45	220.00	2.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4322E+02 EXCESS= .0000E+00 OUTFLOW= .4322E+02 BASIN STORAGE= .6644E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.55	549.26	218.56	2.36	5.00	545.72	220.00	2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4238E+02 EXCESS= .0000E+00 OUTFLOW= .4238E+02 BASIN STORAGE= .5757E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.56	532.39	217.39	2.28	5.00	529.37	220.00	2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4098E+02 EXCESS= .0000E+00 OUTFLOW= .4098E+02 BASIN STORAGE= .6592E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.58	516.14	217.82	2.20	5.00	512.01	220.00	2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3958E+02 EXCESS= .0000E+00 OUTFLOW= .3959E+02 BASIN STORAGE= .5628E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.58	508.27	218.65	2.17	5.00	505.24	220.00	2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3903E+02 EXCESS= .0000E+00 OUTFLOW= .3903E+02 BASIN STORAGE= .5563E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.59	504.08	217.64	2.15	5.00	500.84	220.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3863E+02 EXCESS= .0000E+00 OUTFLOW= .3864E+02 BASIN STORAGE= .5899E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.59	501.61	218.06	2.13	5.00	496.44	220.00	2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3837E+02 EXCESS= .0000E+00 OUTFLOW= .3837E+02 BASIN STORAGE= .6686E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.60	494.36	218.74	2.11	5.00	491.87	220.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3791E+02 EXCESS= .0000E+00 OUTFLOW= .3791E+02 BASIN STORAGE= .6880E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
	RCAMDK2 MANE	1.60	489.03	218.00	2.08	5.00	484.55	220.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3736E+02 EXCESS= .0000E+00 OUTFLOW= .3736E+02 BASIN STORAGE= .6767E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	1.68	1501.81	297.45	2.14	5.00	1299.42	300.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4312E+03 EXCESS= .0000E+00 OUTFLOW= .4308E+03 BASIN STORAGE= .3910E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	1.74	1281.15	302.12	2.09	5.00	1123.50	305.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4214E+03 EXCESS= .0000E+00 OUTFLOW= .4210E+03 BASIN STORAGE= .3910E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.01	644.08	313.57	2.01	5.00	636.29	315.00	2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4054E+03 EXCESS= .0000E+00 OUTFLOW= .4050E+03 BASIN STORAGE= .3909E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.66	159.26	340.61	1.94	5.00	159.25	340.00	1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3919E+03 EXCESS= .0000E+00 OUTFLOW= .3915E+03 BASIN STORAGE= .3895E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.67	157.90	341.20	1.93	5.00	157.89	340.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3889E+03 EXCESS= .0000E+00 OUTFLOW= .3885E+03 BASIN STORAGE= .3877E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.67	156.95	341.61	1.92	5.00	156.95	340.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3864E+03 EXCESS= .0000E+00 OUTFLOW= .3861E+03 BASIN STORAGE= .3866E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.67	156.27	341.90	1.91	5.00	156.27	340.00	1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3851E+03 EXCESS= .0000E+00 OUTFLOW= .3847E+03 BASIN STORAGE= .3857E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.67	155.20	339.70	1.90	5.00	155.20	340.00	1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3824E+03 EXCESS= .0000E+00 OUTFLOW= .3820E+03 BASIN STORAGE= .3844E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.68	153.85	340.29	1.88	5.00	153.85	340.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3794E+03 EXCESS= .0000E+00 OUTFLOW= .3791E+03 BASIN STORAGE= .3826E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.20	427.21	221.26	1.89	5.00	419.18	220.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3392E+02 EXCESS= .0000E+00 OUTFLOW= .3392E+02 BASIN STORAGE= .1519E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.21	416.97	222.00	1.84	5.00	409.23	220.00	1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3316E+02 EXCESS= .0000E+00 OUTFLOW= .3316E+02 BASIN STORAGE= .1691E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.22	402.04	221.69	1.77	5.00	393.77	220.00	1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3189E+02 EXCESS= .0000E+00 OUTFLOW= .3189E+02 BASIN STORAGE= .1544E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.24	387.01	221.44	1.70	5.00	379.01	220.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3064E+02 EXCESS= .0000E+00 OUTFLOW= .3064E+02 BASIN STORAGE= .1646E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.25	380.71	221.61	1.68	5.00	372.55	220.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3014E+02 EXCESS= .0000E+00 OUTFLOW= .3014E+02 BASIN STORAGE= .1547E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.26	376.68	221.36	1.66	5.00	368.97	220.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2979E+02 EXCESS= .0000E+00 OUTFLOW= .2979E+02 BASIN STORAGE= .1656E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.26	372.91	222.08	1.64	5.00	365.22	225.00	1.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2953E+02 EXCESS= .0000E+00 OUTFLOW= .2954E+02 BASIN STORAGE= .1627E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

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          RMNA3  MANE          1.27    368.14    221.99      1.62      5.00    360.44    225.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2913E+02 EXCESS= .0000E+00 OUTFLOW= .2913E+02 BASIN STORAGE= .1647E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA3  MANE          1.28    361.87    222.20      1.59      5.00    354.90    225.00        1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2864E+02 EXCESS= .0000E+00 OUTFLOW= .2864E+02 BASIN STORAGE= .1541E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .79    620.41    221.12      2.02      5.00    617.54    220.00        2.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4981E+02 EXCESS= .0000E+00 OUTFLOW= .4981E+02 BASIN STORAGE= .1267E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .80    608.27    220.69      1.98      5.00    604.54    220.00        1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4873E+02 EXCESS= .0000E+00 OUTFLOW= .4873E+02 BASIN STORAGE= .1269E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .81    586.55    220.64      1.91      5.00    582.98    220.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4696E+02 EXCESS= .0000E+00 OUTFLOW= .4696E+02 BASIN STORAGE= .1259E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .82    565.37    220.56      1.83      5.00    561.97    220.00        1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4520E+02 EXCESS= .0000E+00 OUTFLOW= .4520E+02 BASIN STORAGE= .1272E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .83    556.16    221.13      1.81      5.00    553.05    220.00        1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4449E+02 EXCESS= .0000E+00 OUTFLOW= .4449E+02 BASIN STORAGE= .1182E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .83    550.87    221.14      1.79      5.00    547.74    220.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4401E+02 EXCESS= .0000E+00 OUTFLOW= .4401E+02 BASIN STORAGE= .1184E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .83    545.91    221.13      1.77      5.00    542.74    220.00        1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4364E+02 EXCESS= .0000E+00 OUTFLOW= .4365E+02 BASIN STORAGE= .1187E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .84    539.38    220.58      1.75      5.00    535.93    220.00        1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4308E+02 EXCESS= .0000E+00 OUTFLOW= .4308E+02 BASIN STORAGE= .1243E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RMNA2  MANE           .84    530.96    221.11      1.72      5.00    527.62    220.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4239E+02 EXCESS= .0000E+00 OUTFLOW= .4239E+02 BASIN STORAGE= .1169E-02 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .50   1968.92    220.46      2.08      5.00   1966.38    220.00        2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5753E+03 EXCESS= .0000E+00 OUTFLOW= .5752E+03 BASIN STORAGE= .2617E+00 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .50   1927.34    220.31      2.04      5.00   1924.41    220.00        2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5624E+03 EXCESS= .0000E+00 OUTFLOW= .5623E+03 BASIN STORAGE= .2617E+00 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .51   1859.99    220.45      1.96      5.00   1857.17    220.00        1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5407E+03 EXCESS= .0000E+00 OUTFLOW= .5405E+03 BASIN STORAGE= .2616E+00 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .52   1790.94    220.11      1.89      5.00   1789.33    220.00        1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5221E+03 EXCESS= .0000E+00 OUTFLOW= .5219E+03 BASIN STORAGE= .2609E+00 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .52   1765.26    220.43      1.87      5.00   1762.18    220.00        1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5168E+03 EXCESS= .0000E+00 OUTFLOW= .5166E+03 BASIN STORAGE= .2600E+00 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .00
          RCOM3  MANE           .52   1746.36    220.31      1.86      5.00   1743.30    220.00        1.86
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .5131E+03 EXCESS= .0000E+00 OUTFLOW= .5130E+03 BASIN STORAGE= .2595E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM3	MANE	.52	1733.21	220.50	1.85	5.00	1730.34	220.00	1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5104E+03 EXCESS= .0000E+00 OUTFLOW= .5103E+03 BASIN STORAGE= .2590E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM3	MANE	.53	1711.01	220.56	1.83	5.00	1708.59	220.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5063E+03 EXCESS= .0000E+00 OUTFLOW= .5062E+03 BASIN STORAGE= .2584E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM3	MANE	.53	1684.15	220.37	1.81	5.00	1680.94	220.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5011E+03 EXCESS= .0000E+00 OUTFLOW= .5009E+03 BASIN STORAGE= .2575E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.57	2551.19	220.54	2.10	5.00	2539.65	220.00	2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6240E+03 EXCESS= .0000E+00 OUTFLOW= .6239E+03 BASIN STORAGE= .3314E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.57	2496.01	220.69	2.05	5.00	2485.70	220.00	2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6102E+03 EXCESS= .0000E+00 OUTFLOW= .6100E+03 BASIN STORAGE= .3313E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.58	2407.49	220.31	1.97	5.00	2399.25	220.00	1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5867E+03 EXCESS= .0000E+00 OUTFLOW= .5866E+03 BASIN STORAGE= .3313E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.59	2326.30	220.61	1.91	5.00	2314.65	220.00	1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+03 EXCESS= .0000E+00 OUTFLOW= .5663E+03 BASIN STORAGE= .3304E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.59	2288.88	220.75	1.89	5.00	2278.71	220.00	1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5605E+03 EXCESS= .0000E+00 OUTFLOW= .5603E+03 BASIN STORAGE= .3293E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.59	2266.01	220.49	1.87	5.00	2255.17	220.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5564E+03 EXCESS= .0000E+00 OUTFLOW= .5562E+03 BASIN STORAGE= .3286E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.60	2250.39	220.55	1.86	5.00	2238.89	220.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5534E+03 EXCESS= .0000E+00 OUTFLOW= .5532E+03 BASIN STORAGE= .3280E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.60	2220.56	220.44	1.85	5.00	2210.36	220.00	1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5487E+03 EXCESS= .0000E+00 OUTFLOW= .5486E+03 BASIN STORAGE= .3271E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.60	2187.93	220.64	1.83	5.00	2176.43	220.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5428E+03 EXCESS= .0000E+00 OUTFLOW= .5427E+03 BASIN STORAGE= .3260E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.50	2689.28	220.43	2.09	5.00	2676.73	220.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6354E+03 EXCESS= .0000E+00 OUTFLOW= .6352E+03 BASIN STORAGE= .2991E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.51	2628.85	220.31	2.05	5.00	2618.72	220.00	2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6211E+03 EXCESS= .0000E+00 OUTFLOW= .6210E+03 BASIN STORAGE= .2991E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.51	2538.94	220.40	1.97	5.00	2527.20	220.00	1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5972E+03 EXCESS= .0000E+00 OUTFLOW= .5971E+03 BASIN STORAGE= .2990E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.52	2450.86	220.48	1.90	5.00	2437.65	220.00	1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5765E+03 EXCESS= .0000E+00 OUTFLOW= .5764E+03 BASIN STORAGE= .2982E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.52	2408.18	220.82	1.88	5.00	2398.33	220.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5704E+03 EXCESS= .0000E+00 OUTFLOW= .5702E+03 BASIN STORAGE= .2972E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.53	2385.53	220.70	1.87	5.00	2373.56	220.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5662E+03 EXCESS= .0000E+00 OUTFLOW= .5660E+03 BASIN STORAGE= .2966E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.53	2365.98	220.81	1.86	5.00	2355.73	220.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5631E+03 EXCESS= .0000E+00 OUTFLOW= .5629E+03 BASIN STORAGE= .2961E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.53	2336.78	220.36	1.84	5.00	2325.85	220.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5583E+03 EXCESS= .0000E+00 OUTFLOW= .5581E+03 BASIN STORAGE= .2953E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.53	2302.48	220.67	1.82	5.00	2289.87	220.00	1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5522E+03 EXCESS= .0000E+00 OUTFLOW= .5520E+03 BASIN STORAGE= .2943E+00 PERCENT ERROR= .0

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

ULTIMATE CONDITIONS HYDROLOGY

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

WESTERN SEGMENT OF THE LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY
ULTIMATE CONDITIONS

Project No: 451.002.001
Date: 5/28/2008
Calculated by: JYL

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN (16)	K (2)	AREA Ac (3)	AREA Sq Mi (4)	INITIAL LENGTH Feet (5)	SLOPE % (6)	Ti Min (7)	TRAVEL LENGTH Feet (8)	SLOPE % (9a)	V1 VELOCITY fps (9b)	V2 VELOCITY fps (10)	Tt Min (11)	TOTAL LENGTH Feet (12)	Tc = (L/180)+10 Min (13)	Min (14)	Tlag = 0.6Tc/60 Hours (15)	Remarks: RAINFALL
EFPOA1	D	91.2	0.8138	91.75	0.1434	100	1.0	5.2	3395	4.8	4.4	6.7	9.1	3495	29.4	14.3	0.143	3.22
EFPOA2	D	91.7	0.8204	81.57	0.1275	100	1.0	5.0	3244	4.2	4.1	6.2	9.4	3344	28.6	14.4	0.144	3.23
EFPOB1	D	91.7	0.8204	42.10	0.0658	100	1.0	5.0	3323	2.4	3.1	4.7	12.7	3423	29.0	17.8	0.178	3.23
W1	D	94.5	0.8574	94.10	0.1470	100	1.0	4.4	4900	3.3	3.7	5.6	15.5	5000	37.8	19.8	0.198	3.25
W2	D	94.0	0.8508	108.06	0.1688	100	1.0	4.5	4129	4.2	4.1	6.3	11.6	4229	33.5	16.1	0.161	3.26
W3	D	95.8	0.8746	200.14	0.3127	100	1.0	4.1	5769	6.2	5.0	7.6	13.1	5869	42.6	17.2	0.172	3.29
HLBW1-CA	D	95.4	0.8693	251.50	0.3930	100	1.0	4.2	9000	5.3	4.7	7.0	21.9	9100	60.6	26.1	0.261	3.30
HLBW1-CB	D	95.4	0.8693	74.95	0.1171	100	1.0	4.2	5700	5.0	4.5	6.8	14.5	5800	42.2	18.7	0.187	3.22
WRBW1	D	94.8	0.8614	208.37	0.3256	100	1.0	4.3	8100	5.4	4.7	7.1	19.6	8200	55.6	23.9	0.239	3.23
LWBW1A	D	93.5	0.8442	153.69	0.2401	100	1.0	4.6	6300	5.5	4.7	7.2	15.2	6400	45.6	19.8	0.198	3.31
LWBW1B	D	93.5	0.8442	48.34	0.0755	100	1.0	4.6	3600	4.7	4.4	6.6	9.7	3700	30.6	14.3	0.143	3.24
UVB1-2A	D	93.3	0.8416	157.00	0.2453	100	1.0	4.7	5900	6.9	5.3	8.0	12.8	6000	43.3	17.4	0.174	3.30
UVB1-2B	D	93.3	0.8416	12.28	0.0192	100	1.0	4.7	1400	3.6	3.8	5.8	4.8	1500	18.3	9.4	0.094	3.23
UVB1-1A	D	92.0	0.8244	140.66	0.2198	100	1.0	5.0	4300	6.5	5.2	7.8	9.7	4400	34.4	14.7	0.147	3.28
UVB1-1B	D	91.0	0.8112	7.92	0.0124	100	1.0	5.2	850	4.7	4.4	6.6	2.8	950	15.3	8.0	0.080	3.20
UVB1-2C	D	93.3	0.8416	20.65	0.0323	100	1.0	4.7	2000	3.0	3.5	5.3	7.1	2100	21.7	11.8	0.118	3.23
LMDBS	D	84.8	0.7294	37.69	0.0589	100	1.0	6.7	1300	5.8	4.9	7.4	3.5	1400	17.8	10.2	0.102	3.20
WBLM	D	90.0	0.7980	51.55	0.0805	100	1.0	5.4	2900	1.6	2.6	3.9	13.6	3000	26.7	19.0	0.190	3.17
WBCA	D	92.0	0.8244	41.43	0.0647	100	1.0	5.0	5200	0.5	1.4	2.2	42.0	5300	39.4	47.0	0.394	3.20
LWBW1C	D	93.5	0.8442	36.49	0.0570	100	1.0	4.6	2200	3.9	4.0	6.0	6.8	2300	22.8	11.4	0.114	3.20
LMDBN	D	84.8	0.7294	15.17	0.0237	100	1.0	6.7	1800	1.4	2.4	3.6	9.5	1900	20.6	16.1	0.161	3.18
WBAW	D	88.0	0.7716	36.46	0.0570	100	1.0	5.9	4400	2.4	3.1	4.7	16.4	4500	35.0	22.3	0.223	3.20
UVB1-1C	D	92.0	0.8244	11.86	0.0185	100	1.0	5.0	1200	4.2	4.1	6.3	3.9	1300	17.2	8.8	0.088	3.23
LMBW1	D	88.6	0.7795	53.84	0.0841	100	1.0	5.8	3000	15.7	8.0	12.1	4.5	3100	27.2	10.2	0.102	3.18
WBCL	D	92.0	0.8244	19.98	0.0312	100	1.0	5.0	2300	3.3	3.7	5.6	7.7	2400	23.3	12.6	0.126	3.21
UVB1-1D	D	92.0	0.8244	22.72	0.0355	100	1.0	5.0	1500	4.0	4.0	6.1	4.8	1600	18.9	9.7	0.097	3.23
UVB1-1E	D	92.0	0.8244	17.89	0.0280	100	1.0	5.0	1500	4.0	4.0	6.1	4.8	1600	18.9	9.7	0.097	3.24
CDMNA2	D	92.8	0.8350	80.00	0.1250	100	1.0	4.8	3740	2.4	3.1	4.7	14.1	3840	31.3	18.8	0.188	3.18

$Tc = Ti + Tt$ $\quad Tlag = 0.6\ Tc$

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

$K = 0.0132\ (CN) - 0.39$

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

Existing: $V1 = 14.8*(S/100)^{1/2}$ $\quad V2 = 29.4*(S/100)^{1/2}$

Developed: $V1 = 20.2*(S/100)^{1/2}$ $\quad V2 = 30.6*(S/100)^{1/2}$

REFERENCE: CN Values are referrenced from the 2008 MPU hydrologic model.

STANDARD FORM 4

HEC-1 ANALYSIS MODEL #1 – SDN3

```
**********                                    **********
*                                  *          *                                  *
*   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  28MAY08  TIME 09:06:52 *        *        (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

                       *DIAGRAM
 *** FREE ***
               1       ID    LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
               2       ID    DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
               3       ID    DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
               4       ID    INPUT FILE = WBMOD1-SDN3.H1
               5       ID    LAST MODIFIED = 05/13/08
               6       ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
               7       ID    STORM DISTRIBUTION = SDN3
               8       ID    MODELED BY = JTL/JYL/MGK
               9       ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
              10       ID
              11       ID                          AREA    DARF
              12       ID                          SQ. MI.
              13       ID                          0-0.5   0.99
              14       ID                          0.5-1   0.975
              15       ID                          1-2     0.95
              16       ID                          2-3     0.925
              17       ID                          3-4     0.915
              18       ID                          4-5     0.908
              19       ID                          5-6     0.903
              20       ID                          6-7     0.895
              21       ID                          7-8     0.885
              22       ID
              23       ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
              24       ID
              25       IT       5       0       0     500
              26       IO       5       0       0
              27       IN       5       0       0
              28       JR    PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
                       *

              29       KK  CAMDK2
              30       KM   BASIN PARAMETERS TAKEN FROM CAM-10 ALTERNATIVES SUMMARY, APPENDIX A-3 BY LBG
              31       BA   0.337
              32       PB    3.28
              33       PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              34       PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              35       PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              36       PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              37       PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              38       PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              39       PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              40       PC   0.998   0.999   1.000
              41       LS       0    92.1
              42       UD0.213342
                       *

              43       KK RCAMDK2
              44       KM  ROUTE RCAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
              45       KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
              46       KM  FACILITY # = GOAN 0065, 0067, 0068, 0070
              47       KM  LINING = SOIL CEMENT
              48       RD    1400  0.0321   0.025       0    TRAP      10       4
                       *

1                                        HEC-1 INPUT                                        PAGE  2

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

              49       KK  CAMDK3
              50       BA   0.316
              51       PB    3.32
              52       LS       0    90.3
              53       UD0.193556
                       *

              54       KK CCAMDK3
              55       KM  COMBINE RCAMDK2 AND CAMDK3
              56       HC       2
                       *

              57       KK CAM-10A
              58       BA   1.266
              59       PB    3.41
```

```
LS       0    94.8
UD0.209967
*

KK CAM-10B
BA   1.809
PB    3.39
LS       0    91.8
UD0.211495
*

KKDETCAM10
BA   0.046
PB   3.294
LS       0    86.9
UD0.137401
*

KK CAM10IN
KM  COMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
KM  TOTAL INFLOW TO CAM10 DETENTION BASIN
HC       4
*

KK CAM10DB
KM  DETENTION BASIN PARAMETERS FROM 2008 MPU BY PBS&J
KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
KM  FACILITY # = GOAN 0058
KM  STORAGE VOLUME = 429.52 AC-FT (BERGER 5-05 VOLUME = 364 AC-FT; 18% INCREASE)
KM  OUTLET = 33" ORIFICE WITH 54" RCP
KM  100-YEAR DISCHARGE = 156 CFS
KM  SPILLWAY LENGTH = 1360 FT
KM  SPILLWAY HEIGHT = 27.7 FT
KM  SPILLWAY CREST ELEVATION = 3000'
KM  SPILLWAY TYPE =
KM  PMF DISCHARGE = 24,614 CFS
KM  TOP OF EMBANKMENT ELEVATION = 3004.5'
KM  INFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
KM  BY THE LOUIS BERGER GROUP (5-05)
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```
LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

RS       1    STOR      -1
*        0       0       0    0.67    3.33    8.33   26.67   43.33     110       2
*      280   347.2     364     396
SV    0.00    0.00    0.00    0.79    3.93    9.83   31.47   51.13  129.80  236.00
SV  330.40  409.70  429.52  467.28
SE  2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
SE  2995.0  2999.0  3000.0  3003.4
SQ    0.00    6.67   17.78   27.78   45.56   54.44   64.44   82.22   93.33  117.78
SQ  138.39  156.00  160.40   24614
*

KK  RCAM10
RD    3200    .019   0.013       0    CIRC     4.0
*
* END BASINS AND PARAMETERS TAKEN FROM 2008 MPU
*

KK      W1
PB    3.25
BA  .14700
LS       0    94.5
UD   0.198
*

KK     RW1
RD    2850     .03   0.013       0    CIRC     5.0
*

KK      W2
PB    3.26
BA  .16880
LS       0    94.0
UD   0.161
*

KK     CP1
HC       3
*

KK    RCP1
RD     760    .028   0.013       0    CIRC     6.0
*

KK  CDMNA3
BA  0.3017
PB    3.21
LS       0    95.3
UD0.254836
*
```



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

KK   RMNA3
KM  ROUTE CDMNA3 TO CMNA2
KM  FACILITY = GOWAN BELTWAY WEST
KM  FACILITY ID-MILE = GOBW 0322, 0326
KM  LINING = RCB
RD    1615    0.01   0.015       0    TRAP      10       0
*

KK  CDMNA2
BA  0.1250
PB    3.18
LS       0    92.8
UD   0.188
*

KK   CMNA2
KM  COMBINE RMNA3 AND CDMNA2
```

```
134          KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
135          HC       2
             *
136          KK   RMNA2
137          KM  ROUTE CMNA2 TO COM1
138          KM  FACILITY = GOWAN BELTWAY WEST
139          RD    1400   0.015   0.015       0    TRAP      10       0
             *
140          KK  EFPOA1
141          PB    3.22
142          BA  .14340
143          LS       0    91.2
144          UD   0.143
             *
145          KK    COM1
146          HC       2
             *
147          KK   RCOM1
148          KM  ROUTE COM1 TO COM2
149          KM  FACILITY = GOWAN BELTWAY WEST
150          RD    1350    0.01   0.015       0    TRAP      10       0
             *
151          KK  EFPOA2
152          PB    3.23
153          BA  .12750
154          LS       0    91.7
155          UD   0.144
             *
1                                        HEC-1 INPUT                                        PAGE  5

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

156          KK    COM2
157          HC       2
             *
158          KK   RCOM2
159          KM  ROUTE COM2 TO COM3
160          KM  FACILITY = GOWAN BELTWAY WEST
161          RD    2300    0.02   0.015       0    TRAP      14       0
             *
162          KK  EFPOB1
163          PB    3.23
164          BA  .06580
165          LS       0    91.7
166          UD   0.178
             *
167          KK  REFPB1
168          KM  ROUTE EFPOB1 TO COM3
169          KM  FACILITY = GOWAN BELTWAY WEST
170          RD     760   0.028   0.015       0    TRAP      14       0
             *
171          KK      W3
172          PB    3.29
173          BA  .31270
174          LS       0    95.8
175          UD   0.172
             *
176          KK    COM3
177          HC       4
             *
178          KK   RCOM3
179          KM  ROUTE COM3 TO COM4
180          KM  FACILITY = GOWAN BELTWAY WEST
181          RD    1080    0.01   0.015       0    TRAP      14       0
             *
182          KK    WBCA
183          KM   BASIN FROM CENT TO ANN
184          BA  0.0647
185          PB    3.20
186          LS       0    92.0
187          UD   0.394
             *
188          KKHLBW1-CA
189          BA  0.3933
190          PB    3.30
191          LS       0    95.4
192          UD   0.261
             *
1                                        HEC-1 INPUT                                        PAGE  6

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

193          KK    COM4
194          KM  COMBINE COM3, WBCA, AND HLBW1-CA
195          KM  LAS VEGAS BELTWAY @ ANN ROAD
196          HC       3
             *
197          KK   RCOM4
198          KM  ROUTE COM4 TO HLBW1-CB
199          RD    1800  0.0250   0.015       0    TRAP      14       0
             *
200          KKHLBW1-CB
201          BA  0.1171
202          PB    3.22
203          LS       0    95.4
204          UD   0.187
             *
```

```
205          KK    COM5
206          KM  COMBINE RCOM4 & HLBW1-CB
207          HC       2
             *

208          KK   RCOM5
209          KM  ROUTE COM5 TO WRBW1
210          RD    2000   0.050   0.015       0    TRAP      14       0
             *

211          KK    WBAW
212          BA  0.0570
213          PB    3.20
214          LS       0    88.0
215          UD   0.223
             *

216          KK   WRBW1
217          BA  0.3256
218          PB    3.23
219          LS       0    94.8
220          UD   0.239
             *

221          KK    COM6
222          KM  COMBINE RCOM5, WBAW, & WRBW1
223          KM  LAS VEGAS BELTWAY @ WASHBURN ROAD
224          HC       3
             *

225          KK   RCOM6
226          KM  ROUTE COM6 TO CLMDBN
227          RD    1600  0.0050   0.015       0    TRAP      14       0
             *
1                                        HEC-1 INPUT                                        PAGE  7

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

228          KK  LWBW1C
229          BA  0.0570
230          PB    3.20
231          LS       0    93.5
232          UD   0.114
             *

233          KK   LMDBN
234          BA  0.0237
235          PB    3.18
236          LS       0    84.8
237          UD   0.161
             *

238          KK  CLMDBN
239          KM  COMBINE LMDBN AND RCOM6
240          HC       3
             *

241          KKBOXCANYON
242          BA   3.410
243          PB    3.55
244          LS       0    88.7
245          UD0.326658
             *

246          KK  BOXDET
247          KM  BOX CANYON DETENTION BASIN
248          KM  FACILITY = GOWAN BOX CANYON
249          KM  FACILITY # = GOBX 0118
250          KM  OUTLET = GOBX 0016: 18" RCP
251          RS       1    STOR      -1
252          SV     0.0    35.4    71.5   108.4   146.0   184.3   223.4   263.3   304.0   345.4
253          SV   387.6
254          SE       0       2       4       6       8      10      12      14      16      18
255          SE      20
256          SQ     0.0    10.3    16.6    21.1    24.8    28.0    30.9    33.5    36.0    38.3
257          SQ    40.4
             *

258          KK RBOXDET
259          KM  ROUTE THRU LWBW1A
260          KM  LONE MOUNTAIN
261          RD    7000  0.0647   0.013       0    CIRC     5.5
             *

262          KK  LWBW1A
263          BA  0.2401
264          PB    3.31
265          LS       0    93.5
266          UD   0.198
             *
1                                        HEC-1 INPUT                                        PAGE  8

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

267          KK UVB1-2A
268          BA  0.2453
269          PB    3.30
270          LS       0    93.3
271          UD   0.174
             *

272          KK  NDIV2A
273          KM  DIVERT 363 CFS FROM UVB1-2A TO PEACEFUL DAWN
274          DT  EDIV2A
275          DI       0     467    5000
276          DQ       0     363     363
             *

277          KKRUVB1-2A
278          RD     700  0.0050   0.016       0    TRAP      80       0
             *
```

```
279          KK    COM7
280          KM  COMBINE RBOXDET, LWBW1A, AND RUVB1-2A
281          HC        3
             *
282          KK   RCOM7
283          KM  ROUTE COM7 TO COM8
284          RD    1000  0.0600   0.016        0    TRAP       80        0
             *
285          KK UVB1-2B
286          BA  0.0192
287          PB    3.23
288          LS       0     93.3
289          UD   0.094
             *
290          KK  LWBW1B
291          BA  0.0755
292          PB    3.24
293          LS       0     93.5
294          UD   0.143
             *
295          KK    COM8
296          KM  COMBINE LWBW1B, RCOM7, UVB1-2B
297          KM  LAS VEGAS BELTWAY @ LONE MOUNTAIN
298          HC        3
             *
299          KK   RCOM8
300          RD    1300  0.0500   0.015        0    CIRC       5        0
             *
1                                        HEC-1 INPUT                                        PAGE  9

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

301          KKRETDIV2A
302          KM  RETRIEVE DIVERSION AT PEACEFUL DAWN
303          DR  EDIV2A
             *
304          KK  RDIV2A
305          KM  ROUTE DIV2A TO CUVB1-2C
306          RD    1000  0.0700   0.016        0    TRAP       50        0
             *
307          KK UVB1-2C
308          BA  0.0323
309          PB    3.23
310          LS       0     93.3
311          UD   0.118
             *
312          KK   COM10
313          KM  COMBINE RDIV2A AND UVB1-2C
314          KM
315          HC        2
             *
316          KK    COM9
317          KM  COMBINE RCOM8 & COM10
318          HC        2
             *
319          KK UVB1-1C
320          BA  0.0185
321          PB    3.23
322          LS       0     92.0
323          UD   0.088
             *
324          KKRUVB1-1C
325          KM  ROUTE UVB1-1C TO COM11
326          RD     900   0.050   0.016        0    TRAP       50        0
             *
327          KK UVB1-1B
328          BA  0.0124
329          PB    3.20
330          LS       0     91.0
331          UD   0.080
             *
332          KK   COM11
333          KM  COMBINE RUVB1-1C AND UVB1-1B
334          HC        2
             *
1                                        HEC-1 INPUT                                        PAGE 10

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

335          KK UVB1-1A
336          BA  0.2198
337          PB    3.28
338          LS       0     92.0
339          UD   0.147
             *
340          KKRUVB1-1A
341          RD    1300   0.040   0.015        0    TRAP       10        0
             *
342          KK UVB1-1D
343          BA  0.0355
344          PB    3.20
345          LS       0     92.0
346          UD   0.097
             *
347          KK   COM12
```

```
348           KM  COMBINE RUVB1-1A AND UVB1-1D
349           HC       2
              *

350           KK  RCOM12
351           KM  ROUTE COM12 TO COM13
352           RD    1200   0.042   0.015       0    TRAP      10       0
              *

353           KK UVB1-1E
354           BA  0.0280
355           PB    3.24
356           LS       0    92.0
357           UD   0.097
              *

358           KKRUVB1-1E
359           RD    2000   0.033   0.015       0    TRAP      10       0
              *

360           KK   COM13
361           KM  COMBINE RCOM11, RCOM12, & RUVB1-1E
362           HC       3
              *

363           KK    WBCL
364           BA  0.0312
365           PB    3.21
366           LS       0    92.0
367           UD   0.126
              *
```

1 HEC-1 INPUT PAGE 11

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

368           KK   LMBW1
369           BA  0.0841
370           PB    3.18
371           LS       0    88.6
372           UD   0.102
              *

373           KK   COM14
374           KM  COMBINE LMBW1, WBCL, RCOM13
375           HC       3
              *

376           KK   LMDBS
377           BA  0.0589
378           PB    3.20
379           LS       0    84.8
380           UD   0.102
              *

381           KK  CLMDBS
382           KM  COMBINE COM9, COM10, COM14, & LMDBS
383           KM  COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
384           HC       3
              *

385           KKCLMBWCDB
386           KM  COMBINE CLMDBS & CLMDBN
387           HC       2
              *

388           KK LMBWCDB
389           KM  LONE MOUNTAIN/BELTWAY DETENTION BASINS (COMBINED)
390           KM  ROUTE COMBINED INFLOWS TO OUTFALL IN BALANCING CONDUIT
391           KM  DUAL LEVEL OUTFALL WITH LOWER LEVEL (BELOW ELEVATION 2730)
392           KM  23" ORIFICE AND SECOND LEVEL (ABOVE ELEVATION 2730) 26" ORIFICE
393           KM  OUTFALL PEAK OUTFLOW OF 168 CFS AT ELEVATION 2738
394           RS       1    STOR      -1
395           SV     0.0     7.4    29.8    81.0   150.8   233.1   352.9   493.7   585.4   617.3
396           SQ     0.0    26.9    37.8    46.1    53.2    59.4    65.0   114.0   118.8   120.3
397           SE    2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
              *

398           KK    WBLM
399           BA  0.0805
400           PB    3.17
401           LS       0    90.0
402           UD   0.190
              *
```

1 HEC-1 INPUT PAGE 12

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

403           KK   COM15
404           KM  COMBINE WBLM & LMBWCDB
405           HC       2
              *

406           KK RLMBWDB
407           KM  ROUTE LMBWDB TO LMBW2-C
408           KM  FACILITY = GOWAN BELTWAY WEST
409           KM  FACILITY # = GOBW 0000
410           KM  LINING = RCP
411           RD    2700   0.019   0.013       0    TRAP       5       0
              *

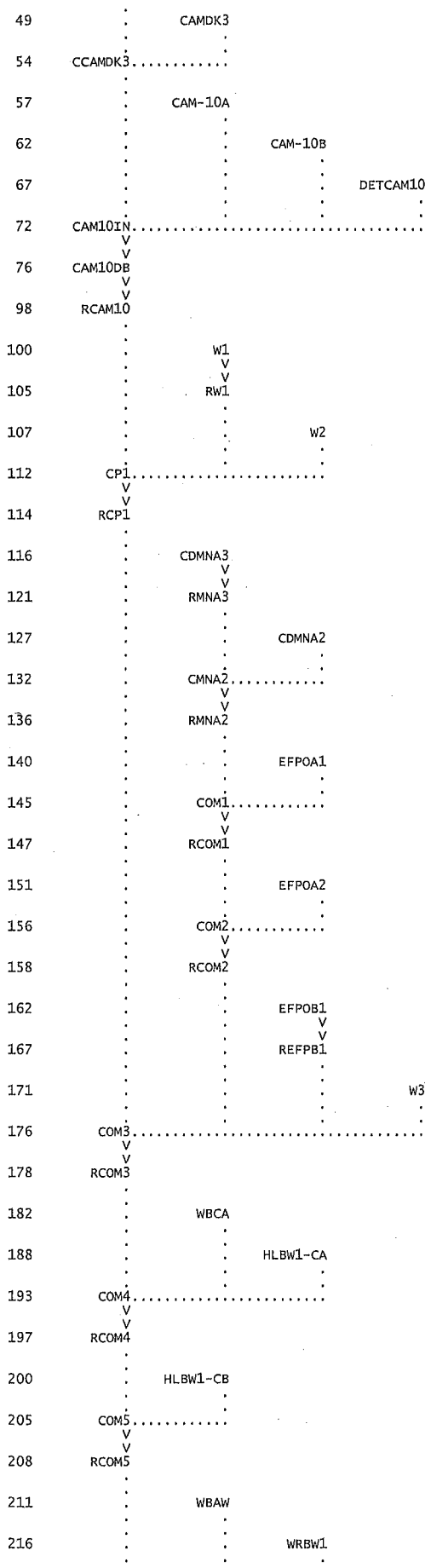
412           ZZ
```

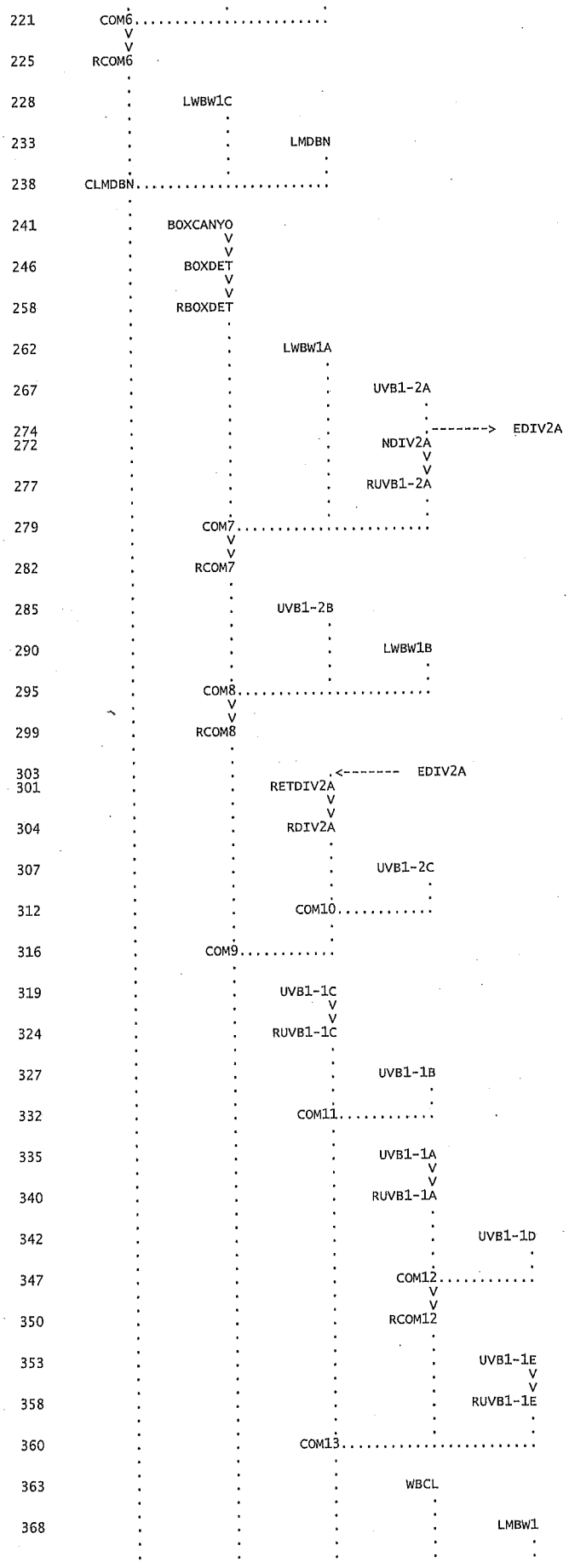
1 SCHEMATIC DIAGRAM OF STREAM NETWORK

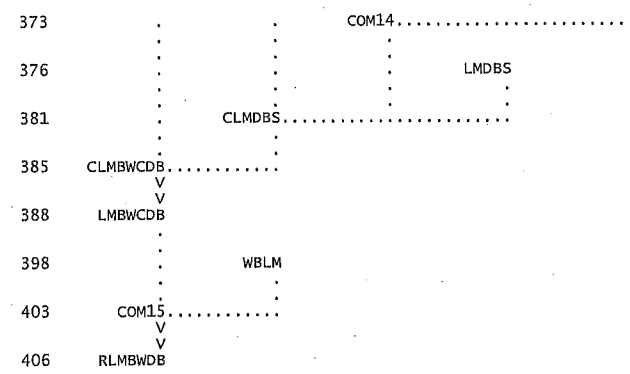
```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   29      CAMDK2
             V
             V
   43      RCAMDK2
```


49 CAMDK3
54 CCAMDK3
57 CAM-10A
62 CAM-10B
67 DETCAM10
72 CAM10IN
76 CAM10DB
98 RCAM10
100 W1
105 RW1
107 W2
112 CP1
114 RCP1
116 CDMNA3
121 RMNA3
127 CDMNA2
132 CMNA2
136 RMNA2
140 EFPOA1
145 COM1
147 RCOM1
151 EFPOA2
156 COM2
158 RCOM2
162 EFPOB1
167 REFPB1
171 W3
176 COM3
178 RCOM3
182 WBCA
188 HLBW1-CA
193 COM4
197 RCOM4
200 HLBW1-CB
205 COM5
208 RCOM5
211 WBAW
216 WRBW1


221 COM6
225 RCOM6
228 LWBW1C
233 LMDBN
238 CLMDBN
241 BOXCANYO
246 BOXDET
258 RBOXDET
262 LWBW1A
267 UVB1-2A
274 EDIV2A
272 NDIV2A
277 RUVB1-2A
279 COM7
282 RCOM7
285 UVB1-2B
290 LWBW1B
295 COM8
299 RCOM8
303 EDIV2A
301 RETDIV2A
304 RDIV2A
307 UVB1-2C
312 COM10
316 COM9
319 UVB1-1C
324 RUVB1-1C
327 UVB1-1B
332 COM11
335 UVB1-1A
340 RUVB1-1A
342 UVB1-1D
347 COM12
350 RCOM12
353 UVB1-1E
358 RUVB1-1E
360 COM13
363 WBCL
368 LMBW1



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   28MAY08  TIME  09:06:52   *
*                                       *
*****************************************
```

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

LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
INPUT FILE = WBMOD1-SDN3.H1
LAST MODIFIED = 05/13/08
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
MODELED BY = JTL/JYL/MGK
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ. MI.	DARF
0-0.5	0.99
0.5-1	0.975
1-2	0.95
2-3	0.925
3-4	0.915
4-5	0.908
5-6	0.903
6-7	0.895
7-8	0.885

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

```
 26 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        500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME       1735  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   41.58 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
                    .99       .98       .95       .93       .92       .91       .90       .89       .88

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HYDROGRAPH AT														
+	CAMDK2	.34	1	FLOW	558.	547.	531.	514.	507.	502.	499.	494.	487.	
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO														
	RCAMDK2	.34	1	FLOW	556.	546.	529.	512.	505.	501.	496.	492.	485.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	CAMDK3	.32	1	FLOW	531.	521.	504.	487.	480.	475.	472.	466.	459.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT														
+	CCAMDK3	.65	1	FLOW	1065.	1045.	1012.	979.	966.	957.	949.	940.	926.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	CAM-10A	1.27	1	FLOW	2377.	2337.	2270.	2204.	2177.	2158.	2145.	2123.	2097.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT														
+	CAM-10B	1.81	1	FLOW	3106.	3049.	2953.	2857.	2819.	2792.	2773.	2742.	2704.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT														
+	DETCAM10	.05	1	FLOW	77.	75.	73.	70.	69.	68.	67.	67.	66.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
4 COMBINED AT														
+	CAM10IN	3.77	1	FLOW	6621.	6502.	6303.	6104.	6024.	5968.	5929.	5865.	5785.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO														
+	CAM10DB	3.77	1	FLOW	1585.	1346.	648.	159.	158.	157.	156.	155.	154.	
				TIME	4.92	5.00	5.25	5.67	5.67	5.67	5.67	5.67	5.67	
			** PEAK STAGES IN FEET **											
			1	STAGE	3000.20	3000.16	3000.07	2999.74	2999.43	2999.22	2999.06	2998.82	2998.51	
				TIME	4.92	5.00	5.25	5.67	5.67	5.67	5.67	5.67	5.67	
ROUTED TO														
+	RCAM10	3.77	1	FLOW	1299.	1124.	636.	159.	158.	157.	156.	155.	154.	
				TIME	5.00	5.08	5.25	5.67	5.67	5.67	5.67	5.67	5.67	
HYDROGRAPH AT														
+	W1	.15	1	FLOW	268.	264.	256.	248.	245.	243.	242.	239.	236.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO														
+	RW1	.15	1	FLOW	260.	254.	248.	241.	237.	235.	233.	232.	229.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	W2	.17	1	FLOW	331.	325.	315.	306.	302.	300.	298.	295.	291.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
3 COMBINED AT														
+	CP1	4.09	1	FLOW	1398.	1201.	677.	638.	631.	626.	622.	616.	609.	
				TIME	5.00	5.08	5.25	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO														
+	RCP1	4.09	1	FLOW	1385.	1191.	663.	632.	625.	620.	616.	610.	603.	
				TIME	5.00	5.08	5.25	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT														
+	CDMNA3	.30	1	FLOW	505.	496.	482.	468.	463.	459.	456.	452.	446.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO														
+	RMNA3	.30	1	FLOW	498.	490.	476.	462.	456.	453.	449.	446.	440.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	CDMNA2	.13	1	FLOW	218.	214.	207.	201.	198.	196.	195.	193.	190.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT														
+	CMNA2	.43	1	FLOW	702.	691.	671.	650.	643.	638.	633.	627.	619.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO														
+	RMNA2	.43	1	FLOW	698.	687.	667.	646.	639.	634.	629.	623.	615.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	EFPOA1	.14	1	FLOW	264.	259.	251.	243.	240.	237.	236.	233.	230.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT														
+	COM1	.57	1	FLOW	916.	900.	872.	845.	835.	828.	821.	814.	803.	
				TIME	3.58	3.58	3.67	3.58	3.67	3.67	3.67	3.67	3.67	
ROUTED TO														
+	RCOM1	.57	1	FLOW	913.	898.	871.	844.	834.	827.	821.	813.	803.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	EFPOA2	.13	1	FLOW	239.	234.	227.	220.	217.	215.	213.	211.	208.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
2 COMBINED AT														
+	COM2	.70	1	FLOW	1135.	1114.	1081.	1046.	1032.	1023.	1016.	1005.	990.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO														
	RCOM2	.70	1	FLOW	1113.	1093.	1061.	1027.	1014.	1007.	999.	988.	976.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT														
+	EFPOB1	.07	1	FLOW	116.	114.	110.	107.	105.	104.	103.	102.	101.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	
ROUTED TO														
+	REFPB1	.07	1	FLOW	114.	111.	108.	104.	103.	102.	101.	100.	99.	

FOR COM3, COM4, COM5, COM6, CLMDBN, COM7, COM8, COM9, CLMDBS SEE SDN3 MODEL #2

				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	W3	.31	1	FLOW	630.	620.	603.	586.	579.	574.	571.	565.	558.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT	COM3	5.17	1	FLOW	2525.	2482.	2409.	2336.	2308.	2287.	2274.	2250.	2221.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RCOM3	5.17	1	FLOW	2496.	2452.	2382.	2308.	2281.	2258.	2246.	2222.	2195.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WBCA	.06	1	FLOW	80.	79.	76.	74.	73.	72.	72.	71.	70.
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT	HLBW1-CA	.39	1	FLOW	673.	662.	644.	625.	618.	612.	609.	603.	595.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	COM4	5.62	1	FLOW	3186.	3130.	3043.	2953.	2916.	2893.	2874.	2846.	2810.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM4	5.62	1	FLOW	3184.	3128.	3041.	2950.	2914.	2890.	2871.	2843.	2808.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	HLBW1-CB	.12	1	FLOW	222.	218.	212.	206.	203.	201.	200.	198.	196.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	COM5	5.74	1	FLOW	3390.	3330.	3237.	3141.	3103.	3078.	3057.	3028.	2990.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM5	5.74	1	FLOW	3385.	3327.	3233.	3138.	3098.	3073.	3053.	3023.	2986.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	WBAW	.06	1	FLOW	80.	78.	75.	73.	72.	71.	70.	69.	68.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	WRBW1	.33	1	FLOW	554.	545.	529.	513.	507.	503.	500.	495.	489.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	COM6	6.12	1	FLOW	4019.	3950.	3837.	3724.	3677.	3647.	3624.	3587.	3543.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO	RCOM6	6.12	1	FLOW	4004.	3933.	3824.	3709.	3660.	3629.	3607.	3570.	3530.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	LWBW1C	.06	1	FLOW	113.	111.	108.	104.	103.	102.	101.	100.	99.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	LMDBN	.02	1	FLOW	33.	33.	31.	30.	30.	29.	29.	29.	28.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	CLMDBN	6.20	1	FLOW	4114.	4040.	3928.	3809.	3759.	3727.	3705.	3667.	3625.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	BOXCANYO	3.41	1	FLOW	4811.	4716.	4557.	4398.	4334.	4290.	4258.	4207.	4144.
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO	BOXDET	3.41	1	FLOW	42.	41.	41.	40.	40.	39.	39.	39.	39.
+				TIME	6.42	6.42	6.42	6.42	6.42	6.42	6.42	6.42	6.42
				** PEAK STAGES IN FEET **									
			1	STAGE	21.30	20.89	20.20	19.51	19.24	19.05	18.91	18.69	18.42
				TIME	6.42	6.42	6.42	6.42	6.42	6.42	6.42	6.42	6.42
ROUTED TO	RBOXDET	3.41	1	FLOW	42.	41.	41.	40.	40.	39.	39.	39.	39.
+				TIME	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
HYDROGRAPH AT	LWBW1A	.24	1	FLOW	436.	429.	416.	403.	398.	394.	392.	388.	383.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-2A	.25	1	FLOW	467.	459.	445.	432.	426.	422.	420.	415.	410.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO	EDIV2A	.25	1	FLOW	363.	357.	346.	335.	331.	328.	326.	323.	318.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	NDIV2A	.25	1	FLOW	104.	102.	99.	96.	95.	94.	93.	92.	91.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RUVB1-2A	.25	1	FLOW	99.	97.	94.	91.	91.	90.	89.	88.	87.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT	COM7	3.90	1	FLOW	553.	542.	526.	510.	504.	500.	496.	490.	485.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RCOM7	3.90	1	FLOW	540.	529.	513.	498.	493.	488.	485.	480.	474.
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT	UVB1-2B	.02	1	FLOW	41.	40.	39.	38.	37.	37.	37.	37.	36.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
'DROGRAPH AT	LWBW1B	.08	1	FLOW	149.	146.	142.	138.	136.	135.	134.	132.	131.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	COM8	3.99	1	FLOW	724.	711.	690.	668.	660.	654.	649.	642.	634.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RCOM8	3.99	1	FLOW	712.	700.	679.	657.	649.	643.	638.	631.	623.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	RETDIV2A	.00	1	FLOW	363.	357.	346.	335.	331.	328.	326.	323.	318.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RDIV2A	.00	1	FLOW	356.	350.	339.	329.	324.	321.	320.	316.	312.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-2C	.03	1	FLOW	64.	63.	61.	59.	58.	58.	57.	57.	56.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	COM10	.03	1	FLOW	420.	412.	400.	388.	383.	379.	377.	373.	368.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	COM9	4.02	1	FLOW	1132.	1112.	1079.	1044.	1031.	1022.	1015.	1004.	991.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-1C	.02	1	FLOW	39.	38.	37.	36.	36.	35.	35.	35.	34.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	RUVB1-1C	.02	1	FLOW	36.	35.	34.	33.	33.	33.	32.	32.	31.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	UVB1-1B	.01	1	FLOW	26.	25.	25.	24.	23.	23.	23.	23.	23.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	COM11	.03	1	FLOW	62.	61.	59.	57.	56.	56.	55.	55.	54.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	UVB1-1A	.22	1	FLOW	421.	413.	401.	388.	383.	379.	377.	373.	368.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
)UTED TO	RUVB1-1A	.22	1	FLOW	417.	409.	396.	384.	379.	375.	373.	369.	363.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-1D	.04	1	FLOW	72.	71.	68.	66.	65.	65.	64.	64.	63.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT	COM12	.26	1	FLOW	482.	473.	459.	444.	438.	434.	431.	426.	420.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RCOM12	.26	1	FLOW	478.	470.	455.	440.	434.	431.	428.	423.	417.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-1E	.03	1	FLOW	58.	56.	55.	53.	52.	52.	51.	51.	50.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO	RUVB1-1E	.03	1	FLOW	55.	53.	52.	51.	49.	49.	49.	48.	48.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT	COM13	.31	1	FLOW	590.	578.	560.	543.	535.	531.	528.	521.	514.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	WBCL	.03	1	FLOW	59.	58.	56.	55.	54.	53.	53.	53.	52.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	LMBW1	.08	1	FLOW	149.	146.	141.	135.	133.	132.	131.	129.	127.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	COM14	.43	1	FLOW	790.	775.	751.	727.	716.	710.	706.	697.	688.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT	LMDBS	.06	1	FLOW	91.	89.	86.	82.	81.	80.	79.	78.	77.
+				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	CLMDBS	4.51	1	FLOW	2010.	1973.	1912.	1851.	1826.	1810.	1798.	1777.	1753.
+				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT	CLMBWCDB	10.72	1	FLOW	5976.	5868.	5694.	5516.	5442.	5389.	5356.	5298.	5235.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO	LMBWCDB	10.72	1	FLOW	122.	121.	120.	118.	118.	118.	117.	117.	117.
+				TIME	41.50	41.58	41.50	41.50	41.50	41.58	41.42	41.42	41.33

** PEAK STAGES IN FEET **

1	STAGE	2739.95	2739.41	2738.53	2737.75	2737.49	2737.31	2737.19	2736.99	2736.74

				TIME	41.58	41.58	41.58	41.58	41.58	41.58	41.58	41.50	41.50
HYDROGRAPH AT													
+	WBLM	.08	1	FLOW	127.	125.	121.	116.	115.	114.	113.	111.	110.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	COM15	10.80	1	FLOW	184.	181.	176.	171.	170.	168.	167.	166.	164.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RLMBWDB	10.80	1	FLOW	181.	178.	174.	169.	167.	166.	165.	164.	162.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.54	559.87	217.41	2.40	5.00	556.45	220.00	2.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4322E+02 EXCESS= .0000E+00 OUTFLOW= .4322E+02 BASIN STORAGE= .6644E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.55	549.26	218.56	2.36	5.00	545.72	220.00	2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4238E+02 EXCESS= .0000E+00 OUTFLOW= .4238E+02 BASIN STORAGE= .5757E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.56	532.39	217.39	2.28	5.00	529.37	220.00	2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4098E+02 EXCESS= .0000E+00 OUTFLOW= .4098E+02 BASIN STORAGE= .6592E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.58	516.14	217.82	2.20	5.00	512.01	220.00	2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3958E+02 EXCESS= .0000E+00 OUTFLOW= .3959E+02 BASIN STORAGE= .5628E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.58	508.27	218.65	2.17	5.00	505.24	220.00	2.17

ONTINUITY SUMMARY (AC-FT) - INFLOW= .3903E+02 EXCESS= .0000E+00 OUTFLOW= .3903E+02 BASIN STORAGE= .5563E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.59	504.08	217.64	2.15	5.00	500.84	220.00	2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3863E+02 EXCESS= .0000E+00 OUTFLOW= .3864E+02 BASIN STORAGE= .5899E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.59	501.61	218.06	2.13	5.00	496.44	220.00	2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3837E+02 EXCESS= .0000E+00 OUTFLOW= .3837E+02 BASIN STORAGE= .6686E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.60	494.36	218.74	2.11	5.00	491.87	220.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3791E+02 EXCESS= .0000E+00 OUTFLOW= .3791E+02 BASIN STORAGE= .6880E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAMDK2	MANE	1.60	489.03	218.00	2.08	5.00	484.55	220.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3736E+02 EXCESS= .0000E+00 OUTFLOW= .3736E+02 BASIN STORAGE= .6767E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAM10	MANE	1.68	1501.81	297.45	2.14	5.00	1299.42	300.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4312E+03 EXCESS= .0000E+00 OUTFLOW= .4308E+03 BASIN STORAGE= .3910E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAM10	MANE	1.74	1281.15	302.12	2.09	5.00	1123.50	305.00	2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4214E+03 EXCESS= .0000E+00 OUTFLOW= .4210E+03 BASIN STORAGE= .3910E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAM10	MANE	2.01	644.08	313.57	2.01	5.00	636.29	315.00	2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4054E+03 EXCESS= .0000E+00 OUTFLOW= .4050E+03 BASIN STORAGE= .3909E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCAM10	MANE	2.66	159.26	340.61	1.94	5.00	159.25	340.00	1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3919E+03 EXCESS= .0000E+00 OUTFLOW= .3915E+03 BASIN STORAGE= .3895E+00 PERCENT ERROR= .0

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FOR PLAN = 1  RATIO=  .00
  RCAM10  MANE          2.67    157.90    341.20      1.93      5.00    157.89    340.00      1.93

ONTINUITY SUMMARY (AC-FT) - INFLOW= .3889E+03 EXCESS= .0000E+00 OUTFLOW= .3885E+03 BASIN STORAGE= .3877E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCAM10  MANE          2.67    156.95    341.61      1.92      5.00    156.95    340.00      1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3864E+03 EXCESS= .0000E+00 OUTFLOW= .3861E+03 BASIN STORAGE= .3866E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCAM10  MANE          2.67    156.27    341.90      1.91      5.00    156.27    340.00      1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3851E+03 EXCESS= .0000E+00 OUTFLOW= .3847E+03 BASIN STORAGE= .3857E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCAM10  MANE          2.67    155.20    339.70      1.90      5.00    155.20    340.00      1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3824E+03 EXCESS= .0000E+00 OUTFLOW= .3820E+03 BASIN STORAGE= .3844E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCAM10  MANE          2.68    153.85    340.29      1.88      5.00    153.85    340.00      1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3794E+03 EXCESS= .0000E+00 OUTFLOW= .3791E+03 BASIN STORAGE= .3826E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.73    267.01    217.54      2.61      5.00    259.60    220.00      2.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2047E+02 EXCESS= .0000E+00 OUTFLOW= .2047E+02 BASIN STORAGE= .2456E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.73    261.90    218.29      2.56      5.00    254.11    220.00      2.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2010E+02 EXCESS= .0000E+00 OUTFLOW= .2010E+02 BASIN STORAGE= .2015E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.74    254.70    217.84      2.48      5.00    247.75    220.00      2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1948E+02 EXCESS= .0000E+00 OUTFLOW= .1948E+02 BASIN STORAGE= .2260E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.75    247.43    217.41      2.41      5.00    240.63    220.00      2.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1886E+02 EXCESS= .0000E+00 OUTFLOW= .1886E+02 BASIN STORAGE= .2479E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.76    244.05    217.95      2.37      5.00    237.41    220.00      2.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1861E+02 EXCESS= .0000E+00 OUTFLOW= .1861E+02 BASIN STORAGE= .2178E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.76    241.68    218.33      2.35      5.00    234.68    220.00      2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1844E+02 EXCESS= .0000E+00 OUTFLOW= .1844E+02 BASIN STORAGE= .2441E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.76    240.91    216.84      2.34      5.00    233.39    220.00      2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1832E+02 EXCESS= .0000E+00 OUTFLOW= .1832E+02 BASIN STORAGE= .2291E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.77    238.41    217.29      2.31      5.00    231.79    220.00      2.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1811E+02 EXCESS= .0000E+00 OUTFLOW= .1811E+02 BASIN STORAGE= .2019E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
      RW1  MANE          1.77    235.03    217.85      2.28      5.00    228.79    220.00      2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1787E+02 EXCESS= .0000E+00 OUTFLOW= .1787E+02 BASIN STORAGE= .2213E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
     RCP1  MANE           .33   1390.40    300.17      2.18      5.00   1385.40    300.00      2.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4746E+03 EXCESS= .0000E+00 OUTFLOW= .4745E+03 BASIN STORAGE= .7534E-01 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
     RCP1  MANE           .34   1196.02    305.32      2.13      5.00   1191.43    305.00      2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4641E+03 EXCESS= .0000E+00 OUTFLOW= .4640E+03 BASIN STORAGE= .7534E-01 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
     RCP1  MANE           .38    670.17    315.57      2.05      5.00    662.52    315.00      2.05
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .4464E+03 EXCESS= .0000E+00 OUTFLOW= .4463E+03 BASIN STORAGE= .7532E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 636.84 215.59 1.98 5.00 631.75 215.00 1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4317E+03 EXCESS= .0000E+00 OUTFLOW= .4316E+03 BASIN STORAGE= .7505E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 629.73 215.67 1.96 5.00 624.88 215.00 1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4280E+03 EXCESS= .0000E+00 OUTFLOW= .4279E+03 BASIN STORAGE= .7471E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 624.89 215.62 1.95 5.00 619.98 215.00 1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4254E+03 EXCESS= .0000E+00 OUTFLOW= .4253E+03 BASIN STORAGE= .7450E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 621.47 215.48 1.94 5.00 616.45 215.00 1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4236E+03 EXCESS= .0000E+00 OUTFLOW= .4235E+03 BASIN STORAGE= .7431E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 615.52 215.50 1.93 5.00 610.50 215.00 1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4206E+03 EXCESS= .0000E+00 OUTFLOW= .4206E+03 BASIN STORAGE= .7407E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCP1 MANE .39 608.24 215.61 1.91 5.00 603.38 215.00 1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4170E+03 EXCESS= .0000E+00 OUTFLOW= .4169E+03 BASIN STORAGE= .7373E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.12 500.66 220.56 2.65 5.00 497.89 220.00 2.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4271E+02 EXCESS= .0000E+00 OUTFLOW= .4271E+02 BASIN STORAGE= .1490E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.13 493.78 220.92 2.61 5.00 490.02 220.00 2.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4195E+02 EXCESS= .0000E+00 OUTFLOW= .4195E+02 BASIN STORAGE= .1542E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.14 480.44 221.19 2.53 5.00 476.40 220.00 2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4068E+02 EXCESS= .0000E+00 OUTFLOW= .4068E+02 BASIN STORAGE= .1657E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.15 464.94 221.51 2.45 5.00 461.68 220.00 2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3942E+02 EXCESS= .0000E+00 OUTFLOW= .3942E+02 BASIN STORAGE= .1513E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.16 459.81 221.42 2.42 5.00 456.27 220.00 2.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3891E+02 EXCESS= .0000E+00 OUTFLOW= .3891E+02 BASIN STORAGE= .1534E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.16 456.51 221.01 2.40 5.00 452.86 220.00 2.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3856E+02 EXCESS= .0000E+00 OUTFLOW= .3856E+02 BASIN STORAGE= .1684E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.17 452.48 221.56 2.38 5.00 449.37 220.00 2.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3831E+02 EXCESS= .0000E+00 OUTFLOW= .3831E+02 BASIN STORAGE= .1489E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.17 449.40 221.27 2.36 5.00 445.61 220.00 2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3790E+02 EXCESS= .0000E+00 OUTFLOW= .3790E+02 BASIN STORAGE= .1568E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA3 MANE 1.18 444.12 221.20 2.32 5.00 440.31 220.00 2.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3740E+02 EXCESS= .0000E+00 OUTFLOW= .3740E+02 BASIN STORAGE= .1620E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RMNA2 MANE .75 700.21 220.65 2.57 5.00 698.25 220.00 2.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5859E+02 EXCESS= .0000E+00 OUTFLOW= .5859E+02 BASIN STORAGE= .1145E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.76	688.53	220.59	2.53	5.00	686.50	220.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5753E+02 EXCESS= .0000E+00 OUTFLOW= .5753E+02 BASIN STORAGE= .1145E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.77	668.59	220.85	2.45	5.00	666.99	220.00	2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5575E+02 EXCESS= .0000E+00 OUTFLOW= .5576E+02 BASIN STORAGE= .1159E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.78	648.02	220.54	2.37	5.00	646.08	220.00	2.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5398E+02 EXCESS= .0000E+00 OUTFLOW= .5398E+02 BASIN STORAGE= .1138E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.78	640.45	220.83	2.34	5.00	638.65	220.00	2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5327E+02 EXCESS= .0000E+00 OUTFLOW= .5328E+02 BASIN STORAGE= .1155E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.78	635.67	220.75	2.32	5.00	633.62	220.00	2.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5278E+02 EXCESS= .0000E+00 OUTFLOW= .5278E+02 BASIN STORAGE= .1164E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.79	630.63	220.62	2.30	5.00	628.61	220.00	2.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5243E+02 EXCESS= .0000E+00 OUTFLOW= .5243E+02 BASIN STORAGE= .1246E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.79	624.93	220.63	2.28	5.00	622.85	220.00	2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5186E+02 EXCESS= .0000E+00 OUTFLOW= .5186E+02 BASIN STORAGE= .1196E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.79	616.43	220.94	2.25	5.00	615.06	220.00	2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5116E+02 EXCESS= .0000E+00 OUTFLOW= .5116E+02 BASIN STORAGE= .1254E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.74	917.01	216.03	2.50	5.00	913.35	220.00	2.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7597E+02 EXCESS= .0000E+00 OUTFLOW= .7597E+02 BASIN STORAGE= .1334E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.74	900.55	216.15	2.45	5.00	897.85	220.00	2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7455E+02 EXCESS= .0000E+00 OUTFLOW= .7455E+02 BASIN STORAGE= .1392E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.75	873.70	216.60	2.37	5.00	871.26	220.00	2.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7220E+02 EXCESS= .0000E+00 OUTFLOW= .7221E+02 BASIN STORAGE= .1334E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.76	846.43	216.29	2.30	5.00	844.30	220.00	2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6985E+02 EXCESS= .0000E+00 OUTFLOW= .6986E+02 BASIN STORAGE= .1252E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.77	835.44	216.62	2.27	5.00	833.67	220.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6892E+02 EXCESS= .0000E+00 OUTFLOW= .6892E+02 BASIN STORAGE= .1257E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.77	828.41	216.57	2.25	5.00	826.71	220.00	2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6826E+02 EXCESS= .0000E+00 OUTFLOW= .6826E+02 BASIN STORAGE= .1258E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.77	822.71	216.46	2.23	5.00	820.52	220.00	2.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6779E+02 EXCESS= .0000E+00 OUTFLOW= .6779E+02 BASIN STORAGE= .1298E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.77	814.24	216.52	2.21	5.00	812.53	220.00	2.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6705E+02 EXCESS= .0000E+00 OUTFLOW= .6705E+02 BASIN STORAGE= .1250E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM1 MANE .78 802.87 219.97 2.17 5.00 802.76 220.00 2.18

/TINUITY SUMMARY (AC-FT) - INFLOW= .6611E+02 EXCESS= .0000E+00 OUTFLOW= .6611E+02 BASIN STORAGE= .1266E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.07 1135.19 216.42 2.47 5.00 1112.60 220.00 2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9181E+02 EXCESS= .0000E+00 OUTFLOW= .9181E+02 BASIN STORAGE= .2292E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.08 1113.25 216.97 2.42 5.00 1092.58 220.00 2.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9009E+02 EXCESS= .0000E+00 OUTFLOW= .9009E+02 BASIN STORAGE= .2148E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.09 1080.56 216.38 2.34 5.00 1060.91 220.00 2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8722E+02 EXCESS= .0000E+00 OUTFLOW= .8722E+02 BASIN STORAGE= .2142E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.11 1045.35 217.01 2.27 5.00 1026.91 220.00 2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8435E+02 EXCESS= .0000E+00 OUTFLOW= .8435E+02 BASIN STORAGE= .2063E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.11 1031.87 217.03 2.24 5.00 1013.87 220.00 2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8321E+02 EXCESS= .0000E+00 OUTFLOW= .8321E+02 BASIN STORAGE= .2027E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.12 1023.39 216.68 2.22 5.00 1006.71 220.00 2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8241E+02 EXCESS= .0000E+00 OUTFLOW= .8241E+02 BASIN STORAGE= .2269E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.12 1016.23 216.17 2.20 5.00 998.73 220.00 2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8184E+02 EXCESS= .0000E+00 OUTFLOW= .8184E+02 BASIN STORAGE= .2156E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.12 1005.10 217.09 2.18 5.00 988.01 220.00 2.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8092E+02 EXCESS= .0000E+00 OUTFLOW= .8093E+02 BASIN STORAGE= .2324E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM2 MANE 1.13 990.50 216.15 2.14 5.00 976.17 220.00 2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7978E+02 EXCESS= .0000E+00 OUTFLOW= .7979E+02 BASIN STORAGE= .2130E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .80 115.23 216.08 2.32 5.00 113.62 215.00 2.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8143E+01 EXCESS= .0000E+00 OUTFLOW= .8144E+01 BASIN STORAGE= .6069E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .80 113.07 216.10 2.27 5.00 111.49 215.00 2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7982E+01 EXCESS= .0000E+00 OUTFLOW= .7982E+01 BASIN STORAGE= .6170E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .81 109.52 215.63 2.20 5.00 108.00 215.00 2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7715E+01 EXCESS= .0000E+00 OUTFLOW= .7715E+01 BASIN STORAGE= .6313E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .82 106.07 216.03 2.12 5.00 104.42 215.00 2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7448E+01 EXCESS= .0000E+00 OUTFLOW= .7448E+01 BASIN STORAGE= .5895E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .83 104.33 215.55 2.09 5.00 102.96 215.00 2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7341E+01 EXCESS= .0000E+00 OUTFLOW= .7342E+01 BASIN STORAGE= .5996E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
REFPB1 MANE .83 103.32 215.55 2.07 5.00 101.96 215.00 2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7267E+01 EXCESS= .0000E+00 OUTFLOW= .7267E+01 BASIN STORAGE= .6018E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6208E+03 EXCESS= .0000E+00 OUTFLOW= .6206E+03 BASIN STORAGE= .3293E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.54	2890.52	220.09	2.05	5.00	2890.34	220.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6164E+03 EXCESS= .0000E+00 OUTFLOW= .6163E+03 BASIN STORAGE= .3286E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.54	2870.99	220.14	2.04	5.00	2870.94	220.00	2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6133E+03 EXCESS= .0000E+00 OUTFLOW= .6131E+03 BASIN STORAGE= .3280E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.54	2843.66	219.92	2.03	5.00	2843.04	220.00	2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6083E+03 EXCESS= .0000E+00 OUTFLOW= .6081E+03 BASIN STORAGE= .3272E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM4	MANE	.55	2808.19	219.94	2.01	5.00	2807.70	220.00	2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6021E+03 EXCESS= .0000E+00 OUTFLOW= .6019E+03 BASIN STORAGE= .3260E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.46	3384.98	219.80	2.30	5.00	3384.83	220.00	2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7037E+03 EXCESS= .0000E+00 OUTFLOW= .7035E+03 BASIN STORAGE= .2991E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.46	3326.95	219.98	2.25	5.00	3326.82	220.00	2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6890E+03 EXCESS= .0000E+00 OUTFLOW= .6888E+03 BASIN STORAGE= .2991E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.47	3233.11	220.15	2.17	5.00	3232.55	220.00	2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6642E+03 EXCESS= .0000E+00 OUTFLOW= .6640E+03 BASIN STORAGE= .2990E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.47	3137.90	220.00	2.10	5.00	3137.89	220.00	2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6425E+03 EXCESS= .0000E+00 OUTFLOW= .6424E+03 BASIN STORAGE= .2982E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.47	3098.59	220.14	2.08	5.00	3097.97	220.00	2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6360E+03 EXCESS= .0000E+00 OUTFLOW= .6359E+03 BASIN STORAGE= .2972E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.47	3073.10	219.90	2.06	5.00	3072.89	220.00	2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6315E+03 EXCESS= .0000E+00 OUTFLOW= .6314E+03 BASIN STORAGE= .2966E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.48	3053.62	220.02	2.05	5.00	3053.46	220.00	2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6283E+03 EXCESS= .0000E+00 OUTFLOW= .6282E+03 BASIN STORAGE= .2961E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.48	3023.28	219.92	2.03	5.00	3023.05	220.00	2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6231E+03 EXCESS= .0000E+00 OUTFLOW= .6230E+03 BASIN STORAGE= .2953E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM5	MANE	.48	2986.13	220.06	2.01	5.00	2985.65	220.00	2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6167E+03 EXCESS= .0000E+00 OUTFLOW= .6166E+03 BASIN STORAGE= .2943E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM6	MANE	.68	4006.00	220.09	2.31	5.00	4004.34	220.00	2.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7553E+03 EXCESS= .0000E+00 OUTFLOW= .7552E+03 BASIN STORAGE= .4775E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM6	MANE	.69	3935.37	220.25	2.26	5.00	3932.74	220.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7397E+03 EXCESS= .0000E+00 OUTFLOW= .7395E+03 BASIN STORAGE= .4775E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM6	MANE	.69	3825.07	220.04	2.18	5.00	3824.34	220.00	2.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7132E+03 EXCESS= .0000E+00 OUTFLOW= .7131E+03 BASIN STORAGE= .4774E+00 PERCENT ERROR= .0

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          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .70   3708.97    219.87      2.11      5.00   3708.67    220.00        2.11

 ONTINUITY SUMMARY (AC-FT) - INFLOW= .6899E+03 EXCESS= .0000E+00 OUTFLOW= .6898E+03 BASIN STORAGE= .4761E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .71   3662.74    220.29      2.09      5.00   3659.94    220.00        2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6828E+03 EXCESS= .0000E+00 OUTFLOW= .6826E+03 BASIN STORAGE= .4745E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .71   3632.03    220.31      2.08      5.00   3628.93    220.00        2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6779E+03 EXCESS= .0000E+00 OUTFLOW= .6777E+03 BASIN STORAGE= .4735E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .71   3610.07    220.16      2.06      5.00   3607.45    220.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6743E+03 EXCESS= .0000E+00 OUTFLOW= .6742E+03 BASIN STORAGE= .4726E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .71   3572.79    220.34      2.05      5.00   3569.84    220.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6686E+03 EXCESS= .0000E+00 OUTFLOW= .6685E+03 BASIN STORAGE= .4714E+00 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCOM6  MANE          .72   3530.26    220.01      2.03      5.00   3529.99    220.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6616E+03 EXCESS= .0000E+00 OUTFLOW= .6615E+03 BASIN STORAGE= .4698E+00 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.47     41.77    388.57       .68      5.00     41.77    390.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1233E+03 EXCESS= .0000E+00 OUTFLOW= .1231E+03 BASIN STORAGE= .2480E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.48     41.33    389.38       .67      5.00     41.33    390.00         .67

 ONTINUITY SUMMARY (AC-FT) - INFLOW= .1220E+03 EXCESS= .0000E+00 OUTFLOW= .1217E+03 BASIN STORAGE= .2455E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.49     40.61    390.76       .66      5.00     40.61    390.00         .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1196E+03 EXCESS= .0000E+00 OUTFLOW= .1194E+03 BASIN STORAGE= .2412E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.51     39.89    387.66       .64      5.00     39.89    390.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1172E+03 EXCESS= .0000E+00 OUTFLOW= .1170E+03 BASIN STORAGE= .2370E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.51     39.60    388.22       .64      5.00     39.60    390.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1162E+03 EXCESS= .0000E+00 OUTFLOW= .1160E+03 BASIN STORAGE= .2353E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.52     39.40    388.61       .63      5.00     39.40    390.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1156E+03 EXCESS= .0000E+00 OUTFLOW= .1154E+03 BASIN STORAGE= .2341E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.52     39.26    388.90       .63      5.00     39.26    390.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1150E+03 EXCESS= .0000E+00 OUTFLOW= .1148E+03 BASIN STORAGE= .2332E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.53     39.03    389.35       .63      5.00     39.03    390.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1144E+03 EXCESS= .0000E+00 OUTFLOW= .1141E+03 BASIN STORAGE= .2317E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RBOXDET  MANE        4.53     38.74    389.93       .62      5.00     38.74    390.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1133E+03 EXCESS= .0000E+00 OUTFLOW= .1131E+03 BASIN STORAGE= .2300E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RUVB1-2A  MANE       2.68    102.17    217.26       .57      5.00     99.22    220.00         .57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7403E+01 EXCESS= .0000E+00 OUTFLOW= .7408E+01 BASIN STORAGE= .2015E-02 PERCENT ERROR=   -.1
```

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.70 98.97 218.92 .55 5.00 96.52 220.00 .55

ONTINUITY SUMMARY (AC-FT) - INFLOW= .7256E+01 EXCESS= .0000E+00 OUTFLOW= .7260E+01 BASIN STORAGE= .1935E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.74 96.13 218.85 .54 5.00 93.72 220.00 .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7025E+01 EXCESS= .0000E+00 OUTFLOW= .7030E+01 BASIN STORAGE= .1997E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.77 93.21 218.84 .52 5.00 90.91 220.00 .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6794E+01 EXCESS= .0000E+00 OUTFLOW= .6798E+01 BASIN STORAGE= .2049E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.78 92.85 217.17 .51 5.00 90.58 220.00 .51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6706E+01 EXCESS= .0000E+00 OUTFLOW= .6710E+01 BASIN STORAGE= .2162E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.79 92.50 217.96 .51 5.00 89.58 220.00 .51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6643E+01 EXCESS= .0000E+00 OUTFLOW= .6647E+01 BASIN STORAGE= .1903E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.80 90.98 218.53 .50 5.00 88.53 220.00 .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6594E+01 EXCESS= .0000E+00 OUTFLOW= .6599E+01 BASIN STORAGE= .2195E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.81 89.77 216.63 .50 5.00 87.73 220.00 .50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6516E+01 EXCESS= .0000E+00 OUTFLOW= .6521E+01 BASIN STORAGE= .1896E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RUVB1-2A MANE 2.83 89.99 217.79 .49 5.00 87.10 220.00 .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6431E+01 EXCESS= .0000E+00 OUTFLOW= .6435E+01 BASIN STORAGE= .1996E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .93 552.17 216.40 .79 5.00 539.69 220.00 .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1634E+03 EXCESS= .0000E+00 OUTFLOW= .1633E+03 BASIN STORAGE= .1741E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .94 542.25 216.16 .78 5.00 529.17 220.00 .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1612E+03 EXCESS= .0000E+00 OUTFLOW= .1611E+03 BASIN STORAGE= .1727E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .95 526.25 215.94 .76 5.00 513.42 220.00 .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1576E+03 EXCESS= .0000E+00 OUTFLOW= .1575E+03 BASIN STORAGE= .1705E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .96 509.23 216.73 .74 5.00 498.18 220.00 .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1540E+03 EXCESS= .0000E+00 OUTFLOW= .1539E+03 BASIN STORAGE= .1682E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .97 502.97 216.85 .73 5.00 492.53 220.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1526E+03 EXCESS= .0000E+00 OUTFLOW= .1525E+03 BASIN STORAGE= .1673E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .97 499.05 216.59 .73 5.00 488.30 220.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1515E+03 EXCESS= .0000E+00 OUTFLOW= .1514E+03 BASIN STORAGE= .1667E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .97 495.73 216.27 .73 5.00 484.73 220.00 .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1508E+03 EXCESS= .0000E+00 OUTFLOW= .1507E+03 BASIN STORAGE= .1662E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .98 490.25 216.27 .72 5.00 479.78 220.00 .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1496E+03 EXCESS= .0000E+00 OUTFLOW= .1495E+03 BASIN STORAGE= .1654E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM7 MANE .98 484.55 216.29 .71 5.00 474.10 220.00 .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1481E+03 EXCESS= .0000E+00 OUTFLOW= .1480E+03 BASIN STORAGE= .1645E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .59 721.18 216.04 .83 5.00 712.38 215.00 .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1759E+03 EXCESS= .0000E+00 OUTFLOW= .1759E+03 BASIN STORAGE= .5799E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .59 709.28 215.64 .82 5.00 699.75 215.00 .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1735E+03 EXCESS= .0000E+00 OUTFLOW= .1735E+03 BASIN STORAGE= .5740E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 688.17 215.74 .80 5.00 678.67 215.00 .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1696E+03 EXCESS= .0000E+00 OUTFLOW= .1695E+03 BASIN STORAGE= .5640E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 665.80 215.95 .78 5.00 656.82 215.00 .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1655E+03 EXCESS= .0000E+00 OUTFLOW= .1655E+03 BASIN STORAGE= .5541E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 657.89 215.87 .77 5.00 648.69 215.00 .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1639E+03 EXCESS= .0000E+00 OUTFLOW= .1639E+03 BASIN STORAGE= .5502E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 652.33 215.67 .76 5.00 643.11 215.00 .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1628E+03 EXCESS= .0000E+00 OUTFLOW= .1627E+03 BASIN STORAGE= .5474E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 647.11 215.97 .76 5.00 638.22 215.00 .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1619E+03 EXCESS= .0000E+00 OUTFLOW= .1619E+03 BASIN STORAGE= .5453E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .60 640.24 215.85 .75 5.00 631.12 215.00 .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1606E+03 EXCESS= .0000E+00 OUTFLOW= .1606E+03 BASIN STORAGE= .5419E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCOM8 MANE .61 632.53 215.78 .75 5.00 623.36 215.00 .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1590E+03 EXCESS= .0000E+00 OUTFLOW= .1589E+03 BASIN STORAGE= .5378E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .87 360.73 215.66 -1.00 5.00 355.95 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .88 353.46 216.28 -1.00 5.00 349.57 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .89 343.18 216.24 -1.00 5.00 339.08 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .90 332.63 216.25 -1.00 5.00 328.54 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .91 328.38 215.55 -1.00 5.00 324.25 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .91 325.08 216.33 -1.00 5.00 321.31 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .91 324.88 215.99 -1.00 5.00 319.70 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .92 321.53 215.98 -1.00 5.00 316.34 215.00 -1.00

FOR PLAN = 1 RATIO= .00
RDIV2A MANE .92 316.09 216.21 -1.00 5.00 311.73 215.00 -1.00

FOR PLAN = 1 RATIO= .00

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          RUVB1-1C  MANE          2.12     38.60    212.00      2.35      5.00     36.35    210.00        2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2317E+01 EXCESS= .0000E+00 OUTFLOW= .2319E+01 BASIN STORAGE= .1052E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.14     37.26    211.43      2.30      5.00     35.46    210.00        2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2270E+01 EXCESS= .0000E+00 OUTFLOW= .2272E+01 BASIN STORAGE= .1275E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.16     36.62    211.94      2.23      5.00     34.46    210.00        2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2197E+01 EXCESS= .0000E+00 OUTFLOW= .2199E+01 BASIN STORAGE= .1152E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.19     35.42    212.52      2.15      5.00     33.27    210.00        2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2121E+01 EXCESS= .0000E+00 OUTFLOW= .2122E+01 BASIN STORAGE= .1064E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.20     34.43    211.45      2.12      5.00     32.70    210.00        2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2091E+01 EXCESS= .0000E+00 OUTFLOW= .2093E+01 BASIN STORAGE= .1079E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.21     34.85    212.24      2.10      5.00     32.62    210.00        2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2071E+01 EXCESS= .0000E+00 OUTFLOW= .2073E+01 BASIN STORAGE= .1171E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.22     34.18    212.82      2.08      5.00     32.17    210.00        2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2054E+01 EXCESS= .0000E+00 OUTFLOW= .2056E+01 BASIN STORAGE= .1041E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.23     33.56    211.53      2.06      5.00     31.79    210.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2030E+01 EXCESS= .0000E+00 OUTFLOW= .2032E+01 BASIN STORAGE= .1103E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1C  MANE          2.24     33.45    212.70      2.03      5.00     31.39    210.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2001E+01 EXCESS= .0000E+00 OUTFLOW= .2002E+01 BASIN STORAGE= .1112E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .64    418.76    215.47      2.40      5.00    416.75    215.00        2.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2808E+02 EXCESS= .0000E+00 OUTFLOW= .2808E+02 BASIN STORAGE= .8195E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .64    410.11    215.12      2.35      5.00    409.28    215.00        2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2753E+02 EXCESS= .0000E+00 OUTFLOW= .2754E+02 BASIN STORAGE= .8530E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .65    397.72    215.22      2.27      5.00    396.38    215.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2662E+02 EXCESS= .0000E+00 OUTFLOW= .2662E+02 BASIN STORAGE= .8502E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .66    385.46    215.38      2.19      5.00    383.62    215.00        2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2571E+02 EXCESS= .0000E+00 OUTFLOW= .2571E+02 BASIN STORAGE= .8207E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .66    379.82    215.19      2.16      5.00    378.68    215.00        2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2535E+02 EXCESS= .0000E+00 OUTFLOW= .2535E+02 BASIN STORAGE= .7995E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .67    376.69    215.33      2.14      5.00    374.98    215.00        2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2509E+02 EXCESS= .0000E+00 OUTFLOW= .2509E+02 BASIN STORAGE= .8603E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .67    373.88    215.24      2.13      5.00    372.51    215.00        2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2491E+02 EXCESS= .0000E+00 OUTFLOW= .2491E+02 BASIN STORAGE= .7975E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1A  MANE           .67    370.59    215.51      2.10      5.00    368.55    215.00        2.10
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2462E+02 EXCESS= .0000E+00 OUTFLOW= .2462E+02 BASIN STORAGE= .8177E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RUVB1-1A	MANE	.68	365.05	215.35	2.07	5.00	363.31	215.00	2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2426E+02 EXCESS= .0000E+00 OUTFLOW= .2426E+02 BASIN STORAGE= .7902E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.55	479.99	215.43	2.39	5.00	478.46	215.00	2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3251E+02 EXCESS= .0000E+00 OUTFLOW= .3251E+02 BASIN STORAGE= .7284E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.55	471.11	215.33	2.34	5.00	469.67	215.00	2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3188E+02 EXCESS= .0000E+00 OUTFLOW= .3188E+02 BASIN STORAGE= .7903E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.56	456.18	215.28	2.26	5.00	454.85	215.00	2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3082E+02 EXCESS= .0000E+00 OUTFLOW= .3082E+02 BASIN STORAGE= .7392E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.57	441.43	215.26	2.19	5.00	440.16	215.00	2.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2977E+02 EXCESS= .0000E+00 OUTFLOW= .2977E+02 BASIN STORAGE= .7879E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.57	435.64	215.23	2.16	5.00	434.46	215.00	2.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2935E+02 EXCESS= .0000E+00 OUTFLOW= .2935E+02 BASIN STORAGE= .8047E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.57	432.07	215.50	2.13	5.00	430.59	215.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2905E+02 EXCESS= .0000E+00 OUTFLOW= .2905E+02 BASIN STORAGE= .7270E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.58	429.20	215.49	2.12	5.00	427.69	215.00	2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2884E+02 EXCESS= .0000E+00 OUTFLOW= .2884E+02 BASIN STORAGE= .7352E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.58	424.03	215.26	2.09	5.00	422.77	215.00	2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2850E+02 EXCESS= .0000E+00 OUTFLOW= .2851E+02 BASIN STORAGE= .7299E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM12	MANE	.58	418.19	215.33	2.06	5.00	416.80	215.00	2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2809E+02 EXCESS= .0000E+00 OUTFLOW= .2809E+02 BASIN STORAGE= .7260E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.31	57.08	212.53	2.36	5.00	54.76	215.00	2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3524E+01 EXCESS= .0000E+00 OUTFLOW= .3527E+01 BASIN STORAGE= .1319E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.33	55.25	211.77	2.31	5.00	53.26	215.00	2.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3453E+01 EXCESS= .0000E+00 OUTFLOW= .3456E+01 BASIN STORAGE= .1653E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.36	54.03	212.11	2.24	5.00	51.93	215.00	2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3339E+01 EXCESS= .0000E+00 OUTFLOW= .3343E+01 BASIN STORAGE= .1548E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.39	52.64	212.50	2.16	5.00	50.69	215.00	2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3226E+01 EXCESS= .0000E+00 OUTFLOW= .3229E+01 BASIN STORAGE= .1480E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.40	51.21	213.64	2.13	5.00	49.34	215.00	2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3175E+01 EXCESS= .0000E+00 OUTFLOW= .3178E+01 BASIN STORAGE= .1536E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.41	50.93	212.03	2.11	5.00	49.20	215.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3146E+01 EXCESS= .0000E+00 OUTFLOW= .3149E+01 BASIN STORAGE= .1300E-02 PERCENT ERROR= -.1

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          FOR PLAN = 1  RATIO=  .00
          RUVB1-1E  MANE          2.42     51.06    212.61      2.10      5.00     49.31    215.00        2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3126E+01 EXCESS= .0000E+00 OUTFLOW= .3129E+01 BASIN STORAGE= .1511E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1E  MANE          2.43     49.91    213.55      2.07      5.00     48.09    215.00        2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3085E+01 EXCESS= .0000E+00 OUTFLOW= .3088E+01 BASIN STORAGE= .1686E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RUVB1-1E  MANE          2.44     49.70    212.30      2.04      5.00     48.00    215.00        2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3042E+01 EXCESS= .0000E+00 OUTFLOW= .3045E+01 BASIN STORAGE= .1726E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.61    183.69    217.22       .68      5.00    180.96    220.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3907E+03 EXCESS= .0000E+00 OUTFLOW= .3903E+03 BASIN STORAGE= .4017E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.62    180.98    216.96       .67      5.00    178.06    220.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3874E+03 EXCESS= .0000E+00 OUTFLOW= .3871E+03 BASIN STORAGE= .4001E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.64    176.06    217.63       .66      5.00    173.72    220.00         .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3818E+03 EXCESS= .0000E+00 OUTFLOW= .3814E+03 BASIN STORAGE= .3975E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.65    171.69    216.70       .65      5.00    168.69    220.00         .65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3755E+03 EXCESS= .0000E+00 OUTFLOW= .3751E+03 BASIN STORAGE= .3951E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.66    169.53    217.66       .65      5.00    167.35    220.00         .65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3731E+03 EXCESS= .0000E+00 OUTFLOW= .3728E+03 BASIN STORAGE= .3943E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.67    168.50    216.68       .64      5.00    165.57    220.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3714E+03 EXCESS= .0000E+00 OUTFLOW= .3711E+03 BASIN STORAGE= .3937E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.67    167.43    217.16       .64      5.00    165.10    220.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3704E+03 EXCESS= .0000E+00 OUTFLOW= .3700E+03 BASIN STORAGE= .3933E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.68    165.73    217.95       .64      5.00    163.58    220.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3685E+03 EXCESS= .0000E+00 OUTFLOW= .3681E+03 BASIN STORAGE= .3926E+00 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RLMBWDB  MANE           1.68    164.05    217.26       .63      5.00    161.88    220.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3659E+03 EXCESS= .0000E+00 OUTFLOW= .3655E+03 BASIN STORAGE= .3919E+00 PERCENT ERROR=    .0


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

HEC-1 ANALYSIS MODEL #1 – SDN4

```
*******************************************
*                                         *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *
*             JUN  1998                   *
*           VERSION 4.1                   *
*                                         *
*  RUN DATE   28MAY08  TIME  09:06:58     *
*                                         *
*******************************************
```

```
***************************************
*                                     *
*    U.S. ARMY CORPS OF ENGINEERS     *
*    HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616       *
*           (916) 756-1104            *
*                                     *
***************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

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

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


```
          LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
                    *DIAGRAM
*** FREE ***
             1      ID    LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
             2      ID    DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
             3      ID    DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
             4      ID    INPUT FILE = WBMOD1-SDN4.H1
             5      ID    LAST MODIFIED = 01/28/08
             6      ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
             7      ID    STORM DISTRIBUTION = SDN4
             8      ID    MODELED BY = JTL/JYL/MGK
             9      ID
            10      ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
            11      ID
            12      ID                        AREA    DARF
            13      ID                        SQ. MI.
            14      ID                        8-9     0.875
            15      ID                        9-10    0.865
            16      ID                        10-11   0.857
            17      ID
            18      ID
            19      ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            20      ID
            21      ID
            22      IT       5       0       0     500
            23      IO       5       0       0
            24      IN       5       0       0
            25      JR    PREC   0.875   0.865   0.857
                    *
                    * START BASINS AND PARAMETERS TAKEN FROM DRAFT 2007 MPU
                    *
            26      KK  CAMDK2
            27      BA   0.337
            28      PB    3.28
            29      PC       0    0.02   0.058   0.075   0.099   0.126   0.137   0.145   0.149   0.151
            30      PC   0.155   0.156   0.159   0.162   0.169   0.172   0.179   0.189   0.201   0.211
            31      PC    0.22   0.228   0.232    0.24   0.246   0.252    0.26   0.269   0.276   0.283
            32      PC   0.286   0.292   0.302   0.312   0.321   0.332   0.352   0.376   0.415   0.462
            33      PC    0.53    0.61    0.71   0.732   0.756   0.782   0.799   0.813   0.823    0.83
            34      PC   0.835   0.844   0.851   0.864   0.885   0.908   0.924   0.944   0.968   0.973
            35      PC   0.978   0.982   0.984   0.986   0.988   0.991   0.992   0.993   0.994   0.997
            36      PC   0.998   0.999       1
            37      LS       0    92.1
            38      UD0.213342
                    *
            39      KK RCAMDK2
            40      KM  ROUTE RCAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
            41      KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
            42      KM  FACILITY # = GOAN 0065, 0067, 0068, 0070
            43      KM  LINING = SOIL CEMENT
            44      RD    1400  0.0321   0.025       0    TRAP      10       4
                    *
```



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          LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
            45      KK  CAMDK3
            46      BA   0.316
            47      PB    3.32
            48      LS       0    90.3
            49      UD0.193556
                    *
            50      KK CCAMDK3
            51      KM  COMBINE RCAMDK2 AND CAMDK3
            52      HC       2
                    *
            53      KK CAM-10A
            54      BA   1.266
            55      PB    3.41
            56      LS       0    94.8
            57      UD0.209967
```

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                *
   58           KK CAM-10B
   59           BA   1.809
   60           PB    3.39
   61           LS       0    91.8
   62           UD0.211495
                *

   63           KKDETCAM10
   64           BA   0.046
   65           PB   3.294
   66           LS       0    86.9
   67           UD0.137401
                *

   68           KK CAM10IN
   69           KM  COMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
   70           KM  TOTAL INFLOW TO CAM10 DETENTION BASIN
   71           HC       4
                *

   72           KK CAM10DB
   73           KM  DETENTION BASIN PARAMETERS FROM 2008 MPU BY PBS&J
   74           KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
   75           KM  FACILITY # = GOAN 0058
   76           KM  STORAGE VOLUME = 429.52 AC-FT (BERGER 5-05 VOLUME = 364 AC-FT; 18% INCREASE)
   77           KM  OUTLET = 33" ORIFICE WITH 54" RCP
   78           KM  100-YEAR DISCHARGE = 156 CFS
   79           KM  SPILLWAY LENGTH = 1360 FT
   80           KM  SPILLWAY HEIGHT = 27.7 FT
   81           KM  SPILLWAY CREST ELEVATION = 3000'
   82           KM  SPILLWAY TYPE =
   83           KM  PMF DISCHARGE = 24,614 CFS
   84           KM  TOP OF EMBANKMENT ELEVATION = 3004.5'
   85           KM  INFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
   86           KM  BY THE LOUIS BERGER GROUP (5-05)
1                                        HEC-1 INPUT                                                    PAGE  3

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

   87           RS        1    STOR      -1
                *         0       0       0    0.67    3.33    8.33   26.67   43.33     110       2
                *       280   347.2     364     396
   88           SV     0.00    0.00    0.00    0.79    3.93    9.83   31.47   51.13  129.80  236.00
   89           SV   330.40  409.70  429.52  467.28
   90           SE   2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
   91           SE   2995.0  2999.0  3000.0  3003.4
   92           SQ     0.00    6.67   17.78   27.78   45.56   54.44   64.44   82.22   93.33  117.78
   93           SQ   138.39  156.00  160.40   24614
                *

   94           KK  RCAM10
   95           RD    3200    .019   0.013       0    CIRC     4.0
                *
                * END BASINS AND PARAMETERS TAKEN FROM 2008 MPU
                *

   96           KK      W1
   97           PB    3.25
   98           BA  .14708
   99           LS       0    94.5
  100           UD   0.198
                *

  101           KK     RW1
  102           RD    2850     .03   0.013       0    CIRC     5.0
                *

  103           KK      W2
  104           PB    3.26
  105           BA  .16884
  106           LS       0    94.0
  107           UD   0.161
                *

  108           KK     CP1
  109           HC       3
                *

  110           KK    RCP1
  111           RD     760    .028   0.013       0    CIRC     6.0
                *

  112           KK  CDMNA3
  113           BA  0.3017
  114           PB    3.21
  115           LS       0    95.3
  116           UD0.254836
                *
1                                        HEC-1 INPUT                                                    PAGE  4

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

  117           KK   RMNA3
  118           KM  ROUTE CDMNA3 TO CMNA2
  119           KM  FACILITY = GOWAN BELTWAY WEST
  120           KM  FACILITY ID-MILE = GOBW 0322, 0326
  121           KM  LINING = RCB
  122           RD    1615    0.01   0.015       0    TRAP      10       0
                *

  123           KK  CDMNA2
  124           BA  0.1250
  125           PB    3.18
  126           LS       0    92.8
  127           UD   0.188
                *

  128           KK   CMNA2
  129           KM  COMBINE RMNA3 AND CDMNA2
  130           KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
  131           HC       2
```

```
                *
132             KK   RMNA2
133             KM  ROUTE CMNA2 TO COM1
134             KM  FACILITY = GOWAN BELTWAY WEST
135             RD    1400   0.015   0.015       0    TRAP      10       0
                *
136             KK  EFPOA1
137             PB    3.22
138             BA  .14340
139             LS       0    91.2
140             UD   0.143
                *
141             KK    COM1
142             HC       2
                *
143             KK   RCOM1
144             KM  ROUTE COM1 TO COM2
145             KM  FACILITY = GOWAN BELTWAY WEST
146             RD    1350    0.01   0.015       0    TRAP      10       0
                *
147             KK  EFPOA2
148             PB    3.23
149             BA  .12750
150             LS       0    91.7
151             UD   0.144
                *
1                                          HEC-1 INPUT                                          PAGE  5

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

152             KK    COM2
153             HC       2
                *
154             KK   RCOM2
155             KM  ROUTE COM2 TO COM3
156             KM  FACILITY = GOWAN BELTWAY WEST
157             RD    2300    0.02   0.015       0    TRAP      14       0
                *
158             KK  EFPOB1
159             PB    3.23
160             BA  .06580
161             LS       0    91.7
162             UD   0.178
                *
163             KK  REFPB1
164             KM  ROUTE EFPOB1 TO COM3
165             KM  FACILITY = GOWAN BELTWAY WEST
166             RD     760   0.028   0.015       0    TRAP      14       0
                *
167             KK      W3
168             PB    3.29
169             BA  .31270
170             LS       0    95.8
171             UD   0.172
                *
172             KK    COM3
173             HC       4
                *
174             KK   RCOM3
175             KM  ROUTE COM3 TO COM4
176             KM  FACILITY = GOWAN BELTWAY WEST
177             RD    1080    0.01   0.015       0    TRAP      14       0
                *
178             KK    WBCA
179             KM   BASIN FROM CENT TO ANN
180             BA  0.0647
181             PB    3.20
182             LS       0    92.0
183             UD   0.394
                *
184             KKHLBW1-CA
185             BA  0.3933
186             PB    3.30
187             LS       0    95.4
188             UD   0.261
                *
1                                          HEC-1 INPUT                                          PAGE  6

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

189             KK    COM4
190             KM  COMBINE COM3, WBCA, AND HLBW1-CA
191             KM  LAS VEGAS BELTWAY @ ANN ROAD
192             HC       3
                *
193             KK   RCOM4
194             KM  ROUTE COM4 TO HLBW1-CB
195             RD    1800  0.0250   0.015       0    TRAP      14       0
                *
196             KKHLBW1-CB
197             BA  0.1171
198             PB    3.22
199             LS       0    95.4
200             UD   0.187
                *
201             KK    COM5
```

```
202          KM  COMBINE RCOM4 & HLBW1-CB
203          HC       2
             *
204          KK   RCOM5
205          KM  ROUTE COM5 TO WRBW1
206          RD    2000   0.050   0.015       0    TRAP      14       0
             *
207          KK    WBAW
208          BA  0.0570
209          PB    3.20
210          LS       0    88.0
211          UD   0.223
             *
212          KK   WRBW1
213          BA  0.3256
214          PB    3.23
215          LS       0    94.8
216          UD   0.239
             *
217          KK    COM6
218          KM  COMBINE RCOM5, WBAW, & WRBW1
219          KM  LAS VEGAS BELTWAY @ WASHBURN ROAD
220          HC       3
             *
221          KK   RCOM6
222          KM  ROUTE COM6 TO CLMDBN
223          RD    1600  0.0050   0.015       0    TRAP      14       0
             *
1                                        HEC-1 INPUT                                        PAGE  7

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

224          KK  LWBW1C
225          BA  0.0570
226          PB    3.20
227          LS       0    93.5
228          UD   0.114
             *
229          KK   LMDBN
230          BA  0.0237
231          PB    3.18
232          LS       0    84.8
233          UD   0.161
             *
234          KK  CLMDBN
235          KM  COMBINE LMDBN AND RCOM6
236          HC       3
             *
237          KKBOXCANYON
238          BA   3.410
239          PB    3.55
240          LS       0    88.7
241          UD0.326658
             *
242          KK  BOXDET
243          KM  BOX CANYON DETENTION BASIN
244          KM  FACILITY = GOWAN BOX CANYON
245          KM  FACILITY # = GOBX 0118
246          KM  OUTLET = GOBX 0016: 18" RCP
247          RS       1    STOR      -1
248          SV     0.0    35.4    71.5   108.4   146.0   184.3   223.4   263.3   304.0   345.4
249          SV   387.6
250          SE       0       2       4       6       8      10      12      14      16      18
251          SE      20
252          SQ     0.0    10.3    16.6    21.1    24.8    28.0    30.9    33.5    36.0    38.3
253          SQ    40.4
             *
254          KK RBOXDET
255          KM  ROUTE THRU LWBW1A
256          KM  LONE MOUNTAIN
257          RD    7000  0.0647   0.013       0    CIRC     5.5
             *
258          KK  LWBW1A
259          BA  0.2401
260          PB    3.31
261          LS       0    93.5
262          UD   0.198
             *
1                                        HEC-1 INPUT                                        PAGE  8

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

263          KK UVB1-2A
264          BA  0.2453
265          PB    3.30
266          LS       0    93.3
267          UD   0.174
             *
268          KK  NDIV2A
269          KM  DIVERT 363 CFS FROM UVB1-2A TO PEACEFUL DAWN
270          DT  EDIV2A
271          DI       0     467    5000
272          DQ       0     363     363
             *
273          KKRUVB1-2A
274          RD     700  0.0050   0.016       0    TRAP      80       0
             *
275          KK    COM7
```

```
276          KM  COMBINE RBOXDET, LWBW1A, AND RUVB1-2A
277          HC       3
             *
278          KK   RCOM7
279          KM  ROUTE COM7 TO COM8
280          RD    1000  0.0600   0.016       0    TRAP      80       0
             *
281          KK UVB1-2B
282          BA  0.0192
283          PB    3.23
284          LS       0    93.3
285          UD   0.094
             *
286          KK  LWBW1B
287          BA  0.0755
288          PB    3.24
289          LS       0    93.5
290          UD   0.143
             *
291          KK    COM8
292          KM  COMBINE LWBW1B, RCOM7, UVB1-2B
293          KM  LAS VEGAS BELTWAY @ LONE MOUNTAIN
294          HC       3
             *
295          KK   RCOM8
296          RD    1300  0.0500   0.015       0    CIRC      5       0
             *
1                                        HEC-1 INPUT                                        PAGE  9

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

297          KKRETDIV2A
298          KM  RETRIEVE DIVERSION AT PEACEFUL DAWN
299          DR  EDIV2A
             *
300          KK  RDIV2A
301          KM  ROUTE DIV2A TO CUVB1-2C
302          RD    1000  0.0700   0.016       0    TRAP      50       0
             *
303          KK UVB1-2C
304          BA  0.0323
305          PB    3.23
306          LS       0    93.3
307          UD   0.118
             *
308          KK   COM10
309          KM  COMBINE RDIV2A AND UVB1-2C
310          KM
311          HC       2
             *
312          KK    COM9
313          KM  COMBINE RCOM8 & COM10
314          HC       2
             *
315          KK UVB1-1C
316          BA  0.0185
317          PB    3.23
318          LS       0    92.0
319          UD   0.088
             *
320          KKRUVB1-1C
321          KM  ROUTE UVB1-1C TO COM11
322          RD     900   0.050   0.016       0    TRAP      50       0
             *
323          KK UVB1-1B
324          BA  0.0124
325          PB    3.20
326          LS       0    91.0
327          UD   0.080
             *
328          KK   COM11
329          KM  COMBINE RUVB1-1C AND UVB1-1B
330          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE 10

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

331          KK UVB1-1A
332          BA  0.2198
333          PB    3.28
334          LS       0    92.0
335          UD   0.147
             *
336          KKRUVB1-1A
337          RD    1300   0.040   0.015       0    TRAP      10       0
             *
338          KK UVB1-1D
339          BA  0.0355
340          PB    3.20
341          LS       0    92.0
342          UD   0.097
             *
343          KK   COM12
344          KM  COMBINE RUVB1-1A AND UVB1-1D
345          HC       2
```

```
                *
          346   KK  RCOM12
          347   KM  ROUTE COM12 TO COM13
          348   RD    1200   0.042   0.015       0    TRAP      10       0
                *
          349   KK UVB1-1E
          350   BA  0.0280
          351   PB    3.24
          352   LS       0    92.0
          353   UD   0.097
                *
          354   KKRUVB1-1E
          355   RD    2000   0.033   0.015       0    TRAP      10       0
                *
          356   KK   COM13
          357   KM  COMBINE RCOM11, RCOM12, & RUVB1-1E
          358   HC       3
                *
          359   KK    WBCL
          360   BA  0.0312
          361   PB    3.21
          362   LS       0    92.0
          363   UD   0.126
                *
1                                        HEC-1 INPUT                                        PAGE 11

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

          364   KK   LMBW1
          365   BA  0.0841
          366   PB    3.18
          367   LS       0    88.6
          368   UD   0.102
                *
          369   KK   COM14
          370   KM  COMBINE LMBW1, WBCL, RCOM13
          371   HC       3
                *
          372   KK   LMDBS
          373   BA  0.0589
          374   PB    3.20
          375   LS       0    84.8
          376   UD   0.102
                *
          377   KK  CLMDBS
          378   KM  COMBINE COM9, COM10, COM14, & LMDBS
          379   KM  COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
          380   HC       3
                *
          381   KKCLMBWCDB
          382   KM  COMBINE CLMDBS & CLMDBN
          383   KO       1
          384   HC       2
                *
          385   KK LMBWCDB
          386   KM  LONE MOUNTAIN/BELTWAY DETENTION BASINS (COMBINED)
          387   KM  ROUTE COMBINED INFLOWS TO OUTFALL IN BALANCING CONDUIT
          388   KM  DUAL LEVEL OUTFALL WITH LOWER LEVEL (BELOW ELEVATION 2730)
          389   KM  23" ORIFICE AND SECOND LEVEL (ABOVE ELEVATION 2730) 26" ORIFICE
          390   KM  OUTFALL PEAK OUTFLOW OF 168 CFS AT ELEVATION 2738
          391   KO       1
          392   RS       1    STOR      -1
          393   SV     0.0     7.4    29.8    81.0   150.8   233.1   352.9   493.7   585.4   617.3
          394   SQ     0.0    26.9    37.8    46.1    53.2    59.4    65.0   114.0   118.8   120.3
          395   SE    2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
                *
          396   KK    WBLM
          397   BA  0.0805
          398   PB    3.17
          399   LS       0    90.0
          400   UD   0.190
                *
1                                        HEC-1 INPUT                                        PAGE 12

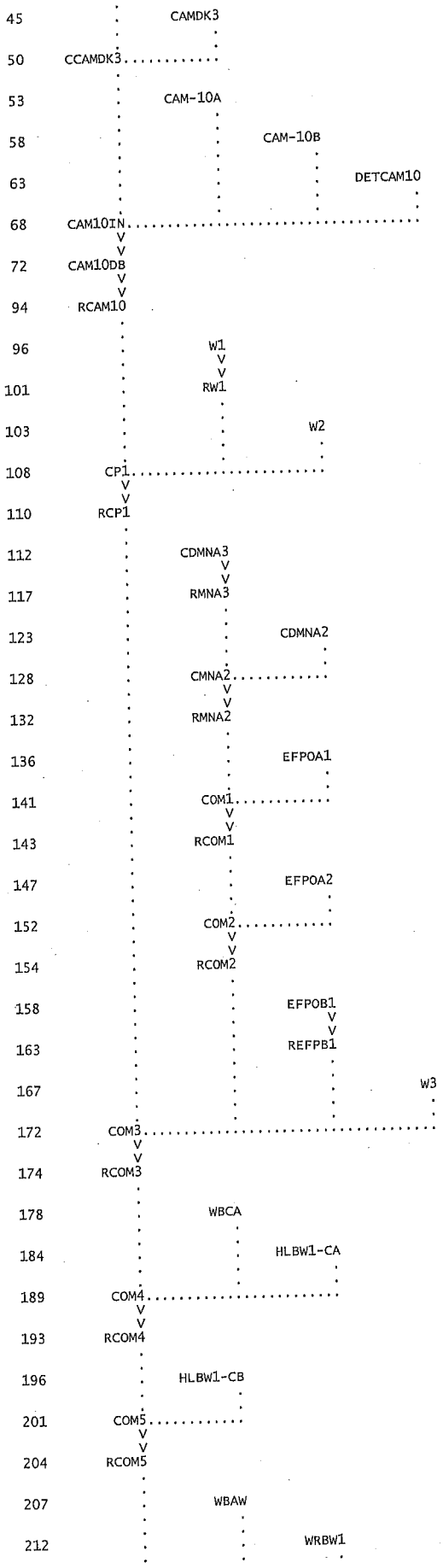
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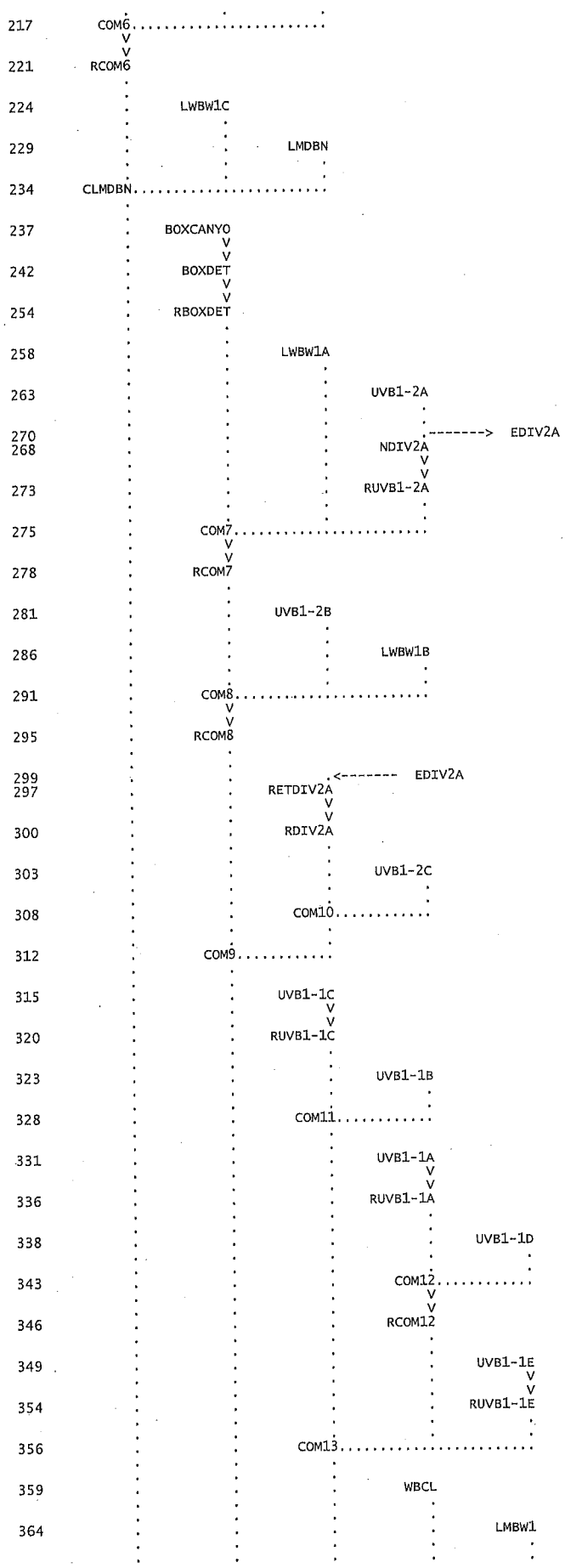
          401   KK   COM15
          402   KM  COMBINE WBLM & LMBWCDB
          403   HC       2
                *
          404   KK RLMBWDB
          405   KM  ROUTE LMBWDB TO LMBW2-C
          406   KM  FACILITY = GOWAN BELTWAY WEST
          407   KM  FACILITY # = GOBW 0000
          408   KM  LINING = RCP
          409   RD    2700   0.019   0.013       0    TRAP       5       0
                *
          410   ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

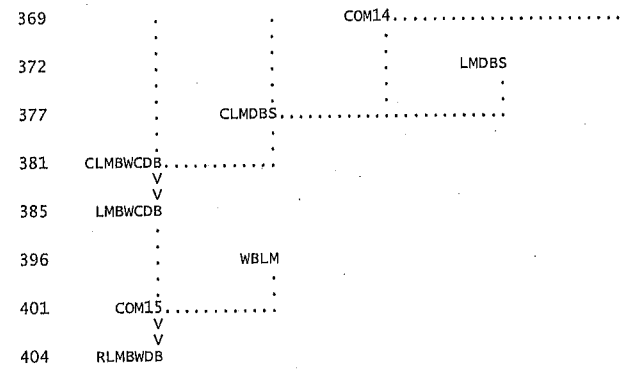
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     26     CAMDK2
                 V
                 V
     39     RCAMDK2
```


45 CAMDK3
50 CCAMDK3
53 CAM-10A
58 CAM-10B
63 DETCAM10
68 CAM10IN
72 CAM10DB
94 RCAM10
96 W1
101 RW1
103 W2
108 CP1
110 RCP1
112 CDMNA3
117 RMNA3
123 CDMNA2
128 CMNA2
132 RMNA2
136 EFPOA1
141 COM1
143 RCOM1
147 EFPOA2
152 COM2
154 RCOM2
158 EFPOB1
163 REFPB1
167 W3
172 COM3
174 RCOM3
178 WBCA
184 HLBW1-CA
189 COM4
193 RCOM4
196 HLBW1-CB
201 COM5
204 RCOM5
207 WBAW
212 WRBW1


217 COM6
221 RCOM6
224 LWBW1C
229 LMDBN
234 CLMDBN
237 BOXCANYO
242 BOXDET
254 RBOXDET
258 LWBW1A
263 UVB1-2A
270 EDIV2A
268 NDIV2A
273 RUVB1-2A
275 COM7
278 RCOM7
281 UVB1-2B
286 LWBW1B
291 COM8
295 RCOM8
299 EDIV2A
297 RETDIV2A
300 RDIV2A
303 UVB1-2C
308 COM10
312 COM9
315 UVB1-1C
320 RUVB1-1C
323 UVB1-1B
328 COM11
331 UVB1-1A
336 RUVB1-1A
338 UVB1-1D
343 COM12
346 RCOM12
349 UVB1-1E
354 RUVB1-1E
356 COM13
359 WBCL
364 LMBW1



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   28MAY08  TIME  09:06:58   *
*                                       *
*****************************************
```

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

LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
INPUT FILE = WBMOD1-SDN4.H1
LAST MODIFIED = 01/28/08
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN4
MODELED BY = JTL/JYL/MGK

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

	AREA SQ. MI.	DARF
	8-9	0.875
	9-10	0.865
	10-11	0.857

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

```
 23 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          500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME         1735  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                    TOTAL TIME BASE    41.58 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
                    .88     .87      .86
```

*** ***

```
          ***************
          *             *
381 KK    *  CLMBWCDB   *
          *             *
          ***************

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

 384 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                    ***
```

HYDROGRAPH AT STATION CLMBWCDB
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .88

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	179.	1		2050	251	153.	2		0715	376	130.
1		0005	2	0.	1		1030	127	178.	1		2055	252	153.	2		0720	377	130.
1		0010	3	2.	1		1035	128	178.	1		2100	253	152.	2		0725	378	130.
1		0015	4	15.	1		1040	129	178.	1		2105	254	152.	2		0730	379	129.
1		0020	5	61.	1		1045	130	178.	1		2110	255	152.	2		0735	380	129.
1		0025	6	159.	1		1050	131	178.	1		2115	256	152.	2		0740	381	129.
1		0030	7	290.	1		1055	132	177.	1		2120	257	152.	2		0745	382	129.
1		0035	8	395.	1		1100	133	177.	1		2125	258	151.	2		0750	383	129.
1		0040	9	435.	1		1105	134	177.	1		2130	259	151.	2		0755	384	129.
1		0045	10	413.	1		1110	135	177.	1		2135	260	151.	2		0800	385	128.
1		0050	11	361.	1		1115	136	176.	1		2140	261	151.	2		0805	386	128.
1		0055	12	307.	1		1120	137	176.	1		2145	262	151.	2		0810	387	128.
1		0100	13	259.	1		1125	138	176.	1		2150	263	150.	2		0815	388	128.
1		0105	14	225.	1		1130	139	176.	1		2155	264	150.	2		0820	389	128.
1		0110	15	211.	1		1135	140	176.	1		2200	265	150.	2		0825	390	128.
1		0115	16	216.	1		1140	141	175.	1		2205	266	150.	2		0830	391	127.
1		0120	17	231.	1		1145	142	175.	1		2210	267	150.	2		0835	392	127.
1		0125	18	260.	1		1150	143	175.	1		2215	268	149.	2		0840	393	127.
1		0130	19	313.	1		1155	144	175.	1		2220	269	149.	2		0845	394	127.
1		0135	20	382.	1		1200	145	174.	1		2225	270	149.	2		0850	395	127.
1		0140	21	445.	1		1205	146	174.	1		2230	271	149.	2		0855	396	127.
1		0145	22	485.	1		1210	147	174.	1		2235	272	149.	2		0900	397	127.
1		0150	23	491.	1		1215	148	174.	1		2240	273	148.	2		0905	398	127.
1		0155	24	475.	1		1220	149	174.	1		2245	274	148.	2		0910	399	127.
1		0200	25	457.	1		1225	150	173.	1		2250	275	148.	2		0915	400	126.
1		0205	26	443.	1		1230	151	173.	1		2255	276	148.	2		0920	401	126.
1		0210	27	438.	1		1235	152	173.	1		2300	277	148.	2		0925	402	126.
1		0215	28	449.	1		1240	153	173.	1		2305	278	147.	2		0930	403	126.
1		0220	29	470.	1		1245	154	172.	1		2310	279	147.	2		0935	404	126.
1		0225	30	487.	1		1250	155	172.	1		2315	280	147.	2		0940	405	126.
1		0230	31	484.	1		1255	156	172.	1		2320	281	147.	2		0945	406	126.
1		0235	32	463.	1		1300	157	172.	1		2325	282	147.	2		0950	407	126.
1		0240	33	453.	1		1305	158	172.	1		2330	283	146.	2		0955	408	126.
1		0245	34	478.	1		1310	159	171.	1		2335	284	146.	2		1000	409	126.
1		0250	35	523.	1		1315	160	171.	1		2340	285	146.	2		1005	410	125.
1		0255	36	573.	1		1320	161	171.	1		2345	286	146.	2		1010	411	125.
1		0300	37	649.	1		1325	162	171.	1		2350	287	146.	2		1015	412	125.
1		0305	38	795.	1		1330	163	171.	1		2355	288	146.	2		1020	413	125.
1		0310	39	1050.	1		1335	164	170.	2		0000	289	145.	2		1025	414	125.
1		0315	40	1455.	1		1340	165	170.	2		0005	290	145.	2		1030	415	125.
1		0320	41	2038.	1		1345	166	170.	2		0010	291	145.	2		1035	416	125.
1		0325	42	2822.	1		1350	167	170.	2		0015	292	145.	2		1040	417	125.
1		0330	43	3776.	1		1355	168	169.	2		0020	293	145.	2		1045	418	125.
1		0335	44	4409.	1		1400	169	169.	2		0025	294	144.	2		1050	419	124.
1		0340	45	4239.	1		1405	170	169.	2		0030	295	144.	2		1055	420	124.
1		0345	46	3664.	1		1410	171	169.	2		0035	296	144.	2		1100	421	124.
1		0350	47	3056.	1		1415	172	169.	2		0040	297	144.	2		1105	422	124.
1		0355	48	2521.	1		1420	173	168.	2		0045	298	144.	2		1110	423	124.
1		0400	49	2076.	1		1425	174	168.	2		0050	299	143.	2		1115	424	124.
1		0405	50	1697.	1		1430	175	168.	2		0055	300	143.	2		1120	425	124.
1		0410	51	1376.	1		1435	176	168.	2		0100	301	143.	2		1125	426	124.
1		0415	52	1132.	1		1440	177	168.	2		0105	302	143.	2		1130	427	124.
1		0420	53	973.	1		1445	178	167.	2		0110	303	143.	2		1135	428	124.
1		0425	54	895.	1		1450	179	167.	2		0115	304	143.	2		1140	429	123.
1		0430	55	930.	1		1455	180	167.	2		0120	305	142.	2		1145	430	123.
1		0435	56	1084.	1		1500	181	167.	2		0125	306	142.	2		1150	431	123.
1		0440	57	1265.	1		1505	182	166.	2		0130	307	142.	2		1155	432	123.
1		0445	58	1390.	1		1510	183	166.	2		0135	308	142.	2		1200	433	123.
1		0450	59	1492.	1		1515	184	166.	2		0140	309	142.	2		1205	434	123.
1		0455	60	1519.	1		1520	185	166.	2		0145	310	141.	2		1210	435	123.
1		0500	61	1392.	1		1525	186	166.	2		0150	311	141.	2		1215	436	123.
1		0505	62	1183.	1		1530	187	165.	2		0155	312	141.	2		1220	437	123.
1		0510	63	966.	1		1535	188	165.	2		0200	313	141.	2		1225	438	123.
1		0515	64	776.	1		1540	189	165.	2		0205	314	141.	2		1230	439	122.
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1		0610	75	273.	1		1635	200	163.	2		0300	325	139.	2		1325	450	121.
1		0615	76	251.	1		1640	201	163.	2		0305	326	139.	2		1330	451	121.
1		0620	77	232.	1		1645	202	162.	2		0310	327	138.	2		1335	452	121.
1		0625	78	217.	1		1650	203	162.	2		0315	328	138.	2		1340	453	121.
1		0630	79	207.	1		1655	204	162.	2		0320	329	138.	2		1345	454	121.
1		0635	80	201.	1		1700	205	162.	2		0325	330	138.	2		1350	455	121.
1		0640	81	196.	1		1705	206	162.	2		0330	331	138.	2		1355	456	121.
1		0645	82	193.	1		1710	207	161.	2		0335	332	137.	2		1400	457	121.
1		0650	83	192.	1		1715	208	161.	2		0340	333	137.	2		1405	458	121.
1		0655	84	190.	1		1720	209	161.	2		0345	334	137.	2		1410	459	120.
1		0700	85	189.	1		1725	210	161.	2		0350	335	137.	2		1415	460	120.
1		0705	86	189.	1		1730	211	161.	2		0355	336	137.	2		1420	461	120.
1		0710	87	188.	1		1735	212	160.	2		0400	337	137.	2		1425	462	120.
1		0715	88	188.	1		1740	213	160.	2		0405	338	136.	2		1430	463	120.
1		0720	89	188.	1		1745	214	160.	2		0410	339	136.	2		1435	464	120.
1		0725	90	187.	1		1750	215	160.	2		0415	340	136.	2		1440	465	120.
1		0730	91	187.	1		1755	216	160.	2		0420	341	136.	2		1445	466	120.
1		0735	92	187.	1		1800	217	159.	2		0425	342	136.	2		1450	467	120.
1		0740	93	186.	1		1805	218	159.	2		0430	343	136.	2		1455	468	120.
1		0745	94	186.	1		1810	219	159.	2		0435	344	135.	2		1500	469	119.
1		0750	95	186.	1		1815	220	159.	2		0440	345	135.	2		1505	470	119.
1		0755	96	186.	1		1820	221	159.	2		0445	346	135.	2		1510	471	119.
1		0800	97	186.	1		1825	222	158.	2		0450	347	135.	2		1515	472	119.
1		0805	98	185.	1		1830	223	158.	2		0455	348	135.	2		1520	473	119.
1		0810	99	185.	1		1835	224	158.	2		0500	349	134.	2		1525	474	119.
1		0815	100	185.	1		1840	225	158.	2		0505	350	134.	2		1530	475	119.
1		0820	101	185.	1		1845	226	158.	2		0510	351	134.	2		1535	476	119.
1		0825	102	184.	1		1850	227	157.	2		0515	352	134.	2		1540	477	119.
1		0830	103	184.	1		1855	228	157.	2		0520	353	134.	2		1545	478	119.
1		0835	104	184.	1		1900	229	157.	2		0525	354	134.	2		1550	479	118.

1	0840	105	184.	*	1	1905	230	157.	*	2	0530	355	133.	*	2	1555	480	118.
1	0845	106	183.	*	1	1910	231	157.	*	2	0535	356	133.	*	2	1600	481	118.
1	0850	107	183.	*	1	1915	232	156.	*	2	0540	357	133.	*	2	1605	482	118.
1	0855	108	183.	*	1	1920	233	156.	*	2	0545	358	133.	*	2	1610	483	118.
1	0900	109	183.	*	1	1925	234	156.	*	2	0550	359	133.	*	2	1615	484	118.
1	0905	110	182.	*	1	1930	235	156.	*	2	0555	360	133.	*	2	1620	485	118.
1	0910	111	182.	*	1	1935	236	156.	*	2	0600	361	132.	*	2	1625	486	118.
1	0915	112	182.	*	1	1940	237	155.	*	2	0605	362	132.	*	2	1630	487	118.
1	0920	113	182.	*	1	1945	238	155.	*	2	0610	363	132.	*	2	1635	488	118.
1	0925	114	181.	*	1	1950	239	155.	*	2	0615	364	132.	*	2	1640	489	117.
1	0930	115	181.	*	1	1955	240	155.	*	2	0620	365	132.	*	2	1645	490	117.
1	0935	116	181.	*	1	2000	241	155.	*	2	0625	366	132.	*	2	1650	491	117.
1	0940	117	181.	*	1	2005	242	154.	*	2	0630	367	131.	*	2	1655	492	117.
1	0945	118	181.	*	1	2010	243	154.	*	2	0635	368	131.	*	2	1700	493	117.
1	0950	119	180.	*	1	2015	244	154.	*	2	0640	369	131.	*	2	1705	494	117.
1	0955	120	180.	*	1	2020	245	154.	*	2	0645	370	131.	*	2	1710	495	117.
1	1000	121	180.	*	1	2025	246	154.	*	2	0650	371	131.	*	2	1715	496	117.
1	1005	122	180.	*	1	2030	247	154.	*	2	0655	372	131.	*	2	1720	497	117.
1	1010	123	179.	*	1	2035	248	153.	*	2	0700	373	130.	*	2	1725	498	117.
1	1015	124	179.	*	1	2040	249	153.	*	2	0705	374	130.	*	2	1730	499	116.
1	1020	125	179.	*	1	2045	250	153.	*	2	0710	375	130.	*	2	1735	500	116.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)			
+ 4409.	3.58	937.	359.	261.	261.
		(INCHES) .813	1.247	1.567	1.567
		(AC-FT) 465.	713.	896.	896.

CUMULATIVE AREA = 10.72 SQ MI

HYDROGRAPH AT STATION CLMBWCDB
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	177.	1		2050	251	151.	2		0715	376	129.
1		0005	2	0.	1		1030	127	177.	1		2055	252	151.	2		0720	377	129.
1		0010	3	2.	1		1035	128	177.	1		2100	253	151.	2		0725	378	128.
1		0015	4	14.	1		1040	129	176.	1		2105	254	151.	2		0730	379	128.
1		0020	5	58.	1		1045	130	176.	1		2110	255	151.	2		0735	380	128.
1		0025	6	153.	1		1050	131	176.	1		2115	256	150.	2		0740	381	128.
1		0030	7	281.	1		1055	132	176.	1		2120	257	150.	2		0745	382	128.
1		0035	8	383.	1		1100	133	176.	1		2125	258	150.	2		0750	383	128.
1		0040	9	424.	1		1105	134	175.	1		2130	259	150.	2		0755	384	127.
1		0045	10	404.	1		1110	135	175.	1		2135	260	150.	2		0800	385	127.
1		0050	11	354.	1		1115	136	175.	1		2140	261	149.	2		0805	386	127.
1		0055	12	301.	1		1120	137	175.	1		2145	262	149.	2		0810	387	127.
1		0100	13	254.	1		1125	138	174.	1		2150	263	149.	2		0815	388	127.
1		0105	14	221.	1		1130	139	174.	1		2155	264	149.	2		0820	389	127.
1		0110	15	208.	1		1135	140	174.	1		2200	265	149.	2		0825	390	127.
1		0115	16	213.	1		1140	141	174.	1		2205	266	148.	2		0830	391	127.
1		0120	17	227.	1		1145	142	174.	1		2210	267	148.	2		0835	392	126.
1		0125	18	256.	1		1150	143	173.	1		2215	268	148.	2		0840	393	126.
1		0130	19	307.	1		1155	144	173.	1		2220	269	148.	2		0845	394	126.
1		0135	20	376.	1		1200	145	173.	1		2225	270	148.	2		0850	395	126.
1		0140	21	437.	1		1205	146	173.	1		2230	271	147.	2		0855	396	126.
1		0145	22	476.	1		1210	147	172.	1		2235	272	147.	2		0900	397	126.
1		0150	23	483.	1		1215	148	172.	1		2240	273	147.	2		0905	398	126.
1		0155	24	467.	1		1220	149	172.	1		2245	274	147.	2		0910	399	126.
1		0200	25	450.	1		1225	150	172.	1		2250	275	147.	2		0915	400	126.
1		0205	26	436.	1		1230	151	172.	1		2255	276	146.	2		0920	401	126.
1		0210	27	430.	1		1235	152	171.	1		2300	277	146.	2		0925	402	125.
1		0215	28	441.	1		1240	153	171.	1		2305	278	146.	2		0930	403	125.
1		0220	29	462.	1		1245	154	171.	1		2310	279	146.	2		0935	404	125.
1		0225	30	479.	1		1250	155	171.	1		2315	280	146.	2		0940	405	125.
1		0230	31	477.	1		1255	156	171.	1		2320	281	145.	2		0945	406	125.
1		0235	32	455.	1		1300	157	170.	1		2325	282	145.	2		0950	407	125.
1		0240	33	446.	1		1305	158	170.	1		2330	283	145.	2		0955	408	125.
1		0245	34	470.	1		1310	159	170.	1		2335	284	145.	2		1000	409	125.
1		0250	35	515.	1		1315	160	170.	1		2340	285	145.	2		1005	410	125.
1		0255	36	564.	1		1320	161	169.	1		2345	286	145.	2		1010	411	124.
1		0300	37	640.	1		1325	162	169.	1		2350	287	144.	2		1015	412	124.
1		0305	38	783.	1		1330	163	169.	1		2355	288	144.	2		1020	413	124.
1		0310	39	1034.	1		1335	164	169.	2		0000	289	144.	2		1025	414	124.
1		0315	40	1433.	1		1340	165	169.	2		0005	290	144.	2		1030	415	124.
1		0320	41	2008.	1		1345	166	168.	2		0010	291	144.	2		1035	416	124.
1		0325	42	2780.	1		1350	167	168.	2		0015	292	143.	2		1040	417	124.
1		0330	43	3723.	1		1355	168	168.	2		0020	293	143.	2		1045	418	124.
1		0335	44	4351.	1		1400	169	168.	2		0025	294	143.	2		1050	419	124.
1		0340	45	4184.	1		1405	170	168.	2		0030	295	143.	2		1055	420	124.
1		0345	46	3618.	1		1410	171	167.	2		0035	296	143.	2		1100	421	123.
1		0350	47	3018.	1		1415	172	167.	2		0040	297	143.	2		1105	422	123.
1		0355	48	2491.	1		1420	173	167.	2		0045	298	142.	2		1110	423	123.
1		0400	49	2051.	1		1425	174	167.	2		0050	299	142.	2		1115	424	123.
1		0405	50	1678.	1		1430	175	167.	2		0055	300	142.	2		1120	425	123.
1		0410	51	1360.	1		1435	176	166.	2		0100	301	142.	2		1125	426	123.
1		0415	52	1119.	1		1440	177	166.	2		0105	302	142.	2		1130	427	123.
1		0420	53	962.	1		1445	178	166.	2		0110	303	141.	2		1135	428	123.
1		0425	54	884.	1		1450	179	166.	2		0115	304	141.	2		1140	429	123.
1		0430	55	919.	1		1455	180	165.	2		0120	305	141.	2		1145	430	123.
1		0435	56	1071.	1		1500	181	165.	2		0125	306	141.	2		1150	431	122.
1		0440	57	1249.	1		1505	182	165.	2		0130	307	141.	2		1155	432	122.
1		0445	58	1373.	1		1510	183	165.	2		0135	308	140.	2		1200	433	122.
1		0450	59	1474.	1		1515	184	165.	2		0140	309	140.	2		1205	434	122.
1		0455	60	1501.	1		1520	185	164.	2		0145	310	140.	2		1210	435	122.
1		0500	61	1376.	1		1525	186	164.	2		0150	311	140.	2		1215	436	122.
1		0505	62	1170.	1		1530	187	164.	2		0155	312	140.	2		1220	437	122.
1		0510	63	955.	1		1535	188	164.	2		0200	313	140.	2		1225	438	122.
1		0515	64	768.	1		1540	189	164.	2		0205	314	139.	2		1230	439	122.
1		0520	65	624.	1		1545	190	163.	2		0210	315	139.	2		1235	440	121.
1		0525	66	526.	1		1550	191	163.	2		0215	316	139.	2		1240	441	121.
1		0530	67	461.	1		1555	192	163.	2		0220	317	139.	2		1245	442	121.
1		0535	68	411.	1		1600	193	163.	2		0225	318	139.	2		1250	443	121.
1		0540	69	368.	1		1605	194	163.	2		0230	319	138.	2		1255	444	121.

1	0545	70	340.	*	1	1610	195	162.	*	2	0235	320	138.	*	2	1300	445	121.
1	0550	71	329.	*	1	1615	196	162.	*	2	0240	321	138.	*	2	1305	446	121.
1	0555	72	319.	*	1	1620	197	162.	*	2	0245	322	138.	*	2	1310	447	121.
1	0600	73	308.	*	1	1625	198	162.	*	2	0250	323	138.	*	2	1315	448	121.
1	0605	74	292.	*	1	1630	199	162.	*	2	0255	324	138.	*	2	1320	449	121.
1	0610	75	271.	*	1	1635	200	161.	*	2	0300	325	137.	*	2	1325	450	120.
1	0615	76	249.	*	1	1640	201	161.	*	2	0305	326	137.	*	2	1330	451	120.
1	0620	77	230.	*	1	1645	202	161.	*	2	0310	327	137.	*	2	1335	452	120.
1	0625	78	215.	*	1	1650	203	161.	*	2	0315	328	137.	*	2	1340	453	120.
1	0630	79	206.	*	1	1655	204	161.	*	2	0320	329	137.	*	2	1345	454	120.
1	0635	80	199.	*	1	1700	205	160.	*	2	0325	330	137.	*	2	1350	455	120.
1	0640	81	195.	*	1	1705	206	160.	*	2	0330	331	136.	*	2	1355	456	120.
1	0645	82	192.	*	1	1710	207	160.	*	2	0335	332	136.	*	2	1400	457	120.
1	0650	83	190.	*	1	1715	208	160.	*	2	0340	333	136.	*	2	1405	458	120.
1	0655	84	189.	*	1	1720	209	160.	*	2	0345	334	136.	*	2	1410	459	120.
1	0700	85	188.	*	1	1725	210	159.	*	2	0350	335	136.	*	2	1415	460	119.
1	0705	86	187.	*	1	1730	211	159.	*	2	0355	336	135.	*	2	1420	461	119.
1	0710	87	187.	*	1	1735	212	159.	*	2	0400	337	135.	*	2	1425	462	119.
1	0715	88	186.	*	1	1740	213	159.	*	2	0405	338	135.	*	2	1430	463	119.
1	0720	89	186.	*	1	1745	214	159.	*	2	0410	339	135.	*	2	1435	464	119.
1	0725	90	186.	*	1	1750	215	158.	*	2	0415	340	135.	*	2	1440	465	119.
1	0730	91	185.	*	1	1755	216	158.	*	2	0420	341	135.	*	2	1445	466	119.
1	0735	92	185.	*	1	1800	217	158.	*	2	0425	342	134.	*	2	1450	467	119.
1	0740	93	185.	*	1	1805	218	158.	*	2	0430	343	134.	*	2	1455	468	119.
1	0745	94	185.	*	1	1810	219	158.	*	2	0435	344	134.	*	2	1500	469	119.
1	0750	95	184.	*	1	1815	220	157.	*	2	0440	345	134.	*	2	1505	470	119.
1	0755	96	184.	*	1	1820	221	157.	*	2	0445	346	134.	*	2	1510	471	118.
1	0800	97	184.	*	1	1825	222	157.	*	2	0450	347	134.	*	2	1515	472	118.
1	0805	98	184.	*	1	1830	223	157.	*	2	0455	348	133.	*	2	1520	473	118.
1	0810	99	183.	*	1	1835	224	157.	*	2	0500	349	133.	*	2	1525	474	118.
1	0815	100	183.	*	1	1840	225	156.	*	2	0505	350	133.	*	2	1530	475	118.
1	0820	101	183.	*	1	1845	226	156.	*	2	0510	351	133.	*	2	1535	476	118.
1	0825	102	183.	*	1	1850	227	156.	*	2	0515	352	133.	*	2	1540	477	118.
1	0830	103	182.	*	1	1855	228	156.	*	2	0520	353	133.	*	2	1545	478	118.
1	0835	104	182.	*	1	1900	229	156.	*	2	0525	354	132.	*	2	1550	479	118.
1	0840	105	182.	*	1	1905	230	155.	*	2	0530	355	132.	*	2	1555	480	118.
1	0845	106	182.	*	1	1910	231	155.	*	2	0535	356	132.	*	2	1600	481	117.
1	0850	107	182.	*	1	1915	232	155.	*	2	0540	357	132.	*	2	1605	482	117.
1	0855	108	181.	*	1	1920	233	155.	*	2	0545	358	132.	*	2	1610	483	117.
1	0900	109	181.	*	1	1925	234	155.	*	2	0550	359	132.	*	2	1615	484	117.
1	0905	110	181.	*	1	1930	235	154.	*	2	0555	360	131.	*	2	1620	485	117.
1	0910	111	181.	*	1	1935	236	154.	*	2	0600	361	131.	*	2	1625	486	117.
1	0915	112	180.	*	1	1940	237	154.	*	2	0605	362	131.	*	2	1630	487	117.
1	0920	113	180.	*	1	1945	238	154.	*	2	0610	363	131.	*	2	1635	488	117.
1	0925	114	180.	*	1	1950	239	154.	*	2	0615	364	131.	*	2	1640	489	117.
1	0930	115	180.	*	1	1955	240	154.	*	2	0620	365	131.	*	2	1645	490	117.
1	0935	116	179.	*	1	2000	241	153.	*	2	0625	366	130.	*	2	1650	491	116.
1	0940	117	179.	*	1	2005	242	153.	*	2	0630	367	130.	*	2	1655	492	116.
1	0945	118	179.	*	1	2010	243	153.	*	2	0635	368	130.	*	2	1700	493	116.
1	0950	119	179.	*	1	2015	244	153.	*	2	0640	369	130.	*	2	1705	494	116.
1	0955	120	179.	*	1	2020	245	153.	*	2	0645	370	130.	*	2	1710	495	116.
1	1000	121	178.	*	1	2025	246	152.	*	2	0650	371	130.	*	2	1715	496	116.
1	1005	122	178.	*	1	2030	247	152.	*	2	0655	372	129.	*	2	1720	497	116.
1	1010	123	178.	*	1	2035	248	152.	*	2	0700	373	129.	*	2	1725	498	116.
1	1015	124	178.	*	1	2040	249	152.	*	2	0705	374	129.	*	2	1730	499	116.
1	1020	125	177.	*	1	2045	250	152.	*	2	0710	375	129.	*	2	1735	500	116.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 4351.	3.58		925.	355.	258.	258.
		(INCHES)	.802	1.232	1.550	1.550
		(AC-FT)	459.	704.	886.	886.

CUMULATIVE AREA = 10.72 SQ MI

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HYDROGRAPH AT STATION CLMBWCDB
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .86

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	176.	*	1		2050	251	150.	*	2		0715	376	128.
1		0005	2	0.	*	1		1030	127	176.	*	1		2055	252	150.	*	2		0720	377	128.
1		0010	3	2.	*	1		1035	128	175.	*	1		2100	253	150.	*	2		0725	378	127.
1		0015	4	14.	*	1		1040	129	175.	*	1		2105	254	150.	*	2		0730	379	127.
1		0020	5	56.	*	1		1045	130	175.	*	1		2110	255	149.	*	2		0735	380	127.
1		0025	6	149.	*	1		1050	131	175.	*	1		2115	256	149.	*	2		0740	381	127.
1		0030	7	274.	*	1		1055	132	175.	*	1		2120	257	149.	*	2		0745	382	127.
1		0035	8	375.	*	1		1100	133	174.	*	1		2125	258	149.	*	2		0750	383	127.
1		0040	9	415.	*	1		1105	134	174.	*	1		2130	259	149.	*	2		0755	384	127.
1		0045	10	396.	*	1		1110	135	174.	*	1		2135	260	148.	*	2		0800	385	126.
1		0050	11	348.	*	1		1115	136	174.	*	1		2140	261	148.	*	2		0805	386	126.
1		0055	12	296.	*	1		1120	137	173.	*	1		2145	262	148.	*	2		0810	387	126.
1		0100	13	251.	*	1		1125	138	173.	*	1		2150	263	148.	*	2		0815	388	126.
1		0105	14	218.	*	1		1130	139	173.	*	1		2155	264	148.	*	2		0820	389	126.
1		0110	15	205.	*	1		1135	140	173.	*	1		2200	265	147.	*	2		0825	390	126.
1		0115	16	210.	*	1		1140	141	173.	*	1		2205	266	147.	*	2		0830	391	126.
1		0120	17	224.	*	1		1145	142	172.	*	1		2210	267	147.	*	2		0835	392	126.
1		0125	18	252.	*	1		1150	143	172.	*	1		2215	268	147.	*	2		0840	393	126.
1		0130	19	303.	*	1		1155	144	172.	*	1		2220	269	147.	*	2		0845	394	126.
1		0135	20	370.	*	1		1200	145	172.	*	1		2225	270	147.	*	2		0850	395	125.
1		0140	21	431.	*	1		1205	146	172.	*	1		2230	271	146.	*	2		0855	396	125.
1		0145	22	470.	*	1		1210	147	171.	*	1		2235	272	146.	*	2		0900	397	125.
1		0150	23	477.	*	1		1215	148	171.	*	1		2240	273	146.	*	2		0905	398	125.
1		0155	24	461.	*	1		1220	149	171.	*	1		2245	274	146.	*	2		0910	399	125.
1		0200	25	444.	*	1		1225	150	171.	*	1		2250	275	146.	*	2		0915	400	125.
1		0205	26	430.	*	1		1230	151	170.	*	1		2255	276	145.	*	2		0920	401	125.
1		0210	27	425.	*	1		1235	152	170.	*	1		2300	277	145.	*	2		0925	402	125.
1		0215	28	435.	*	1		1240	153	170.	*	1		2305	278	145.	*	2		0930	403	125.
1		0220	29	456.	*	1		1245	154	170.	*	1		2310	279	145.	*	2		0935	404	125.
1		0225	30	472.	*	1		1250	155	170.	*	1		2315	280	145.	*	2		0940	405	124.
1		0230	31	471.	*	1		1255	156	169.	*	1		2320	281	144.	*	2		0945	406	124.
1		0235	32	450.	*	1		1300	157	169.	*	1		2325	282	144.	*	2		0950	407	124.
1		0240	33	441.	*	1		1305	158	169.	*	1		2330	283	144.	*	2		0955	408	124.
1		0245	34	464.	*	1		1310	159	169.	*	1		2335	284	144.	*	2		1000	409	124.

1	0250	35	509.	*	1	1315	160	169.	*	1	2340	285	144.	*	2	1005	410	124.
1	0255	36	558.	*	1	1320	161	168.	*	1	2345	286	143.	*	2	1010	411	124.
1	0300	37	633.	*	1	1325	162	168.	*	1	2350	287	143.	*	2	1015	412	124.
1	0305	38	774.	*	1	1330	163	168.	*	1	2355	288	143.	*	2	1020	413	124.
1	0310	39	1021.	*	1	1335	164	168.	*	2	0000	289	143.	*	2	1025	414	123.
1	0315	40	1416.	*	1	1340	165	167.	*	2	0005	290	143.	*	2	1030	415	123.
1	0320	41	1985.	*	1	1345	166	167.	*	2	0010	291	143.	*	2	1035	416	123.
1	0325	42	2748.	*	1	1350	167	167.	*	2	0015	292	142.	*	2	1040	417	123.
1	0330	43	3680.	*	1	1355	168	167.	*	2	0020	293	142.	*	2	1045	418	123.
1	0335	44	4302.	*	1	1400	169	167.	*	2	0025	294	142.	*	2	1050	419	123.
1	0340	45	4142.	*	1	1405	170	166.	*	2	0030	295	142.	*	2	1055	420	123.
1	0345	46	3581.	*	1	1410	171	166.	*	2	0035	296	142.	*	2	1100	421	123.
1	0350	47	2988.	*	1	1415	172	166.	*	2	0040	297	141.	*	2	1105	422	123.
1	0355	48	2466.	*	1	1420	173	166.	*	2	0045	298	141.	*	2	1110	423	123.
1	0400	49	2031.	*	1	1425	174	166.	*	2	0050	299	141.	*	2	1115	424	122.
1	0405	50	1661.	*	1	1430	175	165.	*	2	0055	300	141.	*	2	1120	425	122.
1	0410	51	1348.	*	1	1435	176	165.	*	2	0100	301	141.	*	2	1125	426	122.
1	0415	52	1109.	*	1	1440	177	165.	*	2	0105	302	141.	*	2	1130	427	122.
1	0420	53	953.	*	1	1445	178	165.	*	2	0110	303	140.	*	2	1135	428	122.
1	0425	54	876.	*	1	1450	179	165.	*	2	0115	304	140.	*	2	1140	429	122.
1	0430	55	910.	*	1	1455	180	164.	*	2	0120	305	140.	*	2	1145	430	122.
1	0435	56	1060.	*	1	1500	181	164.	*	2	0125	306	140.	*	2	1150	431	122.
1	0440	57	1236.	*	1	1505	182	164.	*	2	0130	307	140.	*	2	1155	432	122.
1	0445	58	1360.	*	1	1510	183	164.	*	2	0135	308	139.	*	2	1200	433	122.
1	0450	59	1460.	*	1	1515	184	164.	*	2	0140	309	139.	*	2	1205	434	121.
1	0455	60	1486.	*	1	1520	185	163.	*	2	0145	310	139.	*	2	1210	435	121.
1	0500	61	1363.	*	1	1525	186	163.	*	2	0150	311	139.	*	2	1215	436	121.
1	0505	62	1159.	*	1	1530	187	163.	*	2	0155	312	139.	*	2	1220	437	121.
1	0510	63	947.	*	1	1535	188	163.	*	2	0200	313	139.	*	2	1225	438	121.
1	0515	64	761.	*	1	1540	189	162.	*	2	0205	314	138.	*	2	1230	439	121.
1	0520	65	619.	*	1	1545	190	162.	*	2	0210	315	138.	*	2	1235	440	121.
1	0525	66	522.	*	1	1550	191	162.	*	2	0215	316	138.	*	2	1240	441	121.
1	0530	67	458.	*	1	1555	192	162.	*	2	0220	317	138.	*	2	1245	442	121.
1	0535	68	407.	*	1	1600	193	162.	*	2	0225	318	138.	*	2	1250	443	121.
1	0540	69	365.	*	1	1605	194	161.	*	2	0230	319	137.	*	2	1255	444	120.
1	0545	70	338.	*	1	1610	195	161.	*	2	0235	320	137.	*	2	1300	445	120.
1	0550	71	326.	*	1	1615	196	161.	*	2	0240	321	137.	*	2	1305	446	120.
1	0555	72	317.	*	1	1620	197	161.	*	2	0245	322	137.	*	2	1310	447	120.
1	0600	73	305.	*	1	1625	198	161.	*	2	0250	323	137.	*	2	1315	448	120.
1	0605	74	289.	*	1	1630	199	160.	*	2	0255	324	137.	*	2	1320	449	120.
1	0610	75	268.	*	1	1635	200	160.	*	2	0300	325	136.	*	2	1325	450	120.
1	0615	76	247.	*	1	1640	201	160.	*	2	0305	326	136.	*	2	1330	451	120.
1	0620	77	228.	*	1	1645	202	160.	*	2	0310	327	136.	*	2	1335	452	120.
1	0625	78	214.	*	1	1650	203	160.	*	2	0315	328	136.	*	2	1340	453	120.
1	0630	79	204.	*	1	1655	204	159.	*	2	0320	329	136.	*	2	1345	454	119.
1	0635	80	198.	*	1	1700	205	159.	*	2	0325	330	136.	*	2	1350	455	119.
1	0640	81	193.	*	1	1705	206	159.	*	2	0330	331	135.	*	2	1355	456	119.
1	0645	82	190.	*	1	1710	207	159.	*	2	0335	332	135.	*	2	1400	457	119.
1	0650	83	189.	*	1	1715	208	159.	*	2	0340	333	135.	*	2	1405	458	119.
1	0655	84	187.	*	1	1720	209	158.	*	2	0345	334	135.	*	2	1410	459	119.
1	0700	85	186.	*	1	1725	210	158.	*	2	0350	335	135.	*	2	1415	460	119.
1	0705	86	186.	*	1	1730	211	158.	*	2	0355	336	134.	*	2	1420	461	119.
1	0710	87	185.	*	1	1735	212	158.	*	2	0400	337	134.	*	2	1425	462	119.
1	0715	88	185.	*	1	1740	213	158.	*	2	0405	338	134.	*	2	1430	463	119.
1	0720	89	185.	*	1	1745	214	157.	*	2	0410	339	134.	*	2	1435	464	118.
1	0725	90	184.	*	1	1750	215	157.	*	2	0415	340	134.	*	2	1440	465	118.
1	0730	91	184.	*	1	1755	216	157.	*	2	0420	341	134.	*	2	1445	466	118.
1	0735	92	184.	*	1	1800	217	157.	*	2	0425	342	133.	*	2	1450	467	118.
1	0740	93	184.	*	1	1805	218	157.	*	2	0430	343	133.	*	2	1455	468	118.
1	0745	94	183.	*	1	1810	219	156.	*	2	0435	344	133.	*	2	1500	469	118.
1	0750	95	183.	*	1	1815	220	156.	*	2	0440	345	133.	*	2	1505	470	118.
1	0755	96	183.	*	1	1820	221	156.	*	2	0445	346	133.	*	2	1510	471	118.
1	0800	97	183.	*	1	1825	222	156.	*	2	0450	347	133.	*	2	1515	472	118.
1	0805	98	182.	*	1	1830	223	156.	*	2	0455	348	132.	*	2	1520	473	118.
1	0810	99	182.	*	1	1835	224	156.	*	2	0500	349	132.	*	2	1525	474	117.
1	0815	100	182.	*	1	1840	225	155.	*	2	0505	350	132.	*	2	1530	475	117.
1	0820	101	182.	*	1	1845	226	155.	*	2	0510	351	132.	*	2	1535	476	117.
1	0825	102	181.	*	1	1850	227	155.	*	2	0515	352	132.	*	2	1540	477	117.
1	0830	103	181.	*	1	1855	228	155.	*	2	0520	353	132.	*	2	1545	478	117.
1	0835	104	181.	*	1	1900	229	155.	*	2	0525	354	131.	*	2	1550	479	117.
1	0840	105	181.	*	1	1905	230	154.	*	2	0530	355	131.	*	2	1555	480	117.
1	0845	106	180.	*	1	1910	231	154.	*	2	0535	356	131.	*	2	1600	481	117.
1	0850	107	180.	*	1	1915	232	154.	*	2	0540	357	131.	*	2	1605	482	117.
1	0855	108	180.	*	1	1920	233	154.	*	2	0545	358	131.	*	2	1610	483	117.
1	0900	109	180.	*	1	1925	234	154.	*	2	0550	359	131.	*	2	1615	484	117.
1	0905	110	180.	*	1	1930	235	153.	*	2	0555	360	130.	*	2	1620	485	116.
1	0910	111	179.	*	1	1935	236	153.	*	2	0600	361	130.	*	2	1625	486	116.
1	0915	112	179.	*	1	1940	237	153.	*	2	0605	362	130.	*	2	1630	487	116.
1	0920	113	179.	*	1	1945	238	153.	*	2	0610	363	130.	*	2	1635	488	116.
1	0925	114	179.	*	1	1950	239	153.	*	2	0615	364	130.	*	2	1640	489	116.
1	0930	115	178.	*	1	1955	240	152.	*	2	0620	365	130.	*	2	1645	490	116.
1	0935	116	178.	*	1	2000	241	152.	*	2	0625	366	129.	*	2	1650	491	116.
1	0940	117	178.	*	1	2005	242	152.	*	2	0630	367	129.	*	2	1655	492	116.
1	0945	118	178.	*	1	2010	243	152.	*	2	0635	368	129.	*	2	1700	493	116.
1	0950	119	177.	*	1	2015	244	152.	*	2	0640	369	129.	*	2	1705	494	116.
1	0955	120	177.	*	1	2020	245	151.	*	2	0645	370	129.	*	2	1710	495	115.
1	1000	121	177.	*	1	2025	246	151.	*	2	0650	371	129.	*	2	1715	496	115.
1	1005	122	177.	*	1	2030	247	151.	*	2	0655	372	128.	*	2	1720	497	115.
1	1010	123	177.	*	1	2035	248	151.	*	2	0700	373	128.	*	2	1725	498	115.
1	1015	124	176.	*	1	2040	249	151.	*	2	0705	374	128.	*	2	1730	499	115.
1	1020	125	176.	*	1	2045	250	150.	*	2	0710	375	128.	*	2	1735	500	115.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 4302.	3.58		915.	352.	255.	255.
		(INCHES)	.794	1.220	1.536	1.536
		(AC-FT)	454.	697.	878.	878.

CUMULATIVE AREA = 10.72 SQ MI

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385 KK LMBWCDB

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

               HYDROGRAPH ROUTING DATA

392 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

393 SV            STORAGE        .0       7.4      29.8      81.0     150.8     233.1     352.9     493.7     585.4     617.3

394 SQ          DISCHARGE        0.       27.       38.       46.       53.       59.       65.      114.      119.      120.

395 SE          ELEVATION     2699.00   2705.00   2710.00   2715.00   2720.00   2725.00   2730.00   2735.00   2738.00   2739.00

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HYDROGRAPH AT STATION LMBWCDB
PLAN 1, RATIO = .88

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.	.0	2699.0	1		1355	168	111.	485.5	2734.7	2		0350	335	116.	529.2	2736.2
1		0005	2	0.	.0	2699.0	1		1400	169	111.	485.9	2734.7	2		0355	336	116.	529.3	2736.2
1		0010	3	0.	.0	2699.0	1		1405	170	111.	486.3	2734.7	2		0400	337	116.	529.5	2736.2
1		0015	4	0.	.1	2699.1	1		1410	171	112.	486.7	2734.8	2		0405	338	116.	529.6	2736.2
1		0020	5	1.	.3	2699.3	1		1415	172	112.	487.1	2734.8	2		0410	339	116.	529.8	2736.2
1		0025	6	4.	1.1	2699.9	1		1420	173	112.	487.4	2734.8	2		0415	340	116.	529.9	2736.2
1		0030	7	9.	2.6	2701.1	1		1425	174	112.	487.8	2734.8	2		0420	341	116.	530.0	2736.2
1		0035	8	18.	4.8	2702.9	1		1430	175	112.	488.2	2734.8	2		0425	342	116.	530.2	2736.2
1		0040	9	27.	7.5	2705.0	1		1435	176	112.	488.6	2734.8	2		0430	343	116.	530.3	2736.2
1		0045	10	28.	10.3	2705.6	1		1440	177	112.	489.0	2734.8	2		0435	344	116.	530.4	2736.2
1		0050	11	29.	12.7	2706.2	1		1445	178	112.	489.4	2734.8	2		0440	345	116.	530.6	2736.2
1		0055	12	31.	14.8	2706.7	1		1450	179	113.	489.7	2734.9	2		0445	346	116.	530.7	2736.2
1		0100	13	31.	16.6	2707.0	1		1455	180	113.	490.1	2734.9	2		0450	347	116.	530.8	2736.2
1		0105	14	32.	18.0	2707.4	1		1500	181	113.	490.5	2734.9	2		0455	348	116.	531.0	2736.2
1		0110	15	33.	19.3	2707.7	1		1505	182	113.	490.9	2734.9	2		0500	349	116.	531.1	2736.2
1		0115	16	33.	20.5	2707.9	1		1510	183	113.	491.2	2734.9	2		0505	350	116.	531.2	2736.2
1		0120	17	34.	21.8	2708.2	1		1515	184	113.	491.6	2734.9	2		0510	351	116.	531.3	2736.2
1		0125	18	35.	23.3	2708.5	1		1520	185	113.	491.9	2734.9	2		0515	352	116.	531.5	2736.2
1		0130	19	35.	25.0	2708.9	1		1525	186	114.	492.3	2735.0	2		0520	353	116.	531.6	2736.2
1		0135	20	37.	27.2	2709.4	1		1530	187	114.	492.7	2735.0	2		0525	354	116.	531.7	2736.2
1		0140	21	38.	29.8	2710.0	1		1535	188	114.	493.0	2735.0	2		0530	355	116.	531.8	2736.2
1		0145	22	38.	32.7	2710.3	1		1540	189	114.	493.4	2735.0	2		0535	356	116.	532.0	2736.3
1		0150	23	39.	35.8	2710.6	1		1545	190	114.	493.7	2735.0	2		0540	357	116.	532.1	2736.3
1		0155	24	39.	38.9	2710.9	1		1550	191	114.	494.1	2735.0	2		0545	358	116.	532.2	2736.3
1		0200	25	40.	41.8	2711.2	1		1555	192	114.	494.4	2735.0	2		0550	359	116.	532.3	2736.3
1		0205	26	40.	44.6	2711.4	1		1600	193	114.	494.8	2735.0	2		0555	360	116.	532.4	2736.3
1		0210	27	41.	47.4	2711.7	1		1605	194	114.	495.1	2735.0	2		0600	361	116.	532.5	2736.3
1		0215	28	41.	50.1	2712.0	1		1610	195	114.	495.5	2735.1	2		0605	362	116.	532.7	2736.3
1		0220	29	42.	53.0	2712.3	1		1615	196	114.	495.8	2735.1	2		0610	363	116.	532.8	2736.3
1		0225	30	42.	56.0	2712.6	1		1620	197	114.	496.1	2735.1	2		0615	364	116.	532.9	2736.3
1		0230	31	43.	59.1	2712.9	1		1625	198	114.	496.5	2735.1	2		0620	365	116.	533.0	2736.3
1		0235	32	43.	62.0	2713.1	1		1630	199	114.	496.8	2735.1	2		0625	366	116.	533.1	2736.3
1		0240	33	43.	64.9	2713.4	1		1635	200	114.	497.1	2735.1	2		0630	367	116.	533.2	2736.3
1		0245	34	44.	67.8	2713.7	1		1640	201	114.	497.5	2735.1	2		0635	368	116.	533.3	2736.3
1		0250	35	44.	71.0	2714.0	1		1645	202	114.	497.8	2735.1	2		0640	369	116.	533.4	2736.3
1		0255	36	45.	74.4	2714.4	1		1650	203	114.	498.1	2735.1	2		0645	370	116.	533.5	2736.3
1		0300	37	46.	78.3	2714.7	1		1655	204	114.	498.5	2735.2	2		0650	371	116.	533.6	2736.3
1		0305	38	46.	83.0	2715.1	1		1700	205	114.	498.8	2735.2	2		0655	372	116.	533.7	2736.3
1		0310	39	47.	89.0	2715.6	1		1705	206	114.	499.1	2735.2	2		0700	373	116.	533.8	2736.3
1		0315	40	48.	97.3	2716.2	1		1710	207	114.	499.5	2735.2	2		0705	374	116.	533.9	2736.3
1		0320	41	49.	109.0	2717.0	1		1715	208	114.	499.8	2735.2	2		0710	375	116.	534.0	2736.3
1		0325	42	51.	125.4	2718.2	1		1720	209	114.	500.1	2735.2	2		0715	376	116.	534.1	2736.3
1		0330	43	53.	147.8	2719.8	1		1725	210	114.	500.4	2735.2	2		0720	377	116.	534.2	2736.3
1		0335	44	55.	175.6	2721.5	1		1730	211	114.	500.7	2735.2	2		0725	378	116.	534.3	2736.3
1		0340	45	57.	205.0	2723.3	1		1735	212	114.	501.1	2735.2	2		0730	379	116.	534.4	2736.3
1		0345	46	59.	231.8	2724.9	1		1740	213	114.	501.4	2735.3	2		0735	380	116.	534.5	2736.3
1		0350	47	60.	254.5	2725.9	1		1745	214	114.	501.7	2735.3	2		0740	381	116.	534.6	2736.3
1		0355	48	61.	273.3	2726.7	1		1750	215	114.	502.0	2735.3	2		0745	382	116.	534.6	2736.3
1		0400	49	62.	288.7	2727.3	1		1755	216	114.	502.3	2735.3	2		0750	383	116.	534.7	2736.3
1		0405	50	63.	301.3	2727.8	1		1800	217	114.	502.6	2735.3	2		0755	384	116.	534.8	2736.3
1		0410	51	63.	311.4	2728.3	1		1805	218	114.	502.9	2735.3	2		0800	385	116.	534.9	2736.3
1		0415	52	63.	319.6	2728.6	1		1810	219	114.	503.2	2735.3	2		0805	386	116.	535.0	2736.4
1		0420	53	64.	326.4	2728.9	1		1815	220	115.	503.5	2735.3	2		0810	387	116.	535.1	2736.4
1		0425	54	64.	332.4	2729.1	1		1820	221	115.	503.8	2735.3	2		0815	388	116.	535.2	2736.4
1		0430	55	64.	338.2	2729.4	1		1825	222	115.	504.2	2735.3	2		0820	389	116.	535.2	2736.4
1		0435	56	65.	344.7	2729.7	1		1830	223	115.	504.5	2735.4	2		0825	390	116.	535.3	2736.4
1		0440	57	65.	352.4	2730.0	1		1835	224	115.	504.8	2735.4	2		0830	391	116.	535.4	2736.4
1		0445	58	68.	361.1	2730.3	1		1840	225	115.	505.0	2735.4	2		0835	392	116.	535.5	2736.4
1		0450	59	71.	370.5	2730.6	1		1845	226	115.	505.3	2735.4	2		0840	393	116.	535.5	2736.4
1		0455	60	75.	380.4	2731.0	1		1850	227	115.	505.6	2735.4	2		0845	394	116.	535.6	2736.4
1		0500	61	78.	389.9	2731.3	1		1855	228	115.	505.9	2735.4	2		0850	395	116.	535.7	2736.4
1		0505	62	81.	398.2	2731.6	1		1900	229	115.	506.2	2735.4	2		0855	396	116.	535.8	2736.4
1		0510	63	83.	405.0	2731.9	1		1905	230	115.	506.5	2735.4	2		0900	397	116.	535.8	2736.4
1		0515	64	85.	410.5	2732.0	1		1910	231	115.	506.8	2735.4	2		0905	398	116.	535.9	2736.4
1		0520	65	87.	414.7	2732.2	1		1915	232	115.	507.1	2735.4	2		0910	399	116.	536.0	2736.4
1		0525	66	88.	418.1	2732.3	1		1920	233	115.	507.4	2735.4	2		0915	400	116.	536.1	2736.4
1		0530	67	89.	420.9	2732.4	1		1925	234	115.	507.7	2735.5	2		0920	401	116.	536.1	2736.4
1		0535	68	90.	423.4	2732.5	1		1930	235	115.	508.0	2735.5	2		0925	402	116.	536.2	2736.4
1		0540	69	90.	425.5	2732.6	1		1935	236	115.	508.2	2735.5	2		0930	403	116.	536.3	2736.4
1		0545	70	91.	427.3	2732.6	1		1940	237	115.	508.5	2735.5	2		0935	404	116.	536.3	2736.4
1		0550	71	91.	429.0	2732.7	1		1945	238	115.	508.8	2735.5	2		0940	405	116.	536.4	2736.4
1		0555	72	92.	430.6	2732.8	1		1950	239	115.	509.1	2735.5	2		0945	406	116.	536.5	2736.4
1		0600	73	93.	432.2	2732.8	1		1955	240	115.	509.3	2735.5	2		0950	407	116.	536.5	2736.4
1		0605	74	93.	433.6	2732.9	1		2000	241	115.	509.6	2735.5	2		0955	408	116.	536.6	2736.4
1		0610	75	94.	434.9	2732.9	1		2005	242	115.	509.9	2735.5	2		1000	409	116.	536.7	2736.4
1		0615	76	94.	436.1	2733.0	1		2010	243	115.	510.2	2735.5	2		1005	410	116.	536.7	2736.4
1		0620	77	94.	437.1	2733.0	1		2015	244	115.	510.4	2735.5	2		1010	411	116.	536.8	2736.4
1		0625	78	95.	438.0	2733.0	1		2020	245	115.	510.7	2735.6	2		1015	412	116.	536.8	2736.4
1		0630	79	95.	438.8	2733.1	1		2025	246	115.	511.0	2735.6	2		1020	413	116.	536.9	2736.4

1	0635	80	95.	439.5	2733.1	*	1	2030	247	115.	511.2	2735.6	*	2	1025	414	116.	537.0	2736.4
1	0640	81	95.	440.3	2733.1	*	1	2035	248	115.	511.5	2735.6	*	2	1030	415	116.	537.0	2736.4
1	0645	82	96.	440.9	2733.1	*	1	2040	249	115.	511.8	2735.6	*	2	1035	416	116.	537.1	2736.4
1	0650	83	96.	441.6	2733.2	*	1	2045	250	115.	512.0	2735.6	*	2	1040	417	116.	537.1	2736.4
1	0655	84	96.	442.3	2733.2	*	1	2050	251	115.	512.3	2735.6	*	2	1045	418	116.	537.2	2736.4
1	0700	85	96.	442.9	2733.2	*	1	2055	252	115.	512.6	2735.6	*	2	1050	419	116.	537.3	2736.4
1	0705	86	97.	443.5	2733.2	*	1	2100	253	115.	512.8	2735.6	*	2	1055	420	116.	537.3	2736.4
1	0710	87	97.	444.2	2733.2	*	1	2105	254	115.	513.1	2735.6	*	2	1100	421	116.	537.4	2736.4
1	0715	88	97.	444.8	2733.3	*	1	2110	255	115.	513.3	2735.6	*	2	1105	422	116.	537.4	2736.4
1	0720	89	97.	445.4	2733.3	*	1	2115	256	115.	513.6	2735.7	*	2	1110	423	116.	537.5	2736.4
1	0725	90	97.	446.1	2733.3	*	1	2120	257	115.	513.8	2735.7	*	2	1115	424	116.	537.5	2736.4
1	0730	91	98.	446.7	2733.3	*	1	2125	258	115.	514.1	2735.7	*	2	1120	425	116.	537.6	2736.4
1	0735	92	98.	447.3	2733.4	*	1	2130	259	115.	514.3	2735.7	*	2	1125	426	116.	537.6	2736.4
1	0740	93	98.	447.9	2733.4	*	1	2135	260	115.	514.6	2735.7	*	2	1130	427	116.	537.7	2736.4
1	0745	94	98.	448.5	2733.4	*	1	2140	261	115.	514.8	2735.7	*	2	1135	428	116.	537.7	2736.4
1	0750	95	98.	449.1	2733.4	*	1	2145	262	115.	515.1	2735.7	*	2	1140	429	116.	537.8	2736.4
1	0755	96	99.	449.7	2733.4	*	1	2150	263	115.	515.3	2735.7	*	2	1145	430	116.	537.8	2736.4
1	0800	97	99.	450.3	2733.5	*	1	2155	264	115.	515.6	2735.7	*	2	1150	431	116.	537.9	2736.4
1	0805	98	99.	450.9	2733.5	*	1	2200	265	115.	515.8	2735.7	*	2	1155	432	116.	537.9	2736.4
1	0810	99	99.	451.5	2733.5	*	1	2205	266	115.	516.0	2735.7	*	2	1200	433	116.	538.0	2736.4
1	0815	100	100.	452.1	2733.5	*	1	2210	267	115.	516.3	2735.7	*	2	1205	434	116.	538.0	2736.4
1	0820	101	100.	452.7	2733.5	*	1	2215	268	115.	516.5	2735.7	*	2	1210	435	116.	538.1	2736.5
1	0825	102	100.	453.3	2733.6	*	1	2220	269	115.	516.7	2735.8	*	2	1215	436	116.	538.1	2736.5
1	0830	103	100.	453.8	2733.6	*	1	2225	270	115.	517.0	2735.8	*	2	1220	437	116.	538.2	2736.5
1	0835	104	100.	454.4	2733.6	*	1	2230	271	115.	517.2	2735.8	*	2	1225	438	116.	538.2	2736.5
1	0840	105	101.	455.0	2733.6	*	1	2235	272	115.	517.4	2735.8	*	2	1230	439	116.	538.2	2736.5
1	0845	106	101.	455.6	2733.6	*	1	2240	273	115.	517.7	2735.8	*	2	1235	440	116.	538.3	2736.5
1	0850	107	101.	456.1	2733.7	*	1	2245	274	115.	517.9	2735.8	*	2	1240	441	116.	538.3	2736.5
1	0855	108	101.	456.7	2733.7	*	1	2250	275	115.	518.1	2735.8	*	2	1245	442	116.	538.4	2736.5
1	0900	109	101.	457.2	2733.7	*	1	2255	276	115.	518.3	2735.8	*	2	1250	443	116.	538.4	2736.5
1	0905	110	102.	457.8	2733.7	*	1	2300	277	115.	518.6	2735.8	*	2	1255	444	116.	538.4	2736.5
1	0910	111	102.	458.4	2733.7	*	1	2305	278	115.	518.8	2735.8	*	2	1300	445	116.	538.5	2736.5
1	0915	112	102.	458.9	2733.8	*	1	2310	279	115.	519.0	2735.8	*	2	1305	446	116.	538.5	2736.5
1	0920	113	102.	459.5	2733.8	*	1	2315	280	115.	519.2	2735.8	*	2	1310	447	116.	538.6	2736.5
1	0925	114	102.	460.0	2733.8	*	1	2320	281	115.	519.4	2735.8	*	2	1315	448	116.	538.6	2736.5
1	0930	115	102.	460.6	2733.8	*	1	2325	282	115.	519.7	2735.8	*	2	1320	449	116.	538.6	2736.5
1	0935	116	103.	461.1	2733.8	*	1	2330	283	115.	519.9	2735.9	*	2	1325	450	116.	538.7	2736.5
1	0940	117	103.	461.6	2733.9	*	1	2335	284	115.	520.1	2735.9	*	2	1330	451	116.	538.7	2736.5
1	0945	118	103.	462.2	2733.9	*	1	2340	285	115.	520.3	2735.9	*	2	1335	452	116.	538.7	2736.5
1	0950	119	103.	462.7	2733.9	*	1	2345	286	115.	520.5	2735.9	*	2	1340	453	116.	538.8	2736.5
1	0955	120	103.	463.2	2733.9	*	1	2350	287	115.	520.7	2735.9	*	2	1345	454	116.	538.8	2736.5
1	1000	121	104.	463.8	2733.9	*	1	2355	288	115.	520.9	2735.9	*	2	1350	455	116.	538.8	2736.5
1	1005	122	104.	464.3	2734.0	*	2	0000	289	115.	521.1	2735.9	*	2	1355	456	116.	538.9	2736.5
1	1010	123	104.	464.8	2734.0	*	2	0005	290	115.	521.3	2735.9	*	2	1400	457	116.	538.9	2736.5
1	1015	124	104.	465.3	2734.0	*	2	0010	291	115.	521.5	2735.9	*	2	1405	458	116.	538.9	2736.5
1	1020	125	104.	465.8	2734.0	*	2	0015	292	115.	521.7	2735.9	*	2	1410	459	116.	538.9	2736.5
1	1025	126	104.	466.3	2734.0	*	2	0020	293	115.	521.9	2735.9	*	2	1415	460	116.	539.0	2736.5
1	1030	127	105.	466.9	2734.0	*	2	0025	294	115.	522.1	2735.9	*	2	1420	461	116.	539.0	2736.5
1	1035	128	105.	467.4	2734.1	*	2	0030	295	115.	522.3	2735.9	*	2	1425	462	116.	539.0	2736.5
1	1040	129	105.	467.9	2734.1	*	2	0035	296	116.	522.5	2735.9	*	2	1430	463	116.	539.0	2736.5
1	1045	130	105.	468.4	2734.1	*	2	0040	297	116.	522.7	2735.9	*	2	1435	464	116.	539.1	2736.5
1	1050	131	105.	468.9	2734.1	*	2	0045	298	116.	522.9	2736.0	*	2	1440	465	116.	539.1	2736.5
1	1055	132	106.	469.4	2734.1	*	2	0050	299	116.	523.1	2736.0	*	2	1445	466	116.	539.1	2736.5
1	1100	133	106.	469.9	2734.2	*	2	0055	300	116.	523.3	2736.0	*	2	1450	467	116.	539.1	2736.5
1	1105	134	106.	470.4	2734.2	*	2	0100	301	116.	523.5	2736.0	*	2	1455	468	116.	539.2	2736.5
1	1110	135	106.	470.8	2734.2	*	2	0105	302	116.	523.7	2736.0	*	2	1500	469	116.	539.2	2736.5
1	1115	136	106.	471.3	2734.2	*	2	0110	303	116.	523.9	2736.0	*	2	1505	470	116.	539.2	2736.5
1	1120	137	106.	471.8	2734.2	*	2	0115	304	116.	524.1	2736.0	*	2	1510	471	116.	539.2	2736.5
1	1125	138	107.	472.3	2734.2	*	2	0120	305	116.	524.3	2736.0	*	2	1515	472	116.	539.2	2736.5
1	1130	139	107.	472.8	2734.3	*	2	0125	306	116.	524.4	2736.0	*	2	1520	473	116.	539.3	2736.5
1	1135	140	107.	473.2	2734.3	*	2	0130	307	116.	524.6	2736.0	*	2	1525	474	116.	539.3	2736.5
1	1140	141	107.	473.7	2734.3	*	2	0135	308	116.	524.8	2736.0	*	2	1530	475	116.	539.3	2736.5
1	1145	142	107.	474.2	2734.3	*	2	0140	309	116.	525.0	2736.0	*	2	1535	476	116.	539.3	2736.5
1	1150	143	107.	474.6	2734.3	*	2	0145	310	116.	525.2	2736.0	*	2	1540	477	116.	539.3	2736.5
1	1155	144	108.	475.1	2734.3	*	2	0150	311	116.	525.3	2736.0	*	2	1545	478	116.	539.3	2736.5
1	1200	145	108.	475.6	2734.4	*	2	0155	312	116.	525.5	2736.0	*	2	1550	479	116.	539.4	2736.5
1	1205	146	108.	476.0	2734.4	*	2	0200	313	116.	525.7	2736.0	*	2	1555	480	116.	539.4	2736.5
1	1210	147	108.	476.5	2734.4	*	2	0205	314	116.	525.9	2736.1	*	2	1600	481	116.	539.4	2736.5
1	1215	148	108.	476.9	2734.4	*	2	0210	315	116.	526.0	2736.1	*	2	1605	482	116.	539.4	2736.5
1	1220	149	108.	477.4	2734.4	*	2	0215	316	116.	526.2	2736.1	*	2	1610	483	116.	539.4	2736.5
1	1225	150	108.	477.8	2734.4	*	2	0220	317	116.	526.4	2736.1	*	2	1615	484	116.	539.4	2736.5
1	1230	151	109.	478.3	2734.5	*	2	0225	318	116.	526.5	2736.1	*	2	1620	485	116.	539.4	2736.5
1	1235	152	109.	478.7	2734.5	*	2	0230	319	116.	526.7	2736.1	*	2	1625	486	116.	539.4	2736.5
1	1240	153	109.	479.2	2734.5	*	2	0235	320	116.	526.9	2736.1	*	2	1630	487	116.	539.4	2736.5
1	1245	154	109.	479.6	2734.5	*	2	0240	321	116.	527.0	2736.1	*	2	1635	488	116.	539.5	2736.5
1	1250	155	109.	480.0	2734.5	*	2	0245	322	116.	527.2	2736.1	*	2	1640	489	116.	539.5	2736.5
1	1255	156	109.	480.5	2734.5	*	2	0250	323	116.	527.4	2736.1	*	2	1645	490	116.	539.5	2736.5
1	1300	157	110.	480.9	2734.5	*	2	0255	324	116.	527.5	2736.1	*	2	1650	491	116.	539.5	2736.5
1	1305	158	110.	481.3	2734.6	*	2	0300	325	116.	527.7	2736.1	*	2	1655	492	116.	539.5	2736.5
1	1310	159	110.	481.7	2734.6	*	2	0305	326	116.	527.8	2736.1	*	2	1700	493	116.	539.5	2736.5
1	1315	160	110.	482.2	2734.6	*	2	0310	327	116.	528.0	2736.1	*	2	1705	494	116.	539.5	2736.5
1	1320	161	110.	482.6	2734.6	*	2	0315	328	116.	528.1	2736.1	*	2	1710	495	116.	539.5	2736.5
1	1325	162	110.	483.0	2734.6	*	2	0320	329	116.	528.3	2736.1	*	2	1715	496	116.	539.5	2736.5
1	1330	163	110.	483.4	2734.6	*	2	0325	330	116.	528.4	2736.1	*	2	1720	497	116.	539.5	2736.5
1	1335	164	111.	483.8	2734.6	*	2	0330	331	116.	528.6	2736.1	*	2	1725	498	116.	539.5	2736.5
1	1340	165	111.	484.2	2734.7	*	2	0335	332	116.	528.7	2736.1	*	2	1730	499	116.	539.5	2736.5
1	1345	166	111.	484.7	2734.7	*	2	0340	333	116.	528.9	2736.2	*	2	1735	500	116.	539.5	2736.5
1	1350	167	111.	485.1	2734.7	*	2	0345	334	116.	529.0	2736.2	*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)					
+ 116.	41.00	(CFS)	116.	116.	104.	104.
		(INCHES)	.101	.402	.623	.623
		(AC-FT)	58.	230.	356.	356.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	41.58-HR
+ (AC-FT)	(HR)					
540.	41.58		539.	528.	461.	461.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	41.58-HR
(FEET)	(HR)					
2736.50	41.33		2736.48	2736.12	2732.94	2732.94

CUMULATIVE AREA = 10.72 SQ MI

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HYDROGRAPH AT STATION LMBWCDB
PLAN 1, RATIO = .87

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.	.0	2699.0	1		1355	168	109.	479.8	2734.5	2		0350	335	116.	522.7	2735.9
1		0005	2	0.	.0	2699.0	1		1400	169	109.	480.2	2734.5	2		0355	336	116.	522.8	2736.0
1		0010	3	0.	.0	2699.0	1		1405	170	109.	480.6	2734.5	2		0400	337	116.	522.9	2736.0
1		0015	4	0.	.1	2699.0	1		1410	171	110.	481.0	2734.5	2		0405	338	116.	523.1	2736.0
1		0020	5	1.	.3	2699.2	1		1415	172	110.	481.4	2734.6	2		0410	339	116.	523.2	2736.0
1		0025	6	4.	1.0	2699.8	1		1420	173	110.	481.8	2734.6	2		0415	340	116.	523.3	2736.0
1		0030	7	9.	2.5	2701.0	1		1425	174	110.	482.2	2734.6	2		0420	341	116.	523.5	2736.0
1		0035	8	17.	4.7	2702.8	1		1430	175	110.	482.6	2734.6	2		0425	342	116.	523.6	2736.0
1		0040	9	27.	7.3	2704.9	1		1435	176	110.	483.0	2734.6	2		0430	343	116.	523.7	2736.0
1		0045	10	28.	10.0	2705.6	1		1440	177	110.	483.3	2734.6	2		0435	344	116.	523.8	2736.0
1		0050	11	29.	12.4	2706.1	1		1445	178	111.	483.7	2734.6	2		0440	345	116.	524.0	2736.0
1		0055	12	30.	14.4	2706.6	1		1450	179	111.	484.1	2734.7	2		0445	346	116.	524.1	2736.0
1		0100	13	31.	16.1	2706.9	1		1455	180	111.	484.5	2734.7	2		0450	347	116.	524.2	2736.0
1		0105	14	32.	17.5	2707.3	1		1500	181	111.	484.9	2734.7	2		0455	348	116.	524.3	2736.0
1		0110	15	32.	18.8	2707.5	1		1505	182	111.	485.2	2734.7	2		0500	349	116.	524.5	2736.0
1		0115	16	33.	20.0	2707.8	1		1510	183	111.	485.6	2734.7	2		0505	350	116.	524.6	2736.0
1		0120	17	34.	21.3	2708.1	1		1515	184	111.	486.0	2734.7	2		0510	351	116.	524.7	2736.0
1		0125	18	34.	22.7	2708.4	1		1520	185	111.	486.3	2734.7	2		0515	352	116.	524.8	2736.0
1		0130	19	35.	24.4	2708.8	1		1525	186	112.	486.7	2734.8	2		0520	353	116.	524.9	2736.0
1		0135	20	36.	26.5	2709.3	1		1530	187	112.	487.1	2734.8	2		0525	354	116.	525.1	2736.0
1		0140	21	37.	29.1	2709.8	1		1535	188	112.	487.4	2734.8	2		0530	355	116.	525.2	2736.0
1		0145	22	38.	32.0	2710.2	1		1540	189	112.	487.8	2734.8	2		0535	356	116.	525.3	2736.0
1		0150	23	39.	35.0	2710.5	1		1545	190	112.	488.1	2734.8	2		0540	357	116.	525.4	2736.0
1		0155	24	39.	38.0	2710.8	1		1550	191	112.	488.5	2734.8	2		0545	358	116.	525.5	2736.0
1		0200	25	40.	40.9	2711.1	1		1555	192	112.	488.8	2734.8	2		0550	359	116.	525.6	2736.0
1		0205	26	40.	43.7	2711.4	1		1600	193	112.	489.2	2734.8	2		0555	360	116.	525.7	2736.0
1		0210	27	40.	46.4	2711.6	1		1605	194	113.	489.5	2734.9	2		0600	361	116.	525.8	2736.1
1		0215	28	41.	49.1	2711.9	1		1610	195	113.	489.9	2734.9	2		0605	362	116.	525.9	2736.1
1		0220	29	41.	51.9	2712.2	1		1615	196	113.	490.2	2734.9	2		0610	363	116.	526.1	2736.1
1		0225	30	42.	54.9	2712.4	1		1620	197	113.	490.6	2734.9	2		0615	364	116.	526.2	2736.1
1		0230	31	42.	57.9	2712.7	1		1625	198	113.	490.9	2734.9	2		0620	365	116.	526.3	2736.1
1		0235	32	43.	60.8	2713.0	1		1630	199	113.	491.2	2734.9	2		0625	366	116.	526.4	2736.1
1		0240	33	43.	63.6	2713.3	1		1635	200	113.	491.6	2734.9	2		0630	367	116.	526.5	2736.1
1		0245	34	44.	66.5	2713.6	1		1640	201	113.	491.9	2734.9	2		0635	368	116.	526.6	2736.1
1		0250	35	44.	69.6	2713.9	1		1645	202	113.	492.2	2734.9	2		0640	369	116.	526.7	2736.1
1		0255	36	45.	73.0	2714.2	1		1650	203	114.	492.5	2735.0	2		0645	370	116.	526.8	2736.1
1		0300	37	45.	76.8	2714.6	1		1655	204	114.	492.9	2735.0	2		0650	371	116.	526.8	2736.1
1		0305	38	46.	81.4	2715.0	1		1700	205	114.	493.2	2735.0	2		0655	372	116.	526.9	2736.1
1		0310	39	47.	87.3	2715.5	1		1705	206	114.	493.5	2735.0	2		0700	373	116.	527.0	2736.1
1		0315	40	48.	95.5	2716.0	1		1710	207	114.	493.8	2735.0	2		0705	374	116.	527.1	2736.1
1		0320	41	49.	107.0	2716.9	1		1715	208	114.	494.1	2735.0	2		0710	375	116.	527.2	2736.1
1		0325	42	50.	123.2	2718.0	1		1720	209	114.	494.5	2735.0	2		0715	376	116.	527.3	2736.1
1		0330	43	53.	145.2	2719.6	1		1725	210	114.	494.8	2735.0	2		0720	377	116.	527.4	2736.1
1		0335	44	55.	172.6	2721.3	1		1730	211	114.	495.1	2735.0	2		0725	378	116.	527.5	2736.1
1		0340	45	57.	201.6	2723.1	1		1735	212	114.	495.4	2735.1	2		0730	379	116.	527.6	2736.1
1		0345	46	59.	228.1	2724.7	1		1740	213	114.	495.7	2735.1	2		0735	380	116.	527.7	2736.1
1		0350	47	60.	250.5	2725.7	1		1745	214	114.	496.0	2735.1	2		0740	381	116.	527.7	2736.1
1		0355	48	61.	269.1	2726.5	1		1750	215	114.	496.3	2735.1	2		0745	382	116.	527.8	2736.1
1		0400	49	62.	284.3	2727.1	1		1755	216	114.	496.6	2735.1	2		0750	383	116.	527.9	2736.1
1		0405	50	62.	296.7	2727.7	1		1800	217	114.	496.9	2735.1	2		0755	384	116.	528.0	2736.1
1		0410	51	63.	306.8	2728.1	1		1805	218	114.	497.2	2735.1	2		0800	385	116.	528.1	2736.1
1		0415	52	63.	314.9	2728.4	1		1810	219	114.	497.5	2735.1	2		0805	386	116.	528.1	2736.1
1		0420	53	64.	321.6	2728.7	1		1815	220	114.	497.8	2735.1	2		0810	387	116.	528.2	2736.1
1		0425	54	64.	327.5	2728.9	1		1820	221	114.	498.1	2735.1	2		0815	388	116.	528.3	2736.1
1		0430	55	64.	333.3	2729.2	1		1825	222	114.	498.4	2735.2	2		0820	389	116.	528.4	2736.1
1		0435	56	64.	339.7	2729.4	1		1830	223	114.	498.7	2735.2	2		0825	390	116.	528.4	2736.1
1		0440	57	65.	347.2	2729.8	1		1835	224	114.	499.0	2735.2	2		0830	391	116.	528.5	2736.1
1		0445	58	66.	355.8	2730.1	1		1840	225	114.	499.3	2735.2	2		0835	392	116.	528.6	2736.1
1		0450	59	69.	365.1	2730.4	1		1845	226	114.	499.6	2735.2	2		0840	393	116.	528.7	2736.1
1		0455	60	73.	374.9	2730.8	1		1850	227	114.	499.9	2735.2	2		0845	394	116.	528.7	2736.1
1		0500	61	76.	384.3	2731.1	1		1855	228	114.	500.1	2735.2	2		0850	395	116.	528.8	2736.1
1		0505	62	79.	392.5	2731.4	1		1900	229	114.	500.4	2735.2	2		0855	396	116.	528.9	2736.2
1		0510	63	81.	399.3	2731.6	1		1905	230	114.	500.7	2735.2	2		0900	397	116.	529.0	2736.2
1		0515	64	83.	404.7	2731.8	1		1910	231	114.	501.0	2735.2	2		0905	398	116.	529.0	2736.2
1		0520	65	84.	408.9	2732.0	1		1915	232	114.	501.3	2735.2	2		0910	399	116.	529.1	2736.2
1		0525	66	86.	412.3	2732.1	1		1920	233	114.	501.6	2735.3	2		0915	400	116.	529.2	2736.2
1		0530	67	87.	415.1	2732.2	1		1925	234	114.	501.8	2735.3	2		0920	401	116.	529.2	2736.2
1		0535	68	87.	417.5	2732.3	1		1930	235	114.	502.1	2735.3	2		0925	402	116.	529.3	2736.2
1		0540	69	88.	419.5	2732.4	1		1935	236	114.	502.4	2735.3	2		0930	403	116.	529.4	2736.2
1		0545	70	89.	421.4	2732.4	1		1940	237	114.	502.7	2735.3	2		0935	404	116.	529.4	2736.2
1		0550	71	89.	423.1	2732.5	1		1945	238	114.	502.9	2735.3	2		0940	405	116.	529.5	2736.2
1		0555	72	90.	424.7	2732.5	1		1950	239	114.	503.2	2735.3	2		0945	406	116.	529.5	2736.2
1		0600	73	91.	426.2	2732.6	1		1955	240	115.	503.5	2735.3	2		0950	407	116.	529.6	2736.2
1		0605	74	91.	427.7	2732.7	1		2000	241	115.	503.7	2735.3	2		0955	408	116.	529.7	2736.2
1		0610	75	91.	429.0	2732.7	1		2005	242	115.	504.0	2735.3	2		1000	409	116.	529.7	2736.2
1		0615	76	92.	430.1	2732.7	1		2010	243	115.	504.3	2735.3	2		1005	410	116.	529.8	2736.2
1		0620	77	92.	431.1	2732.8	1		2015	244	115.	504.5	2735.4	2		1010	411	116.	529.9	2736.2
1		0625	78	93.	432.0	2732.8	1		2020	245	115.	504.8	2735.4	2		1015	412	116.	529.9	2736.2
1		0630	79	93.	432.8	2732.8	1		2025	246	115.	505.1	2735.4	2		1020	413	116.	530.0	2736.2
1		0635	80	93.	433.6	2732.9	1		2030	247	115.	505.3	2735.4	2		1025	414	116.	530.0	2736.2
1		0640	81	93.	434.3	2732.9	1		2035	248	115.	505.6	2735.4	2		1030	415	116.	530.1	2736.2
1		0645	82	94.	435.0	2732.9	1		2040	249	115.	505.8	2735.4	2		1035	416	116.	530.1	2736.2
1		0650	83	94.	435.7	2732.9	1		2045	250	115.	506.1	2735.4	2		1040	417	116.	530.2	2736.2
1		0655	84	94.	436.3	2733.0	1		2050	251	115.	506.3	2735.4	2		1045	418	116.	530.2	2736.2
1		0700	85	94.	437.0	2733.0	1		2055	252	115.	506.6	2735.4	2		1050	419	116.	530.3	2736.2
1		0705	86	94.	437.6	2733.0	1		2100	253	115.	506.8	2735.4	2		1055	420	116.	530.4	2736.2
1		0710	87	95.	438.2	2733.0	1		2105	254	115.	507.1	2735.4	2		1100	421	116.	530.4	2736.2
1		0715	88	95.	438.9	2733.1	1		2110	255	115.	507.3	2735.4	2		1105	422	116.	530.5	2736.2
1		0720	89	95.	439.5	2733.1	1		2115	256	115.	507.6	2735.5	2		1110	423	116.	530.5	2736.2
1		0725	90	95.	440.1	2733.1	1		2120	257	115.	507.8	2735.5	2		1115	424	116.	530.6	2736.2
1		0730	91	96.	440.7	2733.1	1		2125	258	115.	508.1	2735.5	2		1120	425	116.	530.6	2736.2
1		0735	92	96.	441.4	2733.1	1		2130	259	115.	508.3	2735.5	2		1125	426	116.	530.7	2736.2
1		0740	93	96.	442.0	2733.2	1		2135	260	115.	508.6	2735.5	2		1130	427	116.	530.7	2736.2
1		0745	94	96.	442.6	2733.2	1		2140	261	115.	508.8	2735.5	2		1135	428	116.	530.7	2736.2
1		0750	95	96.	443.2	2733.2	1		2145	262	115.	509.0	2735.5	2		1140	429	116.	530.8	2736.2
1		0755	96	97.	443.8	2733.2	1		2150	263	115.	509.3	2735.5	2		1145	430	116.	530.8	2736.2
1		0800	97	97.	444.4	2733.2	1		2155	264	115.	509.5	2735.5	2		1150	431	116.	530.9	2736.2
1		0805	98	97.	445.0	2733.3	1		2200	265	115.	509.7	2735.5	2		1155	432	116.	530.9	2736.2
1		0810	99	97.	445.6	2733.3	1		2205	266	115.	510.0	2735.5	2		1200	433	116.	531.0	2736.2
1		0815	100	97.	446.2	2733.3	1		2210	267	115.	510.2	2735.5	2		1205	434	116.	531.0	2736.2
1		0820	101	98.	446.8	2733.3	1		2215	268	115.	510.4	2735.5	2		1210	435	116.	531.1	2736.2
1		0825	102	98.	447.4	2733.4	1		2220	269	115.	510.7	2735.6	2		1215	436	116.	531.1	2736.2
1		0830	103	98.	447.9	2733.4	1		2225	270	115.	510.9	2735.6	2		1220	437	116.	531.1	2736.2
1		0835	104	98.	448.5	2733.4	1		2230	271	115.	511.1	2735.6	2		1225	438	116.	531.2	2736.2
1		0840	105	98.	449.1	2733.4	1		2235	272	115.	511.3	2735.6	2		1230	439	116.	531.2	2736.2
1		0845	106	99.	449.7	2733.4	1		2240	273	115.	511.5	2735.6	2		1235	440	116.	531.3	2736.2
1		0850	107	99.	450.2	2733.5	1		2245	274	115.	511.8	2735.6	2		1240	441	116.	531.3	2736.2

1	0855	108	99.	450.8	2733.5	*	1	2250	275	115.	512.0	2735.6	*	2	1245	442	116.	531.3	2736.2
1	0900	109	99.	451.4	2733.5	*	1	2255	276	115.	512.2	2735.6	*	2	1250	443	116.	531.4	2736.2
1	0905	110	99.	451.9	2733.5	*	1	2300	277	115.	512.4	2735.6	*	2	1255	444	116.	531.4	2736.2
1	0910	111	100.	452.5	2733.5	*	1	2305	278	115.	512.6	2735.6	*	2	1300	445	116.	531.4	2736.2
1	0915	112	100.	453.1	2733.6	*	1	2310	279	115.	512.8	2735.6	*	2	1305	446	116.	531.5	2736.2
1	0920	113	100.	453.6	2733.6	*	1	2315	280	115.	513.1	2735.6	*	2	1310	447	116.	531.5	2736.2
1	0925	114	100.	454.2	2733.6	*	1	2320	281	115.	513.3	2735.6	*	2	1315	448	116.	531.5	2736.2
1	0930	115	100.	454.7	2733.6	*	1	2325	282	115.	513.5	2735.6	*	2	1320	449	116.	531.6	2736.2
1	0935	116	101.	455.2	2733.6	*	1	2330	283	115.	513.7	2735.7	*	2	1325	450	116.	531.6	2736.2
1	0940	117	101.	455.8	2733.7	*	1	2335	284	115.	513.9	2735.7	*	2	1330	451	116.	531.6	2736.2
1	0945	118	101.	456.3	2733.7	*	1	2340	285	115.	514.1	2735.7	*	2	1335	452	116.	531.7	2736.2
1	0950	119	101.	456.9	2733.7	*	1	2345	286	115.	514.3	2735.7	*	2	1340	453	116.	531.7	2736.2
1	0955	120	101.	457.4	2733.7	*	1	2350	287	115.	514.5	2735.7	*	2	1345	454	116.	531.7	2736.2
1	1000	121	102.	457.9	2733.7	*	1	2355	288	115.	514.7	2735.7	*	2	1350	455	116.	531.7	2736.2
1	1005	122	102.	458.5	2733.7	*	2	0000	289	115.	514.9	2735.7	*	2	1355	456	116.	531.8	2736.2
1	1010	123	102.	459.0	2733.8	*	2	0005	290	115.	515.1	2735.7	*	2	1400	457	116.	531.8	2736.2
1	1015	124	102.	459.5	2733.8	*	2	0010	291	115.	515.3	2735.7	*	2	1405	458	116.	531.8	2736.2
1	1020	125	102.	460.0	2733.8	*	2	0015	292	115.	515.5	2735.7	*	2	1410	459	116.	531.9	2736.2
1	1025	126	102.	460.5	2733.8	*	2	0020	293	115.	515.7	2735.7	*	2	1415	460	116.	531.9	2736.2
1	1030	127	103.	461.0	2733.8	*	2	0025	294	115.	515.9	2735.7	*	2	1420	461	116.	531.9	2736.2
1	1035	128	103.	461.6	2733.9	*	2	0030	295	115.	516.1	2735.7	*	2	1425	462	116.	531.9	2736.3
1	1040	129	103.	462.1	2733.9	*	2	0035	296	115.	516.3	2735.7	*	2	1430	463	116.	531.9	2736.3
1	1045	130	103.	462.6	2733.9	*	2	0040	297	115.	516.5	2735.7	*	2	1435	464	116.	532.0	2736.3
1	1050	131	103.	463.1	2733.9	*	2	0045	298	115.	516.6	2735.8	*	2	1440	465	116.	532.0	2736.3
1	1055	132	104.	463.6	2733.9	*	2	0050	299	115.	516.8	2735.8	*	2	1445	466	116.	532.0	2736.3
1	1100	133	104.	464.1	2733.9	*	2	0055	300	115.	517.0	2735.8	*	2	1450	467	116.	532.0	2736.3
1	1105	134	104.	464.6	2734.0	*	2	0100	301	115.	517.2	2735.8	*	2	1455	468	116.	532.0	2736.3
1	1110	135	104.	465.1	2734.0	*	2	0105	302	115.	517.4	2735.8	*	2	1500	469	116.	532.1	2736.3
1	1115	136	104.	465.5	2734.0	*	2	0110	303	115.	517.6	2735.8	*	2	1505	470	116.	532.1	2736.3
1	1120	137	104.	466.0	2734.0	*	2	0115	304	115.	517.7	2735.8	*	2	1510	471	116.	532.1	2736.3
1	1125	138	105.	466.5	2734.0	*	2	0120	305	115.	517.9	2735.8	*	2	1515	472	116.	532.1	2736.3
1	1130	139	105.	467.0	2734.1	*	2	0125	306	115.	518.1	2735.8	*	2	1520	473	116.	532.1	2736.3
1	1135	140	105.	467.5	2734.1	*	2	0130	307	115.	518.3	2735.8	*	2	1525	474	116.	532.1	2736.3
1	1140	141	105.	467.9	2734.1	*	2	0135	308	115.	518.4	2735.8	*	2	1530	475	116.	532.2	2736.3
1	1145	142	105.	468.4	2734.1	*	2	0140	309	115.	518.6	2735.8	*	2	1535	476	116.	532.2	2736.3
1	1150	143	105.	468.9	2734.1	*	2	0145	310	115.	518.8	2735.8	*	2	1540	477	116.	532.2	2736.3
1	1155	144	106.	469.4	2734.1	*	2	0150	311	115.	519.0	2735.8	*	2	1545	478	116.	532.2	2736.3
1	1200	145	106.	469.8	2734.2	*	2	0155	312	115.	519.1	2735.8	*	2	1550	479	116.	532.2	2736.3
1	1205	146	106.	470.3	2734.2	*	2	0200	313	115.	519.3	2735.8	*	2	1555	480	116.	532.2	2736.3
1	1210	147	106.	470.7	2734.2	*	2	0205	314	115.	519.5	2735.8	*	2	1600	481	116.	532.2	2736.3
1	1215	148	106.	471.2	2734.2	*	2	0210	315	115.	519.6	2735.8	*	2	1605	482	116.	532.2	2736.3
1	1220	149	106.	471.6	2734.2	*	2	0215	316	115.	519.8	2735.9	*	2	1610	483	116.	532.3	2736.3
1	1225	150	106.	472.1	2734.2	*	2	0220	317	115.	519.9	2735.9	*	2	1615	484	116.	532.3	2736.3
1	1230	151	107.	472.5	2734.2	*	2	0225	318	115.	520.1	2735.9	*	2	1620	485	116.	532.3	2736.3
1	1235	152	107.	473.0	2734.3	*	2	0230	319	115.	520.3	2735.9	*	2	1625	486	116.	532.3	2736.3
1	1240	153	107.	473.4	2734.3	*	2	0235	320	115.	520.4	2735.9	*	2	1630	487	116.	532.3	2736.3
1	1245	154	107.	473.9	2734.3	*	2	0240	321	115.	520.6	2735.9	*	2	1635	488	116.	532.3	2736.3
1	1250	155	107.	474.3	2734.3	*	2	0245	322	115.	520.7	2735.9	*	2	1640	489	116.	532.3	2736.3
1	1255	156	107.	474.8	2734.3	*	2	0250	323	115.	520.9	2735.9	*	2	1645	490	116.	532.3	2736.3
1	1300	157	108.	475.2	2734.3	*	2	0255	324	115.	521.0	2735.9	*	2	1650	491	116.	532.3	2736.3
1	1305	158	108.	475.6	2734.4	*	2	0300	325	115.	521.2	2735.9	*	2	1655	492	116.	532.3	2736.3
1	1310	159	108.	476.0	2734.4	*	2	0305	326	115.	521.4	2735.9	*	2	1700	493	116.	532.3	2736.3
1	1315	160	108.	476.5	2734.4	*	2	0310	327	115.	521.5	2735.9	*	2	1705	494	116.	532.3	2736.3
1	1320	161	108.	476.9	2734.4	*	2	0315	328	115.	521.6	2735.9	*	2	1710	495	116.	532.3	2736.3
1	1325	162	108.	477.3	2734.4	*	2	0320	329	115.	521.8	2735.9	*	2	1715	496	116.	532.3	2736.3
1	1330	163	108.	477.7	2734.4	*	2	0325	330	115.	521.9	2735.9	*	2	1720	497	116.	532.3	2736.3
1	1335	164	109.	478.2	2734.4	*	2	0330	331	115.	522.1	2735.9	*	2	1725	498	116.	532.3	2736.3
1	1340	165	109.	478.6	2734.5	*	2	0335	332	115.	522.2	2735.9	*	2	1730	499	116.	532.3	2736.3
1	1345	166	109.	479.0	2734.5	*	2	0340	333	116.	522.4	2735.9	*	2	1735	500	116.	532.3	2736.3
1	1350	167	109.	479.4	2734.5	*	2	0345	334	116.	522.5	2735.9	*						

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 116.	40.92		116.	115.	103.	103.
		(INCHES)	.101	.401	.618	.618
		(AC-FT)	58.	229.	353.	353.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	41.58-HR
+ (AC-FT)	(HR)				
532.	41.08	532.	521.	455.	455.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	41.58-HR
+ (FEET)	(HR)				
2736.26	40.92	2736.25	2735.91	2732.74	2732.74

CUMULATIVE AREA = 10.72 SQ MI

HYDROGRAPH AT STATION LMBWCDB
PLAN 1, RATIO = .86

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.	.0	2699.0	*	1	1355		168	108.	475.3	2734.3	*	2	0350		335	115.	517.6	2735.8
1	0005		2	0.	.0	2699.0	*	1	1400		169	108.	475.7	2734.4	*	2	0355		336	115.	517.7	2735.8
1	0010		3	0.	.0	2699.0	*	1	1405		170	108.	476.1	2734.4	*	2	0400		337	115.	517.8	2735.8
1	0015		4	0.	.1	2699.0	*	1	1410		171	108.	476.5	2734.4	*	2	0405		338	115.	518.0	2735.8
1	0020		5	1.	.3	2699.2	*	1	1415		172	108.	476.9	2734.4	*	2	0410		339	115.	518.1	2735.8
1	0025		6	4.	1.0	2699.8	*	1	1420		173	108.	477.3	2734.4	*	2	0415		340	115.	518.2	2735.8
1	0030		7	9.	2.4	2700.9	*	1	1425		174	108.	477.7	2734.4	*	2	0420		341	115.	518.3	2735.8
1	0035		8	17.	4.5	2702.7	*	1	1430		175	109.	478.0	2734.4	*	2	0425		342	115.	518.5	2735.8
1	0040		9	26.	7.1	2704.8	*	1	1435		176	109.	478.4	2734.5	*	2	0430		343	115.	518.6	2735.8
1	0045		10	28.	9.7	2705.5	*	1	1440		177	109.	478.8	2734.5	*	2	0435		344	115.	518.7	2735.8
1	0050		11	29.	12.1	2706.0	*	1	1445		178	109.	479.2	2734.5	*	2	0440		345	115.	518.8	2735.8
1	0055		12	30.	14.1	2706.5	*	1	1450		179	109.	479.6	2734.5	*	2	0445		346	115.	519.0	2735.8
1	0100		13	31.	15.8	2706.9	*	1	1455		180	109.	480.0	2734.5	*	2	0450		347	115.	519.1	2735.8
1	0105		14	32.	17.2	2707.2	*	1	1500		181	109.	480.4	2734.5	*	2	0455		348	115.	519.2	2735.8
1	0110		15	32.	18.4	2707.5	*	1	1505		182	109.	480.7	2734.5	*	2	0500		349	115.	519.3	2735.8
1	0115		16	33.	19.6	2707.7	*	1	1510		183	110.	481.1	2734.6	*	2	0505		350	115.	519.4	2735.8
1	0120		17	33.	20.9	2708.0	*	1	1515		184	110.	481.5	2734.6	*	2	0510		351	115.	519.5	2735.8
1	0125		18	34.	22.3	2708.3	*	1	1520		185	110.	481.8	2734.6	*	2	0515		352	115.	519.6	2735.8
1	0130		19	35.	24.0	2708.7	*	1	1525		186	110.	482.2	2734.6	*	2	0520		353	115.	519.8	2735.9
1	0135		20	36.	26.0	2709.2	*	1	1530		187	110.	482.6	2734.6	*	2	0525		354	115.	519.9	2735.9
1	0140		21	37.	28.5	2709.7	*	1	1535		188	110.	482.9	2734.6	*	2	0530		355	115.	520.0	2735.9

1	0145	22	38.	31.4	2710.2	*	1	1540	189	110.	483.3	2734.6	*	2	0535	356	115.	520.1	2735.9
1	0150	23	39.	34.4	2710.4	*	1	1545	190	111.	483.7	2734.6	*	2	0540	357	115.	520.2	2735.9
1	0155	24	39.	37.3	2710.7	*	1	1550	191	111.	484.0	2734.7	*	2	0545	358	115.	520.3	2735.9
1	0200	25	39.	40.2	2711.0	*	1	1555	192	111.	484.4	2734.7	*	2	0550	359	115.	520.4	2735.9
1	0205	26	40.	42.9	2711.3	*	1	1600	193	111.	484.7	2734.7	*	2	0555	360	115.	520.5	2735.9
1	0210	27	40.	45.6	2711.5	*	1	1605	194	111.	485.1	2734.7	*	2	0600	361	115.	520.6	2735.9
1	0215	28	41.	48.3	2711.8	*	1	1610	195	111.	485.4	2734.7	*	2	0605	362	115.	520.7	2735.9
1	0220	29	41.	51.1	2712.1	*	1	1615	196	111.	485.8	2734.7	*	2	0610	363	115.	520.8	2735.9
1	0225	30	42.	54.0	2712.4	*	1	1620	197	111.	486.1	2734.7	*	2	0615	364	115.	520.9	2735.9
1	0230	31	42.	56.9	2712.6	*	1	1625	198	111.	486.4	2734.7	*	2	0620	365	115.	521.0	2735.9
1	0235	32	43.	59.8	2712.9	*	1	1630	199	112.	486.8	2734.8	*	2	0625	366	115.	521.1	2735.9
1	0240	33	43.	62.6	2713.2	*	1	1635	200	112.	487.1	2734.8	*	2	0630	367	115.	521.2	2735.9
1	0245	34	44.	65.4	2713.5	*	1	1640	201	112.	487.4	2734.8	*	2	0635	368	115.	521.3	2735.9
1	0250	35	44.	68.4	2713.8	*	1	1645	202	112.	487.8	2734.8	*	2	0640	369	115.	521.4	2735.9
1	0255	36	45.	71.8	2714.1	*	1	1650	203	112.	488.1	2734.8	*	2	0645	370	115.	521.5	2735.9
1	0300	37	45.	75.6	2714.5	*	1	1655	204	112.	488.4	2734.8	*	2	0650	371	115.	521.6	2735.9
1	0305	38	46.	80.1	2714.9	*	1	1700	205	112.	488.8	2734.8	*	2	0655	372	115.	521.7	2735.9
1	0310	39	47.	86.0	2715.4	*	1	1705	206	112.	489.1	2734.8	*	2	0700	373	115.	521.8	2735.9
1	0315	40	47.	94.1	2715.9	*	1	1710	207	113.	489.4	2734.8	*	2	0705	374	115.	521.8	2735.9
1	0320	41	49.	105.4	2716.8	*	1	1715	208	113.	489.7	2734.9	*	2	0710	375	115.	521.9	2735.9
1	0325	42	50.	121.4	2717.9	*	1	1720	209	113.	490.0	2734.9	*	2	0715	376	115.	522.0	2735.9
1	0330	43	52.	143.2	2719.5	*	1	1725	210	113.	490.3	2734.9	*	2	0720	377	115.	522.1	2735.9
1	0335	44	55.	170.3	2721.2	*	1	1730	211	113.	490.7	2734.9	*	2	0725	378	115.	522.2	2735.9
1	0340	45	57.	199.0	2722.9	*	1	1735	212	113.	491.0	2734.9	*	2	0730	379	115.	522.3	2735.9
1	0345	46	59.	225.2	2724.5	*	1	1740	213	113.	491.3	2734.9	*	2	0735	380	115.	522.3	2735.9
1	0350	47	60.	247.4	2725.6	*	1	1745	214	113.	491.6	2734.9	*	2	0740	381	116.	522.4	2735.9
1	0355	48	61.	265.7	2726.4	*	1	1750	215	113.	491.9	2734.9	*	2	0745	382	116.	522.5	2735.9
1	0400	49	62.	280.8	2727.0	*	1	1755	216	113.	492.2	2734.9	*	2	0750	383	116.	522.6	2735.9
1	0405	50	62.	293.1	2727.5	*	1	1800	217	114.	492.5	2735.0	*	2	0755	384	116.	522.7	2735.9
1	0410	51	63.	303.0	2727.9	*	1	1805	218	114.	492.8	2735.0	*	2	0800	385	116.	522.7	2735.9
1	0415	52	63.	311.1	2728.3	*	1	1810	219	114.	493.1	2735.0	*	2	0805	386	116.	522.8	2736.0
1	0420	53	63.	317.7	2728.5	*	1	1815	220	114.	493.4	2735.0	*	2	0810	387	116.	522.9	2736.0
1	0425	54	64.	323.6	2728.8	*	1	1820	221	114.	493.7	2735.0	*	2	0815	388	116.	523.0	2736.0
1	0430	55	64.	329.3	2729.0	*	1	1825	222	114.	494.0	2735.0	*	2	0820	389	116.	523.0	2736.0
1	0435	56	64.	335.6	2729.3	*	1	1830	223	114.	494.2	2735.0	*	2	0825	390	116.	523.1	2736.0
1	0440	57	65.	343.1	2729.6	*	1	1835	224	114.	494.5	2735.0	*	2	0830	391	116.	523.2	2736.0
1	0445	58	65.	351.6	2729.9	*	1	1840	225	114.	494.8	2735.0	*	2	0835	392	116.	523.2	2736.0
1	0450	59	68.	360.8	2730.3	*	1	1845	226	114.	495.1	2735.0	*	2	0840	393	116.	523.3	2736.0
1	0455	60	71.	370.5	2730.6	*	1	1850	227	114.	495.4	2735.1	*	2	0845	394	116.	523.4	2736.0
1	0500	61	74.	379.8	2731.0	*	1	1855	228	114.	495.7	2735.1	*	2	0850	395	116.	523.4	2736.0
1	0505	62	77.	388.0	2731.2	*	1	1900	229	114.	495.9	2735.1	*	2	0855	396	116.	523.5	2736.0
1	0510	63	80.	394.7	2731.5	*	1	1905	230	114.	496.2	2735.1	*	2	0900	397	116.	523.6	2736.0
1	0515	64	81.	400.0	2731.7	*	1	1910	231	114.	496.5	2735.1	*	2	0905	398	116.	523.6	2736.0
1	0520	65	83.	404.2	2731.8	*	1	1915	232	114.	496.8	2735.1	*	2	0910	399	116.	523.7	2736.0
1	0525	66	84.	407.6	2731.9	*	1	1920	233	114.	497.0	2735.1	*	2	0915	400	116.	523.8	2736.0
1	0530	67	85.	410.4	2732.0	*	1	1925	234	114.	497.3	2735.1	*	2	0920	401	116.	523.8	2736.0
1	0535	68	86.	412.7	2732.1	*	1	1930	235	114.	497.6	2735.1	*	2	0925	402	116.	523.9	2736.0
1	0540	69	87.	414.8	2732.2	*	1	1935	236	114.	497.8	2735.1	*	2	0930	403	116.	524.0	2736.0
1	0545	70	87.	416.6	2732.3	*	1	1940	237	114.	498.1	2735.1	*	2	0935	404	116.	524.0	2736.0
1	0550	71	88.	418.3	2732.3	*	1	1945	238	114.	498.4	2735.2	*	2	0940	405	116.	524.1	2736.0
1	0555	72	88.	419.9	2732.4	*	1	1950	239	114.	498.6	2735.2	*	2	0945	406	116.	524.2	2736.0
1	0600	73	89.	421.5	2732.4	*	1	1955	240	114.	498.9	2735.2	*	2	0950	407	116.	524.2	2736.0
1	0605	74	89.	422.9	2732.5	*	1	2000	241	114.	499.2	2735.2	*	2	0955	408	116.	524.3	2736.0
1	0610	75	90.	424.2	2732.5	*	1	2005	242	114.	499.4	2735.2	*	2	1000	409	116.	524.3	2736.0
1	0615	76	90.	425.3	2732.6	*	1	2010	243	114.	499.7	2735.2	*	2	1005	410	116.	524.4	2736.0
1	0620	77	91.	426.4	2732.6	*	1	2015	244	114.	499.9	2735.2	*	2	1010	411	116.	524.4	2736.0
1	0625	78	91.	427.3	2732.6	*	1	2020	245	114.	500.2	2735.2	*	2	1015	412	116.	524.5	2736.0
1	0630	79	91.	428.1	2732.7	*	1	2025	246	114.	500.5	2735.2	*	2	1020	413	116.	524.6	2736.0
1	0635	80	91.	428.8	2732.7	*	1	2030	247	114.	500.7	2735.2	*	2	1025	414	116.	524.6	2736.0
1	0640	81	92.	429.5	2732.7	*	1	2035	248	114.	501.0	2735.2	*	2	1030	415	116.	524.7	2736.0
1	0645	82	92.	430.2	2732.7	*	1	2040	249	114.	501.2	2735.2	*	2	1035	416	116.	524.7	2736.0
1	0650	83	92.	430.9	2732.8	*	1	2045	250	114.	501.5	2735.3	*	2	1040	417	116.	524.8	2736.0
1	0655	84	92.	431.6	2732.8	*	1	2050	251	114.	501.7	2735.3	*	2	1045	418	116.	524.8	2736.0
1	0700	85	93.	432.2	2732.8	*	1	2055	252	114.	502.0	2735.3	*	2	1050	419	116.	524.9	2736.0
1	0705	86	93.	432.9	2732.8	*	1	2100	253	114.	502.2	2735.3	*	2	1055	420	116.	524.9	2736.0
1	0710	87	93.	433.5	2732.9	*	1	2105	254	114.	502.4	2735.3	*	2	1100	421	116.	525.0	2736.0
1	0715	88	93.	434.1	2732.9	*	1	2110	255	114.	502.7	2735.3	*	2	1105	422	116.	525.0	2736.0
1	0720	89	93.	434.8	2732.9	*	1	2115	256	114.	502.9	2735.3	*	2	1110	423	116.	525.1	2736.0
1	0725	90	94.	435.4	2732.9	*	1	2120	257	114.	503.2	2735.3	*	2	1115	424	116.	525.1	2736.0
1	0730	91	94.	436.0	2733.0	*	1	2125	258	115.	503.4	2735.3	*	2	1120	425	116.	525.2	2736.0
1	0735	92	94.	436.6	2733.0	*	1	2130	259	115.	503.6	2735.3	*	2	1125	426	116.	525.2	2736.0
1	0740	93	94.	437.2	2733.0	*	1	2135	260	115.	503.9	2735.3	*	2	1130	427	116.	525.3	2736.0
1	0745	94	95.	437.9	2733.0	*	1	2140	261	115.	504.1	2735.3	*	2	1135	428	116.	525.3	2736.0
1	0750	95	95.	438.5	2733.0	*	1	2145	262	115.	504.3	2735.3	*	2	1140	429	116.	525.3	2736.0
1	0755	96	95.	439.1	2733.1	*	1	2150	263	115.	504.6	2735.4	*	2	1145	430	116.	525.4	2736.0
1	0800	97	95.	439.7	2733.1	*	1	2155	264	115.	504.8	2735.4	*	2	1150	431	116.	525.4	2736.0
1	0805	98	95.	440.3	2733.1	*	1	2200	265	115.	505.0	2735.4	*	2	1155	432	116.	525.5	2736.0
1	0810	99	96.	440.9	2733.1	*	1	2205	266	115.	505.2	2735.4	*	2	1200	433	116.	525.5	2736.0
1	0815	100	96.	441.5	2733.1	*	1	2210	267	115.	505.5	2735.4	*	2	1205	434	116.	525.5	2736.0
1	0820	101	96.	442.1	2733.2	*	1	2215	268	115.	505.7	2735.4	*	2	1210	435	116.	525.6	2736.0
1	0825	102	96.	442.6	2733.2	*	1	2220	269	115.	505.9	2735.4	*	2	1215	436	116.	525.6	2736.0
1	0830	103	96.	443.2	2733.2	*	1	2225	270	115.	506.1	2735.4	*	2	1220	437	116.	525.7	2736.0
1	0835	104	97.	443.8	2733.2	*	1	2230	271	115.	506.4	2735.4	*	2	1225	438	116.	525.7	2736.0
1	0840	105	97.	444.4	2733.2	*	1	2235	272	115.	506.6	2735.4	*	2	1230	439	116.	525.7	2736.0
1	0845	106	97.	445.0	2733.3	*	1	2240	273	115.	506.8	2735.4	*	2	1235	440	116.	525.8	2736.0
1	0850	107	97.	445.5	2733.3	*	1	2245	274	115.	507.0	2735.4	*	2	1240	441	116.	525.8	2736.1
1	0855	108	97.	446.1	2733.3	*	1	2250	275	115.	507.2	2735.4	*	2	1245	442	116.	525.8	2736.1
1	0900	109	98.	446.7	2733.3	*	1	2255	276	115.	507.4	2735.4	*	2	1250	443	116.	525.9	2736.1
1	0905	110	98.	447.2	2733.4	*	1	2300	277	115.	507.6	2735.5	*	2	1255	444	116.	525.9	2736.1
1	0910	111	98.	447.8	2733.4	*	1	2305	278	115.	507.8	2735.5	*	2	1300	445	116.	525.9	2736.1
1	0915	112	98.	448.4	2733.4	*	1	2310	279	115.	508.1	2735.5	*	2	1305	446	116.	526.0	2736.1
1	0920	113	98.	448.9	2733.4	*	1	2315	280	115.	508.3	2735.5	*	2	1310	447	116.	526.0	2736.1
1	0925	114	99.	449.5	2733.4	*	1	2320	281	115.	508.5	2735.5	*	2	1315	448	116.	526.0	2736.1
1	0930	115	99.	450.0	2733.4	*	1	2325	282	115.	508.7	2735.5	*	2	1320	449	116.	526.1	2736.1
1	0935	116	99.	450.6	2733.5	*	1	2330	283	115.	508.9	2735.5	*	2	1325	450	116.	526.1	2736.1
1	0940	117	99.	451.1	2733.5	*	1	2335	284	115.	509.1	2735.5	*	2	1330	451	116.	526.1	2736.1
1	0945	118	99.	451.7	2733.5	*	1	2340	285	115.	509.3	2735.5	*	2	1335	452	116.	526.1	2736.1
1	0950	119	100.	452.2	2733.5	*	1	2345	286	115.	509.5	2735.5	*	2	1340	453	116.	526.2	2736.1
1	0955	120	100.	452.7	2733.5	*	1	2350	287	115.	509.7	2735.5	*	2	1345	454	116.	526.2	2736.1
1	1000	121	100.	453.3	2733.6	*	1	2355	288	115.	509.9	2735.5	*	2	1350	455	116.	526.2	2736.1
1	1005	122	100.	453.8	2733.6	*	2	0000	289	115.	510.1	2735.5	*	2	1355	456	116.	526.3	2736.1
1	1010	123	100.	454.3	2733.6	*	2	0005	290	115.	510.2	2735.5	*	2	1400	457	116.	526.3	2736.1
1	1015	124	100.	454.8	2733.6	*	2	0010	291	115.	510.4	2735.5	*	2	1405	458	116.	526.3	2736.1
1	1020	125	101.	455.4	2733.6	*	2	0015	292	115.	510.6	2735.6	*	2	1410	459	116.	526.3	2736.1
1	1025	126	101.	455.9	2733.7	*	2	0020	293	115.	510.8	2735.6	*	2	1415	460	116.	526.3	2736.1
1	1030	127	101.	456.4	2733.7	*	2	0025	294	115.	511.0	2735.6	*	2	1420	461	116.	526.4	2736.1
1	1035	128	101.	456.9	2733.7	*	2	0030	295	115.	511.2	2735.6	*	2	1425	462	116.	526.4	2736.1
1	1040	129	101.	457.4	2733.7	*	2	0035	296	115.	511.4	2735.6	*	2	1430	463	116.	526.4	2736.1
1	1045	130	102.	457.9	2733.7	*	2	0040	297	115.	511.6	2735.6	*	2	1435	464	116.	526.4	2736.1
1	1050	131	102.	458.4	2733.7	*	2	0045	298	115.	511.7	2735.6	*	2	1440	465	116.	526.4	2736.1
1	1055	132	102.	458.9	2733.8	*	2	0050	299	115.	511.9	2735.6	*	2	1445	466	116.	526.5	2736.1
1	1100	133	102.	459.4	2733.8	*	2	0055	300	115.	512.1	2735.6	*	2	1450	467	116.	526.5	2736.1
1	1105	134	102.	459.9	2733.8	*	2	0100	301	115.	512.3	2735.6	*	2	1455	468	116.	526.5	2736.1
1	1110	135	102.	460.4	2733.8	*	2	0105	302	115.	512.5	2735.6	*	2	1500	469	116.	526.5	2736.1

1	1115 136	103.	460.9	2733.8	*	2	0110 303	115.	512.6	2735.6	*	2	1505 470	116.	526.5	2736.1			
1	1120 137	103.	461.4	2733.9	*	2	0115 304	115.	512.8	2735.6	*	2	1510 471	116.	526.5	2736.1			
1	1125 138	103.	461.9	2733.9	*	2	0120 305	115.	513.0	2735.6	*	2	1515 472	116.	526.6	2736.1			
1	1130 139	103.	462.4	2733.9	*	2	0125 306	115.	513.1	2735.6	*	2	1520 473	116.	526.6	2736.1			
1	1135 140	103.	462.8	2733.9	*	2	0130 307	115.	513.3	2735.6	*	2	1525 474	116.	526.6	2736.1			
1	1140 141	103.	463.3	2733.9	*	2	0135 308	115.	513.5	2735.6	*	2	1530 475	116.	526.6	2736.1			
1	1145 142	104.	463.8	2733.9	*	2	0140 309	115.	513.7	2735.7	*	2	1535 476	116.	526.6	2736.1			
1	1150 143	104.	464.3	2734.0	*	2	0145 310	115.	513.8	2735.7	*	2	1540 477	116.	526.6	2736.1			
1	1155 144	104.	464.7	2734.0	*	2	0150 311	115.	514.0	2735.7	*	2	1545 478	116.	526.6	2736.1			
1	1200 145	104.	465.2	2734.0	*	2	0155 312	115.	514.1	2735.7	*	2	1550 479	116.	526.6	2736.1			
1	1205 146	104.	465.7	2734.0	*	2	0200 313	115.	514.3	2735.7	*	2	1555 480	116.	526.6	2736.1			
1	1210 147	104.	466.1	2734.0	*	2	0205 314	115.	514.5	2735.7	*	2	1600 481	116.	526.6	2736.1			
1	1215 148	105.	466.6	2734.0	*	2	0210 315	115.	514.6	2735.7	*	2	1605 482	116.	526.7	2736.1			
1	1220 149	105.	467.1	2734.1	*	2	0215 316	115.	514.8	2735.7	*	2	1610 483	116.	526.7	2736.1			
1	1225 150	105.	467.5	2734.1	*	2	0220 317	115.	514.9	2735.7	*	2	1615 484	116.	526.7	2736.1			
1	1230 151	105.	468.0	2734.1	*	2	0225 318	115.	515.1	2735.7	*	2	1620 485	116.	526.7	2736.1			
1	1235 152	105.	468.4	2734.1	*	2	0230 319	115.	515.3	2735.7	*	2	1625 486	116.	526.7	2736.1			
1	1240 153	105.	468.9	2734.1	*	2	0235 320	115.	515.4	2735.7	*	2	1630 487	116.	526.7	2736.1			
1	1245 154	106.	469.3	2734.1	*	2	0240 321	115.	515.6	2735.7	*	2	1635 488	116.	526.7	2736.1			
1	1250 155	106.	469.7	2734.1	*	2	0245 322	115.	515.7	2735.7	*	2	1640 489	116.	526.7	2736.1			
1	1255 156	106.	470.2	2734.2	*	2	0250 323	115.	515.9	2735.7	*	2	1645 490	116.	526.7	2736.1			
1	1300 157	106.	470.6	2734.2	*	2	0255 324	115.	516.0	2735.7	*	2	1650 491	116.	526.7	2736.1			
1	1305 158	106.	471.0	2734.2	*	2	0300 325	115.	516.2	2735.7	*	2	1655 492	116.	526.7	2736.1			
1	1310 159	106.	471.5	2734.2	*	2	0305 326	115.	516.3	2735.7	*	2	1700 493	116.	526.7	2736.1			
1	1315 160	106.	471.9	2734.2	*	2	0310 327	115.	516.4	2735.7	*	2	1705 494	116.	526.7	2736.1			
1	1320 161	107.	472.3	2734.2	*	2	0315 328	115.	516.6	2735.7	*	2	1710 495	116.	526.7	2736.1			
1	1325 162	107.	472.8	2734.3	*	2	0320 329	115.	516.7	2735.8	*	2	1715 496	116.	526.7	2736.1			
1	1330 163	107.	473.2	2734.3	*	2	0325 330	115.	516.9	2735.8	*	2	1720 497	116.	526.7	2736.1			
1	1335 164	107.	473.6	2734.3	*	2	0330 331	115.	517.0	2735.8	*	2	1725 498	116.	526.7	2736.1			
1	1340 165	107.	474.0	2734.3	*	2	0335 332	115.	517.1	2735.8	*	2	1730 499	116.	526.7	2736.1			
1	1345 166	107.	474.4	2734.3	*	2	0340 333	115.	517.3	2735.8	*	2	1735 500	116.	526.7	2736.1			
1	1350 167	107.	474.8	2734.3	*	2	0345 334	115.	517.4	2735.8	*								

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
(CFS)	(HR)	(CFS)				
116.	40.58		116.	115.	102.	102.
		(INCHES)	.100	.400	.614	.614
		(AC-FT)	57.	228.	351.	351.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	41.58-HR
(AC-FT)	(HR)				
527.	40.83	526.	516.	450.	450.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	41.58-HR
(FEET)	(HR)				
2736.08	40.58	2736.07	2735.74	2732.58	2732.58

CUMULATIVE AREA = 10.72 SQ MI

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 .88	RATIO 2 .87	RATIO 3 .86
HYDROGRAPH AT	CAMDK2	.34	1	FLOW	410.	404.	399.
				TIME	3.58	3.58	3.58
ROUTED TO	RCAMDK2	.34	1	FLOW	401.	395.	391.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT	CAMDK3	.32	1	FLOW	386.	381.	376.
				TIME	3.58	3.58	3.58
2 COMBINED AT	CCAMDK3	.65	1	FLOW	776.	765.	755.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT	CAM-10A	1.27	1	FLOW	1757.	1734.	1716.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT	CAM-10B	1.81	1	FLOW	2280.	2248.	2222.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT	DETCAM10	.05	1	FLOW	55.	54.	53.
				TIME	3.58	3.58	3.58
4 COMBINED AT	CAM10IN	3.77	1	FLOW	4867.	4800.	4747.
				TIME	3.58	3.58	3.58
ROUTED TO	CAM10DB	3.77	1	FLOW	152.	151.	150.
				TIME	5.75	5.75	5.75
			** PEAK STAGES IN FEET **				
			1	STAGE	2998.08	2997.78	2997.53
				TIME	5.75	5.75	5.75
ROUTED TO	RCAM10	3.77	1	FLOW	152.	151.	150.
				TIME	5.75	5.75	5.75
HYDROGRAPH AT	W1	.15	1	FLOW	198.	195.	193.
				TIME	3.58	3.58	3.58

ROUTED TO	RW1	.15	1	FLOW	188.	186.	184.
+				TIME	3.58	3.67	3.67
YDROGRAPH AT	W2	.17	1	FLOW	242.	238.	236.
				TIME	3.58	3.58	3.58
3 COMBINED AT	CP1	4.09	1	FLOW	527.	521.	516.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCP1	4.09	1	FLOW	523.	516.	511.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	CDMNA3	.30	1	FLOW	369.	365.	361.
+				TIME	3.67	3.67	3.67
ROUTED TO	RMNA3	.30	1	FLOW	365.	361.	357.
+				TIME	3.67	3.67	3.67
HYDROGRAPH AT	CDMNA2	.13	1	FLOW	159.	157.	155.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	CMNA2	.43	1	FLOW	511.	504.	499.
+				TIME	3.67	3.67	3.67
ROUTED TO	RMNA2	.43	1	FLOW	509.	502.	497.
+				TIME	3.67	3.67	3.67
HYDROGRAPH AT	EFPOA1	.14	1	FLOW	191.	188.	186.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	COM1	.57	1	FLOW	676.	667.	660.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM1	.57	1	FLOW	662.	653.	646.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	EFPOA2	.13	1	FLOW	173.	170.	168.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	COM2	.70	1	FLOW	834.	823.	814.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM2	.70	1	FLOW	809.	798.	789.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	EFPOB1	.07	1	FLOW	84.	83.	82.
+				TIME	3.58	3.58	3.58
ROUTED TO	REFPB1	.07	1	FLOW	83.	82.	81.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	W3	.31	1	FLOW	463.	458.	453.
+				TIME	3.58	3.58	3.58
4 COMBINED AT	COM3	5.17	1	FLOW	1878.	1853.	1834.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM3	5.17	1	FLOW	1855.	1831.	1811.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	WBCA	.06	1	FLOW	58.	57.	57.
+				TIME	3.83	3.83	3.83
HYDROGRAPH AT	HLBW1-CA	.39	1	FLOW	494.	488.	483.
+				TIME	3.67	3.67	3.67
3 COMBINED AT	COM4	5.62	1	FLOW	2365.	2334.	2309.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM4	5.62	1	FLOW	2329.	2299.	2275.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	HLBW1-CB	.12	1	FLOW	163.	161.	159.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	COM5	5.74	1	FLOW	2492.	2460.	2434.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM5	5.74	1	FLOW	2475.	2444.	2419.
				TIME	3.67	3.67	3.67
HYDROGRAPH AT	WBAW	.06	1	FLOW	57.	56.	55.
+				TIME	3.67	3.67	3.67
HYDROGRAPH AT	WRBW1	.33	1	FLOW	403.	398.	394.
+							

				TIME	3.67	3.67	3.67
3 COMBINED AT	COM6	6.12	1	FLOW	2935.	2897.	2868.
+				TIME	3.67	3.67	3.67
ROUTED TO	RCOM6	6.12	1	FLOW	2928.	2891.	2863.
+				TIME	3.67	3.67	3.67
HYDROGRAPH AT	LWBW1C	.06	1	FLOW	83.	82.	81.
+				TIME	3.50	3.50	3.50
HYDROGRAPH AT	LMDBN	.02	1	FLOW	24.	23.	23.
+				TIME	3.58	3.58	3.58
3 COMBINED AT	CLMDBN	6.20	1	FLOW	3002.	2964.	2935.
+				TIME	3.67	3.67	3.67
HYDROGRAPH AT	BOXCANYO	3.41	1	FLOW	3454.	3401.	3359.
+				TIME	3.75	3.75	3.75
ROUTED TO	BOXDET	3.41	1	FLOW	38.	38.	38.
+				TIME	6.42	6.42	6.42
			** PEAK STAGES IN FEET **				
			1	STAGE	18.12	17.85	17.63
				TIME	6.50	6.50	6.42
ROUTED TO	RBOXDET	3.41	1	FLOW	38.	38.	38.
+				TIME	6.50	6.50	6.50
HYDROGRAPH AT	LWBW1A	.24	1	FLOW	320.	316.	313.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-2A	.25	1	FLOW	342.	337.	333.
+				TIME	3.58	3.58	3.58
DIVERSION TO	EDIV2A	.25	1	FLOW	265.	262.	259.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	NDIV2A	.25	1	FLOW	76.	75.	74.
+				TIME	3.58	3.58	3.58
ROUTED TO	RUVB1-2A	.25	1	FLOW	71.	70.	70.
				TIME	3.58	3.67	3.58
3 COMBINED AT	COM7	3.90	1	FLOW	410.	404.	401.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM7	3.90	1	FLOW	399.	393.	390.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-2B	.02	1	FLOW	30.	30.	30.
+				TIME	3.50	3.50	3.50
HYDROGRAPH AT	LWBW1B	.08	1	FLOW	108.	107.	106.
+				TIME	3.58	3.58	3.58
3 COMBINED AT	COM8	3.99	1	FLOW	533.	526.	521.
+				TIME	3.58	3.58	3.58
ROUTED TO	RCOM8	3.99	1	FLOW	525.	518.	513.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	RETDIV2A	.00	1	FLOW	265.	262.	259.
+				TIME	3.58	3.58	3.58
ROUTED TO	RDIV2A	.00	1	FLOW	260.	257.	254.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-2C	.03	1	FLOW	47.	46.	46.
+				TIME	3.50	3.50	3.50
2 COMBINED AT	COM10	.03	1	FLOW	306.	302.	299.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	COM9	4.02	1	FLOW	831.	820.	812.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	UVB1-1C	.02	1	FLOW	29.	28.	28.
+				TIME	3.50	3.50	3.50
ROUTED TO	RUVB1-1C	.02	1	FLOW	26.	26.	25.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT	UVB1-1B	.01	1	FLOW	19.	19.	18.
+				TIME	3.50	3.50	3.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3768E+03 EXCESS= .0000E+00 OUTFLOW= .3764E+03 BASIN STORAGE= .3806E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.69	150.62	347.12	1.86	5.00	150.61	345.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3739E+03 EXCESS= .0000E+00 OUTFLOW= .3735E+03 BASIN STORAGE= .3788E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCAM10	MANE	2.69	149.54	344.93	1.84	5.00	149.54	345.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3712E+03 EXCESS= .0000E+00 OUTFLOW= .3709E+03 BASIN STORAGE= .3775E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RW1	MANE	1.84	195.31	216.58	2.25	5.00	188.06	215.00	2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1763E+02 EXCESS= .0000E+00 OUTFLOW= .1763E+02 BASIN STORAGE= .2249E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RW1	MANE	1.84	193.78	217.15	2.22	5.00	185.76	220.00	2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1738E+02 EXCESS= .0000E+00 OUTFLOW= .1738E+02 BASIN STORAGE= .2454E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RW1	MANE	1.84	191.26	217.61	2.19	5.00	184.04	220.00	2.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1719E+02 EXCESS= .0000E+00 OUTFLOW= .1719E+02 BASIN STORAGE= .2171E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.40	526.19	215.49	1.90	5.00	522.65	215.00	1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4140E+03 EXCESS= .0000E+00 OUTFLOW= .4140E+03 BASIN STORAGE= .7334E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.40	519.17	215.63	1.88	5.00	516.03	215.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4104E+03 EXCESS= .0000E+00 OUTFLOW= .4104E+03 BASIN STORAGE= .7299E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.41	514.12	215.64	1.87	5.00	511.03	215.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4076E+03 EXCESS= .0000E+00 OUTFLOW= .4075E+03 BASIN STORAGE= .7274E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.27	367.05	220.72	2.29	5.00	365.20	220.00	2.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3689E+02 EXCESS= .0000E+00 OUTFLOW= .3689E+02 BASIN STORAGE= .1485E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.27	362.30	220.57	2.26	5.00	360.54	220.00	2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3638E+02 EXCESS= .0000E+00 OUTFLOW= .3639E+02 BASIN STORAGE= .1527E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.28	358.34	220.20	2.24	5.00	357.47	220.00	2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3599E+02 EXCESS= .0000E+00 OUTFLOW= .3599E+02 BASIN STORAGE= .1684E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.86	508.62	220.73	2.22	5.00	508.54	220.00	2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5043E+02 EXCESS= .0000E+00 OUTFLOW= .5043E+02 BASIN STORAGE= .1201E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.86	502.34	220.17	2.19	5.00	501.90	220.00	2.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4973E+02 EXCESS= .0000E+00 OUTFLOW= .4973E+02 BASIN STORAGE= .1257E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.86	497.64	220.12	2.16	5.00	497.31	220.00	2.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4917E+02 EXCESS= .0000E+00 OUTFLOW= .4918E+02 BASIN STORAGE= .1262E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.83	673.84	216.55	2.14	5.00	661.70	215.00	2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6514E+02 EXCESS= .0000E+00 OUTFLOW= .6515E+02 BASIN STORAGE= .1282E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.84	666.10	215.99	2.11	5.00	652.92	215.00	2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6421E+02 EXCESS= .0000E+00 OUTFLOW= .6421E+02 BASIN STORAGE= .1358E-02 PERCENT ERROR= .0

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FOR PLAN = 1  RATIO=  .00
  RCOM1  MANE          .84    658.88    216.08      2.09      5.00    645.52    215.00      2.09

ONTINUITY SUMMARY (AC-FT) - INFLOW= .6348E+02 EXCESS= .0000E+00 OUTFLOW= .6348E+02 BASIN STORAGE= .1267E-02 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM2  MANE          1.21    829.32    216.94      2.11      5.00    809.35    215.00      2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7859E+02 EXCESS= .0000E+00 OUTFLOW= .7859E+02 BASIN STORAGE= .2313E-02 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM2  MANE          1.22    818.38    216.89      2.08      5.00    798.07    215.00      2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7745E+02 EXCESS= .0000E+00 OUTFLOW= .7745E+02 BASIN STORAGE= .2313E-02 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM2  MANE          1.22    810.30    216.66      2.06      5.00    788.99    215.00      2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7655E+02 EXCESS= .0000E+00 OUTFLOW= .7655E+02 BASIN STORAGE= .2011E-02 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  REFPB1 MANE          .91     83.50    215.48      1.97      5.00     82.58    215.00      1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6916E+01 EXCESS= .0000E+00 OUTFLOW= .6917E+01 BASIN STORAGE= .6316E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  REFPB1 MANE          .91     82.74    215.81      1.94      5.00     81.50    215.00      1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6811E+01 EXCESS= .0000E+00 OUTFLOW= .6811E+01 BASIN STORAGE= .5893E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  REFPB1 MANE          .91     81.90    215.90      1.92      5.00     80.62    215.00      1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6726E+01 EXCESS= .0000E+00 OUTFLOW= .6726E+01 BASIN STORAGE= .6416E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM3  MANE          .51   1870.79    215.75      1.96      5.00   1854.97    215.00      1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5398E+03 EXCESS= .0000E+00 OUTFLOW= .5396E+03 BASIN STORAGE= .2565E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM3  MANE          .51   1845.25    215.37      1.94      5.00   1831.04    215.00      1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5344E+03 EXCESS= .0000E+00 OUTFLOW= .5342E+03 BASIN STORAGE= .2556E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM3  MANE          .51   1826.58    215.78      1.92      5.00   1811.03    215.00      1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5301E+03 EXCESS= .0000E+00 OUTFLOW= .5299E+03 BASIN STORAGE= .2549E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM4  MANE          .58   2364.37    215.79      1.99      5.00   2329.17    215.00      1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5964E+03 EXCESS= .0000E+00 OUTFLOW= .5963E+03 BASIN STORAGE= .3247E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM4  MANE          .59   2334.01    215.73      1.97      5.00   2299.23    215.00      1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5903E+03 EXCESS= .0000E+00 OUTFLOW= .5901E+03 BASIN STORAGE= .3236E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM4  MANE          .59   2308.58    216.09      1.95      5.00   2274.75    215.00      1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5853E+03 EXCESS= .0000E+00 OUTFLOW= .5851E+03 BASIN STORAGE= .3228E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM5  MANE          .52   2494.95    216.01      1.99      5.00   2474.94    220.00      1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6108E+03 EXCESS= .0000E+00 OUTFLOW= .6106E+03 BASIN STORAGE= .2931E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM5  MANE          .52   2461.96    216.09      1.97      5.00   2443.83    220.00      1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6045E+03 EXCESS= .0000E+00 OUTFLOW= .6043E+03 BASIN STORAGE= .2921E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM5  MANE          .52   2436.84    215.98      1.96      5.00   2418.82    220.00      1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5994E+03 EXCESS= .0000E+00 OUTFLOW= .5992E+03 BASIN STORAGE= .2913E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
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          RCOM6  MANE          .77   2928.97    219.45      2.00      5.00   2928.16    220.00        2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6550E+03 EXCESS= .0000E+00 OUTFLOW= .6549E+03 BASIN STORAGE= .4680E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM6  MANE          .78   2893.26    219.80      1.98      5.00   2891.00    220.00        1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6480E+03 EXCESS= .0000E+00 OUTFLOW= .6479E+03 BASIN STORAGE= .4663E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM6  MANE          .78   2863.92    219.93      1.97      5.00   2862.89    220.00        1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6425E+03 EXCESS= .0000E+00 OUTFLOW= .6423E+03 BASIN STORAGE= .4651E+00 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RBOXDET  MANE         4.54     38.43    390.56       .62      5.00     38.43    390.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1127E+03 EXCESS= .0000E+00 OUTFLOW= .1124E+03 BASIN STORAGE= .2281E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RBOXDET  MANE         4.55     38.13    391.18       .61      5.00     38.12    390.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1116E+03 EXCESS= .0000E+00 OUTFLOW= .1114E+03 BASIN STORAGE= .2263E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RBOXDET  MANE         4.55     37.87    391.70       .61      5.00     37.87    390.00         .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1107E+03 EXCESS= .0000E+00 OUTFLOW= .1105E+03 BASIN STORAGE= .2249E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-2A  MANE        3.04     73.26    215.98       .48      5.00     71.42    215.00         .48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6336E+01 EXCESS= .0000E+00 OUTFLOW= .6339E+01 BASIN STORAGE= .2125E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-2A  MANE        3.06     73.07    217.16       .48      5.00     70.50    220.00         .48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6244E+01 EXCESS= .0000E+00 OUTFLOW= .6246E+01 BASIN STORAGE= .2269E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RUVB1-2A  MANE        3.07     72.88    218.11       .47      5.00     70.28    215.00         .47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6173E+01 EXCESS= .0000E+00 OUTFLOW= .6176E+01 BASIN STORAGE= .1950E-02 PERCENT ERROR=    -.1

          FOR PLAN = 1  RATIO=  .00
          RCOM7  MANE          1.05    408.31    216.56       .71      5.00    398.98    215.00         .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1470E+03 EXCESS= .0000E+00 OUTFLOW= .1468E+03 BASIN STORAGE= .1635E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM7  MANE          1.06    402.53    216.69       .70      5.00    393.49    215.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1454E+03 EXCESS= .0000E+00 OUTFLOW= .1453E+03 BASIN STORAGE= .1625E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM7  MANE          1.06    399.40    216.44       .69      5.00    389.64    215.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1442E+03 EXCESS= .0000E+00 OUTFLOW= .1441E+03 BASIN STORAGE= .1618E+00 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM8  MANE           .63    530.94    215.86       .74      5.00    524.98    215.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1577E+03 EXCESS= .0000E+00 OUTFLOW= .1576E+03 BASIN STORAGE= .5333E-01 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM8  MANE           .63    523.87    215.82       .73      5.00    517.81    215.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+03 EXCESS= .0000E+00 OUTFLOW= .1559E+03 BASIN STORAGE= .5292E-01 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RCOM8  MANE           .63    519.39    215.63       .73      5.00    513.02    215.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1547E+03 EXCESS= .0000E+00 OUTFLOW= .1546E+03 BASIN STORAGE= .5259E-01 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
          RDIV2A  MANE          .99    263.34    215.72     -1.00      5.00    259.96    215.00       -1.00


          FOR PLAN = 1  RATIO=  .00
          RDIV2A  MANE          .99    260.49    215.89     -1.00      5.00    256.62    215.00       -1.00
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FOR PLAN = 1  RATIO=  .00
  RDIV2A  MANE        1.00    257.41    215.84     -1.00      5.00    253.73    215.00      -1.00

FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE      2.40     27.32    213.59      2.00      5.00     25.99    210.00       1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1970E+01 EXCESS= .0000E+00 OUTFLOW= .1971E+01 BASIN STORAGE= .1042E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE      2.41     27.93    212.38      1.97      5.00     25.82    210.00       1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1943E+01 EXCESS= .0000E+00 OUTFLOW= .1944E+01 BASIN STORAGE= .1068E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE      2.42     26.85    213.36      1.94      5.00     25.32    210.00       1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1916E+01 EXCESS= .0000E+00 OUTFLOW= .1917E+01 BASIN STORAGE= .1144E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE       .73    302.71    215.28      2.04      5.00    301.80    215.00       2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2390E+02 EXCESS= .0000E+00 OUTFLOW= .2390E+02 BASIN STORAGE= .8717E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE       .73    298.71    215.76      2.01      5.00    298.04    215.00       2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2354E+02 EXCESS= .0000E+00 OUTFLOW= .2354E+02 BASIN STORAGE= .8565E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE       .73    295.06    215.28      1.98      5.00    294.19    215.00       1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2325E+02 EXCESS= .0000E+00 OUTFLOW= .2325E+02 BASIN STORAGE= .7949E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM12  MANE         .63    346.07    215.29      2.03      5.00    345.28    215.00       2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2766E+02 EXCESS= .0000E+00 OUTFLOW= .2766E+02 BASIN STORAGE= .7480E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM12  MANE         .63    341.57    215.13      2.00      5.00    341.08    215.00       2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2724E+02 EXCESS= .0000E+00 OUTFLOW= .2724E+02 BASIN STORAGE= .7197E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RCOM12  MANE         .63    337.49    215.59      1.98      5.00    337.01    215.00       1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2691E+02 EXCESS= .0000E+00 OUTFLOW= .2691E+02 BASIN STORAGE= .7937E-03 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RUVB1-1E  MANE      2.61     40.78    211.80      2.01      5.00     39.47    215.00       2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2994E+01 EXCESS= .0000E+00 OUTFLOW= .2996E+01 BASIN STORAGE= .1529E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RUVB1-1E  MANE      2.63     41.07    213.00      1.98      5.00     38.99    215.00       1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2950E+01 EXCESS= .0000E+00 OUTFLOW= .2952E+01 BASIN STORAGE= .1601E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RUVB1-1E  MANE      2.64     39.82    213.98      1.95      5.00     38.35    215.00       1.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2912E+01 EXCESS= .0000E+00 OUTFLOW= .2914E+01 BASIN STORAGE= .1307E-02 PERCENT ERROR=   -.1

FOR PLAN = 1  RATIO=  .00
  RLMBWDB  MANE       1.76    146.75    217.82       .63      5.00    143.72    220.00        .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3639E+03 EXCESS= .0000E+00 OUTFLOW= .3635E+03 BASIN STORAGE= .3911E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RLMBWDB  MANE       1.76    145.73    217.03       .63      5.00    142.07    220.00        .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3611E+03 EXCESS= .0000E+00 OUTFLOW= .3607E+03 BASIN STORAGE= .3903E+00 PERCENT ERROR=    .0

FOR PLAN = 1  RATIO=  .00
  RLMBWDB  MANE       1.77    143.88    217.81       .62      5.00    140.95    220.00        .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3584E+03 EXCESS= .0000E+00 OUTFLOW= .3581E+03 BASIN STORAGE= .3897E+00 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
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HEC-1 ANALYSIS MODEL #2 – SDN3

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*****************************************
*                                       *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*   RUN DATE   28MAY08  TIME  11:35:03  *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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


```
1
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
 *** FREE ***
              1     ID    LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
              2     ID    DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
              3     ID    DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
              4     ID    INPUT FILE = WBMOD2-SDN3.H1
              5     ID    LAST MODIFIED = 05/13/08
              6     ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
              7     ID    STORM DISTRIBUTION = SDN3
              8     ID    MODELED BY = JTL/JYL/MGK
              9     ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
             10     ID
             11     ID                          AREA    DARF
             12     ID                          SQ. MI.
             13     ID                          0-0.5   0.99
             14     ID                          0.5-1   0.975
             15     ID                          1-2     0.95
             16     ID                          2-3     0.925
             17     ID                          3-4     0.915
             18     ID
             19     ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
             20     ID
             21     IT       5       0       0     500
             22     IO       5       0       0
             23     IN       5       0       0
             24     JR    PREC    0.99   0.975    0.95   0.925   0.915
                    *
             25     KK      W1
             26     BA  .14708
             27     PB    3.25
             28     PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             29     PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             30     PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             31     PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             32     PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             33     PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             34     PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             35     PC   0.998   0.999   1.000
             36     LS       0    94.5
             37     UD   0.198
                    *
             38     KK     RW1
             39     RD    2850     .03   0.013       0    CIRC     5.0
                    *
             40     KK      W2
             41     PB    3.26
             42     BA  .16884
             43     LS       0    94.0
             44     UD   0.161
                    *
```



```
1
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
             45     KK     CP1
             46     HC       2
                    *
             47     KK    RCP1
             48     RD     760    .028   0.013       0    CIRC     6.0
                    *
             49     KK  CDMNA3
             50     BA  0.3017
             51     PB    3.21
             52     LS       0    95.3
             53     UD0.254836
                    *
             54     KK   RMNA3
             55     KM  ROUTE CDMNA3 TO CMNA2
```

```
56          KM  FACILITY = GOWAN BELTWAY WEST
57          KM  FACILITY ID-MILE = GOBW 0322, 0326
58          KM  LINING = RCB
59          RD    1615    0.01   0.015       0    TRAP      10        0
            *

60          KK  CDMNA2
61          BA  0.1250
62          PB    3.18
63          LS       0    92.8
64          UD   0.188
            *

65          KK   CMNA2
66          KM  COMBINE RMNA3 AND CDMNA2
67          KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
68          HC       2
            *

69          KK   RMNA2
70          KM  ROUTE CMNA2 TO COM1
71          KM  FACILITY = GOWAN BELTWAY WEST
72          RD    1400   0.015   0.015       0    TRAP      10        0
            *

73          KK  EFPOA1
74          PB    3.22
75          BA  .14340
76          LS       0    91.2
77          UD   0.143
            *
```



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

78          KK    COM1
79          HC       2
            *

80          KK   RCOM1
81          KM  ROUTE COM1 TO COM2
82          KM  FACILITY = GOWAN BELTWAY WEST
83          RD    1350    0.01   0.015       0    TRAP      10        0
            *

84          KK  EFPOA2
85          PB    3.23
86          BA  .12750
87          LS       0    91.7
88          UD   0.144
            *

89          KK    COM2
90          HC       2
            *

91          KK   RCOM2
92          KM  ROUTE COM2 TO COM3
93          KM  FACILITY = GOWAN BELTWAY WEST
94          RD    2300    0.02   0.015       0    TRAP      14        0
            *

95          KK  EFPOB1
96          PB    3.23
97          BA  .06580
98          LS       0    91.7
99          UD   0.178
            *

100         KK  REFPB1
101         KM  ROUTE EFPOB1 TO COM3
102         KM  FACILITY = GOWAN BELTWAY WEST
103         RD     760   0.028   0.015       0    TRAP      14        0
            *

104         KK      W3
105         PB    3.29
106         BA  .31270
107         LS       0    95.8
108         UD   0.172
            *

109         KK    COM3
110         HC       4
            *
```



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

111         KK   RCOM3
112         KM  ROUTE COM3 TO COM4
113         KM  FACILITY = GOWAN BELTWAY WEST
114         RD    1080    0.01   0.015       0    TRAP      14        0
            *

115         KK    WBCA
116         KM   BASIN FROM CENT TO ANN
117         BA  0.0647
118         PB    3.20
119         LS       0    92.0
120         UD   0.394
            *

121         KKHLBW1-CA
122         BA  0.3933
123         PB    3.30
124         LS       0    95.4
125         UD   0.261
            *

126         KK    COM4
127         KM  COMBINE COM3, WBCA, AND HLBW1-CA
```

```
128          KM  LAS VEGAS BELTWAY @ ANN ROAD
129          HC       3
             *
130          KK   RCOM4
131          KM  ROUTE COM4 TO HLBW1-CB
132          RD    1800  0.0250   0.015       0    TRAP      14       0
             *
133          KKHLBW1-CB
134          BA  0.1171
135          PB    3.22
136          LS       0    95.4
137          UD   0.187
             *
138          KK    COM5
139          KM  COMBINE RCOM4 & HLBW1-CB
140          HC       2
             *
141          KK   RCOM5
142          KM  ROUTE COM5 TO WRBW1
143          RD    2000   0.050   0.015       0    TRAP      14       0
             *
1                                        HEC-1 INPUT                                        PAGE  5

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

144          KK    WBAW
145          BA  0.0570
146          PB    3.20
147          LS       0    88.0
148          UD   0.223
             *
149          KK   WRBW1
150          BA  0.3256
151          PB    3.23
152          LS       0    94.8
153          UD   0.239
             *
154          KK    COM6
155          KM  COMBINE RCOM5, WBAW, & WRBW1
156          KM  LAS VEGAS BELTWAY @ WASHBURN ROAD
157          HC       3
             *
158          KK   RCOM6
159          KM  ROUTE COM6 TO CLMDBN
160          RD    1600  0.0050   0.015       0    TRAP      14       0
             *
161          KK  LWBW1C
162          BA  0.0570
163          PB    3.20
164          LS       0    93.5
165          UD   0.114
             *
166          KK   LMDBN
167          BA  0.0237
168          PB    3.18
169          LS       0    84.8
170          UD   0.161
             *
171          KK  CLMDBN
172          KO       1
173          KM  COMBINE LMDBN AND RCOM6
174          HC       3
             *
175          KK  LWBW1A
176          BA  0.2401
177          PB    3.31
178          LS       0    93.5
179          UD   0.198
             *
1                                        HEC-1 INPUT                                        PAGE  6

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

180          KK UVB1-2A
181          BA  0.2453
182          PB    3.30
183          LS       0    93.3
184          UD   0.174
             *
185          KK  NDIV2A
186          KM  DIVERT 363 CFS FROM UVB1-2A TO PEACEFUL DAWN
187          DT  EDIV2A
188          DI       0     467    5000
189          DQ       0     363     363
             *
190          KKRUVB1-2A
191          RD     700  0.0050   0.016       0    TRAP      80       0
             *
192          KK    COM7
193          KM  COMBINE RBOXDET, LWBW1A, AND RUVB1-2A
194          HC       2
             *
195          KK   RCOM7
196          KM  ROUTE COM7 TO COM8
197          RD    1000  0.0600   0.016       0    TRAP      80       0
             *
```

```
198          KK UVB1-2B
199          BA  0.0192
200          PB    3.23
201          LS       0    93.3
202          UD   0.094
             *

203          KK  LWBW1B
204          BA  0.0755
205          PB    3.24
206          LS       0    93.5
207          UD   0.143
             *

208          KK    COM8
209          KM  COMBINE LWBW1B, RCOM7, UVB1-2B
210          KM  LAS VEGAS BELTWAY @ LONE MOUNTAIN
211          HC       3
             *

212          KK   RCOM8
213          RD    1300  0.0500   0.015       0    CIRC       5       0
             *
1                                        HEC-1 INPUT                                        PAGE  7

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

214          KKRETDIV2A
215          KM  RETRIEVE DIVERSION AT PEACEFUL DAWN
216          DR  EDIV2A
             *

217          KK  RDIV2A
218          KM  ROUTE DIV2A TO CUVB1-2C
219          RD    1000  0.0700   0.016       0    TRAP      50       0
             *

220          KK UVB1-2C
221          BA  0.0323
222          PB    3.23
223          LS       0    93.3
224          UD   0.118
             *

225          KK   COM10
226          KM  COMBINE RDIV2A AND UVB1-2C
227          KM
228          HC       2
             *

229          KK    COM9
230          KM  COMBINE RCOM8 & COM10
231          HC       2
             *

232          KK UVB1-1C
233          BA  0.0185
234          PB    3.23
235          LS       0    92.0
236          UD   0.088
             *

237          KKRUVB1-1C
238          KM  ROUTE UVB1-1C TO COM11
239          RD     900   0.050   0.016       0    TRAP      50       0
             *

240          KK UVB1-1B
241          BA  0.0124
242          PB    3.20
243          LS       0    91.0
244          UD   0.080
             *

245          KK   COM11
246          KM  COMBINE RUVB1-1C AND UVB1-1B
247          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  8

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

248          KK UVB1-1A
249          BA  0.2198
250          PB    3.28
251          LS       0    92.0
252          UD   0.147
             *

253          KKRUVB1-1A
254          RD    1300   0.040   0.015       0    TRAP      10       0
             *

255          KK UVB1-1D
256          BA  0.0355
257          PB    3.20
258          LS       0    92.0
259          UD   0.097
             *

260          KK   COM12
261          KM  COMBINE RUVB1-1A AND UVB1-1D
262          HC       2
             *

263          KK  RCOM12
264          KM  ROUTE COM12 TO COM13
265          RD    1200   0.042   0.015       0    TRAP      10       0
             *

266          KK UVB1-1E
267          BA  0.0280
```

```
268           PB    3.24
269           LS       0    92.0
270           UD   0.097
              *

271           KKRUVB1-1E
272           RD    2000   0.033   0.015      0    TRAP      10       0
              *

273           KK   COM13
274           KM  COMBINE RCOM11, RCOM12, & RUVB1-1E
275           HC       3
              *

276           KK    WBCL
277           BA  0.0312
278           PB    3.21
279           LS       0    92.0
280           UD   0.126
              *
```



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

281           KK   LMBW1
282           BA  0.0841
283           PB    3.18
284           LS       0    88.6
285           UD   0.102
              *

286           KK   COM14
287           KM  COMBINE LMBW1, WBCL, RCOM13
288           HC       3
              *

289           KK   LMDBS
290           BA  0.0589
291           PB    3.20
292           LS       0    84.8
293           UD   0.102
              *

294           KK  CLMDBS
295           KO       1
296           KM  COMBINE COM9, COM10, COM14, & LMDBS
297           KM  COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
298           HC       3
              *

299           KKCLMBWCDB
300           KM  COMBINE CLMDBS & CLMDBN
301           HC       2
              *

302           KK LMBWCDB
303           KM  LONE MOUNTAIN/BELTWAY DETENTION BASINS (COMBINED)
304           KM  ROUTE COMBINED INFLOWS TO OUTFALL IN BALANCING CONDUIT
305           KM  DUAL LEVEL OUTFALL WITH LOWER LEVEL (BELOW ELEVATION 2730)
306           KM  23" ORIFICE AND SECOND LEVEL (ABOVE ELEVATION 2730) 26" ORIFICE
307           KM  OUTFALL PEAK OUTFLOW OF 116 CFS AT ELEVATION 2738
308           RS       1    STOR      -1
309           SV     0.0     7.4    29.8    81.0   150.8   233.1   352.9   493.7   585.4   617.3
310           SQ     0.0    26.9    37.8    46.1    53.2    59.4    65.0   114.0   118.8   120.3
311           SE    2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
              *

312           KK    WBLM
313           BA  0.0805
314           PB    3.17
315           LS       0    90.0
316           UD   0.190
              *
```



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

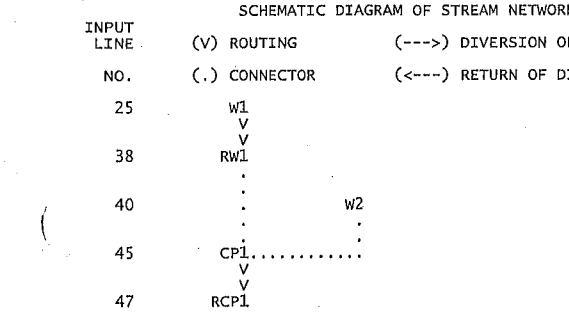
317           KK   COM15
318           KM  COMBINE WBLM & LMBWCDB
319           HC       2
              *

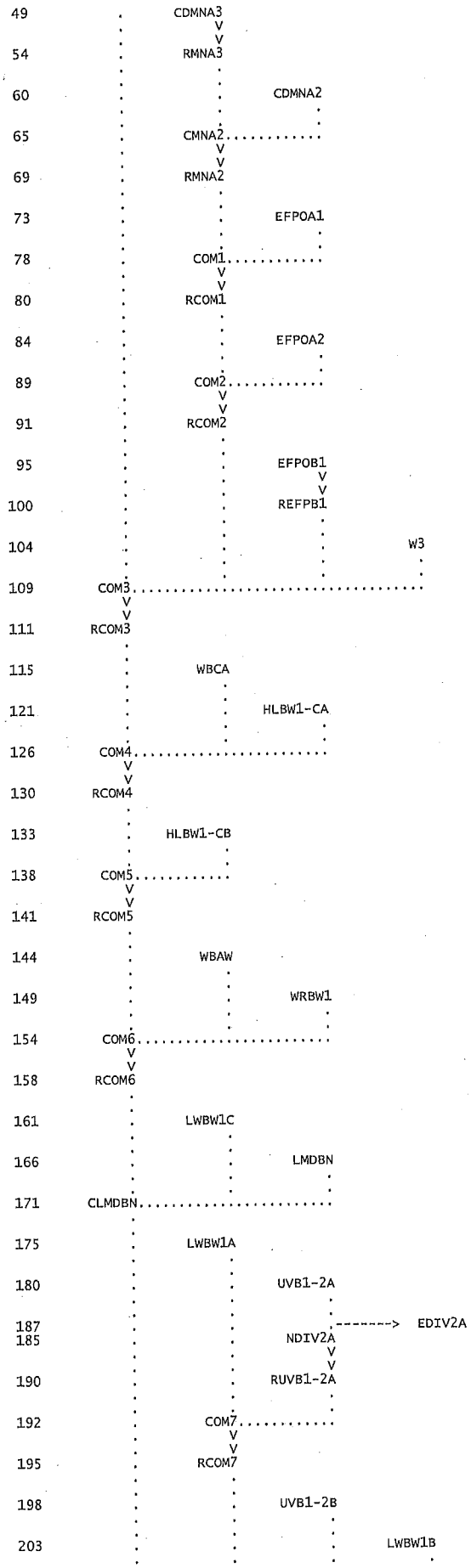
320           KK RLMBWDB
321           KM  ROUTE LMBWDB TO LMBW2-C
322           KM  FACILITY = GOWAN BELTWAY WEST
323           KM  FACILITY # = GOBW 0000
324           KM  LINING = RCP
325           RD    2700   0.019   0.013      0    TRAP       5       0
              *

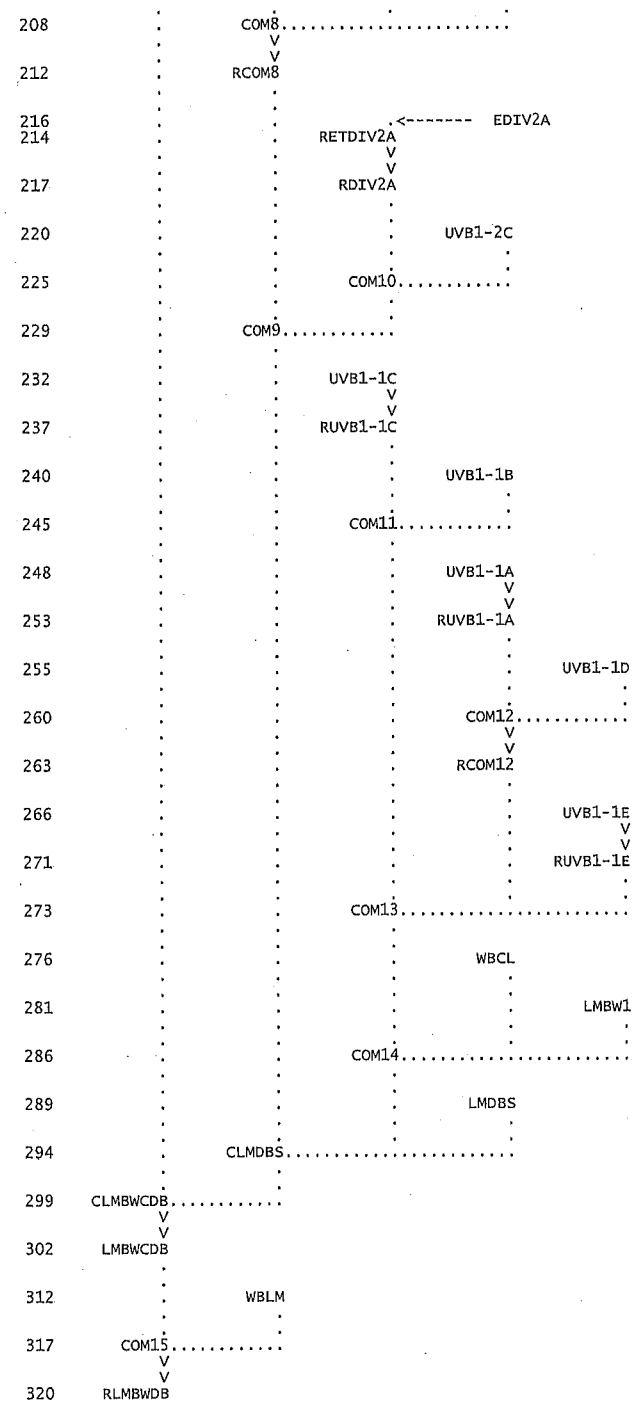
326           ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK




49 CDMNA3
54 RMNA3
60 CDMNA2
65 CMNA2
69 RMNA2
73 EFPOA1
78 COM1
80 RCOM1
84 EFPOA2
89 COM2
91 RCOM2
95 EFPOB1
100 REFPB1
104 W3
109 COM3
111 RCOM3
115 WBCA
121 HLBW1-CA
126 COM4
130 RCOM4
133 HLBW1-CB
138 COM5
141 RCOM5
144 WBAW
149 WRBW1
154 COM6
158 RCOM6
161 LWBW1C
166 LMDBN
171 CLMDBN
175 LWBW1A
180 UVB1-2A
187 EDIV2A
185 NDIV2A
190 RUVB1-2A
192 COM7
195 RCOM7
198 UVB1-2B
203 LWBW1B



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   28MAY08  TIME  09:07:09   *
*                                       *
*****************************************
```

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

LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
INPUT FILE = WBMOD1-SDN3.H1
LAST MODIFIED = 05/13/08
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN3
MODELED BY = JTL/JYL/MGK
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA DARF

SQ. MI.	
0-0.5	0.99
0.5-1	0.975
1-2	0.95
2-3	0.925
3-4	0.915

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

22 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		500	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		1735	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 41.58 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
.99 .98 .95 .93 .92

*** ***

****
* *
171 KK * CLMDBN *
* *
****

172 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

COMBINE LMDBN AND RCOM6

174 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

***

****

HYDROGRAPH AT STATION CLMDBN
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .99

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	0.	1		2050	251	0.	2		0715	376	0.
1		0005	2	0.	1		1030	127	0.	1		2055	252	0.	2		0720	377	0.
1		0010	3	3.	1		1035	128	0.	1		2100	253	0.	2		0725	378	0.
1		0015	4	18.	1		1040	129	0.	1		2105	254	0.	2		0730	379	0.
1		0020	5	51.	1		1045	130	0.	1		2110	255	0.	2		0735	380	0.
1		0025	6	107.	1		1050	131	0.	1		2115	256	0.	2		0740	381	0.
1		0030	7	184.	1		1055	132	0.	1		2120	257	0.	2		0745	382	0.
1		0035	8	261.	1		1100	133	0.	1		2125	258	0.	2		0750	383	0.
1		0040	9	300.	1		1105	134	0.	1		2130	259	0.	2		0755	384	0.
1		0045	10	283.	1		1110	135	0.	1		2135	260	0.	2		0800	385	0.
1		0050	11	228.	1		1115	136	0.	1		2140	261	0.	2		0805	386	0.
1		0055	12	166.	1		1120	137	0.	1		2145	262	0.	2		0810	387	0.
1		0100	13	113.	1		1125	138	0.	1		2150	263	0.	2		0815	388	0.
1		0105	14	77.	1		1130	139	0.	1		2155	264	0.	2		0820	389	0.
1		0110	15	63.	1		1135	140	0.	1		2200	265	0.	2		0825	390	0.
1		0115	16	71.	1		1140	141	0.	1		2205	266	0.	2		0830	391	0.
1		0120	17	89.	1		1145	142	0.	1		2210	267	0.	2		0835	392	0.
1		0125	18	115.	1		1150	143	0.	1		2215	268	0.	2		0840	393	0.
1		0130	19	159.	1		1155	144	0.	1		2220	269	0.	2		0845	394	0.
1		0135	20	221.	1		1200	145	0.	1		2225	270	0.	2		0850	395	0.
1		0140	21	283.	1		1205	146	0.	1		2230	271	0.	2		0855	396	0.
1		0145	22	324.	1		1210	147	0.	1		2235	272	0.	2		0900	397	0.
1		0150	23	333.	1		1215	148	0.	1		2240	273	0.	2		0905	398	0.
1		0155	24	307.	1		1220	149	0.	1		2245	274	0.	2		0910	399	0.
1		0200	25	258.	1		1225	150	0.	1		2250	275	0.	2		0915	400	0.
1		0205	26	203.	1		1230	151	0.	1		2255	276	0.	2		0920	401	0.
1		0210	27	170.	1		1235	152	0.	1		2300	277	0.	2		0925	402	0.
1		0215	28	184.	1		1240	153	0.	1		2305	278	0.	2		0930	403	0.
1		0220	29	248.	1		1245	154	0.	1		2310	279	0.	2		0935	404	0.
1		0225	30	330.	1		1250	155	0.	1		2315	280	0.	2		0940	405	0.
1		0230	31	380.	1		1255	156	0.	1		2320	281	0.	2		0945	406	0.
1		0235	32	376.	1		1300	157	0.	1		2325	282	0.	2		0950	407	0.
1		0240	33	352.	1		1305	158	0.	1		2330	283	0.	2		0955	408	0.
1		0245	34	351.	1		1310	159	0.	1		2335	284	0.	2		1000	409	0.
1		0250	35	364.	1		1315	160	0.	1		2340	285	0.	2		1005	410	0.
1		0255	36	355.	1		1320	161	0.	1		2345	286	0.	2		1010	411	0.
1		0300	37	329.	1		1325	162	0.	1		2350	287	0.	2		1015	412	0.
1		0305	38	346.	1		1330	163	0.	1		2355	288	0.	2		1020	413	0.
1		0310	39	476.	1		1335	164	0.	2		0000	289	0.	2		1025	414	0.

1	0315	40	763.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.
1	0320	41	1302.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.
1	0325	42	2122.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.
1	0330	43	3094.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.
1	0335	44	3867.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.
1	0340	45	4004.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.
1	0345	46	3638.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.
1	0350	47	3061.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.
1	0355	48	2435.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.
1	0400	49	1913.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.
1	0405	50	1519.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.
1	0410	51	1200.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.
1	0415	52	940.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.
1	0420	53	746.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.
1	0425	54	632.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.
1	0430	55	610.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.
1	0435	56	675.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.
1	0440	57	762.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.
1	0445	58	805.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.
1	0450	59	820.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	826.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	792.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	705.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	584.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	462.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	357.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	274.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	214.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	169.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	133.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	109.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	98.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	90.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	82.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	72.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	60.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	47.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	34.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	24.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	16.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	10.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	7.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	4.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	3.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	2.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 4004.	3.67		673.	169.	97.	97.
		(INCHES)	2.573	2.580	2.580	2.580
		(AC-FT)	334.	334.	334.	334.

CUMULATIVE AREA = 2.43 SQ MI

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HYDROGRAPH AT STATION CLMDBN
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .98

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	0.	*	1		2050	251	0.	*	2		0715	376	0.
1		0005	2	0.	*	1		1030	127	0.	*	1		2055	252	0.	*	2		0720	377	0.
1		0010	3	3.	*	1		1035	128	0.	*	1		2100	253	0.	*	2		0725	378	0.
1		0015	4	17.	*	1		1040	129	0.	*	1		2105	254	0.	*	2		0730	379	0.

1	0020	5	48.	*	1	1045	130	0.	*	1	2110	255	0.	*	2	0735	380	0.
1	0025	6	101.	*	1	1050	131	0.	*	1	2115	256	0.	*	2	0740	381	0.
1	0030	7	177.	*	1	1055	132	0.	*	1	2120	257	0.	*	2	0745	382	0.
1	0035	8	252.	*	1	1100	133	0.	*	1	2125	258	0.	*	2	0750	383	0.
1	0040	9	289.	*	1	1105	134	0.	*	1	2130	259	0.	*	2	0755	384	0.
1	0045	10	274.	*	1	1110	135	0.	*	1	2135	260	0.	*	2	0800	385	0.
1	0050	11	222.	*	1	1115	136	0.	*	1	2140	261	0.	*	2	0805	386	0.
1	0055	12	161.	*	1	1120	137	0.	*	1	2145	262	0.	*	2	0810	387	0.
1	0100	13	110.	*	1	1125	138	0.	*	1	2150	263	0.	*	2	0815	388	0.
1	0105	14	75.	*	1	1130	139	0.	*	1	2155	264	0.	*	2	0820	389	0.
1	0110	15	62.	*	1	1135	140	0.	*	1	2200	265	0.	*	2	0825	390	0.
1	0115	16	69.	*	1	1140	141	0.	*	1	2205	266	0.	*	2	0830	391	0.
1	0120	17	87.	*	1	1145	142	0.	*	1	2210	267	0.	*	2	0835	392	0.
1	0125	18	112.	*	1	1150	143	0.	*	1	2215	268	0.	*	2	0840	393	0.
1	0130	19	155.	*	1	1155	144	0.	*	1	2220	269	0.	*	2	0845	394	0.
1	0135	20	215.	*	1	1200	145	0.	*	1	2225	270	0.	*	2	0850	395	0.
1	0140	21	276.	*	1	1205	146	0.	*	1	2230	271	0.	*	2	0855	396	0.
1	0145	22	316.	*	1	1210	147	0.	*	1	2235	272	0.	*	2	0900	397	0.
1	0150	23	325.	*	1	1215	148	0.	*	1	2240	273	0.	*	2	0905	398	0.
1	0155	24	300.	*	1	1220	149	0.	*	1	2245	274	0.	*	2	0910	399	0.
1	0200	25	252.	*	1	1225	150	0.	*	1	2250	275	0.	*	2	0915	400	0.
1	0205	26	199.	*	1	1230	151	0.	*	1	2255	276	0.	*	2	0920	401	0.
1	0210	27	167.	*	1	1235	152	0.	*	1	2300	277	0.	*	2	0925	402	0.
1	0215	28	180.	*	1	1240	153	0.	*	1	2305	278	0.	*	2	0930	403	0.
1	0220	29	243.	*	1	1245	154	0.	*	1	2310	279	0.	*	2	0935	404	0.
1	0225	30	323.	*	1	1250	155	0.	*	1	2315	280	0.	*	2	0940	405	0.
1	0230	31	372.	*	1	1255	156	0.	*	1	2320	281	0.	*	2	0945	406	0.
1	0235	32	368.	*	1	1300	157	0.	*	1	2325	282	0.	*	2	0950	407	0.
1	0240	33	345.	*	1	1305	158	0.	*	1	2330	283	0.	*	2	0955	408	0.
1	0245	34	344.	*	1	1310	159	0.	*	1	2335	284	0.	*	2	1000	409	0.
1	0250	35	356.	*	1	1315	160	0.	*	1	2340	285	0.	*	2	1005	410	0.
1	0255	36	348.	*	1	1320	161	0.	*	1	2345	286	0.	*	2	1010	411	0.
1	0300	37	323.	*	1	1325	162	0.	*	1	2350	287	0.	*	2	1015	412	0.
1	0305	38	339.	*	1	1330	163	0.	*	1	2355	288	0.	*	2	1020	413	0.
1	0310	39	466.	*	1	1335	164	0.	*	2	0000	289	0.	*	2	1025	414	0.
1	0315	40	747.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.
1	0320	41	1275.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.
1	0325	42	2080.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.
1	0330	43	3035.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.
1	0335	44	3803.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.
1	0340	45	3937.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.
1	0345	46	3576.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.
1	0350	47	3010.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.
1	0355	48	2396.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.
1	0400	49	1882.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.
1	0405	50	1495.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.
1	0410	51	1181.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.
1	0415	52	925.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.
1	0420	53	735.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.
1	0425	54	622.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.
1	0430	55	600.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.
1	0435	56	664.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.
1	0440	57	749.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.
1	0445	58	792.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.
1	0450	59	806.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	813.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	779.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	694.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	575.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	455.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	351.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	270.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	211.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	166.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	131.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	108.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	96.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	89.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	81.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	71.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	60.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	47.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	34.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	23.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	15.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	10.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	7.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	4.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	3.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	2.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.

1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)			
+ 3937.	3.67	660.	166.	96.	96.
		(INCHES) 2.526	2.533	2.533	2.533
		(AC-FT) 327.	328.	328.	328.

CUMULATIVE AREA = 2.43 SQ MI

****

HYDROGRAPH AT STATION CLMDBN
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .95

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	0.	*	1		2050	251	0.	*	2		0715	376	0.
1		0005	2	0.	*	1		1030	127	0.	*	1		2055	252	0.	*	2		0720	377	0.
1		0010	3	2.	*	1		1035	128	0.	*	1		2100	253	0.	*	2		0725	378	0.
1		0015	4	15.	*	1		1040	129	0.	*	1		2105	254	0.	*	2		0730	379	0.
1		0020	5	43.	*	1		1045	130	0.	*	1		2110	255	0.	*	2		0735	380	0.
1		0025	6	93.	*	1		1050	131	0.	*	1		2115	256	0.	*	2		0740	381	0.
1		0030	7	164.	*	1		1055	132	0.	*	1		2120	257	0.	*	2		0745	382	0.
1		0035	8	236.	*	1		1100	133	0.	*	1		2125	258	0.	*	2		0750	383	0.
1		0040	9	273.	*	1		1105	134	0.	*	1		2130	259	0.	*	2		0755	384	0.
1		0045	10	259.	*	1		1110	135	0.	*	1		2135	260	0.	*	2		0800	385	0.
1		0050	11	210.	*	1		1115	136	0.	*	1		2140	261	0.	*	2		0805	386	0.
1		0055	12	154.	*	1		1120	137	0.	*	1		2145	262	0.	*	2		0810	387	0.
1		0100	13	105.	*	1		1125	138	0.	*	1		2150	263	0.	*	2		0815	388	0.
1		0105	14	72.	*	1		1130	139	0.	*	1		2155	264	0.	*	2		0820	389	0.
1		0110	15	59.	*	1		1135	140	0.	*	1		2200	265	0.	*	2		0825	390	0.
1		0115	16	65.	*	1		1140	141	0.	*	1		2205	266	0.	*	2		0830	391	0.
1		0120	17	82.	*	1		1145	142	0.	*	1		2210	267	0.	*	2		0835	392	0.
1		0125	18	107.	*	1		1150	143	0.	*	1		2215	268	0.	*	2		0840	393	0.
1		0130	19	148.	*	1		1155	144	0.	*	1		2220	269	0.	*	2		0845	394	0.
1		0135	20	206.	*	1		1200	145	0.	*	1		2225	270	0.	*	2		0850	395	0.
1		0140	21	263.	*	1		1205	146	0.	*	1		2230	271	0.	*	2		0855	396	0.
1		0145	22	302.	*	1		1210	147	0.	*	1		2235	272	0.	*	2		0900	397	0.
1		0150	23	312.	*	1		1215	148	0.	*	1		2240	273	0.	*	2		0905	398	0.
1		0155	24	289.	*	1		1220	149	0.	*	1		2245	274	0.	*	2		0910	399	0.
1		0200	25	243.	*	1		1225	150	0.	*	1		2250	275	0.	*	2		0915	400	0.
1		0205	26	192.	*	1		1230	151	0.	*	1		2255	276	0.	*	2		0920	401	0.
1		0210	27	161.	*	1		1235	152	0.	*	1		2300	277	0.	*	2		0925	402	0.
1		0215	28	173.	*	1		1240	153	0.	*	1		2305	278	0.	*	2		0930	403	0.
1		0220	29	233.	*	1		1245	154	0.	*	1		2310	279	0.	*	2		0935	404	0.
1		0225	30	310.	*	1		1250	155	0.	*	1		2315	280	0.	*	2		0940	405	0.
1		0230	31	358.	*	1		1255	156	0.	*	1		2320	281	0.	*	2		0945	406	0.
1		0235	32	355.	*	1		1300	157	0.	*	1		2325	282	0.	*	2		0950	407	0.
1		0240	33	333.	*	1		1305	158	0.	*	1		2330	283	0.	*	2		0955	408	0.
1		0245	34	332.	*	1		1310	159	0.	*	1		2335	284	0.	*	2		1000	409	0.
1		0250	35	344.	*	1		1315	160	0.	*	1		2340	285	0.	*	2		1005	410	0.
1		0255	36	336.	*	1		1320	161	0.	*	1		2345	286	0.	*	2		1010	411	0.
1		0300	37	312.	*	1		1325	162	0.	*	1		2350	287	0.	*	2		1015	412	0.
1		0305	38	328.	*	1		1330	163	0.	*	1		2355	288	0.	*	2		1020	413	0.
1		0310	39	449.	*	1		1335	164	0.	*	2		0000	289	0.	*	2		1025	414	0.
1		0315	40	720.	*	1		1340	165	0.	*	2		0005	290	0.	*	2		1030	415	0.
1		0320	41	1228.	*	1		1345	166	0.	*	2		0010	291	0.	*	2		1035	416	0.
1		0325	42	2009.	*	1		1350	167	0.	*	2		0015	292	0.	*	2		1040	417	0.
1		0330	43	2938.	*	1		1355	168	0.	*	2		0020	293	0.	*	2		1045	418	0.
1		0335	44	3682.	*	1		1400	169	0.	*	2		0025	294	0.	*	2		1050	419	0.
1		0340	45	3819.	*	1		1405	170	0.	*	2		0030	295	0.	*	2		1055	420	0.
1		0345	46	3476.	*	1		1410	171	0.	*	2		0035	296	0.	*	2		1100	421	0.
1		0350	47	2928.	*	1		1415	172	0.	*	2		0040	297	0.	*	2		1105	422	0.
1		0355	48	2332.	*	1		1420	173	0.	*	2		0045	298	0.	*	2		1110	423	0.
1		0400	49	1833.	*	1		1425	174	0.	*	2		0050	299	0.	*	2		1115	424	0.
1		0405	50	1455.	*	1		1430	175	0.	*	2		0055	300	0.	*	2		1120	425	0.
1		0410	51	1151.	*	1		1435	176	0.	*	2		0100	301	0.	*	2		1125	426	0.
1		0415	52	902.	*	1		1440	177	0.	*	2		0105	302	0.	*	2		1130	427	0.
1		0420	53	716.	*	1		1445	178	0.	*	2		0110	303	0.	*	2		1135	428	0.
1		0425	54	606.	*	1		1450	179	0.	*	2		0115	304	0.	*	2		1140	429	0.
1		0430	55	584.	*	1		1455	180	0.	*	2		0120	305	0.	*	2		1145	430	0.
1		0435	56	645.	*	1		1500	181	0.	*	2		0125	306	0.	*	2		1150	431	0.
1		0440	57	728.	*	1		1505	182	0.	*	2		0130	307	0.	*	2		1155	432	0.
1		0445	58	770.	*	1		1510	183	0.	*	2		0135	308	0.	*	2		1200	433	0.
1		0450	59	784.	*	1		1515	184	0.	*	2		0140	309	0.	*	2		1205	434	0.
1		0455	60	790.	*	1		1520	185	0.	*	2		0145	310	0.	*	2		1210	435	0.
1		0500	61	758.	*	1		1525	186	0.	*	2		0150	311	0.	*	2		1215	436	0.
1		0505	62	675.	*	1		1530	187	0.	*	2		0155	312	0.	*	2		1220	437	0.
1		0510	63	561.	*	1		1535	188	0.	*	2		0200	313	0.	*	2		1225	438	0.
1		0515	64	443.	*	1		1540	189	0.	*	2		0205	314	0.	*	2		1230	439	0.
1		0520	65	343.	*	1		1545	190	0.	*	2		0210	315	0.	*	2		1235	440	0.
1		0525	66	264.	*	1		1550	191	0.	*	2		0215	316	0.	*	2		1240	441	0.
1		0530	67	206.	*	1		1555	192	0.	*	2		0220	317	0.	*	2		1245	442	0.
1		0535	68	163.	*	1		1600	193	0.	*	2		0225	318	0.	*	2		1250	443	0.
1		0540	69	128.	*	1		1605	194	0.	*	2		0230	319	0.	*	2		1255	444	0.
1		0545	70	105.	*	1		1610	195	0.	*	2		0235	320	0.	*	2		1300	445	0.
1		0550	71	94.	*	1		1615	196	0.	*	2		0240	321	0.	*	2		1305	446	0.
1		0555	72	87.	*	1		1620	197	0.	*	2		0245	322	0.	*	2		1310	447	0.
1		0600	73	79.	*	1		1625	198	0.	*	2		0250	323	0.	*	2		1315	448	0.
1		0605	74	69.	*	1		1630	199	0.	*	2		0255	324	0.	*	2		1320	449	0.
1		0610	75	58.	*	1		1635	200	0.	*	2		0300	325	0.	*	2		1325	450	0.
1		0615	76	46.	*	1		1640	201	0.	*	2		0305	326	0.	*	2		1330	451	0.
1		0620	77	33.	*	1		1645	202	0.	*	2		0310	327	0.	*	2		1335	452	0.
1		0625	78	23.	*	1		1650	203	0.	*	2		0315	328	0.	*	2		1340	453	0.
1		0630	79	15.	*	1		1655	204	0.	*	2		0320	329	0.	*	2		1345	454	0.
1		0635	80	10.	*	1		1700	205	0.	*	2		0325	330	0.	*	2		1350	455	0.
1		0640	81	6.	*	1		1705	206	0.	*	2		0330	331	0.	*	2		1355	456	0.
1		0645	82	4.	*	1		1710	207	0.	*	2		0335	332	0.	*	2		1400	457	0.
1		0650	83	3.	*	1		1715	208	0.	*	2		0340	333	0.	*	2		1405	458	0.

1	0655	84	2.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 3819.	3.67		640.	160.	93.	93.
		(INCHES)	2.448	2.454	2.454	2.454
		(AC-FT)	317.	318.	318.	318.

CUMULATIVE AREA = 2.43 SQ MI

****

HYDROGRAPH AT STATION CLMDBN
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .93

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	0.	*	1		2050	251	0.	*	2		0715	376	0.
1		0005	2	0.	*	1		1030	127	0.	*	1		2055	252	0.	*	2		0720	377	0.
1		0010	3	2.	*	1		1035	128	0.	*	1		2100	253	0.	*	2		0725	378	0.
1		0015	4	13.	*	1		1040	129	0.	*	1		2105	254	0.	*	2		0730	379	0.
1		0020	5	39.	*	1		1045	130	0.	*	1		2110	255	0.	*	2		0735	380	0.
1		0025	6	85.	*	1		1050	131	0.	*	1		2115	256	0.	*	2		0740	381	0.
1		0030	7	152.	*	1		1055	132	0.	*	1		2120	257	0.	*	2		0745	382	0.
1		0035	8	220.	*	1		1100	133	0.	*	1		2125	258	0.	*	2		0750	383	0.
1		0040	9	256.	*	1		1105	134	0.	*	1		2130	259	0.	*	2		0755	384	0.
1		0045	10	245.	*	1		1110	135	0.	*	1		2135	260	0.	*	2		0800	385	0.
1		0050	11	200.	*	1		1115	136	0.	*	1		2140	261	0.	*	2		0805	386	0.
1		0055	12	146.	*	1		1120	137	0.	*	1		2145	262	0.	*	2		0810	387	0.
1		0100	13	100.	*	1		1125	138	0.	*	1		2150	263	0.	*	2		0815	388	0.
1		0105	14	69.	*	1		1130	139	0.	*	1		2155	264	0.	*	2		0820	389	0.
1		0110	15	56.	*	1		1135	140	0.	*	1		2200	265	0.	*	2		0825	390	0.
1		0115	16	62.	*	1		1140	141	0.	*	1		2205	266	0.	*	2		0830	391	0.
1		0120	17	78.	*	1		1145	142	0.	*	1		2210	267	0.	*	2		0835	392	0.
1		0125	18	102.	*	1		1150	143	0.	*	1		2215	268	0.	*	2		0840	393	0.
1		0130	19	141.	*	1		1155	144	0.	*	1		2220	269	0.	*	2		0845	394	0.
1		0135	20	196.	*	1		1200	145	0.	*	1		2225	270	0.	*	2		0850	395	0.
1		0140	21	251.	*	1		1205	146	0.	*	1		2230	271	0.	*	2		0855	396	0.
1		0145	22	289.	*	1		1210	147	0.	*	1		2235	272	0.	*	2		0900	397	0.
1		0150	23	298.	*	1		1215	148	0.	*	1		2240	273	0.	*	2		0905	398	0.
1		0155	24	277.	*	1		1220	149	0.	*	1		2245	274	0.	*	2		0910	399	0.
1		0200	25	233.	*	1		1225	150	0.	*	1		2250	275	0.	*	2		0915	400	0.
1		0205	26	185.	*	1		1230	151	0.	*	1		2255	276	0.	*	2		0920	401	0.
1		0210	27	155.	*	1		1235	152	0.	*	1		2300	277	0.	*	2		0925	402	0.
1		0215	28	166.	*	1		1240	153	0.	*	1		2305	278	0.	*	2		0930	403	0.
1		0220	29	223.	*	1		1245	154	0.	*	1		2310	279	0.	*	2		0935	404	0.
1		0225	30	297.	*	1		1250	155	0.	*	1		2315	280	0.	*	2		0940	405	0.
1		0230	31	344.	*	1		1255	156	0.	*	1		2320	281	0.	*	2		0945	406	0.
1		0235	32	341.	*	1		1300	157	0.	*	1		2325	282	0.	*	2		0950	407	0.
1		0240	33	321.	*	1		1305	158	0.	*	1		2330	283	0.	*	2		0955	408	0.
1		0245	34	320.	*	1		1310	159	0.	*	1		2335	284	0.	*	2		1000	409	0.
1		0250	35	331.	*	1		1315	160	0.	*	1		2340	285	0.	*	2		1005	410	0.
1		0255	36	324.	*	1		1320	161	0.	*	1		2345	286	0.	*	2		1010	411	0.
1		0300	37	301.	*	1		1325	162	0.	*	1		2350	287	0.	*	2		1015	412	0.
1		0305	38	316.	*	1		1330	163	0.	*	1		2355	288	0.	*	2		1020	413	0.
1		0310	39	432.	*	1		1335	164	0.	*	2		0000	289	0.	*	2		1025	414	0.
1		0315	40	692.	*	1		1340	165	0.	*	2		0005	290	0.	*	2		1030	415	0.
1		0320	41	1185.	*	1		1345	166	0.	*	2		0010	291	0.	*	2		1035	416	0.
1		0325	42	1941.	*	1		1350	167	0.	*	2		0015	292	0.	*	2		1040	417	0.
1		0330	43	2841.	*	1		1355	168	0.	*	2		0020	293	0.	*	2		1045	418	0.
1		0335	44	3564.	*	1		1400	169	0.	*	2		0025	294	0.	*	2		1050	419	0.
1		0340	45	3703.	*	1		1405	170	0.	*	2		0030	295	0.	*	2		1055	420	0.
1		0345	46	3374.	*	1		1410	171	0.	*	2		0035	296	0.	*	2		1100	421	0.
1		0350	47	2844.	*	1		1415	172	0.	*	2		0040	297	0.	*	2		1105	422	0.
1		0355	48	2267.	*	1		1420	173	0.	*	2		0045	298	0.	*	2		1110	423	0.

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0400	49	1783.	1		1425	174	0.	2		0050	299	0.	2		1115	424	0.
1		0405	50	1416.	1		1430	175	0.	2		0055	300	0.	2		1120	425	0.
1		0410	51	1120.	1		1435	176	0.	2		0100	301	0.	2		1125	426	0.
1		0415	52	878.	1		1440	177	0.	2		0105	302	0.	2		1130	427	0.
1		0420	53	697.	1		1445	178	0.	2		0110	303	0.	2		1135	428	0.
1		0425	54	589.	1		1450	179	0.	2		0115	304	0.	2		1140	429	0.
1		0430	55	567.	1		1455	180	0.	2		0120	305	0.	2		1145	430	0.
1		0435	56	627.	1		1500	181	0.	2		0125	306	0.	2		1150	431	0.
1		0440	57	707.	1		1505	182	0.	2		0130	307	0.	2		1155	432	0.
1		0445	58	748.	1		1510	183	0.	2		0135	308	0.	2		1200	433	0.
1		0450	59	762.	1		1515	184	0.	2		0140	309	0.	2		1205	434	0.
1		0455	60	768.	1		1520	185	0.	2		0145	310	0.	2		1210	435	0.
1		0500	61	737.	1		1525	186	0.	2		0150	311	0.	2		1215	436	0.
1		0505	62	657.	1		1530	187	0.	2		0155	312	0.	2		1220	437	0.
1		0510	63	546.	1		1535	188	0.	2		0200	313	0.	2		1225	438	0.
1		0515	64	432.	1		1540	189	0.	2		0205	314	0.	2		1230	439	0.
1		0520	65	334.	1		1545	190	0.	2		0210	315	0.	2		1235	440	0.
1		0525	66	257.	1		1550	191	0.	2		0215	316	0.	2		1240	441	0.
1		0530	67	201.	1		1555	192	0.	2		0220	317	0.	2		1245	442	0.
1		0535	68	159.	1		1600	193	0.	2		0225	318	0.	2		1250	443	0.
1		0540	69	125.	1		1605	194	0.	2		0230	319	0.	2		1255	444	0.
1		0545	70	103.	1		1610	195	0.	2		0235	320	0.	2		1300	445	0.
1		0550	71	91.	1		1615	196	0.	2		0240	321	0.	2		1305	446	0.
1		0555	72	84.	1		1620	197	0.	2		0245	322	0.	2		1310	447	0.
1		0600	73	77.	1		1625	198	0.	2		0250	323	0.	2		1315	448	0.
1		0605	74	68.	1		1630	199	0.	2		0255	324	0.	2		1320	449	0.
1		0610	75	57.	1		1635	200	0.	2		0300	325	0.	2		1325	450	0.
1		0615	76	44.	1		1640	201	0.	2		0305	326	0.	2		1330	451	0.
1		0620	77	32.	1		1645	202	0.	2		0310	327	0.	2		1335	452	0.
1		0625	78	22.	1		1650	203	0.	2		0315	328	0.	2		1340	453	0.
1		0630	79	15.	1		1655	204	0.	2		0320	329	0.	2		1345	454	0.
1		0635	80	10.	1		1700	205	0.	2		0325	330	0.	2		1350	455	0.
1		0640	81	6.	1		1705	206	0.	2		0330	331	0.	2		1355	456	0.
1		0645	82	4.	1		1710	207	0.	2		0335	332	0.	2		1400	457	0.
1		0650	83	3.	1		1715	208	0.	2		0340	333	0.	2		1405	458	0.
1		0655	84	2.	1		1720	209	0.	2		0345	334	0.	2		1410	459	0.
1		0700	85	1.	1		1725	210	0.	2		0350	335	0.	2		1415	460	0.
1		0705	86	1.	1		1730	211	0.	2		0355	336	0.	2		1420	461	0.
1		0710	87	0.	1		1735	212	0.	2		0400	337	0.	2		1425	462	0.
1		0715	88	0.	1		1740	213	0.	2		0405	338	0.	2		1430	463	0.
1		0720	89	0.	1		1745	214	0.	2		0410	339	0.	2		1435	464	0.
1		0725	90	0.	1		1750	215	0.	2		0415	340	0.	2		1440	465	0.
1		0730	91	0.	1		1755	216	0.	2		0420	341	0.	2		1445	466	0.
1		0735	92	0.	1		1800	217	0.	2		0425	342	0.	2		1450	467	0.
1		0740	93	0.	1		1805	218	0.	2		0430	343	0.	2		1455	468	0.
1		0745	94	0.	1		1810	219	0.	2		0435	344	0.	2		1500	469	0.
1		0750	95	0.	1		1815	220	0.	2		0440	345	0.	2		1505	470	0.
1		0755	96	0.	1		1820	221	0.	2		0445	346	0.	2		1510	471	0.
1		0800	97	0.	1		1825	222	0.	2		0450	347	0.	2		1515	472	0.
1		0805	98	0.	1		1830	223	0.	2		0455	348	0.	2		1520	473	0.
1		0810	99	0.	1		1835	224	0.	2		0500	349	0.	2		1525	474	0.
1		0815	100	0.	1		1840	225	0.	2		0505	350	0.	2		1530	475	0.
1		0820	101	0.	1		1845	226	0.	2		0510	351	0.	2		1535	476	0.
1		0825	102	0.	1		1850	227	0.	2		0515	352	0.	2		1540	477	0.
1		0830	103	0.	1		1855	228	0.	2		0520	353	0.	2		1545	478	0.
1		0835	104	0.	1		1900	229	0.	2		0525	354	0.	2		1550	479	0.
1		0840	105	0.	1		1905	230	0.	2		0530	355	0.	2		1555	480	0.
1		0845	106	0.	1		1910	231	0.	2		0535	356	0.	2		1600	481	0.
1		0850	107	0.	1		1915	232	0.	2		0540	357	0.	2		1605	482	0.
1		0855	108	0.	1		1920	233	0.	2		0545	358	0.	2		1610	483	0.
1		0900	109	0.	1		1925	234	0.	2		0550	359	0.	2		1615	484	0.
1		0905	110	0.	1		1930	235	0.	2		0555	360	0.	2		1620	485	0.
1		0910	111	0.	1		1935	236	0.	2		0600	361	0.	2		1625	486	0.
1		0915	112	0.	1		1940	237	0.	2		0605	362	0.	2		1630	487	0.
1		0920	113	0.	1		1945	238	0.	2		0610	363	0.	2		1635	488	0.
1		0925	114	0.	1		1950	239	0.	2		0615	364	0.	2		1640	489	0.
1		0930	115	0.	1		1955	240	0.	2		0620	365	0.	2		1645	490	0.
1		0935	116	0.	1		2000	241	0.	2		0625	366	0.	2		1650	491	0.
1		0940	117	0.	1		2005	242	0.	2		0630	367	0.	2		1655	492	0.
1		0945	118	0.	1		2010	243	0.	2		0635	368	0.	2		1700	493	0.
1		0950	119	0.	1		2015	244	0.	2		0640	369	0.	2		1705	494	0.
1		0955	120	0.	1		2020	245	0.	2		0645	370	0.	2		1710	495	0.
1		1000	121	0.	1		2025	246	0.	2		0650	371	0.	2		1715	496	0.
1		1005	122	0.	1		2030	247	0.	2		0655	372	0.	2		1720	497	0.
1		1010	123	0.	1		2035	248	0.	2		0700	373	0.	2		1725	498	0.
1		1015	124	0.	1		2040	249	0.	2		0705	374	0.	2		1730	499	0.
1		1020	125	0.	1		2045	250	0.	2		0710	375	0.	2		1735	500	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
(CFS)	(HR)	(CFS)				
3703.	3.67		619.	155.	90.	90.
		(INCHES)	2.369	2.376	2.376	2.376
		(AC-FT)	307.	308.	308.	308.

CUMULATIVE AREA = 2.43 SQ MI

HYDROGRAPH AT STATION CLMDBN
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .92

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	0.	1		2050	251	0.	2		0715	376	0.
1		0005	2	0.	1		1030	127	0.	1		2055	252	0.	2		0720	377	0.
1		0010	3	2.	1		1035	128	0.	1		2100	253	0.	2		0725	378	0.
1		0015	4	12.	1		1040	129	0.	1		2105	254	0.	2		0730	379	0.
1		0020	5	37.	1		1045	130	0.	1		2110	255	0.	2		0735	380	0.
1		0025	6	82.	1		1050	131	0.	1		2115	256	0.	2		0740	381	0.
1		0030	7	147.	1		1055	132	0.	1		2120	257	0.	2		0745	382	0.
1		0035	8	214.	1		1100	133	0.	1		2125	258	0.	2		0750	383	0.
1		0040	9	250.	1		1105	134	0.	1		2130	259	0.	2		0755	384	0.
1		0045	10	239.	1		1110	135	0.	1		2135	260	0.	2		0800	385	0.
1		0050	11	195.	1		1115	136	0.	1		2140	261	0.	2		0805	386	0.
1		0055	12	143.	1		1120	137	0.	1		2145	262	0.	2		0810	387	0.
1		0100	13	98.	1		1125	138	0.	1		2150	263	0.	2		0815	388	0.

1	0105	14	67.	*	1	1130	139	0.	*	1	2155	264	0.	*	2	0820	389	0.	
1	0110	15	55.	*	1	1135	140	0.	*	1	2200	265	0.	*	2	0825	390	0.	
1	0115	16	61.	*	1	1140	141	0.	*	1	2205	266	0.	*	2	0830	391	0.	
1	0120	17	77.	*	1	1145	142	0.	*	1	2210	267	0.	*	2	0835	392	0.	
1	0125	18	100.	*	1	1150	143	0.	*	1	2215	268	0.	*	2	0840	393	0.	
1	0130	19	138.	*	1	1155	144	0.	*	1	2220	269	0.	*	2	0845	394	0.	
1	0135	20	192.	*	1	1200	145	0.	*	1	2225	270	0.	*	2	0850	395	0.	
1	0140	21	247.	*	1	1205	146	0.	*	1	2230	271	0.	*	2	0855	396	0.	
1	0145	22	284.	*	1	1210	147	0.	*	1	2235	272	0.	*	2	0900	397	0.	
1	0150	23	293.	*	1	1215	148	0.	*	1	2240	273	0.	*	2	0905	398	0.	
1	0155	24	272.	*	1	1220	149	0.	*	1	2245	274	0.	*	2	0910	399	0.	
1	0200	25	230.	*	1	1225	150	0.	*	1	2250	275	0.	*	2	0915	400	0.	
1	0205	26	182.	*	1	1230	151	0.	*	1	2255	276	0.	*	2	0920	401	0.	
1	0210	27	152.	*	1	1235	152	0.	*	1	2300	277	0.	*	2	0925	402	0.	
1	0215	28	163.	*	1	1240	153	0.	*	1	2305	278	0.	*	2	0930	403	0.	
1	0220	29	220.	*	1	1245	154	0.	*	1	2310	279	0.	*	2	0935	404	0.	
1	0225	30	292.	*	1	1250	155	0.	*	1	2315	280	0.	*	2	0940	405	0.	
1	0230	31	338.	*	1	1255	156	0.	*	1	2320	281	0.	*	2	0945	406	0.	
1	0235	32	336.	*	1	1300	157	0.	*	1	2325	282	0.	*	2	0950	407	0.	
1	0240	33	316.	*	1	1305	158	0.	*	1	2330	283	0.	*	2	0955	408	0.	
1	0245	34	315.	*	1	1310	159	0.	*	1	2335	284	0.	*	2	1000	409	0.	
1	0250	35	326.	*	1	1315	160	0.	*	1	2340	285	0.	*	2	1005	410	0.	
1	0255	36	320.	*	1	1320	161	0.	*	1	2345	286	0.	*	2	1010	411	0.	
1	0300	37	297.	*	1	1325	162	0.	*	1	2350	287	0.	*	2	1015	412	0.	
1	0305	38	311.	*	1	1330	163	0.	*	1	2355	288	0.	*	2	1020	413	0.	
1	0310	39	425.	*	1	1335	164	0.	*	2	0000	289	0.	*	2	1025	414	0.	
1	0315	40	682.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.	
1	0320	41	1166.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.	
1	0325	42	1912.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.	
1	0330	43	2803.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.	
1	0335	44	3525.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.	
1	0340	45	3661.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.	
1	0345	46	3335.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.	
1	0350	47	2811.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.	
1	0355	48	2241.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.	
1	0400	49	1762.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.	
1	0405	50	1400.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.	
1	0410	51	1107.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.	
1	0415	52	868.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.	
1	0420	53	690.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.	
1	0425	54	583.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.	
1	0430	55	561.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.	
1	0435	56	619.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.	
1	0440	57	698.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.	
1	0445	58	739.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.	
1	0450	59	753.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.	
1	0455	60	759.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.	
1	0500	61	729.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.	
1	0505	62	650.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.	
1	0510	63	540.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.	
1	0515	64	427.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.	
1	0520	65	331.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.	
1	0525	66	254.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.	
1	0530	67	199.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.	
1	0535	68	157.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.	
1	0540	69	124.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.	
1	0545	70	102.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.	
1	0550	71	90.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.	
1	0555	72	83.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.	
1	0600	73	76.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.	
1	0605	74	67.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.	
1	0610	75	56.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.	
1	0615	76	44.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.	
1	0620	77	32.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.	
1	0625	78	22.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.	
1	0630	79	15.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.	
1	0635	80	10.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.	
1	0640	81	6.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.	
1	0645	82	4.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.	
1	0650	83	3.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.	
1	0655	84	2.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.	
1	0700	85	1.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.	
1	0705	86	1.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.	
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.	
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.	
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.	
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.	
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.	
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.	
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.	
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.	
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.	
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.	
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.	
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.	
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.	
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.	
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.	
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.	
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.	
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.	
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.	
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.	
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.	
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.	
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.	
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.	
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.	
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.	
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.	
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.	
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.	
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.	
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.	
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.	
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.	
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.	
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.	
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.	
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.	
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.	
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.	

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	41.58-HR
		(CFS)				
3661.	3.67		611.	153.	88.	88.
		(INCHES)	2.339	2.345	2.345	2.345
		(AC-FT)	303.	304.	304.	304.

CUMULATIVE AREA = 2.43 SQ MI

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          **************
          *            *
294 KK    *   CLMDBS   *
          *            *
          **************

295 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                         COMBINE COM9, COM10, COM14, & LMDBS
                         COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN

298 HC          HYDROGRAPH COMBINATION
                      ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CLMDBS
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .99

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	0.	1		2050	251	0.	2		0715	376	0.
1		0005	2	0.	1		1030	127	0.	1		2055	252	0.	2		0720	377	0.
1		0010	3	1.	1		1035	128	0.	1		2100	253	0.	2		0725	378	0.
1		0015	4	4.	1		1040	129	0.	1		2105	254	0.	2		0730	379	0.
1		0020	5	16.	1		1045	130	0.	1		2110	255	0.	2		0735	380	0.
1		0025	6	42.	1		1050	131	0.	1		2115	256	0.	2		0740	381	0.
1		0030	7	80.	1		1055	132	0.	1		2120	257	0.	2		0745	382	0.
1		0035	8	106.	1		1100	133	0.	1		2125	258	0.	2		0750	383	0.
1		0040	9	102.	1		1105	134	0.	1		2130	259	0.	2		0755	384	0.
1		0045	10	76.	1		1110	135	0.	1		2135	260	0.	2		0800	385	0.
1		0050	11	48.	1		1115	136	0.	1		2140	261	0.	2		0805	386	0.
1		0055	12	28.	1		1120	137	0.	1		2145	262	0.	2		0810	387	0.
1		0100	13	16.	1		1125	138	0.	1		2150	263	0.	2		0815	388	0.
1		0105	14	11.	1		1130	139	0.	1		2155	264	0.	2		0820	389	0.
1		0110	15	18.	1		1135	140	0.	1		2200	265	0.	2		0825	390	0.
1		0115	16	31.	1		1140	141	0.	1		2205	266	0.	2		0830	391	0.
1		0120	17	40.	1		1145	142	0.	1		2210	267	0.	2		0835	392	0.
1		0125	18	55.	1		1150	143	0.	1		2215	268	0.	2		0840	393	0.
1		0130	19	83.	1		1155	144	0.	1		2220	269	0.	2		0845	394	0.
1		0135	20	115.	1		1200	145	0.	1		2225	270	0.	2		0850	395	0.
1		0140	21	132.	1		1205	146	0.	1		2230	271	0.	2		0855	396	0.
1		0145	22	136.	1		1210	147	0.	1		2235	272	0.	2		0900	397	0.
1		0150	23	124.	1		1215	148	0.	1		2240	273	0.	2		0905	398	0.
1		0155	24	98.	1		1220	149	0.	1		2245	274	0.	2		0910	399	0.
1		0200	25	70.	1		1225	150	0.	1		2250	275	0.	2		0915	400	0.
1		0205	26	50.	1		1230	151	0.	1		2255	276	0.	2		0920	401	0.
1		0210	27	54.	1		1235	152	0.	1		2300	277	0.	2		0925	402	0.
1		0215	28	90.	1		1240	153	0.	1		2305	278	0.	2		0930	403	0.
1		0220	29	140.	1		1245	154	0.	1		2310	279	0.	2		0935	404	0.
1		0225	30	171.	1		1250	155	0.	1		2315	280	0.	2		0940	405	0.
1		0230	31	165.	1		1255	156	0.	1		2320	281	0.	2		0945	406	0.
1		0235	32	137.	1		1300	157	0.	1		2325	282	0.	2		0950	407	0.
1		0240	33	130.	1		1305	158	0.	1		2330	283	0.	2		0955	408	0.
1		0245	34	149.	1		1310	159	0.	1		2335	284	0.	2		1000	409	0.
1		0250	35	153.	1		1315	160	0.	1		2340	285	0.	2		1005	410	0.
1		0255	36	130.	1		1320	161	0.	1		2345	286	0.	2		1010	411	0.
1		0300	37	118.	1		1325	162	0.	1		2350	287	0.	2		1015	412	0.
1		0305	38	169.	1		1330	163	0.	1		2355	288	0.	2		1020	413	0.
1		0310	39	294.	1		1335	164	0.	2		0000	289	0.	2		1025	414	0.
1		0315	40	496.	1		1340	165	0.	2		0005	290	0.	2		1030	415	0.
1		0320	41	858.	1		1345	166	0.	2		0010	291	0.	2		1035	416	0.
1		0325	42	1321.	1		1350	167	0.	2		0015	292	0.	2		1040	417	0.
1		0330	43	1798.	1		1355	168	0.	2		0020	293	0.	2		1045	418	0.
1		0335	44	1992.	1		1400	169	0.	2		0025	294	0.	2		1050	419	0.
1		0340	45	1738.	1		1405	170	0.	2		0030	295	0.	2		1055	420	0.
1		0345	46	1402.	1		1410	171	0.	2		0035	296	0.	2		1100	421	0.
1		0350	47	1070.	1		1415	172	0.	2		0040	297	0.	2		1105	422	0.
1		0355	48	776.	1		1420	173	0.	2		0045	298	0.	2		1110	423	0.
1		0400	49	597.	1		1425	174	0.	2		0050	299	0.	2		1115	424	0.
1		0405	50	474.	1		1430	175	0.	2		0055	300	0.	2		1120	425	0.
1		0410	51	355.	1		1435	176	0.	2		0100	301	0.	2		1125	426	0.
1		0415	52	267.	1		1440	177	0.	2		0105	302	0.	2		1130	427	0.
1		0420	53	226.	1		1445	178	0.	2		0110	303	0.	2		1135	428	0.
1		0425	54	222.	1		1450	179	0.	2		0115	304	0.	2		1140	429	0.
1		0430	55	272.	1		1455	180	0.	2		0120	305	0.	2		1145	430	0.
1		0435	56	349.	1		1500	181	0.	2		0125	306	0.	2		1150	431	0.
1		0440	57	379.	1		1505	182	0.	2		0130	307	0.	2		1155	432	0.
1		0445	58	367.	1		1510	183	0.	2		0135	308	0.	2		1200	433	0.
1		0450	59	372.	1		1515	184	0.	2		0140	309	0.	2		1205	434	0.
1		0455	60	372.	1		1520	185	0.	2		0145	310	0.	2		1210	435	0.
1		0500	61	321.	1		1525	186	0.	2		0150	311	0.	2		1215	436	0.
1		0505	62	253.	1		1530	187	0.	2		0155	312	0.	2		1220	437	0.
1		0510	63	187.	1		1535	188	0.	2		0200	313	0.	2		1225	438	0.
1		0515	64	134.	1		1540	189	0.	2		0205	314	0.	2		1230	439	0.
1		0520	65	96.	1		1545	190	0.	2		0210	315	0.	2		1235	440	0.
1		0525	66	74.	1		1550	191	0.	2		0215	316	0.	2		1240	441	0.
1		0530	67	61.	1		1555	192	0.	2		0220	317	0.	2		1245	442	0.
1		0535	68	46.	1		1600	193	0.	2		0225	318	0.	2		1250	443	0.
1		0540	69	37.	1		1605	194	0.	2		0230	319	0.	2		1255	444	0.

1	0545	70	36.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	38.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	34.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	30.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	25.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	18.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	12.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	7.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	4.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	2.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	1.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	1.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	0.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	0.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	0.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	0.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	0.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 1992.	3.58		284.	71.	41.	41.
		(INCHES)	2.403	2.405	2.405	2.405
		(AC-FT)	141.	141.	141.	141.

CUMULATIVE AREA = 1.10 SQ MI

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HYDROGRAPH AT STATION CLMDBS
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .98

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	0.	*	1		2050	251	0.	*	2		0715	376	0.
1		0005	2	0.	*	1		1030	127	0.	*	1		2055	252	0.	*	2		0720	377	0.
1		0010	3	0.	*	1		1035	128	0.	*	1		2100	253	0.	*	2		0725	378	0.
1		0015	4	4.	*	1		1040	129	0.	*	1		2105	254	0.	*	2		0730	379	0.
1		0020	5	15.	*	1		1045	130	0.	*	1		2110	255	0.	*	2		0735	380	0.
1		0025	6	40.	*	1		1050	131	0.	*	1		2115	256	0.	*	2		0740	381	0.
1		0030	7	76.	*	1		1055	132	0.	*	1		2120	257	0.	*	2		0745	382	0.
1		0035	8	102.	*	1		1100	133	0.	*	1		2125	258	0.	*	2		0750	383	0.
1		0040	9	98.	*	1		1105	134	0.	*	1		2130	259	0.	*	2		0755	384	0.
1		0045	10	74.	*	1		1110	135	0.	*	1		2135	260	0.	*	2		0800	385	0.
1		0050	11	47.	*	1		1115	136	0.	*	1		2140	261	0.	*	2		0805	386	0.
1		0055	12	27.	*	1		1120	137	0.	*	1		2145	262	0.	*	2		0810	387	0.
1		0100	13	15.	*	1		1125	138	0.	*	1		2150	263	0.	*	2		0815	388	0.
1		0105	14	11.	*	1		1130	139	0.	*	1		2155	264	0.	*	2		0820	389	0.
1		0110	15	17.	*	1		1135	140	0.	*	1		2200	265	0.	*	2		0825	390	0.
1		0115	16	30.	*	1		1140	141	0.	*	1		2205	266	0.	*	2		0830	391	0.
1		0120	17	39.	*	1		1145	142	0.	*	1		2210	267	0.	*	2		0835	392	0.
1		0125	18	53.	*	1		1150	143	0.	*	1		2215	268	0.	*	2		0840	393	0.
1		0130	19	80.	*	1		1155	144	0.	*	1		2220	269	0.	*	2		0845	394	0.
1		0135	20	111.	*	1		1200	145	0.	*	1		2225	270	0.	*	2		0850	395	0.
1		0140	21	129.	*	1		1205	146	0.	*	1		2230	271	0.	*	2		0855	396	0.
1		0145	22	133.	*	1		1210	147	0.	*	1		2235	272	0.	*	2		0900	397	0.
1		0150	23	121.	*	1		1215	148	0.	*	1		2240	273	0.	*	2		0905	398	0.
1		0155	24	96.	*	1		1220	149	0.	*	1		2245	274	0.	*	2		0910	399	0.
1		0200	25	68.	*	1		1225	150	0.	*	1		2250	275	0.	*	2		0915	400	0.
1		0205	26	49.	*	1		1230	151	0.	*	1		2255	276	0.	*	2		0920	401	0.
1		0210	27	53.	*	1		1235	152	0.	*	1		2300	277	0.	*	2		0925	402	0.
1		0215	28	88.	*	1		1240	153	0.	*	1		2305	278	0.	*	2		0930	403	0.
1		0220	29	137.	*	1		1245	154	0.	*	1		2310	279	0.	*	2		0935	404	0.
1		0225	30	167.	*	1		1250	155	0.	*	1		2315	280	0.	*	2		0940	405	0.
1		0230	31	161.	*	1		1255	156	0.	*	1		2320	281	0.	*	2		0945	406	0.
1		0235	32	134.	*	1		1300	157	0.	*	1		2325	282	0.	*	2		0950	407	0.
1		0240	33	127.	*	1		1305	158	0.	*	1		2330	283	0.	*	2		0955	408	0.
1		0245	34	146.	*	1		1310	159	0.	*	1		2335	284	0.	*	2		1000	409	0.

1	0250	35	150.	*	1	1315	160	0.	*	1	2340	285	0.	*	2	1005	410	0.
1	0255	36	128.	*	1	1320	161	0.	*	1	2345	286	0.	*	2	1010	411	0.
1	0300	37	115.	*	1	1325	162	0.	*	1	2350	287	0.	*	2	1015	412	0.
1	0305	38	166.	*	1	1330	163	0.	*	1	2355	288	0.	*	2	1020	413	0.
1	0310	39	287.	*	1	1335	164	0.	*	2	0000	289	0.	*	2	1025	414	0.
1	0315	40	486.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.
1	0320	41	839.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.
1	0325	42	1294.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.
1	0330	43	1763.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.
1	0335	44	1955.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.
1	0340	45	1705.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.
1	0345	46	1377.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.
1	0350	47	1052.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.
1	0355	48	762.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.
1	0400	49	587.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.
1	0405	50	466.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.
1	0410	51	349.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.
1	0415	52	263.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.
1	0420	53	222.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.
1	0425	54	218.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.
1	0430	55	267.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.
1	0435	56	343.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.
1	0440	57	372.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.
1	0445	58	361.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.
1	0450	59	366.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	366.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	316.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	249.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	184.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	132.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	95.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	73.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	60.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	46.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	36.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	35.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	37.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	33.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	29.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	25.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	18.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	12.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	7.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	4.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	2.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	1.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	1.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	0.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	0.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	0.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	0.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	0.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 1955.	3.58		279.	70.	40.	40.
		(INCHES)	2.355	2.358	2.358	2.358
		(AC-FT)	138.	138.	138.	138.

CUMULATIVE AREA = 1.10 SQ MI

****

HYDROGRAPH AT STATION CLMDBS
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .95

****

DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	1025	126	0.	*	1	2050	251	0.	*	2	0715	376	0.
1	0005	2	0.	*	1	1030	127	0.	*	1	2055	252	0.	*	2	0720	377	0.
1	0010	3	0.	*	1	1035	128	0.	*	1	2100	253	0.	*	2	0725	378	0.
1	0015	4	3.	*	1	1040	129	0.	*	1	2105	254	0.	*	2	0730	379	0.
1	0020	5	13.	*	1	1045	130	0.	*	1	2110	255	0.	*	2	0735	380	0.
1	0025	6	36.	*	1	1050	131	0.	*	1	2115	256	0.	*	2	0740	381	0.
1	0030	7	70.	*	1	1055	132	0.	*	1	2120	257	0.	*	2	0745	382	0.
1	0035	8	95.	*	1	1100	133	0.	*	1	2125	258	0.	*	2	0750	383	0.
1	0040	9	92.	*	1	1105	134	0.	*	1	2130	259	0.	*	2	0755	384	0.
1	0045	10	69.	*	1	1110	135	0.	*	1	2135	260	0.	*	2	0800	385	0.
1	0050	11	44.	*	1	1115	136	0.	*	1	2140	261	0.	*	2	0805	386	0.
1	0055	12	26.	*	1	1120	137	0.	*	1	2145	262	0.	*	2	0810	387	0.
1	0100	13	14.	*	1	1125	138	0.	*	1	2150	263	0.	*	2	0815	388	0.
1	0105	14	10.	*	1	1130	139	0.	*	1	2155	264	0.	*	2	0820	389	0.
1	0110	15	16.	*	1	1135	140	0.	*	1	2200	265	0.	*	2	0825	390	0.
1	0115	16	28.	*	1	1140	141	0.	*	1	2205	266	0.	*	2	0830	391	0.
1	0120	17	37.	*	1	1145	142	0.	*	1	2210	267	0.	*	2	0835	392	0.
1	0125	18	50.	*	1	1150	143	0.	*	1	2215	268	0.	*	2	0840	393	0.
1	0130	19	76.	*	1	1155	144	0.	*	1	2220	269	0.	*	2	0845	394	0.
1	0135	20	105.	*	1	1200	145	0.	*	1	2225	270	0.	*	2	0850	395	0.
1	0140	21	123.	*	1	1205	146	0.	*	1	2230	271	0.	*	2	0855	396	0.
1	0145	22	127.	*	1	1210	147	0.	*	1	2235	272	0.	*	2	0900	397	0.
1	0150	23	116.	*	1	1215	148	0.	*	1	2240	273	0.	*	2	0905	398	0.
1	0155	24	92.	*	1	1220	149	0.	*	1	2245	274	0.	*	2	0910	399	0.
1	0200	25	65.	*	1	1225	150	0.	*	1	2250	275	0.	*	2	0915	400	0.
1	0205	26	47.	*	1	1230	151	0.	*	1	2255	276	0.	*	2	0920	401	0.
1	0210	27	50.	*	1	1235	152	0.	*	1	2300	277	0.	*	2	0925	402	0.
1	0215	28	84.	*	1	1240	153	0.	*	1	2305	278	0.	*	2	0930	403	0.
1	0220	29	131.	*	1	1245	154	0.	*	1	2310	279	0.	*	2	0935	404	0.
1	0225	30	160.	*	1	1250	155	0.	*	1	2315	280	0.	*	2	0940	405	0.
1	0230	31	155.	*	1	1255	156	0.	*	1	2320	281	0.	*	2	0945	406	0.
1	0235	32	129.	*	1	1300	157	0.	*	1	2325	282	0.	*	2	0950	407	0.
1	0240	33	122.	*	1	1305	158	0.	*	1	2330	283	0.	*	2	0955	408	0.
1	0245	34	140.	*	1	1310	159	0.	*	1	2335	284	0.	*	2	1000	409	0.
1	0250	35	144.	*	1	1315	160	0.	*	1	2340	285	0.	*	2	1005	410	0.
1	0255	36	123.	*	1	1320	161	0.	*	1	2345	286	0.	*	2	1010	411	0.
1	0300	37	111.	*	1	1325	162	0.	*	1	2350	287	0.	*	2	1015	412	0.
1	0305	38	159.	*	1	1330	163	0.	*	1	2355	288	0.	*	2	1020	413	0.
1	0310	39	276.	*	1	1335	164	0.	*	2	0000	289	0.	*	2	1025	414	0.
1	0315	40	468.	*	1	1340	165	0.	*	2	0005	290	0.	*	2	1030	415	0.
1	0320	41	810.	*	1	1345	166	0.	*	2	0010	291	0.	*	2	1035	416	0.
1	0325	42	1250.	*	1	1350	167	0.	*	2	0015	292	0.	*	2	1040	417	0.
1	0330	43	1706.	*	1	1355	168	0.	*	2	0020	293	0.	*	2	1045	418	0.
1	0335	44	1896.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.
1	0340	45	1654.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.
1	0345	46	1337.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.
1	0350	47	1021.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.
1	0355	48	741.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.
1	0400	49	570.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.
1	0405	50	453.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.
1	0410	51	339.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.
1	0415	52	256.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.
1	0420	53	216.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.
1	0425	54	212.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.
1	0430	55	260.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.
1	0435	56	333.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.
1	0440	57	362.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.
1	0445	58	351.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.
1	0450	59	356.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	356.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	307.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	242.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	179.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	129.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	92.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	71.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	58.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	45.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	35.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	34.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	36.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	33.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	29.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	24.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	17.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	11.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	7.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	4.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	2.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	1.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	1.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	0.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	0.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	0.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	0.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	0.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.

1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.		
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.		
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.		
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.		
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.		
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.		
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.		
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.		
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.		
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.		
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.		
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.		

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 1896.	3.58		270.	68.	39.	39.
		(INCHES)	2.278	2.281	2.281	2.281
		(AC-FT)	134.	134.	134.	134.

CUMULATIVE AREA = 1.10 SQ MI

HYDROGRAPH AT STATION CLMDBS
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .93

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		1025	126	0.	1		2050	251	0.	2		0715	376	0.
1		0005	2	0.	1		1030	127	0.	1		2055	252	0.	2		0720	377	0.
1		0010	3	0.	1		1035	128	0.	1		2100	253	0.	2		0725	378	0.
1		0015	4	2.	1		1040	129	0.	1		2105	254	0.	2		0730	379	0.
1		0020	5	11.	1		1045	130	0.	1		2110	255	0.	2		0735	380	0.
1		0025	6	32.	1		1050	131	0.	1		2115	256	0.	2		0740	381	0.
1		0030	7	64.	1		1055	132	0.	1		2120	257	0.	2		0745	382	0.
1		0035	8	88.	1		1100	133	0.	1		2125	258	0.	2		0750	383	0.
1		0040	9	86.	1		1105	134	0.	1		2130	259	0.	2		0755	384	0.
1		0045	10	65.	1		1110	135	0.	1		2135	260	0.	2		0800	385	0.
1		0050	11	42.	1		1115	136	0.	1		2140	261	0.	2		0805	386	0.
1		0055	12	24.	1		1120	137	0.	1		2145	262	0.	2		0810	387	0.
1		0100	13	14.	1		1125	138	0.	1		2150	263	0.	2		0815	388	0.
1		0105	14	10.	1		1130	139	0.	1		2155	264	0.	2		0820	389	0.
1		0110	15	15.	1		1135	140	0.	1		2200	265	0.	2		0825	390	0.
1		0115	16	26.	1		1140	141	0.	1		2205	266	0.	2		0830	391	0.
1		0120	17	35.	1		1145	142	0.	1		2210	267	0.	2		0835	392	0.
1		0125	18	47.	1		1150	143	0.	1		2215	268	0.	2		0840	393	0.
1		0130	19	72.	1		1155	144	0.	1		2220	269	0.	2		0845	394	0.
1		0135	20	100.	1		1200	145	0.	1		2225	270	0.	2		0850	395	0.
1		0140	21	117.	1		1205	146	0.	1		2230	271	0.	2		0855	396	0.
1		0145	22	121.	1		1210	147	0.	1		2235	272	0.	2		0900	397	0.
1		0150	23	111.	1		1215	148	0.	1		2240	273	0.	2		0905	398	0.
1		0155	24	88.	1		1220	149	0.	1		2245	274	0.	2		0910	399	0.
1		0200	25	62.	1		1225	150	0.	1		2250	275	0.	2		0915	400	0.
1		0205	26	45.	1		1230	151	0.	1		2255	276	0.	2		0920	401	0.
1		0210	27	48.	1		1235	152	0.	1		2300	277	0.	2		0925	402	0.
1		0215	28	80.	1		1240	153	0.	1		2305	278	0.	2		0930	403	0.
1		0220	29	125.	1		1245	154	0.	1		2310	279	0.	2		0935	404	0.
1		0225	30	153.	1		1250	155	0.	1		2315	280	0.	2		0940	405	0.
1		0230	31	148.	1		1255	156	0.	1		2320	281	0.	2		0945	406	0.
1		0235	32	124.	1		1300	157	0.	1		2325	282	0.	2		0950	407	0.
1		0240	33	117.	1		1305	158	0.	1		2330	283	0.	2		0955	408	0.
1		0245	34	134.	1		1310	159	0.	1		2335	284	0.	2		1000	409	0.
1		0250	35	138.	1		1315	160	0.	1		2340	285	0.	2		1005	410	0.
1		0255	36	118.	1		1320	161	0.	1		2345	286	0.	2		1010	411	0.
1		0300	37	107.	1		1325	162	0.	1		2350	287	0.	2		1015	412	0.
1		0305	38	153.	1		1330	163	0.	1		2355	288	0.	2		1020	413	0.
1		0310	39	265.	1		1335	164	0.	2		0000	289	0.	2		1025	414	0.
1		0315	40	449.	1		1340	165	0.	2		0005	290	0.	2		1030	415	0.
1		0320	41	780.	1		1345	166	0.	2		0010	291	0.	2		1035	416	0.
1		0325	42	1206.	1		1350	167	0.	2		0015	292	0.	2		1040	417	0.
1		0330	43	1650.	1		1355	168	0.	2		0020	293	0.	2		1045	418	0.
1		0335	44	1834.	1		1400	169	0.	2		0025	294	0.	2		1050	419	0.
1		0340	45	1604.	1		1405	170	0.	2		0030	295	0.	2		1055	420	0.
1		0345	46	1297.	1		1410	171	0.	2		0035	296	0.	2		1100	421	0.
1		0350	47	991.	1		1415	172	0.	2		0040	297	0.	2		1105	422	0.
1		0355	48	720.	1		1420	173	0.	2		0045	298	0.	2		1110	423	0.
1		0400	49	554.	1		1425	174	0.	2		0050	299	0.	2		1115	424	0.
1		0405	50	440.	1		1430	175	0.	2		0055	300	0.	2		1120	425	0.
1		0410	51	330.	1		1435	176	0.	2		0100	301	0.	2		1125	426	0.
1		0415	52	249.	1		1440	177	0.	2		0105	302	0.	2		1130	427	0.
1		0420	53	210.	1		1445	178	0.	2		0110	303	0.	2		1135	428	0.
1		0425	54	206.	1		1450	179	0.	2		0115	304	0.	2		1140	429	0.
1		0430	55	252.	1		1455	180	0.	2		0120	305	0.	2		1145	430	0.
1		0435	56	323.	1		1500	181	0.	2		0125	306	0.	2		1150	431	0.
1		0440	57	351.	1		1505	182	0.	2		0130	307	0.	2		1155	432	0.
1		0445	58	341.	1		1510	183	0.	2		0135	308	0.	2		1200	433	0.
1		0450	59	346.	1		1515	184	0.	2		0140	309	0.	2		1205	434	0.
1		0455	60	345.	1		1520	185	0.	2		0145	310	0.	2		1210	435	0.
1		0500	61	299.	1		1525	186	0.	2		0150	311	0.	2		1215	436	0.
1		0505	62	236.	1		1530	187	0.	2		0155	312	0.	2		1220	437	0.
1		0510	63	174.	1		1535	188	0.	2		0200	313	0.	2		1225	438	0.
1		0515	64	125.	1		1540	189	0.	2		0205	314	0.	2		1230	439	0.
1		0520	65	90.	1		1545	190	0.	2		0210	315	0.	2		1235	440	0.
1		0525	66	69.	1		1550	191	0.	2		0215	316	0.	2		1240	441	0.
1		0530	67	56.	1		1555	192	0.	2		0220	317	0.	2		1245	442	0.
1		0535	68	43.	1		1600	193	0.	2		0225	318	0.	2		1250	443	0.
1		0540	69	34.	1		1605	194	0.	2		0230	319	0.	2		1255	444	0.
1		0545	70	33.	1		1610	195	0.	2		0235	320	0.	2		1300	445	0.
1		0550	71	35.	1		1615	196	0.	2		0240	321	0.	2		1305	446	0.
1		0555	72	32.	1		1620	197	0.	2		0245	322	0.	2		1310	447	0.
1		0600	73	28.	1		1625	198	0.	2		0250	323	0.	2		1315	448	0.
1		0605	74	23.	1		1630	199	0.	2		0255	324	0.	2		1320	449	0.
1		0610	75	17.	1		1635	200	0.	2		0300	325	0.	2		1325	450	0.
1		0615	76	11.	1		1640	201	0.	2		0305	326	0.	2		1330	451	0.
1		0620	77	6.	1		1645	202	0.	2		0310	327	0.	2		1335	452	0.
1		0625	78	4.	1		1650	203	0.	2		0315	328	0.	2		1340	453	0.

1	0630	79	2.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	1.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	1.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	0.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	0.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	0.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	0.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	0.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)					
		(CFS)				
1834.	3.58		261.	65.	38.	38.
		(INCHES)	2.201	2.204	2.204	2.204
		(AC-FT)	129.	129.	129.	129.

CUMULATIVE AREA = 1.10 SQ MI

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HYDROGRAPH AT STATION CLMDBS
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .92

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		1025	126	0.	*	1		2050	251	0.	*	2		0715	376	0.
1		0005	2	0.	*	1		1030	127	0.	*	1		2055	252	0.	*	2		0720	377	0.
1		0010	3	0.	*	1		1035	128	0.	*	1		2100	253	0.	*	2		0725	378	0.
1		0015	4	2.	*	1		1040	129	0.	*	1		2105	254	0.	*	2		0730	379	0.
1		0020	5	10.	*	1		1045	130	0.	*	1		2110	255	0.	*	2		0735	380	0.
1		0025	6	30.	*	1		1050	131	0.	*	1		2115	256	0.	*	2		0740	381	0.
1		0030	7	61.	*	1		1055	132	0.	*	1		2120	257	0.	*	2		0745	382	0.
1		0035	8	85.	*	1		1100	133	0.	*	1		2125	258	0.	*	2		0750	383	0.
1		0040	9	84.	*	1		1105	134	0.	*	1		2130	259	0.	*	2		0755	384	0.
1		0045	10	64.	*	1		1110	135	0.	*	1		2135	260	0.	*	2		0800	385	0.
1		0050	11	41.	*	1		1115	136	0.	*	1		2140	261	0.	*	2		0805	386	0.
1		0055	12	24.	*	1		1120	137	0.	*	1		2145	262	0.	*	2		0810	387	0.
1		0100	13	13.	*	1		1125	138	0.	*	1		2150	263	0.	*	2		0815	388	0.
1		0105	14	9.	*	1		1130	139	0.	*	1		2155	264	0.	*	2		0820	389	0.
1		0110	15	15.	*	1		1135	140	0.	*	1		2200	265	0.	*	2		0825	390	0.
1		0115	16	26.	*	1		1140	141	0.	*	1		2205	266	0.	*	2		0830	391	0.
1		0120	17	34.	*	1		1145	142	0.	*	1		2210	267	0.	*	2		0835	392	0.
1		0125	18	46.	*	1		1150	143	0.	*	1		2215	268	0.	*	2		0840	393	0.
1		0130	19	70.	*	1		1155	144	0.	*	1		2220	269	0.	*	2		0845	394	0.
1		0135	20	98.	*	1		1200	145	0.	*	1		2225	270	0.	*	2		0850	395	0.
1		0140	21	114.	*	1		1205	146	0.	*	1		2230	271	0.	*	2		0855	396	0.
1		0145	22	118.	*	1		1210	147	0.	*	1		2235	272	0.	*	2		0900	397	0.
1		0150	23	108.	*	1		1215	148	0.	*	1		2240	273	0.	*	2		0905	398	0.
1		0155	24	86.	*	1		1220	149	0.	*	1		2245	274	0.	*	2		0910	399	0.
1		0200	25	61.	*	1		1225	150	0.	*	1		2250	275	0.	*	2		0915	400	0.
1		0205	26	44.	*	1		1230	151	0.	*	1		2255	276	0.	*	2		0920	401	0.
1		0210	27	47.	*	1		1235	152	0.	*	1		2300	277	0.	*	2		0925	402	0.
1		0215	28	78.	*	1		1240	153	0.	*	1		2305	278	0.	*	2		0930	403	0.
1		0220	29	122.	*	1		1245	154	0.	*	1		2310	279	0.	*	2		0935	404	0.
1		0225	30	150.	*	1		1250	155	0.	*	1		2315	280	0.	*	2		0940	405	0.
1		0230	31	146.	*	1		1255	156	0.	*	1		2320	281	0.	*	2		0945	406	0.
1		0235	32	122.	*	1		1300	157	0.	*	1		2325	282	0.	*	2		0950	407	0.
1		0240	33	116.	*	1		1305	158	0.	*	1		2330	283	0.	*	2		0955	408	0.
1		0245	34	132.	*	1		1310	159	0.	*	1		2335	284	0.	*	2		1000	409	0.
1		0250	35	136.	*	1		1315	160	0.	*	1		2340	285	0.	*	2		1005	410	0.
1		0255	36	116.	*	1		1320	161	0.	*	1		2345	286	0.	*	2		1010	411	0.
1		0300	37	105.	*	1		1325	162	0.	*	1		2350	287	0.	*	2		1015	412	0.
1		0305	38	150.	*	1		1330	163	0.	*	1		2355	288	0.	*	2		1020	413	0.
1		0310	39	260.	*	1		1335	164	0.	*	2		0000	289	0.	*	2		1025	414	0.
1		0315	40	442.	*	1		1340	165	0.	*	2		0005	290	0.	*	2		1030	415	0.
1		0320	41	768.	*	1		1345	166	0.	*	2		0010	291	0.	*	2		1035	416	0.
1		0325	42	1189.	*	1		1350	167	0.	*	2		0015	292	0.	*	2		1040	417	0.
1		0330	43	1626.	*	1		1355	168	0.	*	2		0020	293	0.	*	2		1045	418	0.

1	0335	44	1810.	*	1	1400	169	0.	*	2	0025	294	0.	*	2	1050	419	0.
1	0340	45	1584.	*	1	1405	170	0.	*	2	0030	295	0.	*	2	1055	420	0.
1	0345	46	1281.	*	1	1410	171	0.	*	2	0035	296	0.	*	2	1100	421	0.
1	0350	47	979.	*	1	1415	172	0.	*	2	0040	297	0.	*	2	1105	422	0.
1	0355	48	711.	*	1	1420	173	0.	*	2	0045	298	0.	*	2	1110	423	0.
1	0400	49	547.	*	1	1425	174	0.	*	2	0050	299	0.	*	2	1115	424	0.
1	0405	50	435.	*	1	1430	175	0.	*	2	0055	300	0.	*	2	1120	425	0.
1	0410	51	326.	*	1	1435	176	0.	*	2	0100	301	0.	*	2	1125	426	0.
1	0415	52	246.	*	1	1440	177	0.	*	2	0105	302	0.	*	2	1130	427	0.
1	0420	53	207.	*	1	1445	178	0.	*	2	0110	303	0.	*	2	1135	428	0.
1	0425	54	204.	*	1	1450	179	0.	*	2	0115	304	0.	*	2	1140	429	0.
1	0430	55	249.	*	1	1455	180	0.	*	2	0120	305	0.	*	2	1145	430	0.
1	0435	56	319.	*	1	1500	181	0.	*	2	0125	306	0.	*	2	1150	431	0.
1	0440	57	347.	*	1	1505	182	0.	*	2	0130	307	0.	*	2	1155	432	0.
1	0445	58	337.	*	1	1510	183	0.	*	2	0135	308	0.	*	2	1200	433	0.
1	0450	59	341.	*	1	1515	184	0.	*	2	0140	309	0.	*	2	1205	434	0.
1	0455	60	341.	*	1	1520	185	0.	*	2	0145	310	0.	*	2	1210	435	0.
1	0500	61	295.	*	1	1525	186	0.	*	2	0150	311	0.	*	2	1215	436	0.
1	0505	62	233.	*	1	1530	187	0.	*	2	0155	312	0.	*	2	1220	437	0.
1	0510	63	172.	*	1	1535	188	0.	*	2	0200	313	0.	*	2	1225	438	0.
1	0515	64	124.	*	1	1540	189	0.	*	2	0205	314	0.	*	2	1230	439	0.
1	0520	65	89.	*	1	1545	190	0.	*	2	0210	315	0.	*	2	1235	440	0.
1	0525	66	68.	*	1	1550	191	0.	*	2	0215	316	0.	*	2	1240	441	0.
1	0530	67	56.	*	1	1555	192	0.	*	2	0220	317	0.	*	2	1245	442	0.
1	0535	68	43.	*	1	1600	193	0.	*	2	0225	318	0.	*	2	1250	443	0.
1	0540	69	34.	*	1	1605	194	0.	*	2	0230	319	0.	*	2	1255	444	0.
1	0545	70	33.	*	1	1610	195	0.	*	2	0235	320	0.	*	2	1300	445	0.
1	0550	71	35.	*	1	1615	196	0.	*	2	0240	321	0.	*	2	1305	446	0.
1	0555	72	31.	*	1	1620	197	0.	*	2	0245	322	0.	*	2	1310	447	0.
1	0600	73	28.	*	1	1625	198	0.	*	2	0250	323	0.	*	2	1315	448	0.
1	0605	74	23.	*	1	1630	199	0.	*	2	0255	324	0.	*	2	1320	449	0.
1	0610	75	17.	*	1	1635	200	0.	*	2	0300	325	0.	*	2	1325	450	0.
1	0615	76	11.	*	1	1640	201	0.	*	2	0305	326	0.	*	2	1330	451	0.
1	0620	77	6.	*	1	1645	202	0.	*	2	0310	327	0.	*	2	1335	452	0.
1	0625	78	4.	*	1	1650	203	0.	*	2	0315	328	0.	*	2	1340	453	0.
1	0630	79	2.	*	1	1655	204	0.	*	2	0320	329	0.	*	2	1345	454	0.
1	0635	80	1.	*	1	1700	205	0.	*	2	0325	330	0.	*	2	1350	455	0.
1	0640	81	1.	*	1	1705	206	0.	*	2	0330	331	0.	*	2	1355	456	0.
1	0645	82	0.	*	1	1710	207	0.	*	2	0335	332	0.	*	2	1400	457	0.
1	0650	83	0.	*	1	1715	208	0.	*	2	0340	333	0.	*	2	1405	458	0.
1	0655	84	0.	*	1	1720	209	0.	*	2	0345	334	0.	*	2	1410	459	0.
1	0700	85	0.	*	1	1725	210	0.	*	2	0350	335	0.	*	2	1415	460	0.
1	0705	86	0.	*	1	1730	211	0.	*	2	0355	336	0.	*	2	1420	461	0.
1	0710	87	0.	*	1	1735	212	0.	*	2	0400	337	0.	*	2	1425	462	0.
1	0715	88	0.	*	1	1740	213	0.	*	2	0405	338	0.	*	2	1430	463	0.
1	0720	89	0.	*	1	1745	214	0.	*	2	0410	339	0.	*	2	1435	464	0.
1	0725	90	0.	*	1	1750	215	0.	*	2	0415	340	0.	*	2	1440	465	0.
1	0730	91	0.	*	1	1755	216	0.	*	2	0420	341	0.	*	2	1445	466	0.
1	0735	92	0.	*	1	1800	217	0.	*	2	0425	342	0.	*	2	1450	467	0.
1	0740	93	0.	*	1	1805	218	0.	*	2	0430	343	0.	*	2	1455	468	0.
1	0745	94	0.	*	1	1810	219	0.	*	2	0435	344	0.	*	2	1500	469	0.
1	0750	95	0.	*	1	1815	220	0.	*	2	0440	345	0.	*	2	1505	470	0.
1	0755	96	0.	*	1	1820	221	0.	*	2	0445	346	0.	*	2	1510	471	0.
1	0800	97	0.	*	1	1825	222	0.	*	2	0450	347	0.	*	2	1515	472	0.
1	0805	98	0.	*	1	1830	223	0.	*	2	0455	348	0.	*	2	1520	473	0.
1	0810	99	0.	*	1	1835	224	0.	*	2	0500	349	0.	*	2	1525	474	0.
1	0815	100	0.	*	1	1840	225	0.	*	2	0505	350	0.	*	2	1530	475	0.
1	0820	101	0.	*	1	1845	226	0.	*	2	0510	351	0.	*	2	1535	476	0.
1	0825	102	0.	*	1	1850	227	0.	*	2	0515	352	0.	*	2	1540	477	0.
1	0830	103	0.	*	1	1855	228	0.	*	2	0520	353	0.	*	2	1545	478	0.
1	0835	104	0.	*	1	1900	229	0.	*	2	0525	354	0.	*	2	1550	479	0.
1	0840	105	0.	*	1	1905	230	0.	*	2	0530	355	0.	*	2	1555	480	0.
1	0845	106	0.	*	1	1910	231	0.	*	2	0535	356	0.	*	2	1600	481	0.
1	0850	107	0.	*	1	1915	232	0.	*	2	0540	357	0.	*	2	1605	482	0.
1	0855	108	0.	*	1	1920	233	0.	*	2	0545	358	0.	*	2	1610	483	0.
1	0900	109	0.	*	1	1925	234	0.	*	2	0550	359	0.	*	2	1615	484	0.
1	0905	110	0.	*	1	1930	235	0.	*	2	0555	360	0.	*	2	1620	485	0.
1	0910	111	0.	*	1	1935	236	0.	*	2	0600	361	0.	*	2	1625	486	0.
1	0915	112	0.	*	1	1940	237	0.	*	2	0605	362	0.	*	2	1630	487	0.
1	0920	113	0.	*	1	1945	238	0.	*	2	0610	363	0.	*	2	1635	488	0.
1	0925	114	0.	*	1	1950	239	0.	*	2	0615	364	0.	*	2	1640	489	0.
1	0930	115	0.	*	1	1955	240	0.	*	2	0620	365	0.	*	2	1645	490	0.
1	0935	116	0.	*	1	2000	241	0.	*	2	0625	366	0.	*	2	1650	491	0.
1	0940	117	0.	*	1	2005	242	0.	*	2	0630	367	0.	*	2	1655	492	0.
1	0945	118	0.	*	1	2010	243	0.	*	2	0635	368	0.	*	2	1700	493	0.
1	0950	119	0.	*	1	2015	244	0.	*	2	0640	369	0.	*	2	1705	494	0.
1	0955	120	0.	*	1	2020	245	0.	*	2	0645	370	0.	*	2	1710	495	0.
1	1000	121	0.	*	1	2025	246	0.	*	2	0650	371	0.	*	2	1715	496	0.
1	1005	122	0.	*	1	2030	247	0.	*	2	0655	372	0.	*	2	1720	497	0.
1	1010	123	0.	*	1	2035	248	0.	*	2	0700	373	0.	*	2	1725	498	0.
1	1015	124	0.	*	1	2040	249	0.	*	2	0705	374	0.	*	2	1730	499	0.
1	1020	125	0.	*	1	2045	250	0.	*	2	0710	375	0.	*	2	1735	500	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.58-HR
+ (CFS)	(HR)	(CFS)				
+ 1810.	3.58		257.	64.	37.	37.
		(INCHES)	2.171	2.173	2.173	2.173
		(AC-FT)	127.	128.	128.	128.

CUMULATIVE AREA = 1.10 SQ MI

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92
HYDROGRAPH AT	W1	.15	1	FLOW	268.	264.	256.	249.	245.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO	RW1	.15	1	FLOW	260.	254.	248.	241.	238.
+				TIME	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT									
+	W2	.17	1	FLOW	331.	325.	316.	306.	302.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
	CP1	.32	1	FLOW	585.	575.	558.	542.	535.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	RCP1	.32	1	FLOW	579.	569.	553.	536.	529.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	CDMNA3	.30	1	FLOW	505.	496.	482.	468.	463.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RMNA3	.30	1	FLOW	498.	490.	476.	462.	456.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	CDMNA2	.13	1	FLOW	218.	214.	207.	201.	198.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	CMNA2	.43	1	FLOW	702.	691.	671.	650.	643.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RMNA2	.43	1	FLOW	698.	687.	667.	646.	639.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	EFPOA1	.14	1	FLOW	264.	259.	251.	243.	240.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	COM1	.57	1	FLOW	916.	900.	872.	845.	835.
				TIME	3.58	3.58	3.67	3.58	3.67
ROUTED TO									
+	RCOM1	.57	1	FLOW	913.	898.	871.	844.	834.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	EFPOA2	.13	1	FLOW	239.	234.	227.	220.	217.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	COM2	.70	1	FLOW	1135.	1114.	1081.	1046.	1032.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	RCOM2	.70	1	FLOW	1113.	1093.	1061.	1027.	1014.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	EFPOB1	.07	1	FLOW	116.	114.	110.	107.	105.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	REFPB1	.07	1	FLOW	114.	111.	108.	104.	103.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	W3	.31	1	FLOW	630.	620.	603.	586.	579.
				TIME	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT									
+	COM3	1.39	1	FLOW	2425.	2383.	2311.	2240.	2212.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	RCOM3	1.39	1	FLOW	2396.	2355.	2282.	2211.	2183.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	WBCA	.06	1	FLOW	80.	79.	76.	74.	73.
				TIME	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT									
+	HLBW1-CA	.39	1	FLOW	673.	662.	644.	625.	618.
				TIME	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT									
+	COM4	1.85	1	FLOW	3076.	3022.	2938.	2848.	2813.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RCOM4	1.85	1	FLOW	3076.	3022.	2935.	2846.	2810.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	HLBW1-CB	.12	1	FLOW	222.	218.	212.	206.	203.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	COM5	1.97	1	FLOW	3282.	3224.	3132.	3037.	2999.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RCOM5	1.97	1	FLOW	3278.	3221.	3127.	3033.	2994.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	WBAW	.06	1	FLOW	80.	78.	75.	73.	72.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	WRBW1	.33	1	FLOW	554.	545.	529.	513.	507.
				TIME	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT									
+	COM6	2.35	1	FLOW	3911.	3844.	3732.	3619.	3573.

ROUTED TO									
+	RCOM12	.26	1	FLOW	478.	470.	455.	440.	434.
				TIME	3.58	3.58	3.58	3.58	3.58
DROGRAPH AT									
	UVB1-1E	.03	1	FLOW	58.	56.	55.	53.	52.
				TIME	3.50	3.50	3.50	3.50	3.50
ROUTED TO									
+	RUVB1-1E	.03	1	FLOW	55.	53.	52.	51.	49.
				TIME	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT									
+	COM13	.31	1	FLOW	590.	578.	560.	543.	535.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	WBCL	.03	1	FLOW	59.	58.	56.	55.	54.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	LMBW1	.08	1	FLOW	149.	146.	141.	135.	133.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	COM14	.43	1	FLOW	790.	775.	751.	727.	716.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	LMDBS	.06	1	FLOW	91.	89.	86.	82.	81.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	CLMDBS	1.10	1	FLOW	1992.	1955.	1896.	1834.	1810.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	CLMBWCDB	3.53	1	FLOW	5860.	5758.	5577.	5398.	5335.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	LMBWCDB	3.53	1	FLOW	98.	95.	90.	85.	83.
				TIME	6.08	6.08	6.08	6.08	6.08
			**	PEAK STAGES IN FEET **					
			1	STAGE	2733.35	2733.06	2732.56	2732.07	2731.88
				TIME	6.08	6.08	6.08	6.08	6.08
HYDROGRAPH AT									
+	WBLM	.08	1	FLOW	127.	125.	121.	116.	115.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	COM15	3.61	1	FLOW	182.	179.	175.	170.	168.
				TIME	3.58	3.58	3.58	3.58	3.58
OUTED TO									
+	RLMBWDB	3.61	1	FLOW	179.	177.	172.	168.	165.
				TIME	3.67	3.67	3.67	3.67	3.67

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RW1	MANE	1.73	267.17	217.52	2.61	5.00	259.74	220.00	2.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2048E+02 EXCESS= .0000E+00 OUTFLOW= .2048E+02 BASIN STORAGE= .2470E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RW1	MANE	1.73	262.06	218.27	2.56	5.00	254.28	220.00	2.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2011E+02 EXCESS= .0000E+00 OUTFLOW= .2011E+02 BASIN STORAGE= .2026E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RW1	MANE	1.74	254.86	217.81	2.48	5.00	247.92	220.00	2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1949E+02 EXCESS= .0000E+00 OUTFLOW= .1949E+02 BASIN STORAGE= .2274E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RW1	MANE	1.75	247.58	217.39	2.41	5.00	240.75	220.00	2.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1887E+02 EXCESS= .0000E+00 OUTFLOW= .1887E+02 BASIN STORAGE= .1998E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RW1	MANE	1.76	244.19	217.92	2.37	5.00	237.57	220.00	2.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1862E+02 EXCESS= .0000E+00 OUTFLOW= .1862E+02 BASIN STORAGE= .2191E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCP1	MANE	.40	584.15	215.38	2.59	5.00	579.39	215.00	2.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4363E+02 EXCESS= .0000E+00 OUTFLOW= .4363E+02 BASIN STORAGE= .5465E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RCP1	MANE	.40	573.52	215.33	2.54	5.00	569.28	215.00	2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4282E+02 EXCESS= .0000E+00 OUTFLOW= .4282E+02 BASIN STORAGE= .5537E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.40	557.43	215.42	2.46	5.00	552.67	215.00	2.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4150E+02 EXCESS= .0000E+00 OUTFLOW= .4150E+02 BASIN STORAGE= .5329E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.40	540.12	215.55	2.38	5.00	535.52	215.00	2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4017E+02 EXCESS= .0000E+00 OUTFLOW= .4017E+02 BASIN STORAGE= .5330E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP1	MANE	.40	533.10	215.67	2.35	5.00	528.96	215.00	2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3963E+02 EXCESS= .0000E+00 OUTFLOW= .3963E+02 BASIN STORAGE= .5478E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.12	500.66	220.56	2.65	5.00	497.89	220.00	2.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4271E+02 EXCESS= .0000E+00 OUTFLOW= .4271E+02 BASIN STORAGE= .1490E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.13	493.78	220.92	2.61	5.00	490.02	220.00	2.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4195E+02 EXCESS= .0000E+00 OUTFLOW= .4195E+02 BASIN STORAGE= .1542E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.14	480.44	221.19	2.53	5.00	476.40	220.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4068E+02 EXCESS= .0000E+00 OUTFLOW= .4068E+02 BASIN STORAGE= .1657E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.15	464.94	221.51	2.45	5.00	461.68	220.00	2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3942E+02 EXCESS= .0000E+00 OUTFLOW= .3942E+02 BASIN STORAGE= .1513E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA3	MANE	1.16	459.81	221.42	2.42	5.00	456.27	220.00	2.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3891E+02 EXCESS= .0000E+00 OUTFLOW= .3891E+02 BASIN STORAGE= .1534E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.75	700.21	220.65	2.57	5.00	698.25	220.00	2.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5859E+02 EXCESS= .0000E+00 OUTFLOW= .5859E+02 BASIN STORAGE= .1145E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.76	688.53	220.59	2.53	5.00	686.50	220.00	2.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5753E+02 EXCESS= .0000E+00 OUTFLOW= .5753E+02 BASIN STORAGE= .1145E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.77	668.59	220.85	2.45	5.00	666.99	220.00	2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5575E+02 EXCESS= .0000E+00 OUTFLOW= .5576E+02 BASIN STORAGE= .1159E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.78	648.02	220.54	2.37	5.00	646.08	220.00	2.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5398E+02 EXCESS= .0000E+00 OUTFLOW= .5398E+02 BASIN STORAGE= .1138E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RMNA2	MANE	.78	640.45	220.83	2.34	5.00	638.65	220.00	2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5327E+02 EXCESS= .0000E+00 OUTFLOW= .5328E+02 BASIN STORAGE= .1155E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.74	917.01	216.03	2.50	5.00	913.35	220.00	2.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7597E+02 EXCESS= .0000E+00 OUTFLOW= .7597E+02 BASIN STORAGE= .1334E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.74	900.55	216.15	2.45	5.00	897.85	220.00	2.45

ONTINUITY SUMMARY (AC-FT) - INFLOW= .7455E+02 EXCESS= .0000E+00 OUTFLOW= .7455E+02 BASIN STORAGE= .1392E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM1	MANE	.75	873.70	216.60	2.37	5.00	871.26	220.00	2.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7220E+02 EXCESS= .0000E+00 OUTFLOW= .7221E+02 BASIN STORAGE= .1334E-02 PERCENT ERROR= .0

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          FOR PLAN = 1  RATIO=  .00
             RCOM1  MANE          .76    846.43    216.29      2.30      5.00    844.30    220.00        2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6985E+02 EXCESS= .0000E+00 OUTFLOW= .6986E+02 BASIN STORAGE= .1252E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM1  MANE          .77    835.44    216.62      2.27      5.00    833.67    220.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6892E+02 EXCESS= .0000E+00 OUTFLOW= .6892E+02 BASIN STORAGE= .1257E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM2  MANE         1.07   1135.19    216.42      2.47      5.00   1112.60    220.00        2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9181E+02 EXCESS= .0000E+00 OUTFLOW= .9181E+02 BASIN STORAGE= .2292E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM2  MANE         1.08   1113.25    216.97      2.42      5.00   1092.58    220.00        2.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9009E+02 EXCESS= .0000E+00 OUTFLOW= .9009E+02 BASIN STORAGE= .2148E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM2  MANE         1.09   1080.56    216.38      2.34      5.00   1060.91    220.00        2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8722E+02 EXCESS= .0000E+00 OUTFLOW= .8722E+02 BASIN STORAGE= .2142E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM2  MANE         1.11   1045.35    217.01      2.27      5.00   1026.91    220.00        2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8435E+02 EXCESS= .0000E+00 OUTFLOW= .8435E+02 BASIN STORAGE= .2063E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM2  MANE         1.11   1031.87    217.03      2.24      5.00   1013.87    220.00        2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8321E+02 EXCESS= .0000E+00 OUTFLOW= .8321E+02 BASIN STORAGE= .2027E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             REFPB1  MANE          .80    115.23    216.08      2.32      5.00    113.62    215.00        2.32

ONTINUITY SUMMARY (AC-FT) - INFLOW= .8143E+01 EXCESS= .0000E+00 OUTFLOW= .8144E+01 BASIN STORAGE= .6069E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             REFPB1  MANE          .80    113.07    216.10      2.27      5.00    111.49    215.00        2.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7982E+01 EXCESS= .0000E+00 OUTFLOW= .7982E+01 BASIN STORAGE= .6170E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             REFPB1  MANE          .81    109.52    215.63      2.20      5.00    108.00    215.00        2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7715E+01 EXCESS= .0000E+00 OUTFLOW= .7715E+01 BASIN STORAGE= .6313E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             REFPB1  MANE          .82    106.07    216.03      2.12      5.00    104.42    215.00        2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7448E+01 EXCESS= .0000E+00 OUTFLOW= .7448E+01 BASIN STORAGE= .5895E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             REFPB1  MANE          .83    104.33    215.55      2.09      5.00    102.96    215.00        2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7341E+01 EXCESS= .0000E+00 OUTFLOW= .7342E+01 BASIN STORAGE= .5996E-03 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM3  MANE          .46   2417.87    215.81      2.56      5.00   2395.74    215.00        2.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1901E+03 EXCESS= .0000E+00 OUTFLOW= .1901E+03 BASIN STORAGE= .1170E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM3  MANE          .46   2378.73    215.49      2.51      5.00   2354.88    215.00        2.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1866E+03 EXCESS= .0000E+00 OUTFLOW= .1866E+03 BASIN STORAGE= .1170E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM3  MANE          .47   2304.84    215.80      2.44      5.00   2282.17    215.00        2.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1808E+03 EXCESS= .0000E+00 OUTFLOW= .1808E+03 BASIN STORAGE= .1221E-02 PERCENT ERROR=     .0

          FOR PLAN = 1  RATIO=  .00
             RCOM3  MANE          .47   2234.78    215.69      2.36      5.00   2210.57    215.00        2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1750E+03 EXCESS= .0000E+00 OUTFLOW= .1750E+03 BASIN STORAGE= .1233E-02 PERCENT ERROR=     .0
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          FOR PLAN = 1  RATIO=  .00
             RCOM3  MANE          .47   2205.43    215.84      2.33      5.00   2183.40    215.00        2.33

ONTINUITY SUMMARY (AC-FT) - INFLOW= .1727E+03 EXCESS= .0000E+00 OUTFLOW= .1727E+03 BASIN STORAGE= .1249E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM4  MANE          .53   3075.63    220.02      2.59      5.00   3075.62    220.00        2.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2560E+03 EXCESS= .0000E+00 OUTFLOW= .2560E+03 BASIN STORAGE= .1489E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM4  MANE          .53   3022.08    219.99      2.55      5.00   3021.91    220.00        2.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2513E+03 EXCESS= .0000E+00 OUTFLOW= .2514E+03 BASIN STORAGE= .1457E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM4  MANE          .54   2936.16    219.83      2.47      5.00   2934.79    220.00        2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2436E+03 EXCESS= .0000E+00 OUTFLOW= .2436E+03 BASIN STORAGE= .1447E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM4  MANE          .54   2846.88    219.84      2.39      5.00   2845.64    220.00        2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2358E+03 EXCESS= .0000E+00 OUTFLOW= .2358E+03 BASIN STORAGE= .1455E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM4  MANE          .55   2811.26    219.87      2.36      5.00   2810.11    220.00        2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2327E+03 EXCESS= .0000E+00 OUTFLOW= .2327E+03 BASIN STORAGE= .1495E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM5  MANE          .46   3278.11    219.89      2.60      5.00   3277.51    220.00        2.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2729E+03 EXCESS= .0000E+00 OUTFLOW= .2729E+03 BASIN STORAGE= .1353E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM5  MANE          .47   3221.48    220.04      2.55      5.00   3221.25    220.00        2.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2680E+03 EXCESS= .0000E+00 OUTFLOW= .2680E+03 BASIN STORAGE= .1344E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM5  MANE          .47   3127.53    219.80      2.48      5.00   3127.16    220.00        2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2597E+03 EXCESS= .0000E+00 OUTFLOW= .2597E+03 BASIN STORAGE= .1360E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM5  MANE          .48   3033.03    220.13      2.40      5.00   3032.56    220.00        2.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2514E+03 EXCESS= .0000E+00 OUTFLOW= .2514E+03 BASIN STORAGE= .1354E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM5  MANE          .48   2994.73    219.79      2.36      5.00   2994.49    220.00        2.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2481E+03 EXCESS= .0000E+00 OUTFLOW= .2481E+03 BASIN STORAGE= .1358E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM6  MANE          .69   3895.01    220.42      2.59      5.00   3894.66    220.00        2.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3247E+03 EXCESS= .0000E+00 OUTFLOW= .3246E+03 BASIN STORAGE= .2101E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM6  MANE          .69   3830.50    219.88      2.54      5.00   3829.75    220.00        2.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3187E+03 EXCESS= .0000E+00 OUTFLOW= .3187E+03 BASIN STORAGE= .2124E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM6  MANE          .70   3716.42    220.39      2.46      5.00   3715.18    220.00        2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3088E+03 EXCESS= .0000E+00 OUTFLOW= .3088E+03 BASIN STORAGE= .2102E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM6  MANE          .71   3604.84    220.28      2.39      5.00   3602.27    220.00        2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2990E+03 EXCESS= .0000E+00 OUTFLOW= .2990E+03 BASIN STORAGE= .2075E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCOM6  MANE          .71   3561.58    219.97      2.35      5.00   3561.32    220.00        2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2950E+03 EXCESS= .0000E+00 OUTFLOW= .2950E+03 BASIN STORAGE= .2133E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
          RUVB1-2A  MANE         2.68    102.17    217.26       .57      5.00     99.22    220.00         .57
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .7403E+01 EXCESS= .0000E+00 OUTFLOW= .7408E+01 BASIN STORAGE= .2015E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-2A	MANE	2.70	98.97	218.92	.55	5.00	96.52	220.00	.55	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7256E+01 EXCESS= .0000E+00 OUTFLOW= .7260E+01 BASIN STORAGE= .1935E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-2A	MANE	2.74	96.13	218.85	.54	5.00	93.72	220.00	.54	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7025E+01 EXCESS= .0000E+00 OUTFLOW= .7030E+01 BASIN STORAGE= .1997E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-2A	MANE	2.77	93.21	218.84	.52	5.00	90.91	220.00	.52	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6794E+01 EXCESS= .0000E+00 OUTFLOW= .6798E+01 BASIN STORAGE= .2049E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-2A	MANE	2.78	92.85	217.17	.51	5.00	90.58	220.00	.51	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6706E+01 EXCESS= .0000E+00 OUTFLOW= .6710E+01 BASIN STORAGE= .2162E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCOM7	MANE	.95	533.72	216.45	1.56	5.00	520.51	215.00	1.56	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4031E+02 EXCESS= .0000E+00 OUTFLOW= .4031E+02 BASIN STORAGE= .1413E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM7	MANE	.95	524.32	216.18	1.53	5.00	511.00	215.00	1.53	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3953E+02 EXCESS= .0000E+00 OUTFLOW= .3953E+02 BASIN STORAGE= .1315E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM7	MANE	.96	508.75	215.94	1.48	5.00	495.92	215.00	1.48	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3828E+02 EXCESS= .0000E+00 OUTFLOW= .3828E+02 BASIN STORAGE= .1442E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM7	MANE	.98	492.11	216.71	1.43	5.00	479.84	215.00	1.43	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3703E+02 EXCESS= .0000E+00 OUTFLOW= .3703E+02 BASIN STORAGE= .1311E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM7	MANE	.98	486.03	216.81	1.41	5.00	473.97	215.00	1.41	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3654E+02 EXCESS= .0000E+00 OUTFLOW= .3654E+02 BASIN STORAGE= .1470E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM8	MANE	.59	703.41	215.94	1.71	5.00	694.46	215.00	1.71	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5296E+02 EXCESS= .0000E+00 OUTFLOW= .5296E+02 BASIN STORAGE= .9225E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM8	MANE	.60	690.86	215.53	1.68	5.00	682.29	215.00	1.68	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5194E+02 EXCESS= .0000E+00 OUTFLOW= .5194E+02 BASIN STORAGE= .8329E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM8	MANE	.60	671.30	215.63	1.63	5.00	662.15	215.00	1.63	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5030E+02 EXCESS= .0000E+00 OUTFLOW= .5030E+02 BASIN STORAGE= .9179E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM8	MANE	.60	649.40	215.83	1.57	5.00	640.45	215.00	1.57	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4865E+02 EXCESS= .0000E+00 OUTFLOW= .4865E+02 BASIN STORAGE= .9624E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOM8	MANE	.60	641.62	215.76	1.55	5.00	632.63	215.00	1.55	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4801E+02 EXCESS= .0000E+00 OUTFLOW= .4801E+02 BASIN STORAGE= .9639E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RDIV2A	MANE	.87	360.73	215.66	-1.00	5.00	355.95	215.00	-1.00	

FOR PLAN = 1 RATIO= .00

RDIV2A	MANE	.88	353.46	216.28	-1.00	5.00	349.57	215.00	-1.00	

FOR PLAN = 1 RATIO= .00

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  RDIV2A  MANE          .89    343.18    216.24     -1.00      5.00    339.08    215.00     -1.00

 FOR PLAN = 1  RATIO=  .00
  RDIV2A  MANE          .90    332.63    216.25     -1.00      5.00    328.54    215.00     -1.00

 FOR PLAN = 1  RATIO=  .00
  RDIV2A  MANE          .91    328.38    215.55     -1.00      5.00    324.25    215.00     -1.00

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE       2.12     38.60    212.00      2.35      5.00     36.35    210.00      2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2317E+01 EXCESS= .0000E+00 OUTFLOW= .2319E+01 BASIN STORAGE= .1052E-02 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE       2.14     37.26    211.43      2.30      5.00     35.46    210.00      2.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2270E+01 EXCESS= .0000E+00 OUTFLOW= .2272E+01 BASIN STORAGE= .1275E-02 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE       2.16     36.62    211.94      2.23      5.00     34.46    210.00      2.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2197E+01 EXCESS= .0000E+00 OUTFLOW= .2199E+01 BASIN STORAGE= .1152E-02 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE       2.19     35.42    212.52      2.15      5.00     33.27    210.00      2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2121E+01 EXCESS= .0000E+00 OUTFLOW= .2122E+01 BASIN STORAGE= .1064E-02 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1C  MANE       2.20     34.43    211.45      2.12      5.00     32.70    210.00      2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2091E+01 EXCESS= .0000E+00 OUTFLOW= .2093E+01 BASIN STORAGE= .1079E-02 PERCENT ERROR=   -.1

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE        .64    418.76    215.47      2.40      5.00    416.75    215.00      2.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2808E+02 EXCESS= .0000E+00 OUTFLOW= .2808E+02 BASIN STORAGE= .8195E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE        .64    410.11    215.12      2.35      5.00    409.28    215.00      2.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2753E+02 EXCESS= .0000E+00 OUTFLOW= .2754E+02 BASIN STORAGE= .8530E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE        .65    397.72    215.22      2.27      5.00    396.38    215.00      2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2662E+02 EXCESS= .0000E+00 OUTFLOW= .2662E+02 BASIN STORAGE= .8502E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE        .66    385.46    215.38      2.19      5.00    383.62    215.00      2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2571E+02 EXCESS= .0000E+00 OUTFLOW= .2571E+02 BASIN STORAGE= .8207E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
  RUVB1-1A  MANE        .66    379.82    215.19      2.16      5.00    378.68    215.00      2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2535E+02 EXCESS= .0000E+00 OUTFLOW= .2535E+02 BASIN STORAGE= .7995E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCOM12  MANE         .55    479.99    215.43      2.39      5.00    478.46    215.00      2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3251E+02 EXCESS= .0000E+00 OUTFLOW= .3251E+02 BASIN STORAGE= .7284E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCOM12  MANE         .55    471.11    215.33      2.34      5.00    469.67    215.00      2.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3188E+02 EXCESS= .0000E+00 OUTFLOW= .3188E+02 BASIN STORAGE= .7903E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCOM12  MANE         .56    456.18    215.28      2.26      5.00    454.85    215.00      2.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3082E+02 EXCESS= .0000E+00 OUTFLOW= .3082E+02 BASIN STORAGE= .7392E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCOM12  MANE         .57    441.43    215.26      2.19      5.00    440.16    215.00      2.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2977E+02 EXCESS= .0000E+00 OUTFLOW= .2977E+02 BASIN STORAGE= .7879E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCOM12  MANE         .57    435.64    215.23      2.16      5.00    434.46    215.00      2.16
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2935E+02 EXCESS= .0000E+00 OUTFLOW= .2935E+02 BASIN STORAGE= .8047E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.31	57.08	212.53	2.36	5.00	54.76	215.00	2.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3524E+01 EXCESS= .0000E+00 OUTFLOW= .3527E+01 BASIN STORAGE= .1319E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.33	55.25	211.77	2.31	5.00	53.26	215.00	2.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3453E+01 EXCESS= .0000E+00 OUTFLOW= .3456E+01 BASIN STORAGE= .1653E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.36	54.03	212.11	2.24	5.00	51.93	215.00	2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3339E+01 EXCESS= .0000E+00 OUTFLOW= .3343E+01 BASIN STORAGE= .1548E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.39	52.64	212.50	2.16	5.00	50.69	215.00	2.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3226E+01 EXCESS= .0000E+00 OUTFLOW= .3229E+01 BASIN STORAGE= .1480E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RUVB1-1E	MANE	2.40	51.21	213.64	2.13	5.00	49.34	215.00	2.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3175E+01 EXCESS= .0000E+00 OUTFLOW= .3178E+01 BASIN STORAGE= .1536E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RLMBWDB	MANE	1.61	182.05	217.87	1.25	5.00	179.47	220.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2402E+03 EXCESS= .0000E+00 OUTFLOW= .2400E+03 BASIN STORAGE= .2626E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RLMBWDB	MANE	1.62	179.38	217.61	1.23	5.00	176.88	220.00	1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2364E+03 EXCESS= .0000E+00 OUTFLOW= .2362E+03 BASIN STORAGE= .2620E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RLMBWDB	MANE	1.64	175.07	216.65	1.19	5.00	171.83	220.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2302E+03 EXCESS= .0000E+00 OUTFLOW= .2300E+03 BASIN STORAGE= .2607E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RLMBWDB	MANE	1.66	170.19	217.36	1.16	5.00	167.83	220.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2244E+03 EXCESS= .0000E+00 OUTFLOW= .2241E+03 BASIN STORAGE= .2589E+00 PERCENT ERROR= .0

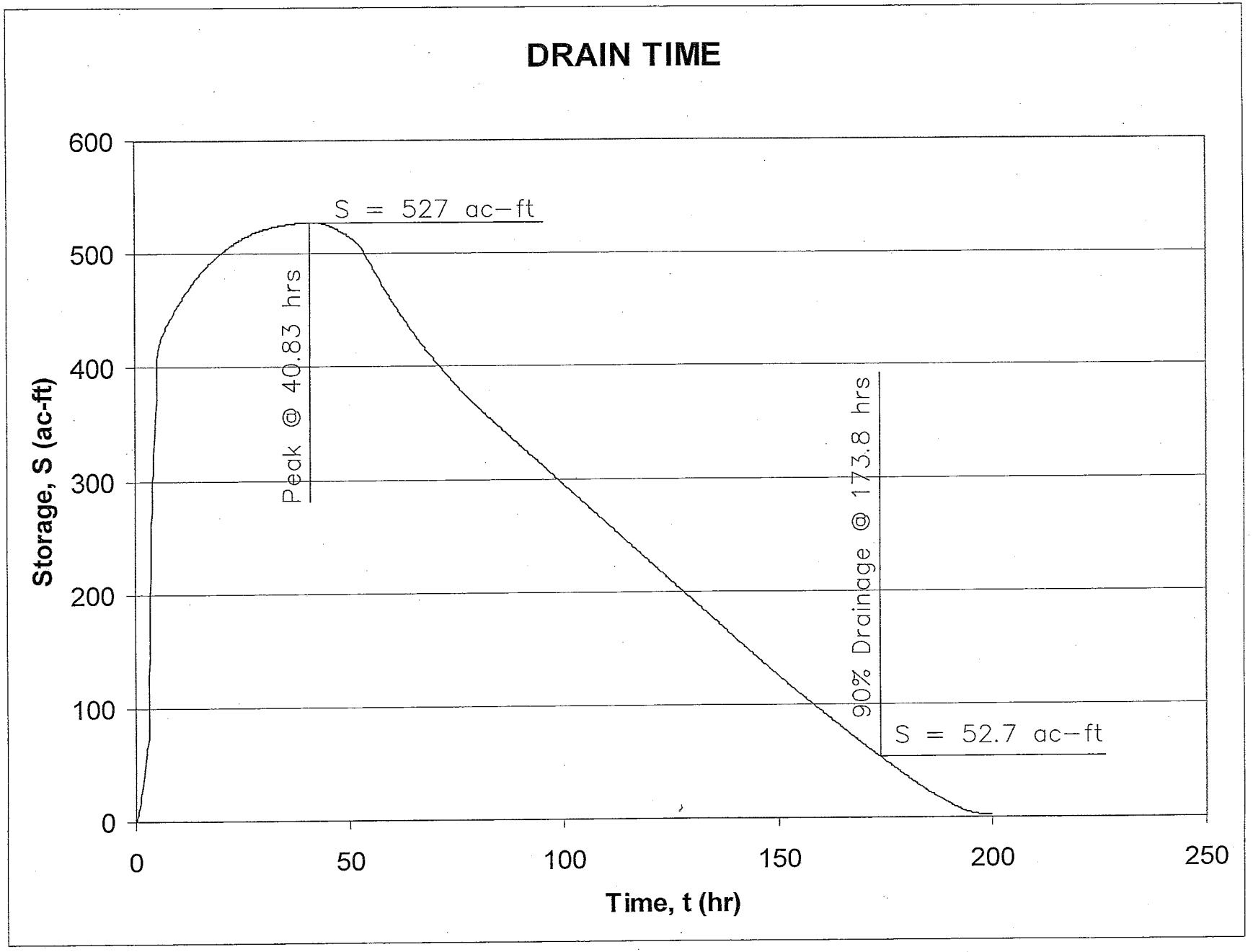
FOR PLAN = 1 RATIO= .00

RLMBWDB	MANE	1.67	168.49	216.66	1.15	5.00	165.49	220.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2223E+03 EXCESS= .0000E+00 OUTFLOW= .2221E+03 BASIN STORAGE= .2581E+00 PERCENT ERROR= .0

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

LMBW DETENTION BASINS DRAIN TIME HEC-1 ANALYSIS


DRAIN TIME
600
500
400
300
200
100
0
Storage, S (ac-ft)
S = 527 ac-ft
Peak @ 40.83 hrs
90% Drainage @ 173.8 hrs
S = 52.7 ac-ft
0
50
100
150
200
250
Time, t (hr)

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              JUN  1998                     *
*            VERSION 4.1                     *
*                                            *
*   RUN DATE   28MAY08  TIME  09:07:04       *
*                                            *
**********************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
                    *DIAGRAM
*** FREE ***
               1    ID    LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
               2    ID    DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
               3    ID    DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
               4    ID    DRAIN TIME MODEL
               5    ID    INPUT FILE = WBMOD1-SDN4-DT.H1
               6    ID    LAST MODIFIED = 05/13/08
               7    ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
               8    ID    STORM DISTRIBUTION = SDN4
               9    ID    MODELED BY = JTL/JYL/MGK
              10    ID
              11    ID    JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
              12    ID
              13    ID                          AREA    DARF
              14    ID                          SQ. MI.
              15    ID                          8-9     0.875
              16    ID                          9-10    0.865
              17    ID                          10-11   0.857
              18    ID
              19    ID
              20    ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
              21    ID
              22    ID
              23    IT      15       0       0     800
              24    IO       5       0       0
              25    IN       5       0       0
              26    JR    PREC   0.875   0.865   0.857
                    *
                    * START BASINS AND PARAMETERS TAKEN FROM DRAFT 2007 MPU
                    *
              27    KK  CAMDK2
              28    BA   0.337
              29    PB    3.28
              30    PC       0    0.02   0.058   0.075   0.099   0.126   0.137   0.145   0.149   0.151
              31    PC   0.155   0.156   0.159   0.162   0.169   0.172   0.179   0.189   0.201   0.211
              32    PC    0.22   0.228   0.232    0.24   0.246   0.252    0.26   0.269   0.276   0.283
              33    PC   0.286   0.292   0.302   0.312   0.321   0.332   0.352   0.376   0.415   0.462
              34    PC    0.53    0.61    0.71   0.732   0.756   0.782   0.799   0.813   0.823    0.83
              35    PC   0.835   0.844   0.851   0.864   0.885   0.908   0.924   0.944   0.968   0.973
              36    PC   0.978   0.982   0.984   0.986   0.988   0.991   0.992   0.993   0.994   0.997
              37    PC   0.998   0.999       1
              38    LS       0    92.1
              39    UD0.213342
                    *
                    * KKRCAMDK2
                    * KMROUTE RCAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
                    * KMFACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
                    * KMFACILITY # = GOAN 0065, 0067, 0068, 0070
                    * KMLINING = SOIL CEMENT
                    * RD1400    0.0321  0.025   0       TRAP    10      4
                    *
```

1 HEC-1 INPUT PAGE 2

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

              40    KK  CAMDK3
              41    BA   0.316
              42    PB    3.32
              43    LS       0    90.3
              44    UD0.193556
                    *
              45    KK CCAMDK3
              46    KM  COMBINE RCAMDK2 AND CAMDK3
              47    HC       2
                    *
              48    KK CAM-10A
              49    BA   1.266
              50    PB    3.41
              51    LS       0    94.8
              52    UD0.209967
```

```
                *
   53           KK CAM-10B
   54           BA   1.809
   55           PB    3.39
   56           LS       0     91.8
   57           UD0.211495
                *
   58           KKDETCAM10
   59           BA   0.046
   60           PB   3.294
   61           LS       0     86.9
   62           UD0.137401
                *
   63           KK CAM10IN
   64           KM  COMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
   65           KM  TOTAL INFLOW TO CAM10 DETENTION BASIN
   66           HC       4
                *
   67           KK CAM10DB
   68           KM  DETENTION BASIN PARAMETERS FROM 2008 MPU BY PBS&J
   69           KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
   70           KM  FACILITY # = GOAN 0058
   71           KM  STORAGE VOLUME = 429.52 AC-FT (BERGER 5-05 VOLUME = 364 AC-FT; 18% INCREASE)
   72           KM  OUTLET = 33" ORIFICE WITH 54" RCP
   73           KM  100-YEAR DISCHARGE = 156 CFS
   74           KM  SPILLWAY LENGTH = 1360 FT
   75           KM  SPILLWAY HEIGHT = 27.7 FT
   76           KM  SPILLWAY CREST ELEVATION = 3000'
   77           KM  SPILLWAY TYPE =
   78           KM  PMF DISCHARGE = 24,614 CFS
   79           KM  TOP OF EMBANKMENT ELEVATION = 3004.5'
   80           KM  INFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
   81           KM  BY THE LOUIS BERGER GROUP (5-05)
1                                      HEC-1 INPUT                                          PAGE  3

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

   82           RS       1    STOR      -1
                *        0       0       0    0.67    3.33    8.33   26.67   43.33     110       2
                *      280   347.2     364     396
   83           SV    0.00    0.00    0.00    0.79    3.93    9.83   31.47   51.13  129.80  236.00
   84           SV  330.40  409.70  429.52  467.28
   85           SE  2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
   86           SE  2995.0  2999.0  3000.0  3003.4
   87           SQ    0.00    6.67   17.78   27.78   45.56   54.44   64.44   82.22   93.33  117.78
   88           SQ  138.39  156.00  160.40   24614
                *
                * KKRCAM10
                * RD  3200    .019   0.013       0    CIRC     4.0
                *
                * END BASINS AND PARAMETERS TAKEN FROM DRAFT 2007 MPU
                *

   89           KK      W1
   90           PB    3.25
   91           BA  .14708
   92           LS       0    94.5
   93           UD   0.198
                *
                * KKRW1
                * RD  2850    .03   0.013       0    CIRC     5.0
                *

   94           KK      W2
   95           PB    3.26
   96           BA  .16884
   97           LS       0    94.0
   98           UD   0.161
                *

   99           KK     CP1
  100           HC       3
                *
                * KKRCP1
                * RD  760    .028   0.013       0    CIRC     6.0
                *

  101           KK  CDMNA3
  102           BA  0.3017
  103           PB    3.21
  104           LS       0    95.3
  105           UD0.254836
                *
                * KKRMNA3
                * KMROUTE CDMNA3 TO CMNA2
                * KMFACILITY = GOWAN BELTWAY WEST
                * KMFACILITY ID-MILE = GOBW 0322, 0326
                * KMLINING = RCB
                * RD1615    0.01    0.015   0       TRAP    10      0
                *
1                                      HEC-1 INPUT                                          PAGE  4

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

  106           KK  CDMNA2
  107           BA  0.1250
  108           PB    3.18
  109           LS       0    92.8
  110           UD   0.188
                *

  111           KK   CMNA2
  112           KM  COMBINE RMNA3 AND CDMNA2
  113           KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
  114           HC       2
                *
                * KKRMNA2
                * KMROUTE CMNA2 TO COM1
                * KMFACILITY = GOWAN BELTWAY WEST
```

```
                * RD1400    0.015    0.015   0       TRAP    10      0
                *
  115           KK  EFPOA1
  116           PB    3.22
  117           BA  .14340
  118           LS       0    91.2
  119           UD   0.143
                *
  120           KK    COM1
  121           HC       2
                *
                * KKRCOM1
                * KMROUTE COM1 TO COM2
                * KMFACILITY = GOWAN BELTWAY WEST
                * RD1350    0.01    0.015   0       TRAP    10      0
                *
  122           KK  EFPOA2
  123           PB    3.23
  124           BA  .12750
  125           LS       0    91.7
  126           UD   0.144
                *
  127           KK    COM2
  128           HC       2
                *
                * KKRCOM2
                * KMROUTE COM2 TO COM3
                * KMFACILITY = GOWAN BELTWAY WEST
                * RD2300    0.02    0.015   0       TRAP    14      0
                *
1                                       HEC-1 INPUT                                     PAGE  5

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

  129           KK  EFPOB1
  130           PB    3.23
  131           BA  .06580
  132           LS       0    91.7
  133           UD   0.178
                *
                * KKREFPB1
                * KMROUTE EFPOB1 TO COM3
                * KMFACILITY = GOWAN BELTWAY WEST
                * RD760     0.028    0.015   0       TRAP    14      0
                *
  134           KK      W3
  135           PB    3.29
  136           BA  .31270
  137           LS       0    95.8
  138           UD   0.172
                *
  139           KK    COM3
  140           HC       4
                *
                * KKRCOM3
                * KMROUTE COM3 TO COM4
                * KMFACILITY = GOWAN BELTWAY WEST
                * RD1080    0.01    0.015   0       TRAP    14      0
                *
  141           KK    WBCA
  142           KM   BASIN FROM CENT TO ANN
  143           BA  0.0647
  144           PB    3.20
  145           LS       0    92.0
  146           UD   0.394
                *
  147           KKHLBW1-CA
  148           BA  0.3933
  149           PB    3.30
  150           LS       0    95.4
  151           UD   0.261
                *
  152           KK    COM4
  153           KM  COMBINE COM3, WBCA, AND HLBW1-CA
  154           KM  LAS VEGAS BELTWAY @ ANN ROAD
  155           HC       3
                *
                * KKRCOM4
                * KMROUTE COM4 TO HLBW1-CB
                * RD1800    0.0250   0.015       0   TRAP        14      0
                *
1                                       HEC-1 INPUT                                     PAGE  6

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

  156           KKHLBW1-CB
  157           BA  0.1171
  158           PB    3.22
  159           LS       0    95.4
  160           UD   0.187
                *
  161           KK    COM5
  162           KM  COMBINE RCOM4 & HLBW1-CB
  163           HC       2
                *
                * KKRCOM5
                * KMROUTE COM5 TO WRBW1
                * RD2000    0.050   0.015       0   TRAP        14      0
                *
  164           KK    WBAW
  165           BA  0.0570
```

```
166          PB    3.20
167          LS       0    88.0
168          UD   0.223
             *

169          KK   WRBW1
170          BA  0.3256
171          PB    3.23
172          LS       0    94.8
173          UD   0.239
             *

174          KK    COM6
175          KM  COMBINE RCOM5, WBAW, & WRBW1
176          KM  LAS VEGAS BELTWAY @ WASHBURN ROAD
177          HC       3
             *
             * KKRCOM6
             * KMROUTE COM6 TO CLMDBN
             * RD1600    0.0050   0.015       0   TRAP       14       0
             *

178          KK  LWBW1C
179          BA  0.0570
180          PB    3.20
181          LS       0    93.5
182          UD   0.114
             *

183          KK   LMDBN
184          BA  0.0237
185          PB    3.18
186          LS       0    84.8
187          UD   0.161
             *
1                                        HEC-1 INPUT                                    PAGE  7

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

188          KK  CLMDBN
189          KM  COMBINE LMDBN AND RCOM6
190          HC       3
             *

191          KKBOXCANYON
192          BA   3.410
193          PB    3.55
194          LS       0    88.7
195          UD0.326658
             *

196          KK  BOXDET
197          KM  BOX CANYON DETENTION BASIN
198          KM  FACILITY = GOWAN BOX CANYON
199          KM  FACILITY # = GOBX 0118
200          KM  OUTLET = GOBX 0016: 18" RCP
201          RS       1    STOR      -1
202          SV     0.0    35.4    71.5   108.4   146.0   184.3   223.4   263.3   304.0   345.4
203          SV   387.6
204          SE       0       2       4       6       8      10      12      14      16      18
205          SE      20
206          SQ     0.0    10.3    16.6    21.1    24.8    28.0    30.9    33.5    36.0    38.3
207          SQ    40.4
             *
             * KKRBOXDET
             * KMROUTE THRU LWBW1A
             * KMLONE MOUNTAIN
             * RD7000    0.0647   0.013       0   CIRC      5.5
             *

208          KK  LWBW1A
209          BA  0.2401
210          PB    3.31
211          LS       0    93.5
212          UD   0.198
             *

213          KK UVB1-2A
214          BA  0.2453
215          PB    3.30
216          LS       0    93.3
217          UD   0.174
             *

218          KK  NDIV2A
219          KM  DIVERT 363 CFS FROM UVB1-2A TO PEACEFUL DAWN
220          DT  EDIV2A
221          DI       0     467    5000
222          DQ       0     363     363
             *
             * KKRUVB1-2A
             * RD700    0.0050   0.016       0   TRAP       80       0
             *
1                                        HEC-1 INPUT                                    PAGE  8

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

223          KK    COM7
224          KM  COMBINE RBOXDET, LWBW1A, AND RUVB1-2A
225          HC       3
             *
             * KKRCOM7
             * KMROUTE COM7 TO COM8
             * RD1000    0.0600   0.016       0   TRAP       80       0
             *

226          KK UVB1-2B
227          BA  0.0192
228          PB    3.23
229          LS       0    93.3
230          UD   0.094
             *
```

```
231          KK  LWBW1B
232          BA  0.0755
233          PB    3.24
234          LS       0    93.5
235          UD   0.143
             *
236          KK    COM8
237          KM  COMBINE LWBW1B, RCOM7, UVB1-2B
238          KM  LAS VEGAS BELTWAY @ LONE MOUNTAIN
239          HC       3
             *
             * KKRCOM8
             * RD1300    0.0500   0.015       0   CIRC       5       0
             *
240          KKRETDIV2A
241          KM  RETRIEVE DIVERSION AT PEACEFUL DAWN
242          DR  EDIV2A
             *
             * KKRDIV2A
             * KMROUTE DIV2A TO CUVB1-2C
             * RD1000    0.0700   0.016       0   TRAP       50       0
             *
243          KK UVB1-2C
244          BA  0.0323
245          PB    3.23
246          LS       0    93.3
247          UD   0.118
             *
248          KK   COM10
249          KM  COMBINE RDIV2A AND UVB1-2C
250          KM
251          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  9

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

252          KK    COM9
253          KM  COMBINE RCOM8 & COM10
254          HC       2
             *
255          KK UVB1-1C
256          BA  0.0185
257          PB    3.23
258          LS       0    92.0
259          UD   0.088
             *
             * KKRUVB1-1C
             * KMROUTE UVB1-1C TO COM11
             * RD900     0.050   0.016       0   TRAP       50       0
             *
260          KK UVB1-1B
261          BA  0.0124
262          PB    3.20
263          LS       0    91.0
264          UD   0.080
             *
265          KK   COM11
266          KM  COMBINE RUVB1-1C AND UVB1-1B
267          HC       2
             *
268          KK UVB1-1A
269          BA  0.2198
270          PB    3.28
271          LS       0    92.0
272          UD   0.147
             *
             * KKRUVB1-1A
             * RD1300    0.040   0.015       0   TRAP       10       0
             *
273          KK UVB1-1D
274          BA  0.0355
275          PB    3.20
276          LS       0    92.0
277          UD   0.097
             *
278          KK   COM12
279          KM  COMBINE RUVB1-1A AND UVB1-1D
280          HC       2
             *
             * KKRCOM12
             * KMROUTE COM12 TO COM13
             * RD1200    0.042   0.015       0   TRAP       10       0
             *
1                                        HEC-1 INPUT                                        PAGE 10

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

281          KK UVB1-1E
282          BA  0.0280
283          PB    3.24
284          LS       0    92.0
285          UD   0.097
             *
             * KKRUVB1-1E
             * RD2000    0.033   0.015       0   TRAP       10       0
             *
286          KK   COM13
287          KM  COMBINE RCOM11, RCOM12, & RUVB1-1E
288          HC       3
```

```
                *
289             KK    WBCL
290             BA  0.0312
291             PB    3.21
292             LS       0    92.0
293             UD   0.126
                *

294             KK   LMBW1
295             BA  0.0841
296             PB    3.18
297             LS       0    88.6
298             UD   0.102
                *

299             KK   COM14
300             KM  COMBINE LMBW1, WBCL, RCOM13
301             HC       3
                *

302             KK   LMDBS
303             BA  0.0589
304             PB    3.20
305             LS       0    84.8
306             UD   0.102
                *

307             KK  CLMDBS
308             KM  COMBINE COM9, COM10, COM14, & LMDBS
309             KM  COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
310             HC       3
                *

311             KKCLMBWCDB
312             KM  COMBINE CLMDBS & CLMDBN
313             HC       2
                *
1                                        HEC-1 INPUT                                                    PAGE 11

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

314             KK LMBWCDB
315             KM  LONE MOUNTAIN/BELTWAY DETENTION BASINS (COMBINED)
316             KM  ROUTE COMBINED INFLOWS TO OUTFALL IN BALANCING CONDUIT
317             KM  DUAL LEVEL OUTFALL WITH LOWER LEVEL (BELOW ELEVATION 2730)
318             KM  23" ORIFICE AND SECOND LEVEL (ABOVE ELEVATION 2730) 26" ORIFICE
319             KM  OUTFALL PEAK OUTFLOW OF 168 CFS AT ELEVATION 2738
320             KO       1
321             RS       1    STOR      -1
322             SV     0.0     7.4    29.8    81.0   150.8   233.1   352.9   493.7   585.4   617.3
323             SQ     0.0    26.9    37.8    46.1    53.2    59.4    65.0   114.0   118.8   120.3
324             SE    2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
                *

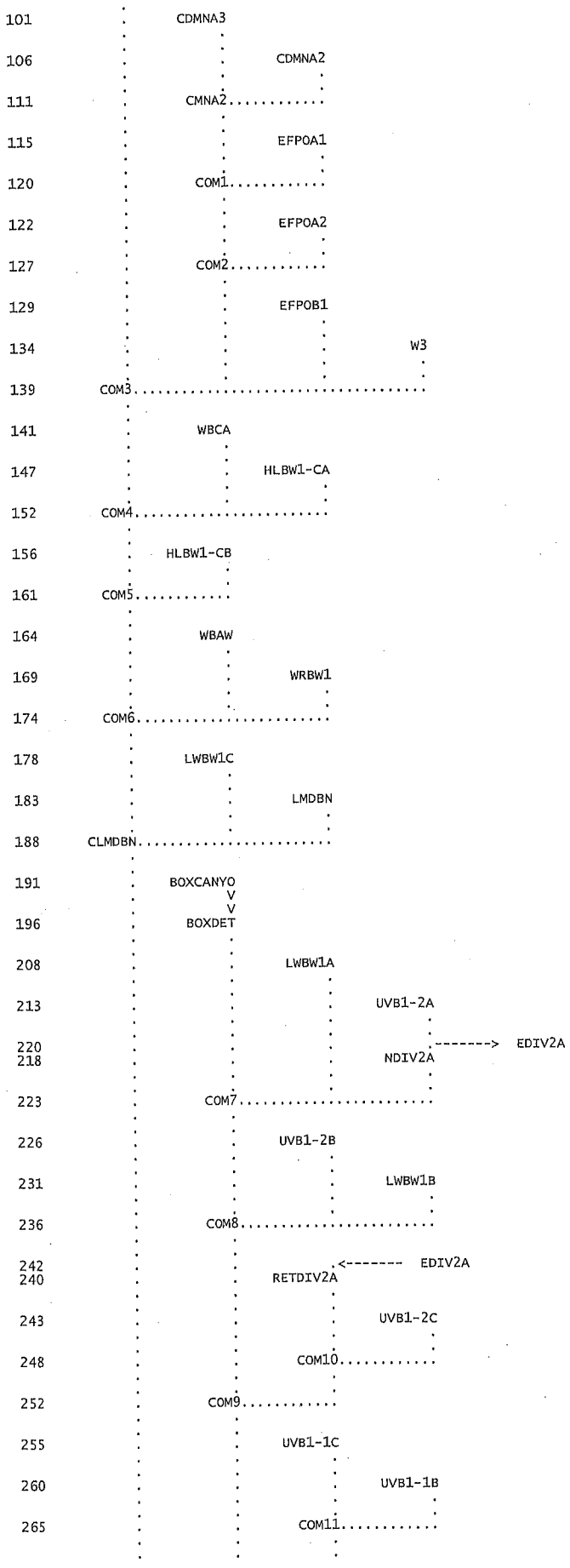
325             KK    WBLM
326             BA  0.0805
327             PB    3.17
328             LS       0    90.0
329             UD   0.190
                *

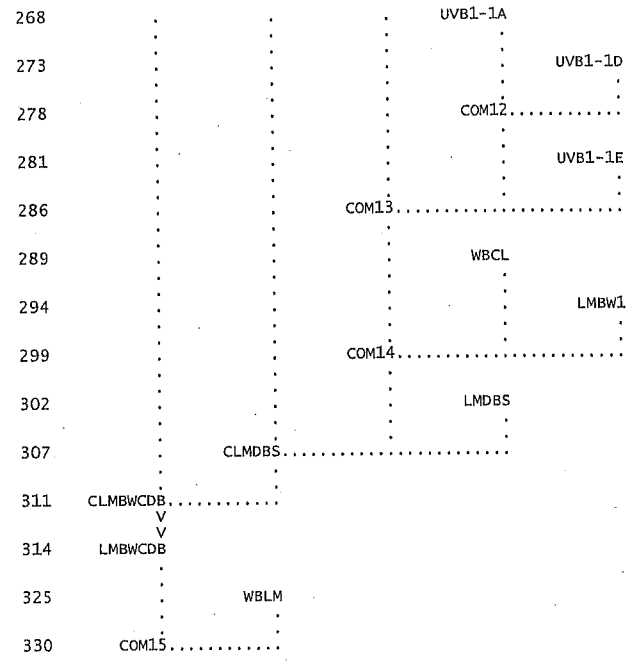
330             KK   COM15
331             KM  COMBINE WBLM & LMBWCDB
332             HC       2
                *
                * KKRLMBWDB
                * KMROUTE LMBWDB TO LMBW2-C
                * KMFACILITY = GOWAN BELTWAY WEST
                * KMFACILITY # = GOBW 0000
                * KMLINING = RCP
                * RD2700     0.019   0.013       0   TRAP        5       0
                *
333             ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
 LINE       (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

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

   27       CAMDK2
                .
                .
   40           .       CAMDK3
                .          .
                .          .
   45       CCAMDK3.........
                .
                .
   48           .      CAM-10A
                .          .
                .          .
   53           .          .      CAM-10B
                .          .          .
                .          .          .
   58           .          .          .     DETCAM10
                .          .          .          .
                .          .          .          .
   63       CAM10IN.....................................
              V
              V
   67       CAM10DB
                .
                .
   89           .           W1
                .            .
                .            .
   94           .            .          W2
                .            .           .
                .            .           .
   99         CP1.........................
                .
```


101 CDMNA3
106 CDMNA2
111 CMNA2
115 EFPOA1
120 COM1
122 EFPOA2
127 COM2
129 EFPOB1
134 W3
139 COM3
141 WBCA
147 HLBW1-CA
152 COM4
156 HLBW1-CB
161 COM5
164 WBAW
169 WRBW1
174 COM6
178 LWBW1C
183 LMDBN
188 CLMDBN
191 BOXCANYO
196 BOXDET
208 LWBW1A
213 UVB1-2A
220 EDIV2A
218 NDIV2A
223 COM7
226 UVB1-2B
231 LWBW1B
236 COM8
242 EDIV2A
240 RETDIV2A
243 UVB1-2C
248 COM10
252 COM9
255 UVB1-1C
260 UVB1-1B
265 COM11



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   28MAY08  TIME  09:07:04   *
*                                       *
*****************************************
```

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

LONE MOUNTAIN/WESTERN BELTWAY DETENTION BASINS
DRAINAGE IMPACT IN ULTIMATE CONDITION DEVELOPMENT
DRAFT 2007 MPU WAS USED AS REFERENCED HYDROLOGIC MODEL
DRAIN TIME MODEL
INPUT FILE = WBMOD1-SDN4-DT.H1
LAST MODIFIED = 05/13/08
DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN4
MODELED BY = JTL/JYL/MGK

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ. MI.	DARF
8-9	0.875
9-10	0.865
10-11	0.857

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

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

    IT          HYDROGRAPH TIME DATA
                     NMIN          15  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         800  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     9   0  ENDING DATE
                     NDTIME       0745  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .25 HOURS
                      TOTAL TIME BASE  199.75 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
                    .88       .87       .86
```

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

          ***************
          *             *
 14 KK    *   LMBWCDB   *
          *             *
          ***************

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

                HYDROGRAPH ROUTING DATA

321 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

322 SV            STORAGE        .0       7.4      29.8      81.0     150.8     233.1     352.9     493.7     585.4     617.3

323 SQ            DISCHARGE      0.       27.      38.       46.      53.       59.       65.       114.      119.      120.

324 SE            ELEVATION   2699.00  2705.00  2710.00  2715.00  2720.00  2725.00  2730.00  2735.00  2738.00  2739.00

                                                        ***

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

                                                HYDROGRAPH AT STATION  LMBWCDB
                                                     PLAN 1,   RATIO =   .88

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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.	.0	2699.0	3		1845	268	93.	434.4	2732.9	6		1330	535	56.	190.4	2722.4
1		0015	2	3.	.7	2699.6	3		1900	269	93.	433.0	2732.8	6		1345	536	56.	189.6	2722.4
1		0030	3	19.	5.1	2703.2	3		1915	270	92.	431.7	2732.8	6		1400	537	56.	188.7	2722.3
1		0045	4	29.	12.2	2706.1	3		1930	271	92.	430.3	2732.7	6		1415	538	56.	187.9	2722.3
1		0100	5	32.	17.7	2707.3	3		1945	272	91.	429.0	2732.7	6		1430	539	56.	187.0	2722.2
1		0115	6	34.	21.8	2708.2	3		2000	273	91.	427.7	2732.7	6		1445	540	56.	186.2	2722.1
1		0130	7	37.	27.4	2709.5	3		2015	274	91.	426.4	2732.6	6		1500	541	56.	185.3	2722.1
1		0145	8	39.	35.6	2710.6	3		2030	275	90.	425.1	2732.6	6		1515	542	56.	184.5	2722.0
1		0200	9	40.	44.3	2711.4	3		2045	276	90.	423.8	2732.5	6		1530	543	56.	183.7	2722.0
1		0215	10	42.	52.9	2712.3	3		2100	277	89.	422.5	2732.5	6		1545	544	56.	182.8	2721.9
1		0230	11	43.	61.5	2713.1	3		2115	278	89.	421.3	2732.4	6		1600	545	56.	182.0	2721.9
1		0245	12	44.	70.7	2714.0	3		2130	279	88.	420.0	2732.4	6		1615	546	55.	181.1	2721.8
1		0300	13	46.	82.9	2715.1	3		2145	280	88.	418.7	2732.3	6		1630	547	55.	180.3	2721.8
1		0315	14	49.	107.2	2716.9	3		2200	281	87.	417.5	2732.3	6		1645	548	55.	179.4	2721.7
1		0330	15	54.	165.8	2720.9	3		2215	282	87.	416.3	2732.2	6		1700	549	55.	178.6	2721.7
1		0345	16	60.	240.0	2725.3	3		2230	283	87.	415.0	2732.2	6		1715	550	55.	177.7	2721.6
1		0400	17	62.	291.5	2727.4	3		2245	284	86.	413.8	2732.2	6		1730	551	55.	176.9	2721.6
1		0415	18	64.	321.3	2728.7	3		2300	285	86.	412.6	2732.1	6		1745	552	55.	176.1	2721.5
1		0430	19	65.	342.7	2729.6	3		2315	286	85.	411.4	2732.1	6		1800	553	55.	175.2	2721.5
1		0445	20	70.	366.8	2730.5	3		2330	287	85.	410.2	2732.0	6		1815	554	55.	174.4	2721.4
1		0500	21	79.	392.4	2731.4	3		2345	288	85.	409.0	2732.0	6		1830	555	55.	173.5	2721.4
1		0515	22	85.	411.2	2732.1	4		0000	289	84.	407.8	2731.9	6		1845	556	55.	172.7	2721.3
1		0530	23	89.	421.9	2732.4	4		0015	290	84.	406.6	2731.9	6		1900	557	55.	171.8	2721.3
1		0545	24	91.	428.6	2732.7	4		0030	291	83.	405.4	2731.9	6		1915	558	55.	171.0	2721.2
1		0600	25	93.	433.6	2732.9	4		0045	292	83.	404.3	2731.8	6		1930	559	55.	170.2	2721.2
1		0615	26	94.	437.2	2733.0	4		0100	293	82.	403.1	2731.8	6		1945	560	55.	169.3	2721.1
1		0630	27	95.	439.7	2733.1	4		0115	294	82.	402.0	2731.7	6		2000	561	55.	168.5	2721.1
1		0645	28	96.	441.8	2733.2	4		0130	295	82.	400.8	2731.7	6		2015	562	54.	167.6	2721.0
1		0700	29	97.	443.8	2733.2	4		0145	296	81.	399.7	2731.7	6		2030	563	54.	166.8	2721.0
1		0715	30	97.	445.7	2733.3	4		0200	297	81.	398.6	2731.6	6		2045	564	54.	166.0	2720.9
1		0730	31	98.	447.5	2733.4	4		0215	298	81.	397.5	2731.6	6		2100	565	54.	165.1	2720.9
1		0745	32	99.	449.4	2733.4	4		0230	299	80.	396.3	2731.5	6		2115	566	54.	164.3	2720.8
1		0800	33	99.	451.2	2733.5	4		0245	300	80.	395.2	2731.5	6		2130	567	54.	163.4	2720.8
1		0815	34	100.	452.9	2733.6	4		0300	301	79.	394.1	2731.5	6		2145	568	54.	162.6	2720.7
1		0830	35	100.	454.7	2733.6	4		0315	302	79.	393.0	2731.4	6		2200	569	54.	161.8	2720.7
1		0845	36	101.	456.4	2733.7	4		0330	303	79.	392.0	2731.4	6		2215	570	54.	160.9	2720.6
1		0900	37	102.	458.0	2733.7	4		0345	304	78.	390.9	2731.3	6		2230	571	54.	160.1	2720.6
1		0915	38	102.	459.7	2733.8	4		0400	305	78.	389.8	2731.3	6		2245	572	54.	159.3	2720.5
1		0930	39	103.	461.3	2733.9	4		0415	306	77.	388.7	2731.3	6		2300	573	54.	158.4	2720.5
1		0945	40	103.	462.9	2733.9	4		0430	307	77.	387.7	2731.2	6		2315	574	54.	157.6	2720.4
1		1000	41	104.	464.5	2734.0	4		0445	308	77.	386.6	2731.2	6		2330	575	54.	156.7	2720.4
1		1015	42	104.	466.1	2734.0	4		0500	309	76.	385.6	2731.2	6		2345	576	54.	155.9	2720.3
1		1030	43	105.	467.6	2734.1	4		0515	310	76.	384.6	2731.1	7		0000	577	54.	155.1	2720.3
1		1045	44	105.	469.1	2734.1	4		0530	311	76.	383.5	2731.1	7		0015	578	53.	154.2	2720.2
1		1100	45	106.	470.6	2734.2	4		0545	312	75.	382.5	2731.1	7		0030	579	53.	153.4	2720.2
1		1115	46	106.	472.0	2734.2	4		0600	313	75.	381.5	2731.0	7		0045	580	53.	152.6	2720.1
1		1130	47	107.	473.4	2734.3	4		0615	314	75.	380.5	2731.0	7		0100	581	53.	151.7	2720.1
1		1145	48	107.	474.8	2734.3	4		0630	315	74.	379.5	2730.9	7		0115	582	53.	150.9	2720.0
1		1200	49	108.	476.2	2734.4	4		0645	316	74.	378.5	2730.9	7		0130	583	53.	150.1	2719.9
1		1215	50	108.	477.6	2734.4	4		0700	317	74.	377.5	2730.9	7		0145	584	53.	149.2	2719.9
1		1230	51	109.	478.9	2734.5	4		0715	318	73.	376.5	2730.8	7		0200	585	53.	148.4	2719.8
1		1245	52	109.	480.2	2734.5	4		0730	319	73.	375.5	2730.8	7		0215	586	53.	147.6	2719.8
1		1300	53	110.	481.5	2734.6	4		0745	320	73.	374.5	2730.8	7		0230	587	53.	146.7	2719.7
1		1315	54	110.	482.8	2734.6	4		0800	321	72.	373.6	2730.7	7		0245	588	53.	145.9	2719.6
1		1330	55	111.	484.0	2734.7	4		0815	322	72.	372.6	2730.7	7		0300	589	53.	145.1	2719.6
1		1345	56	111.	485.2	2734.7	4		0830	323	72.	371.6	2730.7	7		0315	590	53.	144.3	2719.5
1		1400	57	111.	486.4	2734.7	4		0845	324	71.	370.7	2730.6	7		0330	591	52.	143.4	2719.5
1		1415	58	112.	487.6	2734.8	4		0900	325	71.	369.8	2730.6	7		0345	592	52.	142.6	2719.4
1		1430	59	112.	488.8	2734.8	4		0915	326	71.	368.8	2730.6	7		0400	593	52.	141.8	2719.4
1		1445	60	113.	489.9	2734.9	4		0930	327	70.	367.9	2730.5	7		0415	594	52.	141.0	2719.3
1		1500	61	113.	491.0	2734.9	4		0945	328	70.	367.0	2730.5	7		0430	595	52.	140.1	2719.2
1		1515	62	113.	492.1	2734.9	4		1000	329	70.	366.0	2730.5	7		0445	596	52.	139.3	2719.2
1		1530	63	114.	493.2	2735.0	4		1015	330	69.	365.1	2730.4	7		0500	597	52.	138.5	2719.1
1		1545	64	114.	494.2	2735.0	4		1030	331	69.	364.2	2730.4	7		0515	598	52.	137.7	2719.1
1		1600	65	114.	495.3	2735.1	4		1045	332	69.	363.3	2730.4	7		0530	599	52.	136.8	2719.0
1		1615	66	114.	496.3	2735.1	4		1100	333	68.	362.4	2730.3	7		0545	600	52.	136.0	2718.9
1		1630	67	114.	497.3	2735.1	4		1115	334	68.	361.5	2730.3	7		0600	601	52.	135.2	2718.9
1		1645	68	114.	498.3	2735.1	4		1130	335	68.	360.6	2730.3	7		0615	602	52.	134.4	2718.8
1		1700	69	114.	499.3	2735.2	4		1145	336	67.	359.7	2730.2	7		0630	603	51.	133.6	2718.8
1		1715	70	114.	500.2	2735.2	4		1200	337	67.	358.9	2730.2	7		0645	604	51.	132.8	2718.7
1		1730	71	114.	501.2	2735.2	4		1215	338	67.	358.0	2730.2	7		0700	605	51.	131.9	2718.6
1		1745	72	114.	502.1	2735.3	4		1230	339	66.	357.1	2730.1	7		0715	606	51.	131.1	2718.6

1	1800	73	114.	503.1	2735.3	*	4	1245	340	66.	356.3	2730.1	*	7	0730	607	51.	130.3	2718.5
1	1815	74	115.	504.0	2735.3	*	4	1300	341	66.	355.4	2730.1	*	7	0745	608	51.	129.5	2718.5
1	1830	75	115.	504.9	2735.4	*	4	1315	342	66.	354.6	2730.1	*	7	0800	609	51.	128.7	2718.4
1	1845	76	115.	505.8	2735.4	*	4	1330	343	65.	353.7	2730.0	*	7	0815	610	51.	127.9	2718.4
1	1900	77	115.	506.6	2735.4	*	4	1345	344	65.	352.9	2730.0	*	7	0830	611	51.	127.1	2718.3
1	1915	78	115.	507.5	2735.5	*	4	1400	345	65.	352.0	2730.0	*	7	0845	612	51.	126.2	2718.2
1	1930	79	115.	508.3	2735.5	*	4	1415	346	65.	351.2	2729.9	*	7	0900	613	51.	125.4	2718.2
1	1945	80	115.	509.2	2735.5	*	4	1430	347	65.	350.4	2729.9	*	7	0915	614	51.	124.6	2718.1
1	2000	81	115.	510.0	2735.5	*	4	1445	348	65.	349.5	2729.9	*	7	0930	615	50.	123.8	2718.1
1	2015	82	115.	510.8	2735.6	*	4	1500	349	65.	348.7	2729.8	*	7	0945	616	50.	123.0	2718.0
1	2030	83	115.	511.6	2735.6	*	4	1515	350	65.	347.8	2729.8	*	7	1000	617	50.	122.2	2718.0
1	2045	84	115.	512.4	2735.6	*	4	1530	351	65.	347.0	2729.8	*	7	1015	618	50.	121.4	2717.9
1	2100	85	115.	513.2	2735.6	*	4	1545	352	65.	346.2	2729.7	*	7	1030	619	50.	120.6	2717.8
1	2115	86	115.	513.9	2735.7	*	4	1600	353	65.	345.3	2729.7	*	7	1045	620	50.	119.8	2717.8
1	2130	87	115.	514.7	2735.7	*	4	1615	354	65.	344.5	2729.6	*	7	1100	621	50.	119.0	2717.7
1	2145	88	115.	515.4	2735.7	*	4	1630	355	65.	343.6	2729.6	*	7	1115	622	50.	118.2	2717.7
1	2200	89	115.	516.1	2735.7	*	4	1645	356	65.	342.8	2729.6	*	7	1130	623	50.	117.4	2717.6
1	2215	90	115.	516.8	2735.8	*	4	1700	357	64.	341.9	2729.5	*	7	1145	624	50.	116.6	2717.6
1	2230	91	115.	517.5	2735.8	*	4	1715	358	64.	341.1	2729.5	*	7	1200	625	50.	115.8	2717.5
1	2245	92	115.	518.2	2735.8	*	4	1730	359	64.	340.3	2729.5	*	7	1215	626	50.	115.0	2717.4
1	2300	93	115.	518.9	2735.8	*	4	1745	360	64.	339.4	2729.4	*	7	1230	627	49.	114.2	2717.4
1	2315	94	115.	519.5	2735.8	*	4	1800	361	64.	338.6	2729.4	*	7	1245	628	49.	113.4	2717.3
1	2330	95	115.	520.2	2735.9	*	4	1815	362	64.	337.7	2729.4	*	7	1300	629	49.	112.6	2717.3
1	2345	96	115.	520.8	2735.9	*	4	1830	363	64.	336.9	2729.3	*	7	1315	630	49.	111.8	2717.2
2	0000	97	115.	521.4	2735.9	*	4	1845	364	64.	336.1	2729.3	*	7	1330	631	49.	111.0	2717.2
2	0015	98	115.	522.0	2735.9	*	4	1900	365	64.	335.2	2729.3	*	7	1345	632	49.	110.2	2717.1
2	0030	99	116.	522.6	2735.9	*	4	1915	366	64.	334.4	2729.2	*	7	1400	633	49.	109.4	2717.0
2	0045	100	116.	523.2	2736.0	*	4	1930	367	64.	333.5	2729.2	*	7	1415	634	49.	108.7	2717.0
2	0100	101	116.	523.8	2736.0	*	4	1945	368	64.	332.7	2729.2	*	7	1430	635	49.	107.9	2716.9
2	0115	102	116.	524.3	2736.0	*	4	2000	369	64.	331.8	2729.1	*	7	1445	636	49.	107.1	2716.9
2	0130	103	116.	524.9	2736.0	*	4	2015	370	64.	331.0	2729.1	*	7	1500	637	49.	106.3	2716.8
2	0145	104	116.	525.4	2736.0	*	4	2030	371	64.	330.2	2729.1	*	7	1515	638	49.	105.5	2716.8
2	0200	105	116.	525.9	2736.1	*	4	2045	372	64.	329.3	2729.0	*	7	1530	639	49.	104.7	2716.7
2	0215	106	116.	526.4	2736.1	*	4	2100	373	64.	328.5	2729.0	*	7	1545	640	48.	103.9	2716.6
2	0230	107	116.	526.9	2736.1	*	4	2115	374	64.	327.6	2728.9	*	7	1600	641	48.	103.1	2716.6
2	0245	108	116.	527.4	2736.1	*	4	2130	375	64.	326.8	2728.9	*	7	1615	642	48.	102.4	2716.5
2	0300	109	116.	527.9	2736.1	*	4	2145	376	64.	325.9	2728.9	*	7	1630	643	48.	101.6	2716.5
2	0315	110	116.	528.3	2736.1	*	4	2200	377	64.	325.1	2728.8	*	7	1645	644	48.	100.8	2716.4
2	0330	111	116.	528.8	2736.1	*	4	2215	378	64.	324.2	2728.8	*	7	1700	645	48.	100.0	2716.4
2	0345	112	116.	529.2	2736.2	*	4	2230	379	64.	323.4	2728.8	*	7	1715	646	48.	99.2	2716.3
2	0400	113	116.	529.7	2736.2	*	4	2245	380	64.	322.6	2728.7	*	7	1730	647	48.	98.4	2716.2
2	0415	114	116.	530.1	2736.2	*	4	2300	381	64.	321.7	2728.7	*	7	1745	648	48.	97.7	2716.2
2	0430	115	116.	530.5	2736.2	*	4	2315	382	64.	320.9	2728.7	*	7	1800	649	48.	96.9	2716.1
2	0445	116	116.	530.9	2736.2	*	4	2330	383	63.	320.0	2728.6	*	7	1815	650	48.	96.1	2716.1
2	0500	117	116.	531.3	2736.2	*	4	2345	384	63.	319.2	2728.6	*	7	1830	651	48.	95.3	2716.0
2	0515	118	116.	531.6	2736.2	*	5	0000	385	63.	318.3	2728.6	*	7	1845	652	47.	94.5	2716.0
2	0530	119	116.	532.0	2736.3	*	5	0015	386	63.	317.5	2728.5	*	7	1900	653	47.	93.8	2715.9
2	0545	120	116.	532.3	2736.3	*	5	0030	387	63.	316.6	2728.5	*	7	1915	654	47.	93.0	2715.9
2	0600	121	116.	532.7	2736.3	*	5	0045	388	63.	315.8	2728.5	*	7	1930	655	47.	92.2	2715.8
2	0615	122	116.	533.0	2736.3	*	5	0100	389	63.	314.9	2728.4	*	7	1945	656	47.	91.4	2715.7
2	0630	123	116.	533.3	2736.3	*	5	0115	390	63.	314.1	2728.4	*	7	2000	657	47.	90.7	2715.7
2	0645	124	116.	533.6	2736.3	*	5	0130	391	63.	313.3	2728.3	*	7	2015	658	47.	89.9	2715.6
2	0700	125	116.	533.9	2736.3	*	5	0145	392	63.	312.4	2728.3	*	7	2030	659	47.	89.1	2715.6
2	0715	126	116.	534.2	2736.3	*	5	0200	393	63.	311.6	2728.3	*	7	2045	660	47.	88.3	2715.5
2	0730	127	116.	534.5	2736.3	*	5	0215	394	63.	310.7	2728.2	*	7	2100	661	47.	87.6	2715.5
2	0745	128	116.	534.8	2736.3	*	5	0230	395	63.	309.9	2728.2	*	7	2115	662	47.	86.8	2715.4
2	0800	129	116.	535.0	2736.4	*	5	0245	396	63.	309.0	2728.2	*	7	2130	663	47.	86.0	2715.4
2	0815	130	116.	535.2	2736.4	*	5	0300	397	63.	308.2	2728.1	*	7	2145	664	47.	85.2	2715.3
2	0830	131	116.	535.5	2736.4	*	5	0315	398	63.	307.3	2728.1	*	7	2200	665	46.	84.5	2715.2
2	0845	132	116.	535.7	2736.4	*	5	0330	399	63.	306.5	2728.1	*	7	2215	666	46.	83.7	2715.2
2	0900	133	116.	535.9	2736.4	*	5	0345	400	63.	305.6	2728.0	*	7	2230	667	46.	82.9	2715.1
2	0915	134	116.	536.1	2736.4	*	5	0400	401	63.	304.8	2728.0	*	7	2245	668	46.	82.1	2715.1
2	0930	135	116.	536.3	2736.4	*	5	0415	402	63.	303.9	2728.0	*	7	2300	669	46.	81.4	2715.0
2	0945	136	116.	536.5	2736.4	*	5	0430	403	63.	303.1	2727.9	*	7	2315	670	46.	80.6	2715.0
2	1000	137	116.	536.7	2736.4	*	5	0445	404	63.	302.2	2727.9	*	7	2330	671	46.	79.8	2714.9
2	1015	138	116.	536.9	2736.4	*	5	0500	405	63.	301.4	2727.9	*	7	2345	672	46.	79.1	2714.8
2	1030	139	116.	537.1	2736.4	*	5	0515	406	63.	300.6	2727.8	*	8	0000	673	46.	78.3	2714.7
2	1045	140	116.	537.3	2736.4	*	5	0530	407	63.	299.7	2727.8	*	8	0015	674	46.	77.5	2714.7
2	1100	141	116.	537.4	2736.4	*	5	0545	408	62.	298.9	2727.7	*	8	0030	675	45.	76.8	2714.6
2	1115	142	116.	537.6	2736.4	*	5	0600	409	62.	298.0	2727.7	*	8	0045	676	45.	76.0	2714.5
2	1130	143	116.	537.7	2736.4	*	5	0615	410	62.	297.2	2727.7	*	8	0100	677	45.	75.2	2714.4
2	1145	144	116.	537.9	2736.4	*	5	0630	411	62.	296.3	2727.6	*	8	0115	678	45.	74.5	2714.4
2	1200	145	116.	538.0	2736.4	*	5	0645	412	62.	295.5	2727.6	*	8	0130	679	45.	73.7	2714.3
2	1215	146	116.	538.2	2736.5	*	5	0700	413	62.	294.6	2727.6	*	8	0145	680	45.	73.0	2714.2
2	1230	147	116.	538.3	2736.5	*	5	0715	414	62.	293.8	2727.5	*	8	0200	681	45.	72.2	2714.1
2	1245	148	116.	538.4	2736.5	*	5	0730	415	62.	292.9	2727.5	*	8	0215	682	45.	71.5	2714.1
2	1300	149	116.	538.5	2736.5	*	5	0745	416	62.	292.1	2727.5	*	8	0230	683	44.	70.7	2714.0
2	1315	150	116.	538.6	2736.5	*	5	0800	417	62.	291.2	2727.4	*	8	0245	684	44.	70.0	2713.9
2	1330	151	116.	538.7	2736.5	*	5	0815	418	62.	290.4	2727.4	*	8	0300	685	44.	69.2	2713.8
2	1345	152	116.	538.8	2736.5	*	5	0830	419	62.	289.5	2727.4	*	8	0315	686	44.	68.5	2713.8
2	1400	153	116.	538.9	2736.5	*	5	0845	420	62.	288.7	2727.3	*	8	0330	687	44.	67.7	2713.7
2	1415	154	116.	539.0	2736.5	*	5	0900	421	62.	287.8	2727.3	*	8	0345	688	44.	67.0	2713.6
2	1430	155	116.	539.1	2736.5	*	5	0915	422	62.	287.0	2727.2	*	8	0400	689	44.	66.2	2713.6
2	1445	156	116.	539.1	2736.5	*	5	0930	423	62.	286.1	2727.2	*	8	0415	690	44.	65.5	2713.5
2	1500	157	116.	539.2	2736.5	*	5	0945	424	62.	285.3	2727.2	*	8	0430	691	43.	64.8	2713.4
2	1515	158	116.	539.2	2736.5	*	5	1000	425	62.	284.4	2727.1	*	8	0445	692	43.	64.0	2713.3
2	1530	159	116.	539.3	2736.5	*	5	1015	426	62.	283.6	2727.1	*	8	0500	693	43.	63.3	2713.3
2	1545	160	116.	539.3	2736.5	*	5	1030	427	62.	282.7	2727.1	*	8	0515	694	43.	62.6	2713.2
2	1600	161	116.	539.4	2736.5	*	5	1045	428	62.	281.9	2727.0	*	8	0530	695	43.	61.8	2713.1
2	1615	162	116.	539.4	2736.5	*	5	1100	429	62.	281.0	2727.0	*	8	0545	696	43.	61.1	2713.1
2	1630	163	116.	539.4	2736.5	*	5	1115	430	62.	280.2	2727.0	*	8	0600	697	43.	60.4	2713.0
2	1645	164	116.	539.5	2736.5	*	5	1130	431	62.	279.3	2726.9	*	8	0615	698	43.	59.6	2712.9
2	1700	165	116.	539.5	2736.5	*	5	1145	432	62.	278.5	2726.9	*	8	0630	699	43.	58.9	2712.8
2	1715	166	116.	539.5	2736.5	*	5	1200	433	61.	277.6	2726.9	*	8	0645	700	42.	58.2	2712.8
2	1730	167	116.	539.5	2736.5	*	5	1215	434	61.	276.8	2726.8	*	8	0700	701	42.	57.5	2712.7
2	1745	168	116.	539.5	2736.5	*	5	1230	435	61.	275.9	2726.8	*	8	0715	702	42.	56.7	2712.6
2	1800	169	116.	539.5	2736.5	*	5	1245	436	61.	275.0	2726.8	*	8	0730	703	42.	56.0	2712.6
2	1815	170	116.	539.5	2736.5	*	5	1300	437	61.	274.2	2726.7	*	8	0745	704	42.	55.3	2712.5
2	1830	171	116.	539.4	2736.5	*	5	1315	438	61.	273.3	2726.7	*	8	0800	705	42.	54.6	2712.4
2	1845	172	116.	539.4	2736.5	*	5	1330	439	61.	272.5	2726.6	*	8	0815	706	42.	53.9	2712.3
2	1900	173	116.	539.4	2736.5	*	5	1345	440	61.	271.6	2726.6	*	8	0830	707	42.	53.1	2712.3
2	1915	174	116.	539.3	2736.5	*	5	1400	441	61.	270.8	2726.6	*	8	0845	708	41.	52.4	2712.2
2	1930	175	116.	539.3	2736.5	*	5	1415	442	61.	269.9	2726.5	*	8	0900	709	41.	51.7	2712.1
2	1945	176	116.	539.2	2736.5	*	5	1430	443	61.	269.1	2726.5	*	8	0915	710	41.	51.0	2712.1
2	2000	177	116.	539.1	2736.5	*	5	1445	444	61.	268.2	2726.5	*	8	0930	711	41.	50.3	2712.0
2	2015	178	116.	538.9	2736.5	*	5	1500	445	61.	267.4	2726.4	*	8	0945	712	41.	49.6	2711.9
2	2030	179	116.	538.7	2736.5	*	5	1515	446	61.	266.5	2726.4	*	8	1000	713	41.	48.9	2711.9
2	2045	180	116.	538.5	2736.5	*	5	1530	447	61.	265.6	2726.4	*	8	1015	714	41.	48.2	2711.8
2	2100	181	116.	538.3	2736.5	*	5	1545	448	61.	264.8	2726.3	*	8	1030	715	41.	47.5	2711.7
2	2115	182	116.	538.0	2736.5	*	5	1600	449	61.	263.9	2726.3	*	8	1045	716	41.	46.8	2711.7
2	2130	183	116.	537.7	2736.4	*	5	1615	450	61.	263.1	2726.3	*	8	1100	717	40.	46.1	2711.6
2	2145	184	116.	537.4	2736.4	*	5	1630	451	61.	262.2	2726.2	*	8	1115	718	40.	45.4	2711.5
2	2200	185	116.	537.1	2736.4	*	5	1645	452	61.	261.4	2726.2	*	8	1130	719	40.	44.7	2711.5
2	2215	186	116.	536.7	2736.4	*	5	1700	453	61.	260.5	2726.1	*	8	1145	720	40.	44.0	2711.4

2	2230	187	116.	536.3	2736.4	*	5	1715	454	61.	259.7	2726.1	*	8	1200	721	40.	43.3	2711.3
2	2245	188	116.	535.9	2736.4	*	5	1730	455	61.	258.8	2726.1	*	8	1215	722	40.	42.6	2711.3
2	2300	189	116.	535.4	2736.4	*	5	1745	456	61.	257.9	2726.0	*	8	1230	723	40.	41.9	2711.2
2	2315	190	116.	535.0	2736.4	*	5	1800	457	61.	257.1	2726.0	*	8	1245	724	40.	41.2	2711.1
2	2330	191	116.	534.5	2736.3	*	5	1815	458	60.	256.2	2726.0	*	8	1300	725	40.	40.5	2711.0
2	2345	192	116.	534.1	2736.3	*	5	1830	459	60.	255.4	2725.9	*	8	1315	726	39.	39.8	2711.0
3	0000	193	116.	533.6	2736.3	*	5	1845	460	60.	254.5	2725.9	*	8	1330	727	39.	39.2	2710.9
3	0015	194	116.	533.1	2736.3	*	5	1900	461	60.	253.6	2725.9	*	8	1345	728	39.	38.5	2710.8
3	0030	195	116.	532.6	2736.3	*	5	1915	462	60.	252.8	2725.8	*	8	1400	729	39.	37.8	2710.8
3	0045	196	116.	532.0	2736.3	*	5	1930	463	60.	251.9	2725.8	*	8	1415	730	39.	37.1	2710.7
3	0100	197	116.	531.5	2736.2	*	5	1945	464	60.	251.1	2725.8	*	8	1430	731	39.	36.4	2710.6
3	0115	198	116.	531.0	2736.2	*	5	2000	465	60.	250.2	2725.7	*	8	1445	732	39.	35.8	2710.6
3	0130	199	116.	530.4	2736.2	*	5	2015	466	60.	249.4	2725.7	*	8	1500	733	39.	35.1	2710.5
3	0145	200	116.	529.8	2736.2	*	5	2030	467	60.	248.5	2725.6	*	8	1515	734	39.	34.4	2710.5
3	0200	201	116.	529.3	2736.2	*	5	2045	468	60.	247.6	2725.6	*	8	1530	735	38.	33.7	2710.4
3	0215	202	116.	528.7	2736.1	*	5	2100	469	60.	246.8	2725.6	*	8	1545	736	38.	33.1	2710.3
3	0230	203	116.	528.1	2736.1	*	5	2115	470	60.	245.9	2725.5	*	8	1600	737	38.	32.4	2710.3
3	0245	204	116.	527.4	2736.1	*	5	2130	471	60.	245.1	2725.5	*	8	1615	738	38.	31.7	2710.2
3	0300	205	116.	526.8	2736.1	*	5	2145	472	60.	244.2	2725.5	*	8	1630	739	38.	31.1	2710.1
3	0315	206	116.	526.2	2736.1	*	5	2200	473	60.	243.3	2725.4	*	8	1645	740	38.	30.4	2710.1
3	0330	207	116.	525.5	2736.0	*	5	2215	474	60.	242.5	2725.4	*	8	1700	741	38.	29.7	2710.0
3	0345	208	116.	524.8	2736.0	*	5	2230	475	60.	241.6	2725.4	*	8	1715	742	37.	29.1	2709.8
3	0400	209	116.	524.0	2736.0	*	5	2245	476	60.	240.8	2725.3	*	8	1730	743	37.	28.4	2709.7
3	0415	210	116.	523.2	2736.0	*	5	2300	477	60.	239.9	2725.3	*	8	1745	744	37.	27.8	2709.5
3	0430	211	116.	522.4	2735.9	*	5	2315	478	60.	239.0	2725.2	*	8	1800	745	37.	27.1	2709.4
3	0445	212	115.	521.5	2735.9	*	5	2330	479	60.	238.2	2725.2	*	8	1815	746	36.	26.5	2709.3
3	0500	213	115.	520.5	2735.9	*	5	2345	480	60.	237.3	2725.2	*	8	1830	747	36.	25.9	2709.1
3	0515	214	115.	519.4	2735.8	*	6	0000	481	60.	236.5	2725.1	*	8	1845	748	36.	25.2	2709.0
3	0530	215	115.	518.3	2735.8	*	6	0015	482	60.	235.6	2725.1	*	8	1900	749	35.	24.6	2708.8
3	0545	216	115.	517.0	2735.8	*	6	0030	483	59.	234.7	2725.1	*	8	1915	750	35.	24.0	2708.7
3	0600	217	115.	515.5	2735.7	*	6	0045	484	59.	233.9	2725.0	*	8	1930	751	35.	23.4	2708.6
3	0615	218	115.	513.7	2735.7	*	6	0100	485	59.	233.0	2725.0	*	8	1945	752	34.	22.8	2708.4
3	0630	219	115.	511.9	2735.6	*	6	0115	486	59.	232.2	2724.9	*	8	2000	753	34.	22.2	2708.3
3	0645	220	115.	510.2	2735.5	*	6	0130	487	59.	231.3	2724.9	*	8	2015	754	34.	21.6	2708.2
3	0700	221	115.	508.4	2735.5	*	6	0145	488	59.	230.4	2724.8	*	8	2030	755	34.	21.0	2708.0
3	0715	222	115.	506.7	2735.4	*	6	0200	489	59.	229.6	2724.8	*	8	2045	756	33.	20.4	2707.9
3	0730	223	115.	504.9	2735.4	*	6	0215	490	59.	228.7	2724.7	*	8	2100	757	33.	19.9	2707.8
3	0745	224	114.	503.2	2735.3	*	6	0230	491	59.	227.9	2724.7	*	8	2115	758	33.	19.3	2707.7
3	0800	225	114.	501.4	2735.3	*	6	0245	492	59.	227.0	2724.6	*	8	2130	759	32.	18.7	2707.5
3	0815	226	114.	499.7	2735.2	*	6	0300	493	59.	226.1	2724.6	*	8	2145	760	32.	18.2	2707.4
3	0830	227	114.	497.9	2735.1	*	6	0315	494	59.	225.3	2724.5	*	8	2200	761	32.	17.6	2707.3
3	0845	228	114.	496.2	2735.1	*	6	0330	495	59.	224.4	2724.5	*	8	2215	762	32.	17.1	2707.2
3	0900	229	114.	494.5	2735.0	*	6	0345	496	59.	223.6	2724.4	*	8	2230	763	31.	16.5	2707.0
3	0915	230	114.	492.7	2735.0	*	6	0400	497	59.	222.7	2724.4	*	8	2245	764	31.	16.0	2706.9
3	0930	231	113.	491.0	2734.9	*	6	0415	498	59.	221.9	2724.3	*	8	2300	765	31.	15.4	2706.8
3	0945	232	112.	489.3	2734.8	*	6	0430	499	58.	221.0	2724.3	*	8	2315	766	31.	14.9	2706.7
3	1000	233	112.	487.6	2734.8	*	6	0445	500	58.	220.1	2724.2	*	8	2330	767	30.	14.4	2706.6
3	1015	234	111.	485.9	2734.7	*	6	0500	501	58.	219.3	2724.2	*	8	2345	768	30.	13.9	2706.4
3	1030	235	111.	484.2	2734.7	*	6	0515	502	58.	218.4	2724.1	*	9	0000	769	30.	13.3	2706.3
3	1045	236	110.	482.5	2734.6	*	6	0530	503	58.	217.6	2724.1	*	9	0015	770	30.	12.8	2706.2
3	1100	237	110.	480.8	2734.5	*	6	0545	504	58.	216.7	2724.0	*	9	0030	771	29.	12.3	2706.1
3	1115	238	109.	479.2	2734.5	*	6	0600	505	58.	215.9	2724.0	*	9	0045	772	29.	11.8	2706.0
3	1130	239	108.	477.5	2734.4	*	6	0615	506	58.	215.0	2723.9	*	9	0100	773	29.	11.3	2705.9
3	1145	240	108.	475.9	2734.4	*	6	0630	507	58.	214.2	2723.9	*	9	0115	774	29.	10.8	2705.8
3	1200	241	107.	474.3	2734.3	*	6	0645	508	58.	213.3	2723.8	*	9	0130	775	28.	10.3	2705.7
3	1215	242	107.	472.7	2734.3	*	6	0700	509	58.	212.5	2723.7	*	9	0145	776	28.	9.8	2705.5
3	1230	243	106.	471.1	2734.2	*	6	0715	510	58.	211.6	2723.7	*	9	0200	777	28.	9.4	2705.4
3	1245	244	106.	469.5	2734.1	*	6	0730	511	58.	210.8	2723.6	*	9	0215	778	28.	8.9	2705.3
3	1300	245	105.	467.9	2734.1	*	6	0745	512	58.	209.9	2723.6	*	9	0230	779	27.	8.4	2705.2
3	1315	246	104.	466.3	2734.0	*	6	0800	513	58.	209.1	2723.5	*	9	0245	780	27.	7.9	2705.1
3	1330	247	104.	464.8	2734.0	*	6	0815	514	58.	208.2	2723.5	*	9	0300	781	27.	7.5	2705.0
3	1345	248	103.	463.2	2733.9	*	6	0830	515	57.	207.4	2723.4	*	9	0315	782	26.	7.0	2704.7
3	1400	249	103.	461.7	2733.9	*	6	0845	516	57.	206.5	2723.4	*	9	0330	783	24.	6.6	2704.4
3	1415	250	102.	460.2	2733.8	*	6	0900	517	57.	205.7	2723.3	*	9	0345	784	23.	6.2	2704.0
3	1430	251	102.	458.7	2733.8	*	6	0915	518	57.	204.8	2723.3	*	9	0400	785	21.	5.9	2703.7
3	1445	252	101.	457.2	2733.7	*	6	0930	519	57.	204.0	2723.2	*	9	0415	786	20.	5.5	2703.5
3	1500	253	101.	455.7	2733.6	*	6	0945	520	57.	203.1	2723.2	*	9	0430	787	19.	5.2	2703.2
3	1515	254	100.	454.2	2733.6	*	6	1000	521	57.	202.3	2723.1	*	9	0445	788	18.	4.9	2703.0
3	1530	255	100.	452.7	2733.5	*	6	1015	522	57.	201.4	2723.1	*	9	0500	789	17.	4.6	2702.8
3	1545	256	99.	451.2	2733.5	*	6	1030	523	57.	200.6	2723.0	*	9	0515	790	16.	4.4	2702.6
3	1600	257	99.	449.8	2733.4	*	6	1045	524	57.	199.7	2723.0	*	9	0530	791	15.	4.2	2702.4
3	1615	258	98.	448.3	2733.4	*	6	1100	525	57.	198.9	2722.9	*	9	0545	792	14.	3.9	2702.2
3	1630	259	98.	446.9	2733.3	*	6	1115	526	57.	198.0	2722.9	*	9	0600	793	14.	3.7	2702.0
3	1645	260	97.	445.5	2733.3	*	6	1130	527	57.	197.2	2722.8	*	9	0615	794	13.	3.6	2701.9
3	1700	261	97.	444.0	2733.2	*	6	1145	528	57.	196.3	2722.8	*	9	0630	795	12.	3.4	2701.7
3	1715	262	96.	442.6	2733.2	*	6	1200	529	57.	195.5	2722.7	*	9	0645	796	12.	3.2	2701.6
3	1730	263	96.	441.2	2733.1	*	6	1215	530	57.	194.7	2722.7	*	9	0700	797	11.	3.1	2701.5
3	1745	264	95.	439.8	2733.1	*	6	1230	531	56.	193.8	2722.6	*	9	0715	798	11.	2.9	2701.4
3	1800	265	95.	438.4	2733.0	*	6	1245	532	56.	193.0	2722.6	*	9	0730	799	10.	2.8	2701.3
3	1815	266	94.	437.1	2733.0	*	6	1300	533	56.	192.1	2722.5	*	9	0745	800	10.	2.7	2701.2
3	1830	267	94.	435.7	2732.9	*	6	1315	534	56.	191.3	2722.5	*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	199.75-HR
+ (CFS)	(HR)	(CFS)				
+ 116.	41.25		116.	116.	108.	72.
		(INCHES)	.101	.403	1.122	2.080
		(AC-FT)	58.	230.	641.	1189.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	199.75-HR
+ (AC-FT)	(HR)					
539.	41.50		539.	536.	492.	290.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	199.75-HR
+ (FEET)	(HR)					
2736.50	41.25		2736.49	2736.38	2734.88	2725.33

CUMULATIVE AREA = 10.72 SQ MI

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HYDROGRAPH AT STATION LMBWCDB
PLAN 1, RATIO = .87

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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.	.0	2699.0	*	3	1845	268	91.	426.4	2732.6	*	6	1330	535	56.	185.1	2722.1
1	0015	2	3.	.7	2699.6	*	3	1900	269	90.	425.1	2732.6	*	6	1345	536	56.	184.2	2722.0
1	0030	3	18.	5.0	2703.0	*	3	1915	270	90.	423.8	2732.5	*	6	1400	537	56.	183.4	2722.0
1	0045	4	29.	11.9	2706.0	*	3	1930	271	89.	422.5	2732.5	*	6	1415	538	56.	182.5	2721.9
1	0100	5	32.	17.2	2707.2	*	3	1945	272	89.	421.2	2732.4	*	6	1430	539	56.	181.7	2721.9
1	0115	6	34.	21.3	2708.1	*	3	2000	273	88.	420.0	2732.4	*	6	1445	540	55.	180.8	2721.8
1	0130	7	36.	26.8	2709.3	*	3	2015	274	88.	418.7	2732.3	*	6	1500	541	55.	180.0	2721.8
1	0145	8	39.	34.8	2710.5	*	3	2030	275	87.	417.4	2732.3	*	6	1515	542	55.	179.1	2721.7
1	0200	9	40.	43.4	2711.3	*	3	2045	276	87.	416.2	2732.2	*	6	1530	543	55.	178.3	2721.7
1	0215	10	41.	51.8	2712.1	*	3	2100	277	87.	415.0	2732.2	*	6	1545	544	55.	177.5	2721.6
1	0230	11	43.	60.3	2713.0	*	3	2115	278	86.	413.8	2732.2	*	6	1600	545	55.	176.6	2721.6
1	0245	12	44.	69.3	2713.9	*	3	2130	279	86.	412.5	2732.1	*	6	1615	546	55.	175.8	2721.5
1	0300	13	46.	81.3	2715.0	*	3	2145	280	85.	411.3	2732.1	*	6	1630	547	55.	174.9	2721.5
1	0315	14	49.	105.3	2716.7	*	3	2200	281	85.	410.1	2732.0	*	6	1645	548	55.	174.1	2721.4
1	0330	15	54.	163.1	2720.7	*	3	2215	282	84.	408.9	2732.0	*	6	1700	549	55.	173.2	2721.4
1	0345	16	60.	236.3	2725.1	*	3	2230	283	84.	407.7	2731.9	*	6	1715	550	55.	172.4	2721.3
1	0400	17	62.	287.1	2727.3	*	3	2245	284	84.	406.6	2731.9	*	6	1730	551	55.	171.6	2721.3
1	0415	18	63.	316.5	2728.5	*	3	2300	285	83.	405.4	2731.9	*	6	1745	552	55.	170.7	2721.2
1	0430	19	64.	337.7	2729.4	*	3	2315	286	83.	404.2	2731.8	*	6	1800	553	55.	169.9	2721.2
1	0445	20	68.	361.5	2730.3	*	3	2330	287	82.	403.1	2731.8	*	6	1815	554	55.	169.0	2721.1
1	0500	21	77.	386.9	2731.2	*	3	2345	288	82.	401.9	2731.7	*	6	1830	555	55.	168.2	2721.1
1	0515	22	83.	405.4	2731.9	*	4	0000	289	82.	400.8	2731.7	*	6	1845	556	54.	167.3	2721.0
1	0530	23	87.	416.0	2732.2	*	4	0015	290	81.	399.6	2731.7	*	6	1900	557	54.	166.5	2721.0
1	0545	24	89.	422.6	2732.5	*	4	0030	291	81.	398.5	2731.6	*	6	1915	558	54.	165.7	2720.9
1	0600	25	91.	427.6	2732.7	*	4	0045	292	80.	397.4	2731.6	*	6	1930	559	54.	164.8	2720.9
1	0615	26	92.	431.2	2732.8	*	4	0100	293	80.	396.3	2731.5	*	6	1945	560	54.	164.0	2720.8
1	0630	27	93.	433.8	2732.9	*	4	0115	294	80.	395.2	2731.5	*	6	2000	561	54.	163.1	2720.7
1	0645	28	94.	435.9	2732.9	*	4	0130	295	79.	394.1	2731.5	*	6	2015	562	54.	162.3	2720.7
1	0700	29	95.	437.8	2733.0	*	4	0145	296	79.	393.0	2731.4	*	6	2030	563	54.	161.5	2720.6
1	0715	30	95.	439.7	2733.1	*	4	0200	297	79.	391.9	2731.4	*	6	2045	564	54.	160.6	2720.6
1	0730	31	96.	441.6	2733.1	*	4	0215	298	78.	390.8	2731.3	*	6	2100	565	54.	159.8	2720.5
1	0745	32	97.	443.4	2733.2	*	4	0230	299	78.	389.8	2731.3	*	6	2115	566	54.	158.9	2720.5
1	0800	33	97.	445.2	2733.3	*	4	0245	300	77.	388.7	2731.3	*	6	2130	567	54.	158.1	2720.4
1	0815	34	98.	447.0	2733.3	*	4	0300	301	77.	387.6	2731.2	*	6	2145	568	54.	157.3	2720.4
1	0830	35	98.	448.7	2733.4	*	4	0315	302	77.	386.6	2731.2	*	6	2200	569	54.	156.4	2720.3
1	0845	36	99.	450.5	2733.5	*	4	0330	303	76.	385.5	2731.2	*	6	2215	570	54.	155.6	2720.3
1	0900	37	100.	452.2	2733.5	*	4	0345	304	76.	384.5	2731.1	*	6	2230	571	53.	154.8	2720.2
1	0915	38	100.	453.8	2733.6	*	4	0400	305	76.	383.5	2731.1	*	6	2245	572	53.	153.9	2720.2
1	0930	39	101.	455.5	2733.6	*	4	0415	306	75.	382.4	2731.0	*	6	2300	573	53.	153.1	2720.1
1	0945	40	101.	457.1	2733.7	*	4	0430	307	75.	381.4	2731.0	*	6	2315	574	53.	152.3	2720.1
1	1000	41	102.	458.7	2733.8	*	4	0445	308	75.	380.4	2731.0	*	6	2330	575	53.	151.4	2720.0
1	1015	42	102.	460.2	2733.8	*	4	0500	309	74.	379.4	2730.9	*	6	2345	576	53.	150.6	2720.0
1	1030	43	103.	461.8	2733.9	*	4	0515	310	74.	378.4	2730.9	*	7	0000	577	53.	149.8	2719.9
1	1045	44	103.	463.3	2733.9	*	4	0530	311	74.	377.4	2730.9	*	7	0015	578	53.	148.9	2719.9
1	1100	45	104.	464.7	2734.0	*	4	0545	312	73.	376.4	2730.8	*	7	0030	579	53.	148.1	2719.8
1	1115	46	104.	466.2	2734.0	*	4	0600	313	73.	375.4	2730.8	*	7	0045	580	53.	147.3	2719.7
1	1130	47	105.	467.6	2734.1	*	4	0615	314	73.	374.5	2730.8	*	7	0100	581	53.	146.4	2719.7
1	1145	48	105.	469.1	2734.1	*	4	0630	315	72.	373.5	2730.7	*	7	0115	582	53.	145.6	2719.6
1	1200	49	106.	470.5	2734.2	*	4	0645	316	72.	372.5	2730.7	*	7	0130	583	53.	144.8	2719.6
1	1215	50	106.	471.8	2734.2	*	4	0700	317	71.	371.6	2730.7	*	7	0145	584	53.	143.9	2719.5
1	1230	51	107.	473.2	2734.3	*	4	0715	318	71.	370.6	2730.6	*	7	0200	585	52.	143.1	2719.4
1	1245	52	107.	474.5	2734.3	*	4	0730	319	71.	369.7	2730.6	*	7	0215	586	52.	142.3	2719.4
1	1300	53	108.	475.8	2734.4	*	4	0745	320	71.	368.7	2730.6	*	7	0230	587	52.	141.5	2719.3
1	1315	54	108.	477.1	2734.4	*	4	0800	321	70.	367.8	2730.5	*	7	0245	588	52.	140.6	2719.3
1	1330	55	109.	478.3	2734.5	*	4	0815	322	70.	366.9	2730.5	*	7	0300	589	52.	139.8	2719.2
1	1345	56	109.	479.5	2734.5	*	4	0830	323	70.	366.0	2730.5	*	7	0315	590	52.	139.0	2719.2
1	1400	57	109.	480.7	2734.5	*	4	0845	324	69.	365.0	2730.4	*	7	0330	591	52.	138.2	2719.1
1	1415	58	110.	481.9	2734.6	*	4	0900	325	69.	364.1	2730.4	*	7	0345	592	52.	137.3	2719.0
1	1430	59	110.	483.1	2734.6	*	4	0915	326	69.	363.2	2730.4	*	7	0400	593	52.	136.5	2719.0
1	1445	60	111.	484.2	2734.7	*	4	0930	327	68.	362.3	2730.3	*	7	0415	594	52.	135.7	2718.9
1	1500	61	111.	485.4	2734.7	*	4	0945	328	68.	361.4	2730.3	*	7	0430	595	52.	134.9	2718.9
1	1515	62	111.	486.5	2734.7	*	4	1000	329	68.	360.5	2730.3	*	7	0445	596	51.	134.1	2718.8
1	1530	63	112.	487.6	2734.8	*	4	1015	330	67.	359.7	2730.2	*	7	0500	597	51.	133.2	2718.7
1	1545	64	112.	488.6	2734.8	*	4	1030	331	67.	358.8	2730.2	*	7	0515	598	51.	132.4	2718.7
1	1600	65	113.	489.7	2734.9	*	4	1045	332	67.	357.9	2730.2	*	7	0530	599	51.	131.6	2718.6
1	1615	66	113.	490.7	2734.9	*	4	1100	333	66.	357.0	2730.1	*	7	0545	600	51.	130.8	2718.6
1	1630	67	113.	491.7	2734.9	*	4	1115	334	66.	356.2	2730.1	*	7	0600	601	51.	130.0	2718.5
1	1645	68	114.	492.7	2735.0	*	4	1130	335	66.	355.3	2730.1	*	7	0615	602	51.	129.2	2718.5
1	1700	69	114.	493.6	2735.0	*	4	1145	336	66.	354.5	2730.1	*	7	0630	603	51.	128.4	2718.4
1	1715	70	114.	494.6	2735.0	*	4	1200	337	65.	353.6	2730.0	*	7	0645	604	51.	127.5	2718.3
1	1730	71	114.	495.5	2735.1	*	4	1215	338	65.	352.8	2730.0	*	7	0700	605	51.	126.7	2718.3
1	1745	72	114.	496.4	2735.1	*	4	1230	339	65.	351.9	2730.0	*	7	0715	606	51.	125.9	2718.2
1	1800	73	114.	497.3	2735.1	*	4	1245	340	65.	351.1	2729.9	*	7	0730	607	51.	125.1	2718.2
1	1815	74	114.	498.2	2735.1	*	4	1300	341	65.	350.3	2729.9	*	7	0745	608	51.	124.3	2718.1
1	1830	75	114.	499.1	2735.2	*	4	1315	342	65.	349.4	2729.9	*	7	0800	609	50.	123.5	2718.0
1	1845	76	114.	500.0	2735.2	*	4	1330	343	65.	348.6	2729.8	*	7	0815	610	50.	122.7	2718.0
1	1900	77	114.	500.8	2735.2	*	4	1345	344	65.	347.7	2729.8	*	7	0830	611	50.	121.9	2717.9
1	1915	78	114.	501.7	2735.3	*	4	1400	345	65.	346.9	2729.7	*	7	0845	612	50.	121.1	2717.9
1	1930	79	114.	502.5	2735.3	*	4	1415	346	65.	346.1	2729.7	*	7	0900	613	50.	120.3	2717.8
1	1945	80	115.	503.3	2735.3	*	4	1430	347	65.	345.2	2729.7	*	7	0915	614	50.	119.5	2717.8
1	2000	81	115.	504.1	2735.3	*	4	1445	348	65.	344.4	2729.6	*	7	0930	615	50.	118.7	2717.7
1	2015	82	115.	504.9	2735.4	*	4	1500	349	65.	343.5	2729.6	*	7	0945	616	50.	117.9	2717.6
1	2030	83	115.	505.7	2735.4	*	4	1515	350	65.	342.7	2729.6	*	7	1000	617	50.	117.1	2717.6
1	2045	84	115.	506.4	2735.4	*	4	1530	351	64.	341.8	2729.5	*	7	1015	618	50.	116.3	2717.5
1	2100	85	115.	507.2	2735.4	*	4	1545	352	64.	341.0	2729.5	*	7	1030	619	50.	115.5	2717.5
1	2115	86	115.	507.9	2735.5	*	4	1600	353	64.	340.2	2729.5	*	7	1045	620	50.	114.7	2717.4
1	2130	87	115.	508.6	2735.5	*	4	1615	354	64.	339.3	2729.4	*	7	1100	621	49.	113.9	2717.4
1	2145	88	115.	509.3	2735.5	*	4	1630	355	64.	338.5	2729.4	*	7	1115	622	49.	113.1	2717.3
1	2200	89	115.	510.0	2735.5	*	4	1645	356	64.	337.6	2729.4	*	7	1130	623	49.	112.3	2717.2
1	2215	90	115.	510.7	2735.6	*	4	1700	357	64.	336.8	2729.3	*	7	1145	624	49.	111.5	2717.2
1	2230	91	115.	511.4	2735.6	*	4	1715	358	64.	335.9	2729.3	*	7	1200	625	49.	110.7	2717.1
1	2245	92	115.	512.1	2735.6	*	4	1730	359	64.	335.1	2729.3	*	7	1215	626	49.	109.9	2717.1
1	2300	93	115.	512.7	2735.6	*	4	1745	360	64.	334.3	2729.2	*	7	1230	627	49.	109.1	2717.0
1	2315	94	115.	513.3	2735.6	*	4	1800	361	64.	333.4	2729.2	*	7	1245	628	49.	108.3	2717.0
1	2330	95	115.	514.0	2735.7	*	4	1815	362	64.	332.6	2729.2	*	7	1300	629	49.	107.5	2716.9
1	2345	96	115.	514.6	2735.7	*	4	1830	363	64.	331.7	2729.1	*	7	1315	630	49.	106.7	2716.8
2	0000	97	115.	515.2	2735.7	*	4	1845	364	64.	330.9	2729.1	*	7	1330	631	49.	105.9	2716.8
2	0015	98	115.	515.7	2735.7	*	4	1900	365	64.	330.0	2729.0	*	7	1345	632	49.	105.2	2716.7
2	0030	99	115.	516.3	2735.7	*	4	1915	366	64.	329.2	2729.0	*	7	1400	633	48.	104.4	2716.7
2	0045	100	115.	516.9	2735.8	*	4	1930	367	64.	328.4	2729.0	*	7	1415	634	48.	103.6	2716.6
2	0100	101	115.	517.4	2735.8	*	4	1945	368	64.	327.5	2728.9	*	7	1430	635	48.	102.8	2716.6
2	0115	102	115.	518.0	2735.8	*	4	2000	369	64.	326.7	2728.9	*	7	1445	636	48.	102.0	2716.5
2	0130	103	115.	518.5	2735.8	*	4	2015	370	64.	325.8	2728.9	*	7	1500	637	48.	101.2	2716.4
2	0145	104	115.	519.0	2735.8	*	4	2030	371	64.	325.0	2728.8	*	7	1515	638	48.	100.4	2716.4
2	0200	105	115.	519.5	2735.8	*	4	2045	372	64.	324.1	2728.8	*	7	1530	639	48.	99.7	2716.3
2	0215	106	115.	520.0	2735.9	*	4	2100	373	64.	323.3	2728.8	*	7	1545	640	48.	98.9	2716.3
2	0230	107	115.	520.5	2735.9	*	4	2115	374	64.	322.4	2728.7	*	7	1600	641	48.	98.1	2716.2
2	0245	108	115.	520.9	2735.9	*	4	2130	375	64.	321.6	2728.7	*	7	1615	642	48.	97.3	2716.2
2	0300	109	115.	521.4	2735.9	*	4	2145	376	63.	320.7	2728.7	*	7	1630	643	48.	96.5	2716.1
2	0315	110	115.	521.8	2735.9	*	4	2200	377	63.	319.9	2728.6	*	7	1645	644	48.	95.8	2716.1
2	0330	111	115.	522.3	2735.9	*	4	2215	378	63.	319.0	2728.6	*	7	1700	645	48.	95.0	2716.0
2	0345	112	116.	522.7	2735.9	*	4	2230	379	63.	318.2	2728.6	*	7	1715	646	47.	94.2	2715.9
2	0400	113	116.	523.1	2736.0	*	4	2245	380	63.	317.4	2728.5	*	7	1730	647	47.	93.4	2715.9
2	0415	114	116.	523.5	2736.0	*	4	2300	381	63.	316.5	2728.5	*	7	1745	648	47.	92.6	2715.8

2	0430	115	116.	523.9	2736.0	*	4	2315	382	63.	315.7	2728.4	*	7	1800	649	47.	91.9	2715.8
2	0445	116	116.	524.3	2736.0	*	4	2330	383	63.	314.8	2728.4	*	7	1815	650	47.	91.1	2715.7
2	0500	117	116.	524.6	2736.0	*	4	2345	384	63.	314.0	2728.4	*	7	1830	651	47.	90.3	2715.7
2	0515	118	116.	525.0	2736.0	*	5	0000	385	63.	313.1	2728.3	*	7	1845	652	47.	89.5	2715.6
2	0530	119	116.	525.3	2736.0	*	5	0015	386	63.	312.3	2728.3	*	7	1900	653	47.	88.8	2715.6
2	0545	120	116.	525.6	2736.0	*	5	0030	387	63.	311.4	2728.3	*	7	1915	654	47.	88.0	2715.5
2	0600	121	116.	526.0	2736.1	*	5	0045	388	63.	310.6	2728.2	*	7	1930	655	47.	87.2	2715.4
2	0615	122	116.	526.3	2736.1	*	5	0100	389	63.	309.7	2728.2	*	7	1945	656	47.	86.4	2715.4
2	0630	123	116.	526.6	2736.1	*	5	0115	390	63.	308.9	2728.2	*	7	2000	657	47.	85.6	2715.3
2	0645	124	116.	526.9	2736.1	*	5	0130	391	63.	308.0	2728.1	*	7	2015	658	46.	84.9	2715.3
2	0700	125	116.	527.1	2736.1	*	5	0145	392	63.	307.2	2728.1	*	7	2030	659	46.	84.1	2715.2
2	0715	126	116.	527.4	2736.1	*	5	0200	393	63.	306.3	2728.1	*	7	2045	660	46.	83.3	2715.2
2	0730	127	116.	527.7	2736.1	*	5	0215	394	63.	305.5	2728.0	*	7	2100	661	46.	82.6	2715.1
2	0745	128	116.	527.9	2736.1	*	5	0230	395	63.	304.6	2728.0	*	7	2115	662	46.	81.8	2715.1
2	0800	129	116.	528.1	2736.1	*	5	0245	396	63.	303.8	2728.0	*	7	2130	663	46.	81.0	2715.0
2	0815	130	116.	528.4	2736.1	*	5	0300	397	63.	302.9	2727.9	*	7	2145	664	46.	80.2	2714.9
2	0830	131	116.	528.6	2736.1	*	5	0315	398	63.	302.1	2727.9	*	7	2200	665	46.	79.5	2714.9
2	0845	132	116.	528.8	2736.1	*	5	0330	399	63.	301.2	2727.8	*	7	2215	666	46.	78.7	2714.8
2	0900	133	116.	529.0	2736.2	*	5	0345	400	63.	300.4	2727.8	*	7	2230	667	46.	77.9	2714.7
2	0915	134	116.	529.2	2736.2	*	5	0400	401	63.	299.6	2727.8	*	7	2245	668	45.	77.2	2714.6
2	0930	135	116.	529.4	2736.2	*	5	0415	402	62.	298.7	2727.7	*	7	2300	669	45.	76.4	2714.6
2	0945	136	116.	529.6	2736.2	*	5	0430	403	62.	297.9	2727.7	*	7	2315	670	45.	75.6	2714.5
2	1000	137	116.	529.8	2736.2	*	5	0445	404	62.	297.0	2727.7	*	7	2330	671	45.	74.9	2714.4
2	1015	138	116.	530.0	2736.2	*	5	0500	405	62.	296.2	2727.6	*	7	2345	672	45.	74.1	2714.3
2	1030	139	116.	530.1	2736.2	*	5	0515	406	62.	295.3	2727.6	*	8	0000	673	45.	73.4	2714.3
2	1045	140	116.	530.3	2736.2	*	5	0530	407	62.	294.5	2727.6	*	8	0015	674	45.	72.6	2714.2
2	1100	141	116.	530.4	2736.2	*	5	0545	408	62.	293.6	2727.5	*	8	0030	675	45.	71.9	2714.1
2	1115	142	116.	530.6	2736.2	*	5	0600	409	62.	292.8	2727.5	*	8	0045	676	44.	71.1	2714.0
2	1130	143	116.	530.7	2736.2	*	5	0615	410	62.	291.9	2727.5	*	8	0100	677	44.	70.4	2714.0
2	1145	144	116.	530.9	2736.2	*	5	0630	411	62.	291.1	2727.4	*	8	0115	678	44.	69.6	2713.9
2	1200	145	116.	531.0	2736.2	*	5	0645	412	62.	290.2	2727.4	*	8	0130	679	44.	68.9	2713.8
2	1215	146	116.	531.1	2736.2	*	5	0700	413	62.	289.4	2727.3	*	8	0145	680	44.	68.1	2713.7
2	1230	147	116.	531.2	2736.2	*	5	0715	414	62.	288.5	2727.3	*	8	0200	681	44.	67.4	2713.7
2	1245	148	116.	531.4	2736.2	*	5	0730	415	62.	287.7	2727.3	*	8	0215	682	44.	66.6	2713.6
2	1300	149	116.	531.5	2736.2	*	5	0745	416	62.	286.8	2727.2	*	8	0230	683	44.	65.9	2713.5
2	1315	150	116.	531.6	2736.2	*	5	0800	417	62.	286.0	2727.2	*	8	0245	684	44.	65.1	2713.5
2	1330	151	116.	531.6	2736.2	*	5	0815	418	62.	285.1	2727.2	*	8	0300	685	43.	64.4	2713.4
2	1345	152	116.	531.7	2736.2	*	5	0830	419	62.	284.3	2727.1	*	8	0315	686	43.	63.7	2713.3
2	1400	153	116.	531.8	2736.2	*	5	0845	420	62.	283.4	2727.1	*	8	0330	687	43.	62.9	2713.2
2	1415	154	116.	531.9	2736.2	*	5	0900	421	62.	282.5	2727.1	*	8	0345	688	43.	62.2	2713.2
2	1430	155	116.	531.9	2736.3	*	5	0915	422	62.	281.7	2727.0	*	8	0400	689	43.	61.5	2713.1
2	1445	156	116.	532.0	2736.3	*	5	0930	423	62.	280.8	2727.0	*	8	0415	690	43.	60.7	2713.0
2	1500	157	116.	532.1	2736.3	*	5	0945	424	62.	280.0	2727.0	*	8	0430	691	43.	60.0	2712.9
2	1515	158	116.	532.1	2736.3	*	5	1000	425	62.	279.1	2726.9	*	8	0445	692	43.	59.3	2712.9
2	1530	159	116.	532.1	2736.3	*	5	1015	426	62.	278.3	2726.9	*	8	0500	693	42.	58.5	2712.8
2	1545	160	116.	532.2	2736.3	*	5	1030	427	61.	277.4	2726.9	*	8	0515	694	42.	57.8	2712.7
2	1600	161	116.	532.2	2736.3	*	5	1045	428	61.	276.6	2726.8	*	8	0530	695	42.	57.1	2712.7
2	1615	162	116.	532.2	2736.3	*	5	1100	429	61.	275.7	2726.8	*	8	0545	696	42.	56.4	2712.6
2	1630	163	116.	532.3	2736.3	*	5	1115	430	61.	274.9	2726.7	*	8	0600	697	42.	55.7	2712.5
2	1645	164	116.	532.3	2736.3	*	5	1130	431	61.	274.0	2726.7	*	8	0615	698	42.	54.9	2712.5
2	1700	165	116.	532.3	2736.3	*	5	1145	432	61.	273.2	2726.7	*	8	0630	699	42.	54.2	2712.4
2	1715	166	116.	532.3	2736.3	*	5	1200	433	61.	272.3	2726.6	*	8	0645	700	42.	53.5	2712.3
2	1730	167	116.	532.3	2736.3	*	5	1215	434	61.	271.4	2726.6	*	8	0700	701	42.	52.8	2712.2
2	1745	168	116.	532.2	2736.3	*	5	1230	435	61.	270.6	2726.6	*	8	0715	702	41.	52.1	2712.2
2	1800	169	116.	532.2	2736.3	*	5	1245	436	61.	269.7	2726.5	*	8	0730	703	41.	51.4	2712.1
2	1815	170	116.	532.2	2736.3	*	5	1300	437	61.	268.9	2726.5	*	8	0745	704	41.	50.6	2712.0
2	1830	171	116.	532.2	2736.3	*	5	1315	438	61.	268.0	2726.5	*	8	0800	705	41.	49.9	2712.0
2	1845	172	116.	532.1	2736.3	*	5	1330	439	61.	267.2	2726.4	*	8	0815	706	41.	49.2	2711.9
2	1900	173	116.	532.1	2736.3	*	5	1345	440	61.	266.3	2726.4	*	8	0830	707	41.	48.5	2711.8
2	1915	174	116.	532.0	2736.3	*	5	1400	441	61.	265.4	2726.4	*	8	0845	708	41.	47.8	2711.8
2	1930	175	116.	531.9	2736.2	*	5	1415	442	61.	264.6	2726.3	*	8	0900	709	41.	47.1	2711.7
2	1945	176	116.	531.8	2736.2	*	5	1430	443	61.	263.7	2726.3	*	8	0915	710	40.	46.4	2711.6
2	2000	177	116.	531.6	2736.2	*	5	1445	444	61.	262.9	2726.2	*	8	0930	711	40.	45.7	2711.6
2	2015	178	116.	531.4	2736.2	*	5	1500	445	61.	262.0	2726.2	*	8	0945	712	40.	45.0	2711.5
2	2030	179	116.	531.1	2736.2	*	5	1515	446	61.	261.2	2726.2	*	8	1000	713	40.	44.3	2711.4
2	2045	180	116.	530.9	2736.2	*	5	1530	447	61.	260.3	2726.1	*	8	1015	714	40.	43.6	2711.4
2	2100	181	116.	530.6	2736.2	*	5	1545	448	61.	259.4	2726.1	*	8	1030	715	40.	42.9	2711.3
2	2115	182	116.	530.3	2736.2	*	5	1600	449	61.	258.6	2726.1	*	8	1045	716	40.	42.2	2711.2
2	2130	183	116.	529.9	2736.2	*	5	1615	450	61.	257.7	2726.0	*	8	1100	717	40.	41.6	2711.1
2	2145	184	116.	529.6	2736.2	*	5	1630	451	61.	256.9	2726.0	*	8	1115	718	40.	40.9	2711.1
2	2200	185	116.	529.2	2736.2	*	5	1645	452	60.	256.0	2726.0	*	8	1130	719	39.	40.2	2711.0
2	2215	186	116.	528.8	2736.1	*	5	1700	453	60.	255.2	2725.9	*	8	1145	720	39.	39.5	2710.9
2	2230	187	116.	528.3	2736.1	*	5	1715	454	60.	254.3	2725.9	*	8	1200	721	39.	38.8	2710.9
2	2245	188	116.	527.9	2736.1	*	5	1730	455	60.	253.4	2725.8	*	8	1215	722	39.	38.1	2710.8
2	2300	189	116.	527.4	2736.1	*	5	1745	456	60.	252.6	2725.8	*	8	1230	723	39.	37.4	2710.7
2	2315	190	116.	527.0	2736.1	*	5	1800	457	60.	251.7	2725.8	*	8	1245	724	39.	36.8	2710.7
2	2330	191	116.	526.5	2736.1	*	5	1815	458	60.	250.9	2725.7	*	8	1300	725	39.	36.1	2710.6
2	2345	192	116.	526.0	2736.1	*	5	1830	459	60.	250.0	2725.7	*	8	1315	726	39.	35.4	2710.5
3	0000	193	116.	525.5	2736.0	*	5	1845	460	60.	249.1	2725.7	*	8	1330	727	39.	34.7	2710.5
3	0015	194	116.	525.0	2736.0	*	5	1900	461	60.	248.3	2725.6	*	8	1345	728	38.	34.1	2710.4
3	0030	195	116.	524.4	2736.0	*	5	1915	462	60.	247.4	2725.6	*	8	1400	729	38.	33.4	2710.4
3	0045	196	116.	523.9	2736.0	*	5	1930	463	60.	246.6	2725.6	*	8	1415	730	38.	32.7	2710.3
3	0100	197	116.	523.3	2736.0	*	5	1945	464	60.	245.7	2725.5	*	8	1430	731	38.	32.1	2710.2
3	0115	198	116.	522.8	2736.0	*	5	2000	465	60.	244.8	2725.5	*	8	1445	732	38.	31.4	2710.2
3	0130	199	115.	522.2	2735.9	*	5	2015	466	60.	244.0	2725.5	*	8	1500	733	38.	30.7	2710.1
3	0145	200	115.	521.6	2735.9	*	5	2030	467	60.	243.1	2725.4	*	8	1515	734	38.	30.1	2710.0
3	0200	201	115.	521.0	2735.9	*	5	2045	468	60.	242.3	2725.4	*	8	1530	735	38.	29.4	2709.9
3	0215	202	115.	520.4	2735.9	*	5	2100	469	60.	241.4	2725.3	*	8	1545	736	37.	28.7	2709.8
3	0230	203	115.	519.8	2735.9	*	5	2115	470	60.	240.5	2725.3	*	8	1600	737	37.	28.1	2709.6
3	0245	204	115.	519.1	2735.8	*	5	2130	471	60.	239.7	2725.3	*	8	1615	738	37.	27.4	2709.5
3	0300	205	115.	518.4	2735.8	*	5	2145	472	60.	238.8	2725.2	*	8	1630	739	36.	26.8	2709.3
3	0315	206	115.	517.7	2735.8	*	5	2200	473	60.	238.0	2725.2	*	8	1645	740	36.	26.2	2709.2
3	0330	207	115.	517.0	2735.8	*	5	2215	474	60.	237.1	2725.2	*	8	1700	741	36.	25.5	2709.0
3	0345	208	115.	516.2	2735.7	*	5	2230	475	60.	236.2	2725.1	*	8	1715	742	35.	24.9	2708.9
3	0400	209	115.	515.4	2735.7	*	5	2245	476	60.	235.4	2725.1	*	8	1730	743	35.	24.3	2708.8
3	0415	210	115.	514.5	2735.7	*	5	2300	477	59.	234.5	2725.1	*	8	1745	744	35.	23.7	2708.6
3	0430	211	115.	513.5	2735.6	*	5	2315	478	59.	233.6	2725.0	*	8	1800	745	35.	23.1	2708.5
3	0445	212	115.	512.4	2735.6	*	5	2330	479	59.	232.8	2725.0	*	8	1815	746	34.	22.5	2708.4
3	0500	213	115.	511.3	2735.6	*	5	2345	480	59.	231.9	2724.9	*	8	1830	747	34.	21.9	2708.2
3	0515	214	115.	510.0	2735.5	*	6	0000	481	59.	231.1	2724.9	*	8	1845	748	34.	21.3	2708.1
3	0530	215	115.	508.5	2735.5	*	6	0015	482	59.	230.2	2724.8	*	8	1900	749	33.	20.7	2708.0
3	0545	216	115.	506.7	2735.4	*	6	0030	483	59.	229.3	2724.8	*	8	1915	750	33.	20.1	2707.8
3	0600	217	115.	505.0	2735.4	*	6	0045	484	59.	228.5	2724.7	*	8	1930	751	33.	19.6	2707.7
3	0615	218	114.	503.2	2735.3	*	6	0100	485	59.	227.6	2724.7	*	8	1945	752	33.	19.0	2707.6
3	0630	219	114.	501.5	2735.3	*	6	0115	486	59.	226.8	2724.6	*	8	2000	753	32.	18.4	2707.5
3	0645	220	114.	499.7	2735.2	*	6	0130	487	59.	225.9	2724.6	*	8	2015	754	32.	17.9	2707.3
3	0700	221	114.	498.0	2735.1	*	6	0145	488	59.	225.0	2724.5	*	8	2030	755	32.	17.3	2707.2
3	0715	222	114.	496.2	2735.1	*	6	0200	489	59.	224.2	2724.5	*	8	2045	756	31.	16.8	2707.1
3	0730	223	114.	494.5	2735.0	*	6	0215	490	59.	223.3	2724.4	*	8	2100	757	31.	16.2	2707.0
3	0745	224	114.	492.7	2735.0	*	6	0230	491	59.	222.5	2724.4	*	8	2115	758	31.	15.7	2706.8
3	0800	225	113.	491.0	2734.9	*	6	0245	492	59.	221.6	2724.3	*	8	2130	759	31.	15.1	2706.7
3	0815	226	112.	489.3	2734.8	*	6	0300	493	58.	220.8	2724.3	*	8	2145	760	30.	14.6	2706.6
3	0830	227	112.	487.6	2734.8	*	6	0315	494	58.	219.9	2724.2	*	8	2200	761	30.	14.1	2706.5
3	0845	228	111.	485.9	2734.7	*	6	0330	495	58.	219.0	2724.1	*	8	2215	762	30.	13.6	2706.4

3	0900	229	111.	484.2	2734.7	*	6	0345	496	58.	218.2	2724.1	*	8	2230	763	30.	13.1	2706.3
3	0915	230	110.	482.5	2734.6	*	6	0400	497	58.	217.3	2724.0	*	8	2245	764	29.	12.5	2706.1
3	0930	231	110.	480.8	2734.5	*	6	0415	498	58.	216.5	2724.0	*	8	2300	765	29.	12.0	2706.0
3	0945	232	109.	479.2	2734.5	*	6	0430	499	58.	215.6	2723.9	*	8	2315	766	29.	11.5	2705.9
3	1000	233	108.	477.5	2734.4	*	6	0445	500	58.	214.8	2723.9	*	8	2330	767	29.	11.0	2705.8
3	1015	234	108.	475.9	2734.4	*	6	0500	501	58.	213.9	2723.8	*	8	2345	768	28.	10.5	2705.7
3	1030	235	107.	474.3	2734.3	*	6	0515	502	58.	213.1	2723.8	*	9	0000	769	28.	10.1	2705.6
3	1045	236	107.	472.7	2734.3	*	6	0530	503	58.	212.2	2723.7	*	9	0015	770	28.	9.6	2705.5
3	1100	237	106.	471.1	2734.2	*	6	0545	504	58.	211.4	2723.7	*	9	0030	771	28.	9.1	2705.4
3	1115	238	106.	469.5	2734.1	*	6	0600	505	58.	210.5	2723.6	*	9	0045	772	27.	8.6	2705.3
3	1130	239	105.	467.9	2734.1	*	6	0615	506	58.	209.7	2723.6	*	9	0100	773	27.	8.1	2705.2
3	1145	240	104.	466.3	2734.0	*	6	0630	507	58.	208.8	2723.5	*	9	0115	774	27.	7.7	2705.1
3	1200	241	104.	464.8	2734.0	*	6	0645	508	58.	208.0	2723.5	*	9	0130	775	26.	7.2	2704.9
3	1215	242	103.	463.2	2733.9	*	6	0700	509	57.	207.1	2723.4	*	9	0145	776	25.	6.8	2704.5
3	1230	243	103.	461.7	2733.9	*	6	0715	510	57.	206.3	2723.4	*	9	0200	777	23.	6.4	2704.2
3	1245	244	102.	460.2	2733.8	*	6	0730	511	57.	205.4	2723.3	*	9	0215	778	22.	6.0	2703.9
3	1300	245	102.	458.7	2733.8	*	6	0745	512	57.	204.6	2723.3	*	9	0230	779	21.	5.7	2703.6
3	1315	246	101.	457.1	2733.7	*	6	0800	513	57.	203.7	2723.2	*	9	0245	780	19.	5.3	2703.3
3	1330	247	101.	455.6	2733.6	*	6	0815	514	57.	202.9	2723.2	*	9	0300	781	18.	5.0	2703.1
3	1345	248	100.	454.2	2733.6	*	6	0830	515	57.	202.0	2723.1	*	9	0315	782	17.	4.8	2702.9
3	1400	249	100.	452.7	2733.5	*	6	0845	516	57.	201.2	2723.1	*	9	0330	783	16.	4.5	2702.6
3	1415	250	99.	451.2	2733.5	*	6	0900	517	57.	200.3	2723.0	*	9	0345	784	15.	4.3	2702.5
3	1430	251	99.	449.8	2733.4	*	6	0915	518	57.	199.5	2723.0	*	9	0400	785	15.	4.0	2702.3
3	1445	252	98.	448.3	2733.4	*	6	0930	519	57.	198.6	2722.9	*	9	0415	786	14.	3.8	2702.1
3	1500	253	98.	446.9	2733.3	*	6	0945	520	57.	197.8	2722.9	*	9	0430	787	13.	3.6	2701.9
3	1515	254	97.	445.4	2733.3	*	6	1000	521	57.	196.9	2722.8	*	9	0445	788	13.	3.5	2701.8
3	1530	255	97.	444.0	2733.2	*	6	1015	522	57.	196.1	2722.8	*	9	0500	789	12.	3.3	2701.7
3	1545	256	96.	442.6	2733.2	*	6	1030	523	57.	195.2	2722.7	*	9	0515	790	11.	3.1	2701.5
3	1600	257	96.	441.2	2733.1	*	6	1045	524	56.	194.4	2722.6	*	9	0530	791	11.	3.0	2701.4
3	1615	258	95.	439.8	2733.1	*	6	1100	525	56.	193.5	2722.6	*	9	0545	792	10.	2.8	2701.3
3	1630	259	95.	438.4	2733.0	*	6	1115	526	56.	192.7	2722.5	*	9	0600	793	10.	2.7	2701.2
3	1645	260	94.	437.0	2733.0	*	6	1130	527	56.	191.8	2722.5	*	9	0615	794	9.	2.6	2701.1
3	1700	261	94.	435.7	2732.9	*	6	1145	528	56.	191.0	2722.4	*	9	0630	795	9.	2.5	2701.0
3	1715	262	93.	434.3	2732.9	*	6	1200	529	56.	190.1	2722.4	*	9	0645	796	9.	2.4	2700.9
3	1730	263	93.	433.0	2732.8	*	6	1215	530	56.	189.3	2722.3	*	9	0700	797	8.	2.3	2700.9
3	1745	264	92.	431.6	2732.8	*	6	1230	531	56.	188.4	2722.3	*	9	0715	798	8.	2.2	2700.8
3	1800	265	92.	430.3	2732.7	*	6	1245	532	56.	187.6	2722.2	*	9	0730	799	8.	2.1	2700.7
3	1815	266	91.	429.0	2732.7	*	6	1300	533	56.	186.8	2722.2	*	9	0745	800	7.	2.0	2700.7
3	1830	267	91.	427.7	2732.7	*	6	1315	534	56.	185.9	2722.1	*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	199.75-HR
+ (CFS)	(HR)					
		(CFS)				
+ 116.	40.75		116.	116.	106.	71.
		(INCHES)	.101	.402	1.108	2.050
		(AC-FT)	58.	230.	633.	1172.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	199.75-HR
+ (AC-FT)	(HR)				
532.	41.00	532.	528.	484.	284.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	199.75-HR
(FEET)	(HR)				
2736.26	40.75	2736.26	2736.14	2734.63	2725.00

CUMULATIVE AREA = 10.72 SQ MI

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HYDROGRAPH AT STATION LMBWCDB
PLAN 1, RATIO = .86

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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.	.0	2699.0	*	3		1845	268	88.	420.4	2732.4	*	6		1330	535	55.	180.9	2721.8
1		0015	2	2.	.7	2699.5	*	3		1900	269	88.	419.1	2732.4	*	6		1345	536	55.	180.0	2721.8
1		0030	3	18.	4.9	2702.9	*	3		1915	270	88.	417.9	2732.3	*	6		1400	537	55.	179.2	2721.7
1		0045	4	29.	11.6	2705.9	*	3		1930	271	87.	416.6	2732.3	*	6		1415	538	55.	178.3	2721.7
1		0100	5	32.	16.9	2707.1	*	3		1945	272	87.	415.4	2732.2	*	6		1430	539	55.	177.5	2721.6
1		0115	6	33.	20.9	2708.0	*	3		2000	273	86.	414.2	2732.2	*	6		1445	540	55.	176.6	2721.6
1		0130	7	36.	26.3	2709.2	*	3		2015	274	86.	413.0	2732.1	*	6		1500	541	55.	175.8	2721.5
1		0145	8	39.	34.2	2710.4	*	3		2030	275	85.	411.7	2732.1	*	6		1515	542	55.	175.0	2721.5
1		0200	9	40.	42.6	2711.3	*	3		2045	276	85.	410.5	2732.0	*	6		1530	543	55.	174.1	2721.4
1		0215	10	41.	51.0	2712.1	*	3		2100	277	85.	409.3	2732.0	*	6		1545	544	55.	173.3	2721.4
1		0230	11	43.	59.3	2712.9	*	3		2115	278	84.	408.2	2732.0	*	6		1600	545	55.	172.4	2721.3
1		0245	12	44.	68.2	2713.7	*	3		2130	279	84.	407.0	2731.9	*	6		1615	546	55.	171.6	2721.3
1		0300	13	46.	80.1	2714.9	*	3		2145	280	83.	405.8	2731.9	*	6		1630	547	55.	170.7	2721.2
1		0315	14	48.	103.7	2716.6	*	3		2200	281	83.	404.6	2731.8	*	6		1645	548	55.	169.9	2721.2
1		0330	15	54.	161.0	2720.6	*	3		2215	282	83.	403.5	2731.8	*	6		1700	549	55.	169.1	2721.1
1		0345	16	59.	233.4	2725.0	*	3		2230	283	82.	402.3	2731.8	*	6		1715	550	55.	168.2	2721.1
1		0400	17	62.	283.6	2727.1	*	3		2245	284	82.	401.2	2731.7	*	6		1730	551	54.	167.4	2721.0
1		0415	18	63.	312.7	2728.3	*	3		2300	285	81.	400.0	2731.7	*	6		1745	552	54.	166.5	2721.0
1		0430	19	64.	333.6	2729.2	*	3		2315	286	81.	398.9	2731.6	*	6		1800	553	54.	165.7	2720.9
1		0445	20	67.	357.3	2730.2	*	3		2330	287	81.	397.8	2731.6	*	6		1815	554	54.	164.8	2720.9
1		0500	21	75.	382.4	2731.0	*	3		2345	288	80.	396.7	2731.6	*	6		1830	555	54.	164.0	2720.8
1		0515	22	82.	400.7	2731.7	*	4		0000	289	80.	395.5	2731.5	*	6		1845	556	54.	163.2	2720.8
1		0530	23	85.	411.3	2732.1	*	4		0015	290	79.	394.4	2731.5	*	6		1900	557	54.	162.3	2720.7
1		0545	24	88.	417.9	2732.3	*	4		0030	291	79.	393.4	2731.4	*	6		1915	558	54.	161.5	2720.6
1		0600	25	89.	422.8	2732.5	*	4		0045	292	79.	392.3	2731.4	*	6		1930	559	54.	160.6	2720.6
1		0615	26	91.	426.4	2732.6	*	4		0100	293	78.	391.2	2731.4	*	6		1945	560	54.	159.8	2720.5
1		0630	27	91.	429.0	2732.7	*	4		0115	294	78.	390.1	2731.3	*	6		2000	561	54.	159.0	2720.5
1		0645	28	92.	431.1	2732.8	*	4		0130	295	78.	389.0	2731.3	*	6		2015	562	54.	158.1	2720.4
1		0700	29	93.	433.1	2732.8	*	4		0145	296	77.	388.0	2731.2	*	6		2030	563	54.	157.3	2720.4
1		0715	30	94.	435.0	2732.9	*	4		0200	297	77.	386.9	2731.2	*	6		2045	564	54.	156.5	2720.3
1		0730	31	94.	436.8	2733.0	*	4		0215	298	76.	385.9	2731.2	*	6		2100	565	54.	155.6	2720.3
1		0745	32	95.	438.7	2733.0	*	4		0230	299	76.	384.8	2731.1	*	6		2115	566	53.	154.8	2720.2
1		0800	33	95.	440.5	2733.1	*	4		0245	300	76.	383.8	2731.1	*	6		2130	567	53.	153.9	2720.2
1		0815	34	96.	442.3	2733.2	*	4		0300	301	75.	382.8	2731.1	*	6		2145	568	53.	153.1	2720.1
1		0830	35	97.	444.0	2733.2	*	4		0315	302	75.	381.7	2731.0	*	6		2200	569	53.	152.3	2720.1
1		0845	36	97.	445.7	2733.3	*	4		0330	303	75.	380.7	2731.0	*	6		2215	570	53.	151.4	2720.0
1		0900	37	98.	447.4	2733.4	*	4		0345	304	74.	379.7	2731.0	*	6		2230	571	53.	150.6	2720.0
1		0915	38	98.	449.1	2733.4	*	4		0400	305	74.	378.7	2730.9	*	6		2245	572	53.	149.8	2719.9
1		0930	39	99.	450.8	2733.5	*	4		0415	306	74.	377.7	2730.9	*	6		2300	573	53.	148.9	2719.9
1		0945	40	100.	452.4	2733.5	*	4		0430	307	73.	376.7	2730.8	*	6		2315	574	53.	148.1	2719.8
1		1000	41	100.	454.0	2733.6	*	4		0445	308	73.	375.7	2730.8	*	6		2330	575	53.	147.3	2719.7
1		1015	42	101.	455.5	2733.6	*	4		0500	309	73.	374.8	2730.8	*	6		2345	576	53.	146.4	2719.7

1	1030	43	101.	457.1	2733.7	*	4	0515	310	72.	373.8	2730.7	*	7	0000	577	53.	145.6	2719.6
1	1045	44	102.	458.6	2733.8	*	4	0530	311	72.	372.8	2730.7	*	7	0015	578	53.	144.8	2719.6
1	1100	45	102.	460.1	2733.8	*	4	0545	312	72.	371.9	2730.7	*	7	0030	579	53.	143.9	2719.5
1	1115	46	103.	461.6	2733.9	*	4	0600	313	71.	370.9	2730.6	*	7	0045	580	52.	143.1	2719.4
1	1130	47	103.	463.0	2733.9	*	4	0615	314	71.	370.0	2730.6	*	7	0100	581	52.	142.3	2719.4
1	1145	48	104.	464.4	2734.0	*	4	0630	315	71.	369.0	2730.6	*	7	0115	582	52.	141.5	2719.3
1	1200	49	104.	465.8	2734.0	*	4	0645	316	70.	368.1	2730.5	*	7	0130	583	52.	140.6	2719.3
1	1215	50	105.	467.2	2734.1	*	4	0700	317	70.	367.2	2730.5	*	7	0145	584	52.	139.8	2719.2
1	1230	51	105.	468.6	2734.1	*	4	0715	318	70.	366.2	2730.5	*	7	0200	585	52.	139.0	2719.2
1	1245	52	106.	469.9	2734.2	*	4	0730	319	69.	365.3	2730.4	*	7	0215	586	52.	138.2	2719.1
1	1300	53	106.	471.2	2734.2	*	4	0745	320	69.	364.4	2730.4	*	7	0230	587	52.	137.3	2719.0
1	1315	54	107.	472.5	2734.2	*	4	0800	321	69.	363.5	2730.4	*	7	0245	588	52.	136.5	2719.0
1	1330	55	107.	473.7	2734.3	*	4	0815	322	68.	362.6	2730.3	*	7	0300	589	52.	135.7	2718.9
1	1345	56	107.	475.0	2734.3	*	4	0830	323	68.	361.7	2730.3	*	7	0315	590	52.	134.9	2718.9
1	1400	57	108.	476.2	2734.4	*	4	0845	324	68.	360.8	2730.3	*	7	0330	591	51.	134.1	2718.8
1	1415	58	108.	477.4	2734.4	*	4	0900	325	67.	359.9	2730.2	*	7	0345	592	51.	133.2	2718.7
1	1430	59	109.	478.6	2734.5	*	4	0915	326	67.	359.0	2730.2	*	7	0400	593	51.	132.4	2718.7
1	1445	60	109.	479.7	2734.5	*	4	0930	327	67.	358.2	2730.2	*	7	0415	594	51.	131.6	2718.6
1	1500	61	110.	480.9	2734.5	*	4	0945	328	67.	357.3	2730.2	*	7	0430	595	51.	130.8	2718.6
1	1515	62	110.	482.0	2734.6	*	4	1000	329	66.	356.4	2730.1	*	7	0445	596	51.	130.0	2718.5
1	1530	63	110.	483.1	2734.6	*	4	1015	330	66.	355.6	2730.1	*	7	0500	597	51.	129.2	2718.4
1	1545	64	111.	484.1	2734.7	*	4	1030	331	66.	354.7	2730.1	*	7	0515	598	51.	128.3	2718.4
1	1600	65	111.	485.2	2734.7	*	4	1045	332	65.	353.9	2730.0	*	7	0530	599	51.	127.5	2718.3
1	1615	66	111.	486.2	2734.7	*	4	1100	333	65.	353.0	2730.0	*	7	0545	600	51.	126.7	2718.3
1	1630	67	112.	487.2	2734.8	*	4	1115	334	65.	352.2	2730.0	*	7	0600	601	51.	125.9	2718.2
1	1645	68	112.	488.2	2734.8	*	4	1130	335	65.	351.3	2729.9	*	7	0615	602	51.	125.1	2718.2
1	1700	69	112.	489.2	2734.8	*	4	1145	336	65.	350.5	2729.9	*	7	0630	603	51.	124.3	2718.1
1	1715	70	113.	490.1	2734.9	*	4	1200	337	65.	349.7	2729.9	*	7	0645	604	50.	123.5	2718.0
1	1730	71	113.	491.1	2734.9	*	4	1215	338	65.	348.8	2729.8	*	7	0700	605	50.	122.7	2718.0
1	1745	72	113.	492.0	2734.9	*	4	1230	339	65.	348.0	2729.8	*	7	0715	606	50.	121.9	2717.9
1	1800	73	114.	492.9	2735.0	*	4	1245	340	65.	347.1	2729.8	*	7	0730	607	50.	121.1	2717.9
1	1815	74	114.	493.8	2735.0	*	4	1300	341	65.	346.3	2729.7	*	7	0745	608	50.	120.3	2717.8
1	1830	75	114.	494.6	2735.0	*	4	1315	342	65.	345.4	2729.7	*	7	0800	609	50.	119.5	2717.8
1	1845	76	114.	495.5	2735.1	*	4	1330	343	65.	344.6	2729.7	*	7	0815	610	50.	118.7	2717.7
1	1900	77	114.	496.3	2735.1	*	4	1345	344	65.	343.8	2729.6	*	7	0830	611	50.	117.8	2717.6
1	1915	78	114.	497.1	2735.1	*	4	1400	345	65.	342.9	2729.6	*	7	0845	612	50.	117.0	2717.6
1	1930	79	114.	497.9	2735.1	*	4	1415	346	64.	342.1	2729.5	*	7	0900	613	50.	116.2	2717.5
1	1945	80	114.	498.7	2735.2	*	4	1430	347	64.	341.2	2729.5	*	7	0915	614	50.	115.4	2717.5
1	2000	81	114.	499.5	2735.2	*	4	1445	348	64.	340.4	2729.5	*	7	0930	615	50.	114.6	2717.4
1	2015	82	114.	500.3	2735.2	*	4	1500	349	64.	339.5	2729.4	*	7	0945	616	49.	113.9	2717.4
1	2030	83	114.	501.0	2735.2	*	4	1515	350	64.	338.7	2729.4	*	7	1000	617	49.	113.1	2717.3
1	2045	84	114.	501.8	2735.3	*	4	1530	351	64.	337.9	2729.4	*	7	1015	618	49.	112.3	2717.2
1	2100	85	114.	502.5	2735.3	*	4	1545	352	64.	337.0	2729.3	*	7	1030	619	49.	111.5	2717.2
1	2115	86	114.	503.2	2735.3	*	4	1600	353	64.	336.2	2729.3	*	7	1045	620	49.	110.7	2717.1
1	2130	87	115.	503.9	2735.3	*	4	1615	354	64.	335.3	2729.3	*	7	1100	621	49.	109.9	2717.1
1	2145	88	115.	504.6	2735.4	*	4	1630	355	64.	334.5	2729.2	*	7	1115	622	49.	109.1	2717.0
1	2200	89	115.	505.3	2735.4	*	4	1645	356	64.	333.6	2729.2	*	7	1130	623	49.	108.3	2717.0
1	2215	90	115.	506.0	2735.4	*	4	1700	357	64.	332.8	2729.2	*	7	1145	624	49.	107.5	2716.9
1	2230	91	115.	506.6	2735.4	*	4	1715	358	64.	331.9	2729.1	*	7	1200	625	49.	106.7	2716.8
1	2245	92	115.	507.3	2735.4	*	4	1730	359	64.	331.1	2729.1	*	7	1215	626	49.	105.9	2716.8
1	2300	93	115.	507.9	2735.5	*	4	1745	360	64.	330.3	2729.1	*	7	1230	627	49.	105.1	2716.7
1	2315	94	115.	508.5	2735.5	*	4	1800	361	64.	329.4	2729.0	*	7	1245	628	48.	104.3	2716.7
1	2330	95	115.	509.1	2735.5	*	4	1815	362	64.	328.6	2729.0	*	7	1300	629	48.	103.6	2716.6
1	2345	96	115.	509.7	2735.5	*	4	1830	363	64.	327.7	2728.9	*	7	1315	630	48.	102.8	2716.6
2	0000	97	115.	510.3	2735.5	*	4	1845	364	64.	326.9	2728.9	*	7	1330	631	48.	102.0	2716.5
2	0015	98	115.	510.9	2735.6	*	4	1900	365	64.	326.0	2728.9	*	7	1345	632	48.	101.2	2716.4
2	0030	99	115.	511.4	2735.6	*	4	1915	366	64.	325.2	2728.8	*	7	1400	633	48.	100.4	2716.4
2	0045	100	115.	512.0	2735.6	*	4	1930	367	64.	324.3	2728.8	*	7	1415	634	48.	99.6	2716.3
2	0100	101	115.	512.5	2735.6	*	4	1945	368	64.	323.5	2728.8	*	7	1430	635	48.	98.9	2716.3
2	0115	102	115.	513.0	2735.6	*	4	2000	369	64.	322.6	2728.7	*	7	1445	636	48.	98.1	2716.2
2	0130	103	115.	513.5	2735.6	*	4	2015	370	64.	321.8	2728.7	*	7	1500	637	48.	97.3	2716.2
2	0145	104	115.	514.0	2735.7	*	4	2030	371	64.	320.9	2728.7	*	7	1515	638	48.	96.5	2716.1
2	0200	105	115.	514.5	2735.7	*	4	2045	372	63.	320.1	2728.6	*	7	1530	639	48.	95.7	2716.1
2	0215	106	115.	515.0	2735.7	*	4	2100	373	63.	319.2	2728.6	*	7	1545	640	48.	94.9	2716.0
2	0230	107	115.	515.4	2735.7	*	4	2115	374	63.	318.4	2728.6	*	7	1600	641	47.	94.2	2715.9
2	0245	108	115.	515.9	2735.7	*	4	2130	375	63.	317.6	2728.5	*	7	1615	642	47.	93.4	2715.9
2	0300	109	115.	516.3	2735.7	*	4	2145	376	63.	316.7	2728.5	*	7	1630	643	47.	92.6	2715.8
2	0315	110	115.	516.8	2735.8	*	4	2200	377	63.	315.9	2728.5	*	7	1645	644	47.	91.8	2715.8
2	0330	111	115.	517.2	2735.8	*	4	2215	378	63.	315.0	2728.4	*	7	1700	645	47.	91.0	2715.7
2	0345	112	115.	517.6	2735.8	*	4	2230	379	63.	314.2	2728.4	*	7	1715	646	47.	90.3	2715.7
2	0400	113	115.	518.0	2735.8	*	4	2245	380	63.	313.3	2728.3	*	7	1730	647	47.	89.5	2715.6
2	0415	114	115.	518.3	2735.8	*	4	2300	381	63.	312.5	2728.3	*	7	1745	648	47.	88.7	2715.6
2	0430	115	115.	518.7	2735.8	*	4	2315	382	63.	311.6	2728.3	*	7	1800	649	47.	87.9	2715.5
2	0445	116	115.	519.1	2735.8	*	4	2330	383	63.	310.8	2728.2	*	7	1815	650	47.	87.2	2715.4
2	0500	117	115.	519.4	2735.8	*	4	2345	384	63.	309.9	2728.2	*	7	1830	651	47.	86.4	2715.4
2	0515	118	115.	519.8	2735.9	*	5	0000	385	63.	309.1	2728.2	*	7	1845	652	47.	85.6	2715.3
2	0530	119	115.	520.1	2735.9	*	5	0015	386	63.	308.2	2728.1	*	7	1900	653	46.	84.8	2715.3
2	0545	120	115.	520.4	2735.9	*	5	0030	387	63.	307.4	2728.1	*	7	1915	654	46.	84.0	2715.2
2	0600	121	115.	520.7	2735.9	*	5	0045	388	63.	306.5	2728.1	*	7	1930	655	46.	83.3	2715.2
2	0615	122	115.	521.0	2735.9	*	5	0100	389	63.	305.7	2728.0	*	7	1945	656	46.	82.5	2715.1
2	0630	123	115.	521.3	2735.9	*	5	0115	390	63.	304.8	2728.0	*	7	2000	657	46.	81.7	2715.1
2	0645	124	115.	521.6	2735.9	*	5	0130	391	63.	304.0	2728.0	*	7	2015	658	46.	81.0	2715.0
2	0700	125	115.	521.8	2735.9	*	5	0145	392	63.	303.1	2727.9	*	7	2030	659	46.	80.2	2714.9
2	0715	126	115.	522.1	2735.9	*	5	0200	393	63.	302.3	2727.9	*	7	2045	660	46.	79.4	2714.8
2	0730	127	115.	522.3	2735.9	*	5	0215	394	63.	301.4	2727.9	*	7	2100	661	46.	78.6	2714.8
2	0745	128	116.	522.6	2735.9	*	5	0230	395	63.	300.6	2727.8	*	7	2115	662	46.	77.9	2714.7
2	0800	129	116.	522.8	2736.0	*	5	0245	396	63.	299.7	2727.8	*	7	2130	663	45.	77.1	2714.6
2	0815	130	116.	523.0	2736.0	*	5	0300	397	62.	298.9	2727.7	*	7	2145	664	45.	76.3	2714.5
2	0830	131	116.	523.2	2736.0	*	5	0315	398	62.	298.0	2727.7	*	7	2200	665	45.	75.6	2714.5
2	0845	132	116.	523.4	2736.0	*	5	0330	399	62.	297.2	2727.7	*	7	2215	666	45.	74.8	2714.4
2	0900	133	116.	523.6	2736.0	*	5	0345	400	62.	296.3	2727.6	*	7	2230	667	45.	74.1	2714.3
2	0915	134	116.	523.8	2736.0	*	5	0400	401	62.	295.5	2727.6	*	7	2245	668	45.	73.3	2714.2
2	0930	135	116.	524.0	2736.0	*	5	0415	402	62.	294.6	2727.6	*	7	2300	669	45.	72.6	2714.2
2	0945	136	116.	524.2	2736.0	*	5	0430	403	62.	293.8	2727.5	*	7	2315	670	45.	71.8	2714.1
2	1000	137	116.	524.4	2736.0	*	5	0445	404	62.	292.9	2727.5	*	7	2330	671	44.	71.0	2714.0
2	1015	138	116.	524.5	2736.0	*	5	0500	405	62.	292.1	2727.5	*	7	2345	672	44.	70.3	2714.0
2	1030	139	116.	524.7	2736.0	*	5	0515	406	62.	291.2	2727.4	*	8	0000	673	44.	69.5	2713.9
2	1045	140	116.	524.8	2736.0	*	5	0530	407	62.	290.4	2727.4	*	8	0015	674	44.	68.8	2713.8
2	1100	141	116.	525.0	2736.0	*	5	0545	408	62.	289.5	2727.4	*	8	0030	675	44.	68.0	2713.7
2	1115	142	116.	525.1	2736.0	*	5	0600	409	62.	288.7	2727.3	*	8	0045	676	44.	67.3	2713.7
2	1130	143	116.	525.3	2736.0	*	5	0615	410	62.	287.8	2727.3	*	8	0100	677	44.	66.6	2713.6
2	1145	144	116.	525.4	2736.0	*	5	0630	411	62.	287.0	2727.2	*	8	0115	678	44.	65.8	2713.5
2	1200	145	116.	525.5	2736.0	*	5	0645	412	62.	286.1	2727.2	*	8	0130	679	44.	65.1	2713.4
2	1215	146	116.	525.6	2736.0	*	5	0700	413	62.	285.3	2727.2	*	8	0145	680	43.	64.3	2713.4
2	1230	147	116.	525.7	2736.0	*	5	0715	414	62.	284.4	2727.1	*	8	0200	681	43.	63.6	2713.3
2	1245	148	116.	525.8	2736.1	*	5	0730	415	62.	283.6	2727.1	*	8	0215	682	43.	62.9	2713.2
2	1300	149	116.	525.9	2736.1	*	5	0745	416	62.	282.7	2727.1	*	8	0230	683	43.	62.1	2713.2
2	1315	150	116.	526.0	2736.1	*	5	0800	417	62.	281.8	2727.0	*	8	0245	684	43.	61.4	2713.1
2	1330	151	116.	526.1	2736.1	*	5	0815	418	62.	281.0	2727.0	*	8	0300	685	43.	60.7	2713.0
2	1345	152	116.	526.2	2736.1	*	5	0830	419	62.	280.1	2727.0	*	8	0315	686	43.	59.9	2712.9
2	1400	153	116.	526.3	2736.1	*	5	0845	420	62.	279.3	2726.9	*	8	0330	687	43.	59.2	2712.9
2	1415	154	116.	526.3	2736.1	*	5	0900	421	62.	278.4	2726.9	*	8	0345	688	42.	58.5	2712.8
2	1430	155	116.	526.4	2736.1	*	5	0915	422	61.	277.6	2726.9	*	8	0400	689	42.	57.7	2712.7
2	1445	156	116.	526.4	2736.1	*	5	0930	423	61.	276.7	2726.8	*	8	0415	690	42.	57.0	2712.7

2	1500	157	116.	526.5	2736.1	*	5	0945	424	61.	275.9	2726.8	*	8	0430	691	42.	56.3	2712.6				
2	1515	158	116.	526.5	2736.1	*	5	1000	425	61.	275.0	2726.7	*	8	0445	692	42.	55.6	2712.5				
2	1530	159	116.	526.6	2736.1	*	5	1015	426	61.	274.2	2726.7	*	8	0500	693	42.	54.9	2712.4				
2	1545	160	116.	526.6	2736.1	*	5	1030	427	61.	273.3	2726.7	*	8	0515	694	42.	54.1	2712.4				
2	1600	161	116.	526.6	2736.1	*	5	1045	428	61.	272.4	2726.6	*	8	0530	695	42.	53.4	2712.3				
2	1615	162	116.	526.6	2736.1	*	5	1100	429	61.	271.6	2726.6	*	8	0545	696	42.	52.7	2712.2				
2	1630	163	116.	526.6	2736.1	*	5	1115	430	61.	270.7	2726.6	*	8	0600	697	41.	52.0	2712.2				
2	1645	164	116.	526.6	2736.1	*	5	1130	431	61.	269.9	2726.5	*	8	0615	698	41.	51.3	2712.1				
2	1700	165	116.	526.6	2736.1	*	5	1145	432	61.	269.0	2726.5	*	8	0630	699	41.	50.6	2712.0				
2	1715	166	116.	526.6	2736.1	*	5	1200	433	61.	268.2	2726.5	*	8	0645	700	41.	49.9	2712.0				
2	1730	167	116.	526.6	2736.1	*	5	1215	434	61.	267.3	2726.4	*	8	0700	701	41.	49.2	2711.9				
2	1745	168	116.	526.6	2736.1	*	5	1230	435	61.	266.4	2726.4	*	8	0715	702	41.	48.4	2711.8				
2	1800	169	116.	526.6	2736.1	*	5	1245	436	61.	265.6	2726.4	*	8	0730	703	41.	47.7	2711.8				
2	1815	170	116.	526.5	2736.1	*	5	1300	437	61.	264.7	2726.3	*	8	0745	704	41.	47.0	2711.7				
2	1830	171	116.	526.5	2736.1	*	5	1315	438	61.	263.9	2726.3	*	8	0800	705	40.	46.3	2711.6				
2	1845	172	116.	526.4	2736.1	*	5	1330	439	61.	263.0	2726.2	*	8	0815	706	40.	45.6	2711.5				
2	1900	173	116.	526.3	2736.1	*	5	1345	440	61.	262.2	2726.2	*	8	0830	707	40.	44.9	2711.5				
2	1915	174	116.	526.2	2736.1	*	5	1400	441	61.	261.3	2726.2	*	8	0845	708	40.	44.2	2711.4				
2	1930	175	116.	526.1	2736.1	*	5	1415	442	61.	260.4	2726.1	*	8	0900	709	40.	43.5	2711.3				
2	1945	176	116.	525.9	2736.1	*	5	1430	443	61.	259.6	2726.1	*	8	0915	710	40.	42.9	2711.3				
2	2000	177	116.	525.7	2736.0	*	5	1445	444	61.	258.7	2726.1	*	8	0930	711	40.	42.2	2711.2				
2	2015	178	116.	525.4	2736.0	*	5	1500	445	61.	257.9	2726.0	*	8	0945	712	40.	41.5	2711.1				
2	2030	179	116.	525.1	2736.0	*	5	1515	446	61.	257.0	2726.0	*	8	1000	713	40.	40.8	2711.1				
2	2045	180	116.	524.8	2736.0	*	5	1530	447	60.	256.1	2726.0	*	8	1015	714	39.	40.1	2711.0				
2	2100	181	116.	524.5	2736.0	*	5	1545	448	60.	255.3	2725.9	*	8	1030	715	39.	39.4	2710.9				
2	2115	182	116.	524.2	2736.0	*	5	1600	449	60.	254.4	2725.9	*	8	1045	716	39.	38.7	2710.9				
2	2130	183	116.	523.8	2736.0	*	5	1615	450	60.	253.6	2725.9	*	8	1100	717	39.	38.0	2710.8				
2	2145	184	116.	523.4	2736.0	*	5	1630	451	60.	252.7	2725.8	*	8	1115	718	39.	37.4	2710.7				
2	2200	185	116.	522.9	2736.0	*	5	1645	452	60.	251.8	2725.8	*	8	1130	719	39.	36.7	2710.7				
2	2215	186	116.	522.5	2735.9	*	5	1700	453	60.	251.0	2725.7	*	8	1145	720	39.	36.0	2710.6				
2	2230	187	115.	522.1	2735.9	*	5	1715	454	60.	250.1	2725.7	*	8	1200	721	39.	35.3	2710.5				
2	2245	188	115.	521.6	2735.9	*	5	1730	455	60.	249.3	2725.7	*	8	1215	722	39.	34.6	2710.5				
2	2300	189	115.	521.1	2735.9	*	5	1745	456	60.	248.4	2725.6	*	8	1230	723	38.	34.0	2710.4				
2	2315	190	115.	520.6	2735.9	*	5	1800	457	60.	247.5	2725.6	*	8	1245	724	38.	33.3	2710.3				
2	2330	191	115.	520.1	2735.9	*	5	1815	458	60.	246.7	2725.6	*	8	1300	725	38.	32.6	2710.3				
2	2345	192	115.	519.6	2735.8	*	5	1830	459	60.	245.8	2725.5	*	8	1315	726	38.	32.0	2710.2				
3	0000	193	115.	519.1	2735.8	*	5	1845	460	60.	245.0	2725.5	*	8	1330	727	38.	31.3	2710.1				
3	0015	194	115.	518.6	2735.8	*	5	1900	461	60.	244.1	2725.5	*	8	1345	728	38.	30.6	2710.1				
3	0030	195	115.	518.0	2735.8	*	5	1915	462	60.	243.2	2725.4	*	8	1400	729	38.	30.0	2710.0				
3	0045	196	115.	517.5	2735.8	*	5	1930	463	60.	242.4	2725.4	*	8	1415	730	38.	29.3	2709.9				
3	0100	197	115.	516.9	2735.8	*	5	1945	464	60.	241.5	2725.4	*	8	1430	731	37.	28.6	2709.7				
3	0115	198	115.	516.3	2735.7	*	5	2000	465	60.	240.6	2725.3	*	8	1445	732	37.	28.0	2709.6				
3	0130	199	115.	515.7	2735.7	*	5	2015	466	60.	239.8	2725.3	*	8	1500	733	37.	27.4	2709.5				
3	0145	200	115.	515.1	2735.7	*	5	2030	467	60.	238.9	2725.2	*	8	1515	734	36.	26.7	2709.3				
3	0200	201	115.	514.5	2735.7	*	5	2045	468	60.	238.1	2725.2	*	8	1530	735	36.	26.1	2709.2				
3	0215	202	115.	513.8	2735.7	*	5	2100	469	60.	237.2	2725.2	*	8	1545	736	36.	25.5	2709.0				
3	0230	203	115.	513.2	2735.6	*	5	2115	470	60.	236.3	2725.1	*	8	1600	737	35.	24.8	2708.9				
3	0245	204	115.	512.5	2735.6	*	5	2130	471	60.	235.5	2725.1	*	8	1615	738	35.	24.2	2708.8				
3	0300	205	115.	511.8	2735.6	*	5	2145	472	59.	234.6	2725.1	*	8	1630	739	35.	23.6	2708.6				
3	0315	206	115.	511.0	2735.6	*	5	2200	473	59.	233.7	2725.0	*	8	1645	740	34.	23.0	2708.5				
3	0330	207	115.	510.2	2735.5	*	5	2215	474	59.	232.9	2725.0	*	8	1700	741	34.	22.4	2708.3				
3	0345	208	115.	509.3	2735.5	*	5	2230	475	59.	232.0	2724.9	*	8	1715	742	34.	21.8	2708.2				
3	0400	209	115.	508.4	2735.5	*	5	2245	476	59.	231.2	2724.9	*	8	1730	743	34.	21.2	2708.1				
3	0415	210	115.	507.4	2735.4	*	5	2300	477	59.	230.3	2724.8	*	8	1745	744	33.	20.6	2708.0				
3	0430	211	115.	506.2	2735.4	*	5	2315	478	59.	229.4	2724.8	*	8	1800	745	33.	20.1	2707.8				
3	0445	212	115.	505.0	2735.4	*	5	2330	479	59.	228.6	2724.7	*	8	1815	746	33.	19.5	2707.7				
3	0500	213	115.	503.7	2735.3	*	5	2345	480	59.	227.7	2724.7	*	8	1830	747	33.	18.9	2707.6				
3	0515	214	114.	502.1	2735.3	*	6	0000	481	59.	226.9	2724.6	*	8	1845	748	32.	18.3	2707.4				
3	0530	215	114.	500.4	2735.2	*	6	0015	482	59.	226.0	2724.6	*	8	1900	749	32.	17.8	2707.3				
3	0545	216	114.	498.6	2735.2	*	6	0030	483	59.	225.1	2724.5	*	8	1915	750	32.	17.2	2707.2				
3	0600	217	114.	496.9	2735.1	*	6	0045	484	59.	224.3	2724.5	*	8	1930	751	31.	16.7	2707.1				
3	0615	218	114.	495.2	2735.0	*	6	0100	485	59.	223.4	2724.4	*	8	1945	752	31.	16.1	2707.0				
3	0630	219	114.	493.4	2735.0	*	6	0115	486	59.	222.6	2724.4	*	8	2000	753	31.	15.6	2706.8				
3	0645	220	113.	491.7	2734.9	*	6	0130	487	59.	221.7	2724.3	*	8	2015	754	31.	15.1	2706.7				
3	0700	221	113.	489.9	2734.9	*	6	0145	488	58.	220.8	2724.3	*	8	2030	755	30.	14.5	2706.6				
3	0715	222	112.	488.2	2734.8	*	6	0200	489	58.	220.0	2724.2	*	8	2045	756	30.	14.0	2706.5				
3	0730	223	112.	486.5	2734.7	*	6	0215	490	58.	219.1	2724.2	*	8	2100	757	30.	13.5	2706.4				
3	0745	224	111.	484.8	2734.7	*	6	0230	491	58.	218.3	2724.1	*	8	2115	758	30.	13.0	2706.2				
3	0800	225	110.	483.2	2734.6	*	6	0245	492	58.	217.4	2724.0	*	8	2130	759	29.	12.5	2706.1				
3	0815	226	110.	481.5	2734.6	*	6	0300	493	58.	216.6	2724.0	*	8	2145	760	29.	12.0	2706.0				
3	0830	227	109.	479.8	2734.5	*	6	0315	494	58.	215.7	2723.9	*	8	2200	761	29.	11.5	2705.9				
3	0845	228	109.	478.2	2734.4	*	6	0330	495	58.	214.9	2723.9	*	8	2215	762	29.	11.0	2705.8				
3	0900	229	108.	476.5	2734.4	*	6	0345	496	58.	214.0	2723.8	*	8	2230	763	28.	10.5	2705.7				
3	0915	230	107.	474.9	2734.3	*	6	0400	497	58.	213.2	2723.8	*	8	2245	764	28.	10.0	2705.6				
3	0930	231	107.	473.3	2734.3	*	6	0415	498	58.	212.3	2723.7	*	8	2300	765	28.	9.5	2705.5				
3	0945	232	106.	471.7	2734.2	*	6	0430	499	58.	211.5	2723.7	*	8	2315	766	28.	9.0	2705.4				
3	1000	233	106.	470.1	2734.2	*	6	0445	500	58.	210.6	2723.6	*	8	2330	767	27.	8.5	2705.3				
3	1015	234	105.	468.5	2734.1	*	6	0500	501	58.	209.7	2723.6	*	8	2345	768	27.	8.1	2705.1				
3	1030	235	105.	466.9	2734.0	*	6	0515	502	58.	208.9	2723.5	*	9	0000	769	27.	7.6	2705.0				
3	1045	236	104.	465.4	2734.0	*	6	0530	503	58.	208.0	2723.5	*	9	0015	770	26.	7.1	2704.8				
3	1100	237	104.	463.8	2733.9	*	6	0545	504	57.	207.2	2723.4	*	9	0030	771	24.	6.7	2704.4				
3	1115	238	103.	462.3	2733.9	*	6	0600	505	57.	206.3	2723.4	*	9	0045	772	23.	6.3	2704.1				
3	1130	239	103.	460.7	2733.8	*	6	0615	506	57.	205.5	2723.3	*	9	0100	773	22.	5.9	2703.8				
3	1145	240	102.	459.2	2733.8	*	6	0630	507	57.	204.6	2723.3	*	9	0115	774	20.	5.6	2703.5				
3	1200	241	101.	457.7	2733.7	*	6	0645	508	57.	203.8	2723.2	*	9	0130	775	19.	5.3	2703.3				
3	1215	242	101.	456.2	2733.7	*	6	0700	509	57.	202.9	2723.2	*	9	0145	776	18.	5.0	2703.0				
3	1230	243	100.	454.7	2733.6	*	6	0715	510	57.	202.1	2723.1	*	9	0200	777	17.	4.7	2702.8				
3	1245	244	100.	453.2	2733.6	*	6	0730	511	57.	201.2	2723.1	*	9	0215	778	16.	4.5	2702.6				
3	1300	245	99.	451.8	2733.5	*	6	0745	512	57.	200.4	2723.0	*	9	0230	779	15.	4.2	2702.4				
3	1315	246	99.	450.3	2733.5	*	6	0800	513	57.	199.5	2723.0	*	9	0245	780	15.	4.0	2702.2				
3	1330	247	98.	448.8	2733.4	*	6	0815	514	57.	198.7	2722.9	*	9	0300	781	14.	3.8	2702.1				
3	1345	248	98.	447.4	2733.4	*	6	0830	515	57.	197.8	2722.9	*	9	0315	782	13.	3.6	2701.9				
3	1400	249	97.	446.0	2733.3	*	6	0845	516	57.	197.0	2722.8	*	9	0330	783	12.	3.4	2701.8				
3	1415	250	97.	444.5	2733.3	*	6	0900	517	57.	196.1	2722.8	*	9	0345	784	12.	3.3	2701.6				
3	1430	251	96.	443.1	2733.2	*	6	0915	518	57.	195.3	2722.7	*	9	0400	785	11.	3.1	2701.5				
3	1445	252	96.	441.7	2733.2	*	6	0930	519	56.	194.4	2722.7	*	9	0415	786	11.	3.0	2701.4				
3	1500	253	95.	440.3	2733.1	*	6	0945	520	56.	193.6	2722.6	*	9	0430	787	10.	2.8	2701.3				
3	1515	254	95.	438.9	2733.1	*	6	1000	521	56.	192.7	2722.5	*	9	0445	788	10.	2.7	2701.2				
3	1530	255	94.	437.5	2733.0	*	6	1015	522	56.	191.9	2722.5	*	9	0500	789	9.	2.6	2701.1				
3	1545	256	94.	436.2	2733.0	*	6	1030	523	56.	191.0	2722.4	*	9	0515	790	9.	2.5	2701.0				
3	1600	257	94.	434.8	2732.9	*	6	1045	524	56.	190.2	2722.4	*	9	0530	791	9.	2.4	2700.9				
3	1615	258	93.	433.5	2732.9	*	6	1100	525	56.	189.3	2722.3	*	9	0545	792	8.	2.3	2700.8				
3	1630	259	93.	432.1	2732.8	*	6	1115	526	56.	188.5	2722.3	*	9	0600	793	8.	2.2	2700.8				
3	1645	260	92.	430.8	2732.8	*	6	1130	527	56.	187.6	2722.2	*	9	0615	794	8.	2.1	2700.7				
3	1700	261	92.	429.5	2732.7	*	6	1145	528	56.	186.8	2722.2	*	9	0630	795	7.	2.0	2700.6				
3	1715	262	91.	428.1	2732.7	*	6	1200	529	56.	186.0	2722.1	*	9	0645	796	7.	2.0	2700.6				
3	1730	263	91.	426.8	2732.6	*	6	1215	530	56.	185.1	2722.1	*	9	0700	797	7.	1.9	2700.5				
3	1745	264	90.	425.5	2732.6	*	6	1230	531	56.	184.3	2722.0	*	9	0715	798	7.	1.8	2700.5				
3	1800	265	90.	424.2	2732.5	*	6	1245	532	56.	183.4	2722.0	*	9	0730	799	6.	1.8	2700.4				
3	1815	266	89.	422.9	2732.5	*	6	1300	533	56.	182.6	2721.9	*	9	0745	800	6.	1.7	2700.4				
3	1830	267	89.	421.7	2732.4	*	6	1315	534	56.	181.7	2721.9	*										
						*							*										

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← 90% Drainage of Detention Basin from Peak at 173.8 hrs. from the start of 6-hr storm.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	199.75-HR
+ (CFS)	(HR)					
		(CFS)				
116.	40.50		116.	116.	105.	70.
		(INCHES)	.100	.401	1.097	2.027
		(AC-FT)	57.	229.	627.	1158.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	199.75-HR
+ (AC-FT)	(HR)				
527.	40.75	526.	523.	479.	280.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	199.75-HR
+ (FEET)	(HR)				
2736.08	40.50	2736.07	2735.95	2734.44	2724.74

CUMULATIVE AREA = 10.72 SQ MI

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 .88	RATIO 2 .87	RATIO 3 .86
HYDROGRAPH AT +	CAMDK2	.34	1	FLOW	341.	336.	333.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	CAMDK3	.32	1	FLOW	326.	321.	317.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CCAMDK3	.65	1	FLOW	668.	658.	650.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	CAM-10A	1.27	1	FLOW	1476.	1457.	1442.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	CAM-10B	1.81	1	FLOW	1901.	1874.	1852.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	DETCAM10	.05	1	FLOW	49.	48.	48.
				TIME	3.50	3.50	3.50
4 COMBINED AT	CAM10IN	3.77	1	FLOW	4094.	4037.	3992.
				TIME	3.50	3.50	3.50
ROUTED TO +	CAM10DB	3.77	1	FLOW	152.	150.	149.
				TIME	6.00	6.00	6.00
			** PEAK STAGES IN FEET **				
			1	STAGE	2998.05	2997.75	2997.50
				TIME	6.00	6.00	6.00
HYDROGRAPH AT +	W1	.15	1	FLOW	167.	165.	164.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	W2	.17	1	FLOW	214.	211.	209.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	CP1	4.09	1	FLOW	478.	472.	467.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	CDMNA3	.30	1	FLOW	302.	299.	296.
				TIME	3.75	3.75	3.75
HYDROGRAPH AT +	CDMNA2	.13	1	FLOW	136.	135.	133.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CMNA2	.43	1	FLOW	427.	422.	417.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	EFPOA1	.14	1	FLOW	172.	169.	167.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	COM1	.57	1	FLOW	599.	591.	585.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	EFPOA2	.13	1	FLOW	156.	153.	152.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	COM2	.70	1	FLOW	755.	745.	736.
				TIME	3.50	3.50	3.50
YDROGRAPH AT	EFPOB1	.07	1	FLOW	73.	72.	71.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	W3	.31	1	FLOW	407.	402.	397.
				TIME	3.50	3.50	3.50

+ 4 COMBINED AT	COM3	5.17	1	FLOW	1712.	1690.	1672.
				TIME	3.50	3.50	3.50
'DROGRAPH AT	WBCA	.06	1	FLOW	54.	53.	52.
				TIME	3.75	3.75	3.75
HYDROGRAPH AT							
+	HLBW1-CA	.39	1	FLOW	409.	403.	399.
				TIME	3.75	3.75	3.75
+ 3 COMBINED AT	COM4	5.62	1	FLOW	2132.	2105.	2082.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	HLBW1-CB	.12	1	FLOW	141.	139.	138.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	COM5	5.74	1	FLOW	2273.	2244.	2220.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WBAW	.06	1	FLOW	46.	45.	45.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	WRBW1	.33	1	FLOW	327.	323.	319.
				TIME	3.50	3.50	3.50
+ 3 COMBINED AT	COM6	6.12	1	FLOW	2646.	2611.	2584.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	LWBW1C	.06	1	FLOW	77.	75.	75.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	LMDBN	.02	1	FLOW	20.	20.	20.
				TIME	3.50	3.50	3.50
+ 3 COMBINED AT	CLMDBN	6.20	1	FLOW	2743.	2707.	2678.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	BOXCANYO	3.41	1	FLOW	3128.	3080.	3041.
				TIME	3.75	3.75	3.75
ROUTED TO							
+	BOXDET	3.41	1	FLOW	38.	38.	38.
				TIME	6.50	6.50	6.50
			** PEAK STAGES IN FEET **				
			1	STAGE	18.11	17.83	17.61
				TIME	6.50	6.50	6.50
HYDROGRAPH AT							
+	LWBW1A	.24	1	FLOW	271.	267.	264.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	UVB1-2A	.25	1	FLOW	297.	293.	290.
				TIME	3.50	3.50	3.50
DIVERSION TO							
+	EDIV2A	.25	1	FLOW	231.	228.	225.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	NDIV2A	.25	1	FLOW	66.	65.	65.
				TIME	3.50	3.50	3.50
+ 3 COMBINED AT	COM7	3.90	1	FLOW	356.	351.	347.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	UVB1-2B	.02	1	FLOW	26.	26.	25.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	LWBW1B	.08	1	FLOW	98.	97.	96.
				TIME	3.50	3.50	3.50
+ 3 COMBINED AT	COM8	3.99	1	FLOW	480.	473.	468.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	RETDIV2A	.00	1	FLOW	231.	228.	225.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	UVB1-2C	.03	1	FLOW	44.	43.	43.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	COM10	.03	1	FLOW	275.	271.	268.
				TIME	3.50	3.50	3.50
2 COMBINED AT	COM9	4.02	1	FLOW	754.	744.	736.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	UVB1-1C	.02	1	FLOW	24.	24.	23.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							

+	UVB1-1B	.01	1	FLOW	15.	15.	15.
				TIME	3.50	3.50	3.50
2 COMBINED AT	COM11	.03	1	FLOW	39.	39.	38.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	UVB1-1A	.22	1	FLOW	274.	270.	267.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	UVB1-1D	.04	1	FLOW	45.	45.	44.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	COM12	.26	1	FLOW	320.	315.	311.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	UVB1-1E	.03	1	FLOW	36.	36.	35.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	COM13	.31	1	FLOW	395.	390.	385.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	WBCL	.03	1	FLOW	40.	39.	39.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	LMBW1	.08	1	FLOW	94.	93.	92.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	COM14	.43	1	FLOW	530.	522.	516.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT +	LMDBS	.06	1	FLOW	57.	56.	55.
				TIME	3.50	3.50	3.50
3 COMBINED AT +	CLMDBS	4.51	1	FLOW	1341.	1322.	1307.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	CLMBWCDB	10.72	1	FLOW	4084.	4029.	3985.
				TIME	3.50	3.50	3.50
ROUTED TO +	LMBWCDB	10.72	1	FLOW	116.	116.	116.
				TIME	41.25	40.75	40.50
			** PEAK STAGES IN FEET **				
			1	STAGE	2736.50	2736.26	2736.08
				TIME	41.25	40.75	40.50
HYDROGRAPH AT +	WBLM	.08	1	FLOW	78.	77.	76.
				TIME	3.50	3.50	3.50
2 COMBINED AT +	COM15	10.80	1	FLOW	133.	131.	130.
				TIME	3.50	3.50	3.50

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

LMBW DETENTION BASINS STAGE/VOLUMES/DISCHARGES SUMMARY

WESTERN BELTWAY DETENTION BASINS SUMMARY

SOUTH DETENTION BASIN

STAGE	VOLUME ACRE-FEET
2700	0.0
2705	7.4
2710	24.7
2715	46.0
2720	71.6
2725	102.7
2730	164.1
2735	239.2
2738	287.9
2739	304.8

COMBINED DETENTION BASINS

STAGE	DISCHARGE CFS
2700	0
2705	26.9
2710	37.8
2715	46.1
2720	53.2
2725	59.4
2730	65.0
2735	114.0
2738	118.8
2739	120.3

NORTH DETENTION BASIN

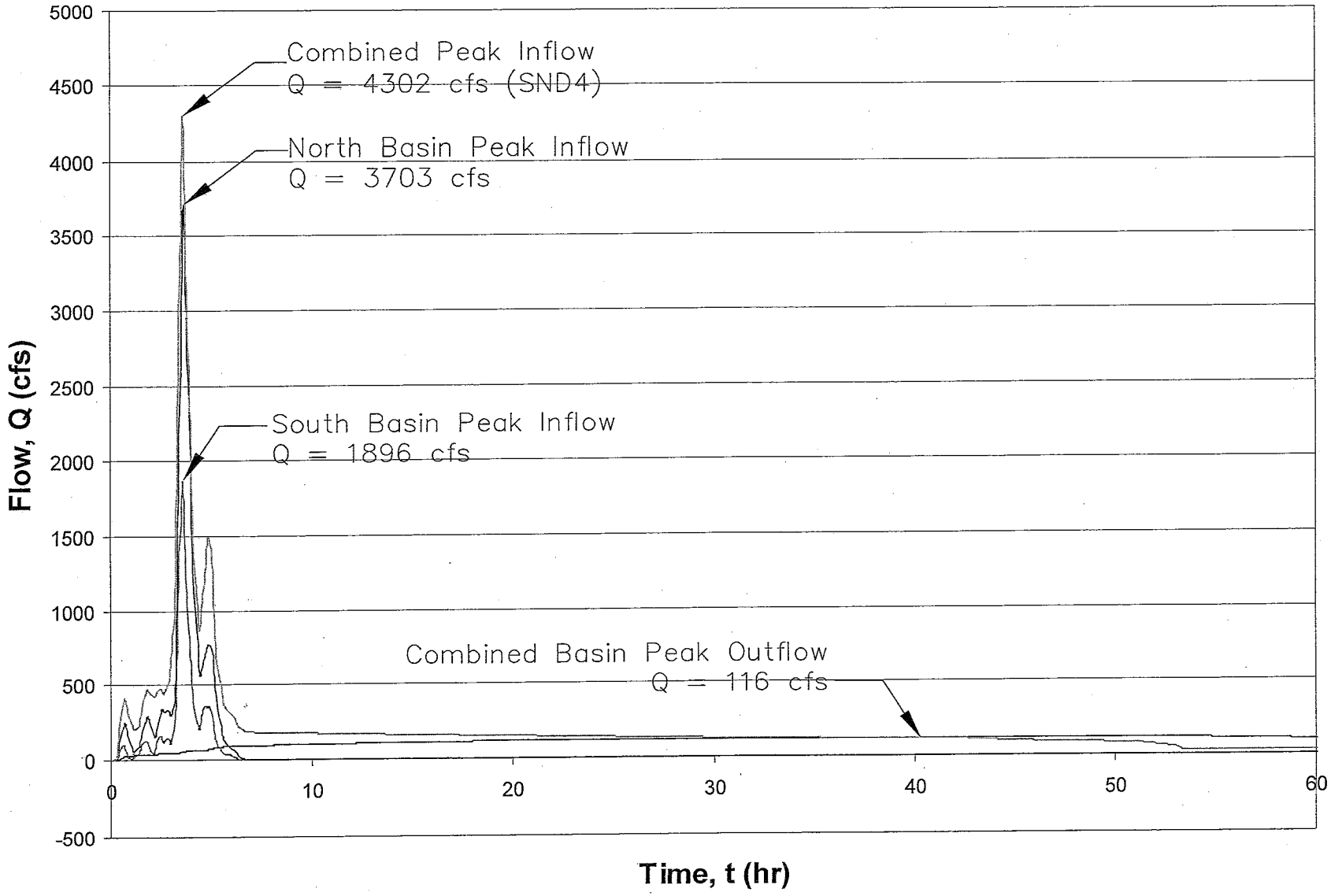
STAGE	VOLUME ACRE-FEET
2700	0.0
2705	0.0
2710	5.1
2715	35.0
2720	79.2
2725	130.4
2730	188.7
2735	254.4
2738	297.5
2739	312.5

COMBINED DETENTION BASINS

STAGE	VOLUME ACRE-FEET
2700	0.0
2705	7.4
2710	29.8
2715	81.0
2720	150.8
2725	233.1
2730	352.9
2735	493.7
2738	585.4
2739	617.3

LMBW DETENTION BASINS INFLOW-OUTFLOW HYDROGRAPHS

INFLOW-OUTFLOW HYDROGRAPHS



REVISED PMF ANALYSIS
(NORTH DETENTION BASIN TRIBUTARY WATERSHED)

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   14MAY08  TIME  09:26:39   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

                    *DIAGRAM
            1       ID   ********************************************************************
            2       ID   * ..................................................................  *
            3       ID   * :                                                                :  *
            4       ID   * :            LONE MOUNTAIN/BELTWAY DETENTION BASIN               :  *
            5       ID   * :                        NORTH BASIN                             :  *
            6       ID   * :                    (PMF ANALYSIS)                              :  *
            7       ID   * :................................................................:  *
            8       ID   * :                TRIBUTARY AREA FOR PMF CALCULATION              :  *
            9       ID   * :                IS 3.974 SQUARE MI                              :  *
           10       ID   * :                PMF NALYSIS IS BASED ON NOAA HMR NO. 49         :  *
           11       ID   * :                (TIME SEQUENCE EM1110-2-1411)                   :  *
           12       ID   * :                                                                :  *
           13       ID   * :                PROJECT NO_ _ _ _ _ 451.002.001                 :  *
           14       ID   * :                FILENAME_ _ _ _ _ _ PMPN-COE.H1                 :  *
           15       ID   * :                DATE_ _ _ _ _ _ _ _ 05/14/08                    :  *
           16       ID   * :                BY_ _ _ _ _ _ _ _ _ JYL                         :  *
           17       ID   * :                                                                :  *
           18       ID   * :................................................................:  *
           19       ID   ********************************************************************
                    *
           20       IT       5       0       0     150
           21       IO       5       0       0
                    * USE 15 MINUTE INPUT INTERVAL
           22       IN      15       0       0
           23       JR    PREC    1.00
                    *
           24       KK  PMPA-N
           25       KM   TRIBUTARY AREA FOR NORTH BASIN
           26       KO       1
           27       BA   3.974
           28       PB    13.1
           29       PC    .000    .004    .008    .011    .015    .027    .038    .050    .061    .092
           30       PC    .122    .153    .183    .702    .832    .885    .931    .943    .954    .966
           31       PC    .977    .983    .989    .994   1.000
           32       LS       0   86.7
           33       UD     .77
                    *
           34       ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     24     PMPA-N

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   14MAY08  TIME  09:26:39   *
*                                       *
*****************************************
```

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



```
*********************************************************************
* ..................................................................  *
* :                                                                :  *
* :            LONE MOUNTAIN/BELTWAY DETENTION BASIN               :  *
* :                        NORTH BASIN                             :  *
* :                    (PMF ANALYSIS)                              :  *
```

```
                    TRIBUTARY AREA FOR PMF CALCULATION
                    IS 3.974 SQUARE MI
                    PMF NALYSIS IS BASED ON NOAA HMR NO. 49
                    (TIME SEQUENCE EM1110-2-1411)

                    PROJECT NO_ _ _ _ _ 451.002.001
                    FILENAME_ _ _ _ _ _ PMPN-COE.H1
                    DATE_ _ _ _ _ _ _ _ 05/14/08
                    BY_ _ _ _ _ _ _ _ _ JYL

21 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          150  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      1    0  ENDING DATE
                  NDTIME         1225  ENDING TIME
                  ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL      .08 HOURS
                    TOTAL TIME BASE   12.42 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

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

               ***************
               *             *
24 KK          *    PMPA-N   *
               *             *
               ***************

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

22 IN          TIME DATA FOR INPUT TIME SERIES
                    JXMIN         15  TIME INTERVAL IN MINUTES
                   JXDATE      1    0  STARTING DATE
                   JXTIME           0  STARTING TIME

            SUBBASIN RUNOFF DATA

27 BA          SUBBASIN CHARACTERISTICS
                    TAREA       3.97  SUBBASIN AREA

               PRECIPITATION DATA

28 PB               STORM      13.10  BASIN TOTAL PRECIPITATION

29 PI            INCREMENTAL PRECIPITATION PATTERN
                   .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                   .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                   .00    .00    .00    .00    .01    .01    .01    .01    .01    .01
                   .01    .01    .01    .01    .01    .01    .17    .17    .17    .04
                   .04    .04    .02    .02    .02    .02    .02    .02    .00    .00
                   .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                   .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                   .00    .00

32 LS          SCS LOSS RATE
                    STRTL          .31  INITIAL ABSTRACTION
                   CRVNBR        86.70  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

33 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG           .77  LAG

                                        ***

                                        UNIT HYDROGRAPH
                                    48 END-OF-PERIOD ORDINATES
          75.     248.     472.     774.    1172.    1623.    1989.    2231.    2349.    2360.
        2301.    2148.    1970.    1758.    1496.    1224.    1013.     855.     721.     617.
         528.     448.     375.     318.     269.     229.     192.     163.     136.     116.
          98.      84.      70.      60.      50.      43.      36.      31.      26.      23.
          20.      17.      14.      11.       9.       7.       4.       2.

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

                                    HYDROGRAPH AT STATION    PMPA-N
```

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		0615	76	.00	.00	.00	1311.
1		0005	2	.02	.02	.00	0.	1		0620	77	.00	.00	.00	1205.
1		0010	3	.02	.02	.00	0.	1		0625	78	.00	.00	.00	1104.
1		0015	4	.02	.02	.00	0.	1		0630	79	.00	.00	.00	1004.
1		0020	5	.02	.02	.00	0.	1		0635	80	.00	.00	.00	902.
1		0025	6	.02	.02	.00	0.	1		0640	81	.00	.00	.00	800.
1		0030	7	.02	.02	.00	0.	1		0645	82	.00	.00	.00	700.
1		0035	8	.01	.01	.00	0.	1		0650	83	.00	.00	.00	605.
1		0040	9	.01	.01	.00	0.	1		0655	84	.00	.00	.00	516.
1		0045	10	.01	.01	.00	0.	1		0700	85	.00	.00	.00	432.
1		0050	11	.02	.02	.00	0.	1		0705	86	.00	.00	.00	356.
1		0055	12	.02	.02	.00	0.	1		0710	87	.00	.00	.00	291.
1		0100	13	.02	.02	.00	0.	1		0715	88	.00	.00	.00	239.
1		0105	14	.05	.05	.00	0.	1		0720	89	.00	.00	.00	199.
1		0110	15	.05	.05	.00	0.	1		0725	90	.00	.00	.00	166.
1		0115	16	.05	.05	.00	0.	1		0730	91	.00	.00	.00	139.
1		0120	17	.05	.04	.00	1.	1		0735	92	.00	.00	.00	116.
1		0125	18	.05	.04	.01	2.	1		0740	93	.00	.00	.00	97.
1		0130	19	.05	.04	.01	5.	1		0745	94	.00	.00	.00	81.
1		0135	20	.05	.04	.01	11.	1		0750	95	.00	.00	.00	67.
1		0140	21	.05	.04	.01	21.	1		0755	96	.00	.00	.00	56.
1		0145	22	.05	.04	.02	35.	1		0800	97	.00	.00	.00	47.
1		0150	23	.05	.03	.02	54.	1		0805	98	.00	.00	.00	40.
1		0155	24	.05	.03	.02	79.	1		0810	99	.00	.00	.00	33.
1		0200	25	.05	.03	.02	109.	1		0815	100	.00	.00	.00	28.
1		0205	26	.14	.07	.06	147.	1		0820	101	.00	.00	.00	23.
1		0210	27	.14	.06	.07	197.	1		0825	102	.00	.00	.00	19.
1		0215	28	.14	.06	.08	260.	1		0830	103	.00	.00	.00	16.
1		0220	29	.13	.05	.08	340.	1		0835	104	.00	.00	.00	13.
1		0225	30	.13	.04	.09	442.	1		0840	105	.00	.00	.00	11.
1		0230	31	.13	.04	.09	569.	1		0845	106	.00	.00	.00	9.
1		0235	32	.14	.04	.10	719.	1		0850	107	.00	.00	.00	7.
1		0240	33	.14	.03	.10	887.	1		0855	108	.00	.00	.00	6.
1		0245	34	.14	.03	.10	1069.	1		0900	109	.00	.00	.00	5.
1		0250	35	.13	.03	.10	1258.	1		0905	110	.00	.00	.00	4.
1		0255	36	.13	.03	.10	1450.	1		0910	111	.00	.00	.00	3.
1		0300	37	.13	.02	.11	1642.	1		0915	112	.00	.00	.00	3.
1		0305	38	2.27	.25	2.02	1972.	1		0920	113	.00	.00	.00	2.
1		0310	39	2.27	.11	2.16	2634.	1		0925	114	.00	.00	.00	2.
1		0315	40	2.27	.06	2.20	3738.	1		0930	115	.00	.00	.00	1.
1		0320	41	.57	.01	.56	5318.	1		0935	116	.00	.00	.00	1.
1		0325	42	.57	.01	.56	7411.	1		0940	117	.00	.00	.00	1.
1		0330	43	.57	.01	.56	10050.	1		0945	118	.00	.00	.00	0.
1		0335	44	.23	.00	.23	12935.	1		0950	119	.00	.00	.00	0.
1		0340	45	.23	.00	.23	15630.	1		0955	120	.00	.00	.00	0.
1		0345	46	.23	.00	.23	17773.	1		1000	121	.00	.00	.00	0.
1		0350	47	.20	.00	.20	19250.	1		1005	122	.00	.00	.00	0.
1		0355	48	.20	.00	.20	20077.	1		1010	123	.00	.00	.00	0.
1		0400	49	.20	.00	.20	20247.	1		1015	124	.00	.00	.00	0.
1		0405	50	.05	.00	.05	19884.	1		1020	125	.00	.00	.00	0.
1		0410	51	.05	.00	.05	19059.	1		1025	126	.00	.00	.00	0.
1		0415	52	.05	.00	.05	17857.	1		1030	127	.00	.00	.00	0.
1		0420	53	.05	.00	.05	16320.	1		1035	128	.00	.00	.00	0.
1		0425	54	.05	.00	.05	14629.	1		1040	129	.00	.00	.00	0.
1		0430	55	.05	.00	.05	13000.	1		1045	130	.00	.00	.00	0.
1		0435	56	.05	.00	.05	11531.	1		1050	131	.00	.00	.00	0.
1		0440	57	.05	.00	.05	10216.	1		1055	132	.00	.00	.00	0.
1		0445	58	.05	.00	.05	9043.	1		1100	133	.00	.00	.00	0.
1		0450	59	.05	.00	.05	8011.	1		1105	134	.00	.00	.00	0.
1		0455	60	.05	.00	.05	7080.	1		1110	135	.00	.00	.00	0.
1		0500	61	.05	.00	.05	6252.	1		1115	136	.00	.00	.00	0.
1		0505	62	.03	.00	.03	5527.	1		1120	137	.00	.00	.00	0.
1		0510	63	.03	.00	.03	4902.	1		1125	138	.00	.00	.00	0.
1		0515	64	.03	.00	.03	4360.	1		1130	139	.00	.00	.00	0.
1		0520	65	.03	.00	.03	3897.	1		1135	140	.00	.00	.00	0.
1		0525	66	.03	.00	.03	3493.	1		1140	141	.00	.00	.00	0.
1		0530	67	.03	.00	.03	3140.	1		1145	142	.00	.00	.00	0.
1		0535	68	.02	.00	.02	2825.	1		1150	143	.00	.00	.00	0.
1		0540	69	.02	.00	.02	2549.	1		1155	144	.00	.00	.00	0.
1		0545	70	.02	.00	.02	2301.	1		1200	145	.00	.00	.00	0.
1		0550	71	.03	.00	.03	2082.	1		1205	146	.00	.00	.00	0.
1		0555	72	.03	.00	.03	1887.	1		1210	147	.00	.00	.00	0.
1		0600	73	.03	.00	.03	1718.	1		1215	148	.00	.00	.00	0.
1		0605	74	.00	.00	.00	1565.	1		1220	149	.00	.00	.00	0.
1		0610	75	.00	.00	.00	1431.	1		1225	150	.00	.00	.00	0.

TOTAL RAINFALL = 13.10, TOTAL LOSS = 1.68, TOTAL EXCESS = 11.42

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	20247.	4.00	4876.	2359.	2359.	2359.
			(INCHES) 11.408	11.423	11.423	11.423
			(AC-FT) 2418.	2421.	2421.	2421.

CUMULATIVE AREA = 3.97 SQ MI

HYDROGRAPH AT STATION PMPA-N
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		0615	76	.00	.00	.00	1311.
1		0005	2	.02	.02	.00	0.	1		0620	77	.00	.00	.00	1205.
1		0010	3	.02	.02	.00	0.	1		0625	78	.00	.00	.00	1104.

1	0015	4	.02	.02	.00	0.	*	1	0630	79	.00	.00	.00	1004.
1	0020	5	.02	.02	.00	0.	*	1	0635	80	.00	.00	.00	902.
1	0025	6	.02	.02	.00	0.	*	1	0640	81	.00	.00	.00	800.
1	0030	7	.02	.02	.00	0.	*	1	0645	82	.00	.00	.00	700.
1	0035	8	.01	.01	.00	0.	*	1	0650	83	.00	.00	.00	605.
1	0040	9	.01	.01	.00	0.	*	1	0655	84	.00	.00	.00	516.
1	0045	10	.01	.01	.00	0.	*	1	0700	85	.00	.00	.00	432.
1	0050	11	.02	.02	.00	0.	*	1	0705	86	.00	.00	.00	356.
1	0055	12	.02	.02	.00	0.	*	1	0710	87	.00	.00	.00	291.
1	0100	13	.02	.02	.00	0.	*	1	0715	88	.00	.00	.00	239.
1	0105	14	.05	.05	.00	0.	*	1	0720	89	.00	.00	.00	199.
1	0110	15	.05	.05	.00	0.	*	1	0725	90	.00	.00	.00	166.
1	0115	16	.05	.05	.00	0.	*	1	0730	91	.00	.00	.00	139.
1	0120	17	.05	.04	.00	1.	*	1	0735	92	.00	.00	.00	116.
1	0125	18	.05	.04	.01	2.	*	1	0740	93	.00	.00	.00	97.
1	0130	19	.05	.04	.01	5.	*	1	0745	94	.00	.00	.00	81.
1	0135	20	.05	.04	.01	11.	*	1	0750	95	.00	.00	.00	67.
1	0140	21	.05	.04	.01	21.	*	1	0755	96	.00	.00	.00	56.
1	0145	22	.05	.04	.02	35.	*	1	0800	97	.00	.00	.00	47.
1	0150	23	.05	.03	.02	54.	*	1	0805	98	.00	.00	.00	40.
1	0155	24	.05	.03	.02	79.	*	1	0810	99	.00	.00	.00	33.
1	0200	25	.05	.03	.02	109.	*	1	0815	100	.00	.00	.00	28.
1	0205	26	.14	.07	.06	147.	*	1	0820	101	.00	.00	.00	23.
1	0210	27	.14	.06	.07	197.	*	1	0825	102	.00	.00	.00	19.
1	0215	28	.14	.06	.08	260.	*	1	0830	103	.00	.00	.00	16.
1	0220	29	.13	.05	.08	340.	*	1	0835	104	.00	.00	.00	13.
1	0225	30	.13	.04	.09	442.	*	1	0840	105	.00	.00	.00	11.
1	0230	31	.13	.04	.09	569.	*	1	0845	106	.00	.00	.00	9.
1	0235	32	.14	.04	.10	719.	*	1	0850	107	.00	.00	.00	7.
1	0240	33	.14	.03	.10	887.	*	1	0855	108	.00	.00	.00	6.
1	0245	34	.14	.03	.10	1069.	*	1	0900	109	.00	.00	.00	5.
1	0250	35	.13	.03	.10	1258.	*	1	0905	110	.00	.00	.00	4.
1	0255	36	.13	.03	.10	1450.	*	1	0910	111	.00	.00	.00	3.
1	0300	37	.13	.02	.11	1642.	*	1	0915	112	.00	.00	.00	3.
1	0305	38	2.27	.25	2.02	1972.	*	1	0920	113	.00	.00	.00	2.
1	0310	39	2.27	.11	2.16	2634.	*	1	0925	114	.00	.00	.00	2.
1	0315	40	2.27	.06	2.20	3738.	*	1	0930	115	.00	.00	.00	1.
1	0320	41	.57	.01	.56	5318.	*	1	0935	116	.00	.00	.00	1.
1	0325	42	.57	.01	.56	7411.	*	1	0940	117	.00	.00	.00	1.
1	0330	43	.57	.01	.56	10050.	*	1	0945	118	.00	.00	.00	0.
1	0335	44	.23	.00	.23	12935.	*	1	0950	119	.00	.00	.00	0.
1	0340	45	.23	.00	.23	15630.	*	1	0955	120	.00	.00	.00	0.
1	0345	46	.23	.00	.23	17773.	*	1	1000	121	.00	.00	.00	0.
1	0350	47	.20	.00	.20	19250.	*	1	1005	122	.00	.00	.00	0.
1	0355	48	.20	.00	.20	20077.	*	1	1010	123	.00	.00	.00	0.
1	0400	49	.20	.00	.20	20247.	*	1	1015	124	.00	.00	.00	0.
1	0405	50	.05	.00	.05	19884.	*	1	1020	125	.00	.00	.00	0.
1	0410	51	.05	.00	.05	19059.	*	1	1025	126	.00	.00	.00	0.
1	0415	52	.05	.00	.05	17857.	*	1	1030	127	.00	.00	.00	0.
1	0420	53	.05	.00	.05	16320.	*	1	1035	128	.00	.00	.00	0.
1	0425	54	.05	.00	.05	14629.	*	1	1040	129	.00	.00	.00	0.
1	0430	55	.05	.00	.05	13000.	*	1	1045	130	.00	.00	.00	0.
1	0435	56	.05	.00	.05	11531.	*	1	1050	131	.00	.00	.00	0.
1	0440	57	.05	.00	.05	10216.	*	1	1055	132	.00	.00	.00	0.
1	0445	58	.05	.00	.05	9043.	*	1	1100	133	.00	.00	.00	0.
1	0450	59	.05	.00	.05	8011.	*	1	1105	134	.00	.00	.00	0.
1	0455	60	.05	.00	.05	7080.	*	1	1110	135	.00	.00	.00	0.
1	0500	61	.05	.00	.05	6252.	*	1	1115	136	.00	.00	.00	0.
1	0505	62	.03	.00	.03	5527.	*	1	1120	137	.00	.00	.00	0.
1	0510	63	.03	.00	.03	4902.	*	1	1125	138	.00	.00	.00	0.
1	0515	64	.03	.00	.03	4360.	*	1	1130	139	.00	.00	.00	0.
1	0520	65	.03	.00	.03	3897.	*	1	1135	140	.00	.00	.00	0.
1	0525	66	.03	.00	.03	3493.	*	1	1140	141	.00	.00	.00	0.
1	0530	67	.03	.00	.03	3140.	*	1	1145	142	.00	.00	.00	0.
1	0535	68	.02	.00	.02	2825.	*	1	1150	143	.00	.00	.00	0.
1	0540	69	.02	.00	.02	2549.	*	1	1155	144	.00	.00	.00	0.
1	0545	70	.02	.00	.02	2301.	*	1	1200	145	.00	.00	.00	0.
1	0550	71	.03	.00	.03	2082.	*	1	1205	146	.00	.00	.00	0.
1	0555	72	.03	.00	.03	1887.	*	1	1210	147	.00	.00	.00	0.
1	0600	73	.03	.00	.03	1718.	*	1	1215	148	.00	.00	.00	0.
1	0605	74	.00	.00	.00	1565.	*	1	1220	149	.00	.00	.00	0.
1	0610	75	.00	.00	.00	1431.	*	1	1225	150	.00	.00	.00	0.
							*							

****

TOTAL RAINFALL = 13.10, TOTAL LOSS = 1.68, TOTAL EXCESS = 11.42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	20247.	4.00		4876.	2359.	2359.	2359.
			(INCHES)	11.408	11.423	11.423	11.423
			(AC-FT)	2418.	2421.	2421.	2421.

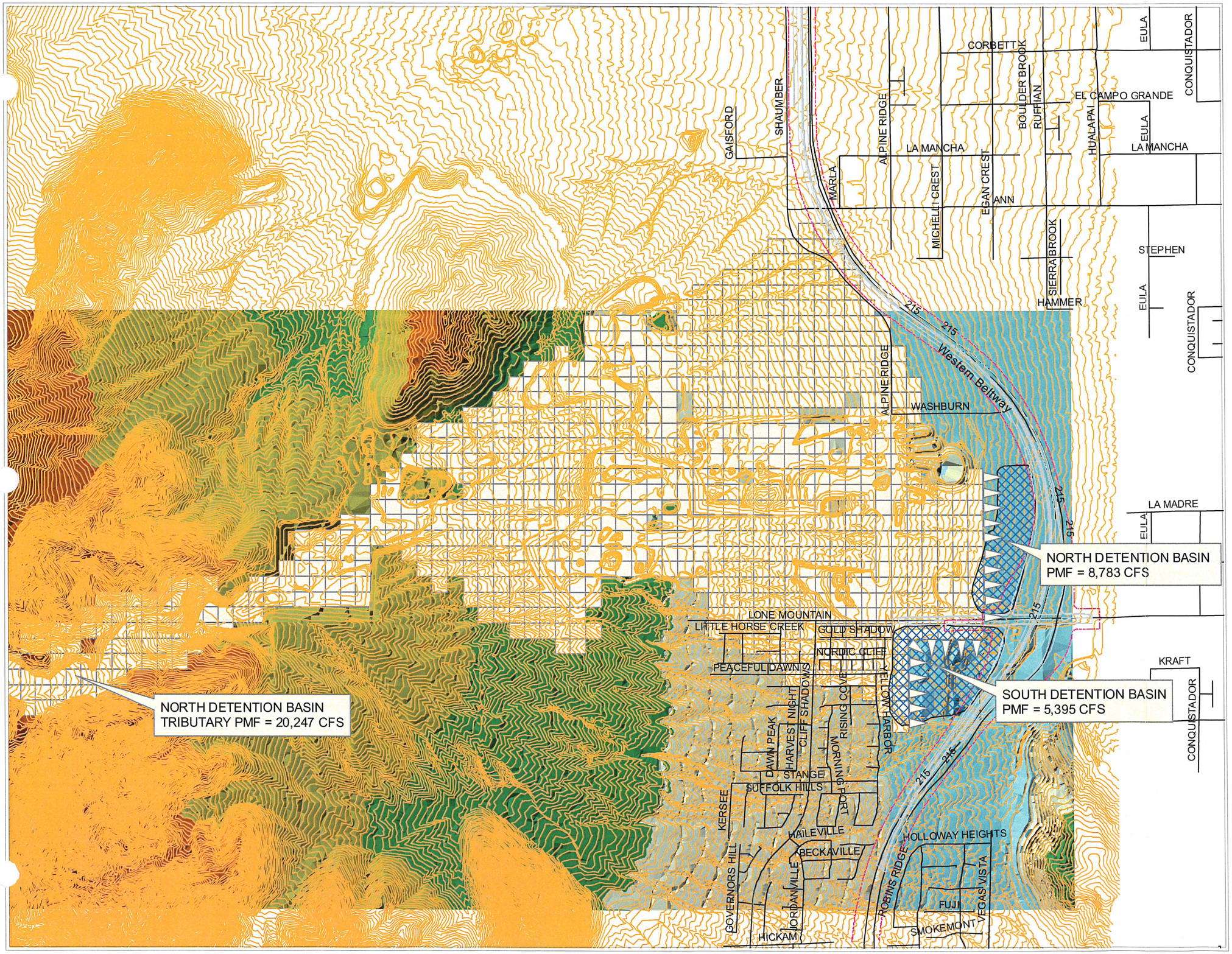
CUMULATIVE AREA = 3.97 SQ MI

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
					1.00
HYDROGRAPH AT					
+	PMPA-N	3.97	1	FLOW	20247.
				TIME	4.00

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



Legend

- Detention Basins
- Flo-2D Flow Grids

N

Feet

0 600 1,200 2,400

LONE MOUNTAIN / WESTERN BELTWAY
DETENTION BASINS

EXHIBIT A
FLO-2D ANALYSIS - PMF FLOW

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

GIS DEPARTMENT

APPENDIX B

Hydraulics

DETENTION BASIN CALCULATIONS

STAGE-STORAGE VOLUMES
(NORTH BASIN, SOUTH BASIN, AND COMBINED)

STAGE-STORAGE VOLUME CALCULATIONS

Project: Western Beltway Detention Basins
Project No: 451-002-001

$Total\ Volume_n = ((Area_n+Area_{n-1})/2)*(Elevation_n-Elevation_{n-1})+Total\ Volume_{n-1}$

South Detention Basin

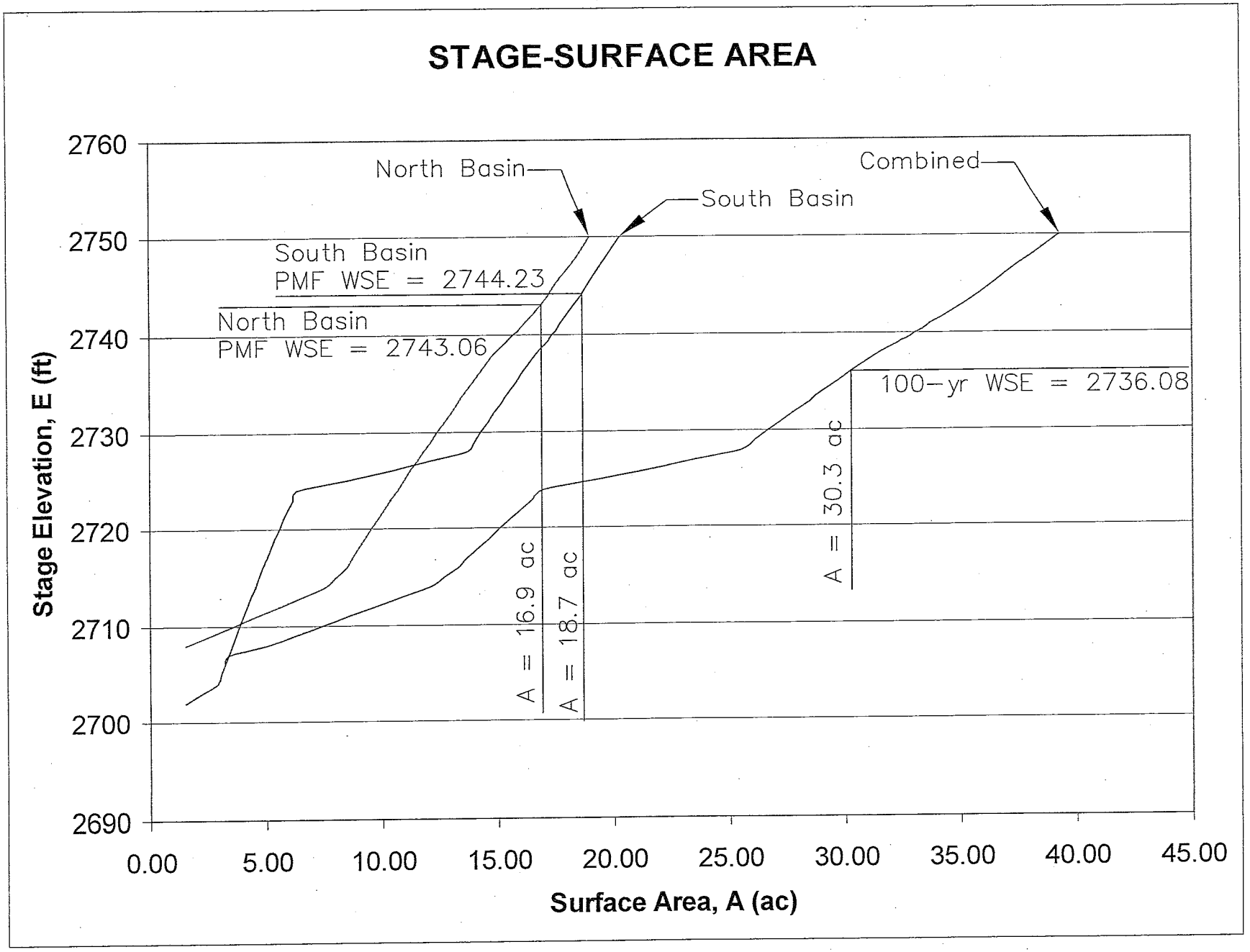
Elevation (ft)	Area (ft^2)	Area (ac)	Incremental Volume (ft^3)	Total Volume (ft^3)	Total Volume (ac-ft)
2702	66941.10	1.54	0	0	0.0
2703	96859.96	2.22	81901	81901	1.9
2704	126778.82	2.91	111819	193720	4.4
2705	133447.23	3.06	130113	323833	7.4
2706	140115.63	3.22	136781	460614	10.6
2707	146849.60	3.37	143483	604097	13.9
2708	153583.56	3.53	150217	754314	17.3
2709	160494.37	3.68	157039	911353	20.9
2710	167405.18	3.84	163950	1075302	24.7
2711	174530.10	4.01	170968	1246270	28.6
2712	181655.02	4.17	178093	1424363	32.7
2713	188985.74	4.34	185320	1609683	37.0
2714	196316.45	4.51	192651	1802334	41.4
2715	203841.61	4.68	200079	2002413	46.0
2716	211366.77	4.85	207604	2210017	50.7
2717	219094.28	5.03	215231	2425248	55.7
2718	226821.79	5.21	222958	2648206	60.8
2719	234738.05	5.39	230780	2878986	66.1
2720	242654.31	5.57	238696	3117682	71.6
2721	250777.63	5.76	246716	3364398	77.2
2722	258900.94	5.94	254839	3619237	83.1
2723	267228.94	6.13	263065	3882302	89.1
2724	275556.93	6.33	271393	4153695	95.4
2725	363973.44	8.36	319765	4473460	102.7
2726	452389.94	10.39	408182	4881642	112.1
2727	524706.01	12.05	488548	5370190	123.3
2728	597022.07	13.71	560864	5931054	136.2
2729	609518.22	13.99	603270	6534324	150.0
2730	622014.36	14.28	615766	7150090	164.1
2731	634743.01	14.57	628379	7778469	178.6
2732	647471.66	14.86	641107	8419576	193.3
2733	660533.96	15.16	654003	9073579	208.3
2734	673596.26	15.46	667065	9740644	223.6
2735	686929.60	15.77	680263	10420907	239.2
2736	700262.93	16.08	693596	11114503	255.2
2737	713870.44	16.39	707067	11821570	271.4
2738	727477.94	16.70	720674	12542244	287.9
2739	742070.63	17.04	734774	13277019	304.8
2740	756663.31	17.37	749367	14026386	322.0

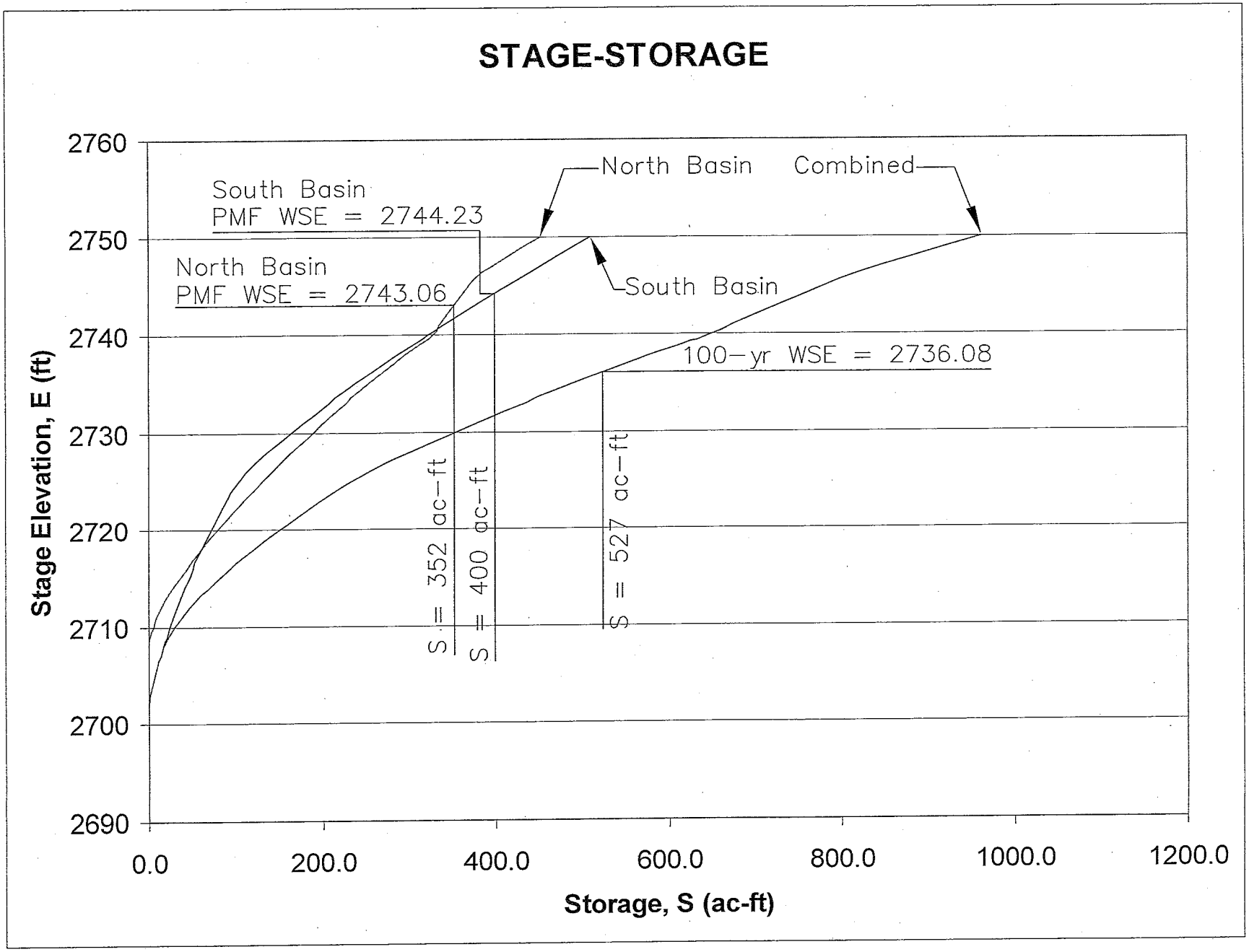
North Detention Basin

Elevation (ft)	Area (ft^2)	Area (ac)	Incremental Volume (ft^3)	Total Volume (ft^3)	Total Volume (ac-ft)
2708	65860.71	1.51	0	0	0.0
2709	110970.28	2.55	88415	88415	2.0
2710	156079.84	3.58	133525	221941	5.1
2711	197888.93	4.54	176984	398925	9.2
2712	239698.01	5.50	218793	617718	14.2
2713	284158.28	6.52	261928	879647	20.2
2714	328618.54	7.54	306388	1186035	27.2
2715	348520.58	8.00	338570	1524605	35.0
2716	368422.62	8.46	358472	1883076	43.2
2717	380159.85	8.73	374291	2257367	51.8
2718	391897.07	9.00	386028	2643396	60.7
2719	403801.68	9.27	397849	3041245	69.8
2720	415706.28	9.54	409754	3450999	79.2
2721	427778.58	9.82	421742	3872742	88.9
2722	439850.87	10.10	433815	4306556	98.9
2723	452090.55	10.38	445971	4752527	109.1
2724	464330.23	10.66	458210	5210737	119.6
2725	476737.52	10.94	470534	5681271	130.4
2726	489144.80	11.23	482941	6164212	141.5
2727	501719.83	11.52	495432	6659645	152.9
2728	514294.85	11.81	508007	7167652	164.5
2729	527037.64	12.10	520666	7688318	176.5
2730	539780.43	12.39	533409	8221727	188.7
2731	552691.24	12.69	546236	8767963	201.3
2732	565602.05	12.98	559147	9327110	214.1
2733	578680.78	13.28	572141	9899251	227.3
2734	591759.50	13.58	585220	10484471	240.7
2735	605006.48	13.89	598383	11082854	254.4
2736	618253.45	14.19	611630	11694484	268.5
2737	632077.02	14.51	625165	12319650	282.8
2738	645900.58	14.83	638989	12958638	297.5
2739	665062.78	15.27	655482	13614120	312.5
2740	684224.98	15.71	674644	14288764	328.0

Combined

Elevation (ft)	Total SDB & NDB Volume (ac-ft)
2702	0.0
2703	1.9
2704	4.4
2705	7.4
2706	10.6
2707	13.9
2708	17.3
2709	23.0
2710	29.8
2711	37.8
2712	46.9
2713	57.1
2714	68.6
2715	81.0
2716	94.0
2717	107.5
2718	121.5
2719	135.9
2720	150.8
2721	166.1
2722	182.0
2723	198.2
2724	215.0
2725	233.1
2726	253.6
2727	276.2
2728	300.7
2729	326.5
2730	352.9
2731	379.9
2732	407.4
2733	435.6
2734	464.3
2735	493.7
2736	523.6
2737	554.2
2738	585.4
2739	617.3
2740	650.0


STAGE-SURFACE AREA
North Basin
South Basin
Combined
South Basin
PMF WSE = 2744.23
North Basin
PMF WSE = 2743.06
100-yr WSE = 2736.08
A = 16.9 ac
A = 18.7 ac
A = 30.3 ac
Stage Elevation, E (ft)
2760
2750
2740
2730
2720
2710
2700
2690
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
Surface Area, A (ac)


STAGE-STORAGE
2760
2750
2740
2730
2720
2710
2700
2690
Stage Elevation, E (ft)
South Basin
PMF WSE = 2744.23
North Basin
PMF WSE = 2743.06
North Basin
Combined
South Basin
100-yr WSE = 2736.08
S = 352 ac-ft
S = 400 ac-ft
S = 527 ac-ft
0.0
200.0
400.0
600.0
800.0
1000.0
1200.0
Storage, S (ac-ft)

PMF SPILLWAY STAGE-DISCHARGES
(NORTH BASIN AND SOUTH BASIN)

SPILLWAY STAGE-DISCHARGE CALCULATIONS

Spillway Weir Equation Worksheet

$$Q=C*L*H^{3/2}$$

where,

Q = Discharge over weir (cfs)
C = Weir Coefficient 2.8
L = Weir Length (ft)
H = Weir Depth (ft) Weir Elev. - Crest Elev.

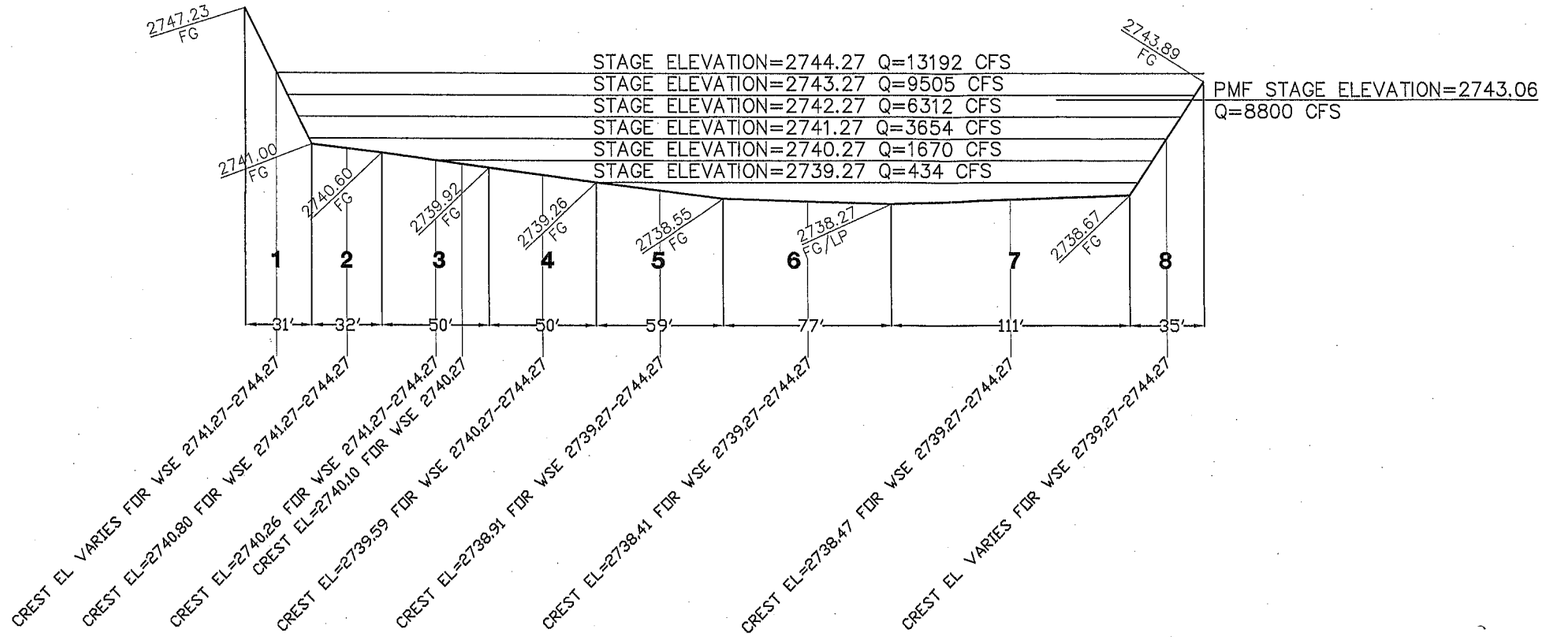
NORTH DETENTION BASIN SPILLWAY - ELEVATION 2738.27

						PMF WSE		
	Weir Elev.	2739.27	2740.27	2741.27	2742.27	2743.06	2743.27	2744.27
SECT1	Crest Elev.	NA	NA	2741.14	2741.64	2742.03	2742.14	2742.64
	L	NA	NA	1	6	10	11	16
	h	NA	NA	0.13	0.63	1.03	1.13	1.63
	Q	0	0	0	9	30	38	95
SECT2	Crest Elev.	NA	NA	2740.8	2740.8	2740.8	2740.8	2740.8
	L	NA	NA	32	32	32	32	32
	h	NA	NA	0.47	1.47	2.26	2.47	3.47
	Q	0	0	29	160	306	350	582
SECT3	Crest Elev.	NA	2740.10	2740.26	2740.26	2740.26	2740.26	2740.26
	L	NA	26	50	50	50	50	50
	h	NA	0.17	1.01	2.01	2.80	3.01	4.01
	Q	0	5	142	399	657	731	1124
SECT4	Crest Elev.	2739.27	2739.59	2739.59	2739.59	2739.59	2739.59	2739.59
	L	1	50	50	50	50	50	50
	h	0.00	0.68	1.68	2.68	3.47	3.68	4.68
	Q	0	79	305	614	906	988	1417
SECT5	Crest Elev.	2738.91	2738.91	2738.91	2738.91	2738.91	2738.91	2738.91
	L	59	59	59	59	59	59	59
	h	0.36	1.36	2.36	3.36	4.16	4.36	5.36
	Q	36	262	598	1015	1394	1499	2043
SECT6	Crest Elev.	2738.41	2738.41	2738.41	2738.41	2738.41	2738.41	2738.41
	L	77	77	77	77	77	77	77
	h	0.86	1.86	2.86	3.86	4.65	4.86	5.86
	Q	171	545	1040	1630	2157	2303	3049
SECT7	Crest Elev.	2738.47	2738.47	2738.47	2738.47	2738.47	2738.47	2738.47
	L	112	112	112	112	112	112	112
	h	0.80	1.80	2.80	3.80	4.59	4.80	5.80
	Q	224	757	1469	2322	3085	3296	4378
SECT8	Crest Elev.	2738.97	2739.47	2739.97	2740.47	2740.866	2740.97	2741.28
	L	4	11	17	24	29	31	35
	h	0.30	0.80	1.30	1.80	2.20	2.30	2.99
	Q	2	21	72	162	266	299	503
Total Q @ each weir elevation	**Weir Elev.**	**2739.27**	**2740.27**	**2741.27**	**2742.27**	**2743.06**	**2743.27**	**2744.27**
	Q (cfs)	**434**	**1670**	**3654**	**6312**	**8800**	**9505**	**13192**

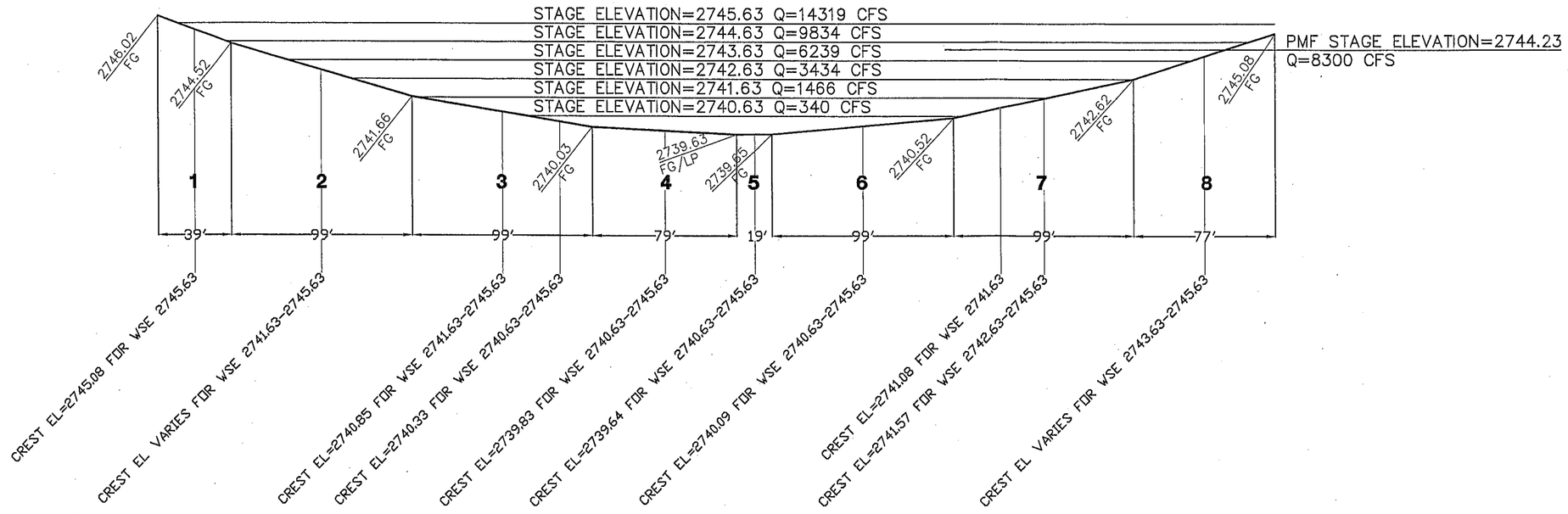
SOUTH DETENTION BASIN SPILLWAY - ELEVATION 2739.63

						PMF WSE		
	Weir Elev.	2740.63	2741.63	2742.63	2743.63	2744.23	2744.63	2745.63
SECT1	Crest Elev.	NA	NA	NA	NA	NA	2744.58	2745.08
	L	NA	NA	NA	NA	NA	3	29
	h	NA	NA	NA	NA	NA	0.06	0.56
	Q	0	0	0	0	0	0	34
SECT2	Crest Elev.	NA	NA	2742.15	2742.65	2742.95	2743.09	2743.09
	L	NA	NA	33	68	89	99	99
	h	NA	NA	0.49	0.99	1.29	1.54	2.54
	Q	0	0	32	186	362	528	1118
SECT3	Crest Elev.	2740.33	2740.85	2740.85	2740.85	2740.85	2740.85	2740.85
	L	36	97	99	99	99	99	99
	h	0.30	0.78	1.79	2.79	3.39	3.79	4.79
	Q	17	187	659	1284	1721	2034	2891
SECT4	Crest Elev.	2739.83	2739.83	2739.83	2739.83	2739.83	2739.83	2739.83
	L	79	79	79	79	79	79	79
	h	0.80	1.80	2.80	3.80	4.40	4.80	5.80
	Q	159	537	1043	1648	2055	2340	3108
SECT5	Crest Elev.	2739.64	2739.64	2739.64	2739.64	2739.64	2739.64	2739.64
	L	19	19	19	19	19	19	19
	h	0.99	1.99	2.99	3.99	4.5912	4.99	5.99
	Q	53	151	278	428	528	599	787
SECT6	Crest Elev.	2740.09	2740.09	2740.09	2740.09	2740.09	2740.09	2740.09
	L	99	99	99	99	99	99	99
	h	0.55	1.55	2.55	3.55	4.15	4.55	5.55
	Q	111	530	1121	1844	2332	2676	3607
SECT7	Crest Elev.	2740.58	2741.08	2741.57	2741.57	2741.57	2741.57	2741.57
	L	5	52	99	99	99	99	99
	h	0.06	0.56	1.06	2.06	2.66	3.06	4.06
	Q	0	60	302	817	1200	1480	2261
SECT8	Crest Elev.	NA	NA	2742.63	2743.13	2743.43	2743.63	2743.85
	L	NA	NA	0	32	50	63	77
	h	NA	NA	0.01	0.51	0.81	1.01	1.78
	Q	0	0	0	32	102	178	512
Total Q @ each weir elevation	**Weir Elev.**	**2740.63**	**2741.63**	**2742.63**	**2743.63**	**2744.23**	**2744.63**	**2745.63**
	Q (cfs)	**340**	**1466**	**3434**	**6239**	**8300**	**9834**	**14319**

NORTH DETENTION BASIN SPILLWAY



SOUTH DETENTION BASIN SPILLWAY



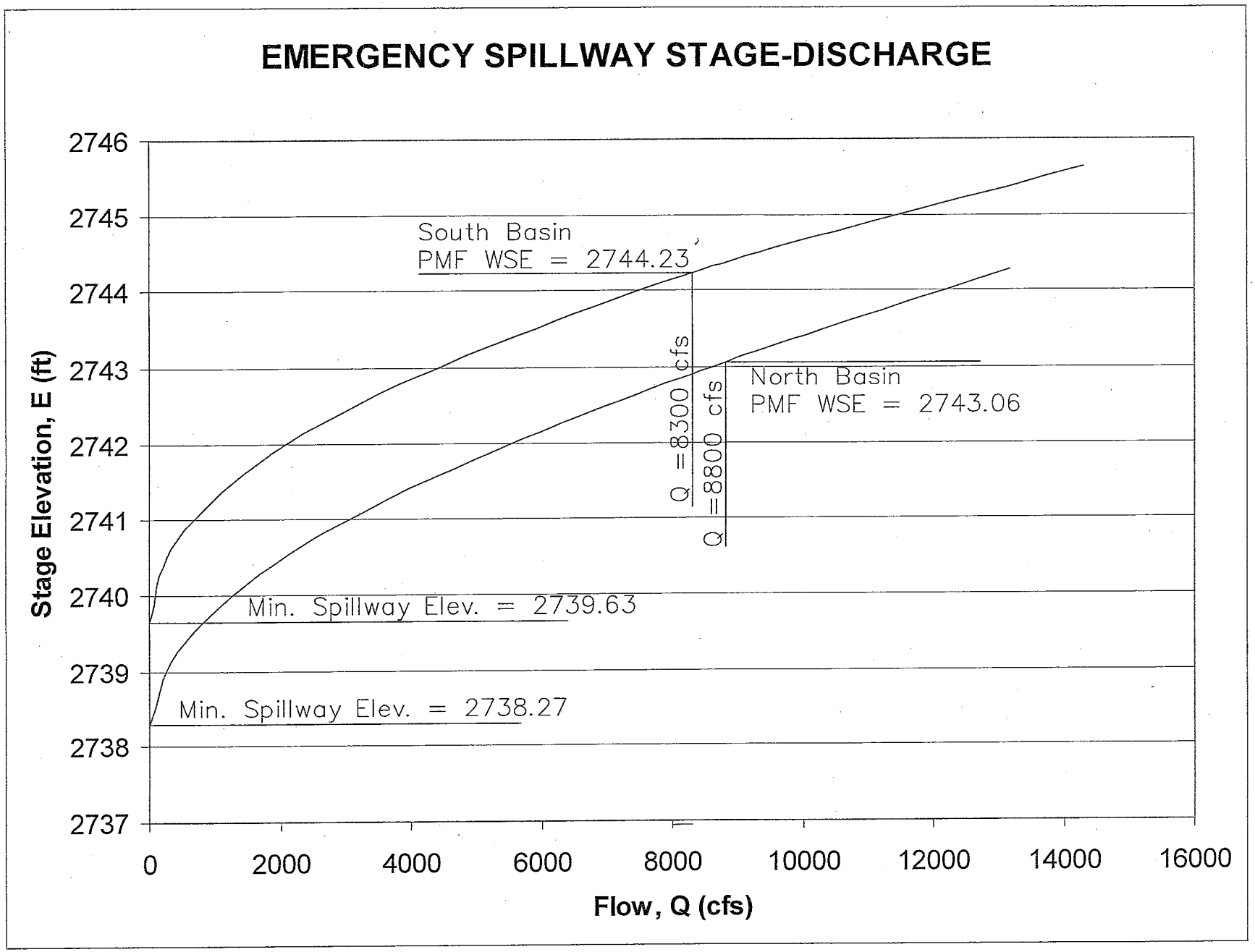
LONE MOUNTAIN/BELTWAY
DETENTION BASINS

EXHIBIT B

SPILLWAY STAGE–DISCHARGES

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
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EMERGENCY SPILLWAY STAGE-DISCHARGE
Stage Elevation, E (ft)
2746
2745
2744
2743
2742
2741
2740
2739
2738
2737
South Basin
PMF WSE = 2744.23
North Basin
PMF WSE = 2743.06
Q =8300 cfs
Q =8800 cfs
Min. Spillway Elev. = 2739.63
Min. Spillway Elev. = 2738.27
0
2000
4000
6000
8000
10000
12000
14000
16000
Flow, Q (cfs)

STAGE-OUTFALL DISCHARGES

OUTFALL DISCHARGE FLOW CALCULATIONS

Orifice Equation Worksheet

	Lower Level Plate	Second Level Plate
Orifice diameter	23 inches	26 inches
Orifice coefficient	0.65 from Criteria Manual	

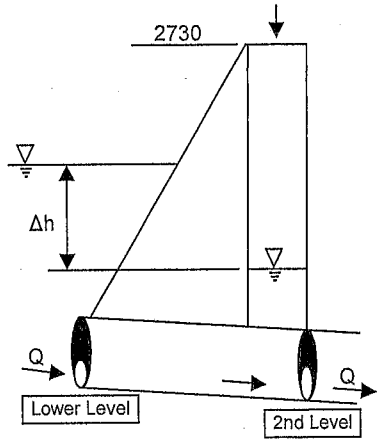
Orifice Equation: $Q=CA(2g\Delta h)^{1/2}$

Where:
- Q = Outflow Discharge in cfs
- A = Orifice Cross Sectional Area (ft^2)
- g = Gravitational Constant (ft/sec^2)
- Δh = Head, (ft) above centroid of orifice opening or tailwater elevation (Lower Level Only)
- C = Orifice Coefficient

The Lower Level Orifice is affected by the Headwater of the Second Level Orifice. When the outfall flow enters the Lower Level Orifice at stages below elevation 2730, the Headwater of the Second Level Orifice becomes the Tailwater of the Lower Level Orifice. Therefore, for the Lower Level Orifice, Δh = (Stage Elevation of Lower Level Orifice) - (Headwater Elevation of Second Level Orifice) at the balance of approximately equivalent flows passing both the Lower and Second Level orifices at stages below elevation 2730. The balanced Qs for both the Lower Level Orifice and Second Level Orifice are highlighted in the tables below.

Lower Level 23" Orifice Plate		
Centroid Elevation		2700.00
Δh (ft)	Q (cfs)	Elevation
0.00	0.0	2700
3.20	26.9	2705
6.30	37.8	2710
9.40	46.1	2715
12.50	53.2	2720
15.60	59.4	2725
18.70	65.0	2730
35.18	114.0	2735 *
38.18	118.8	2738 *
39.18	120.3	2739 *

* Stage Elevation above 2730, Q = Second Level Outflow



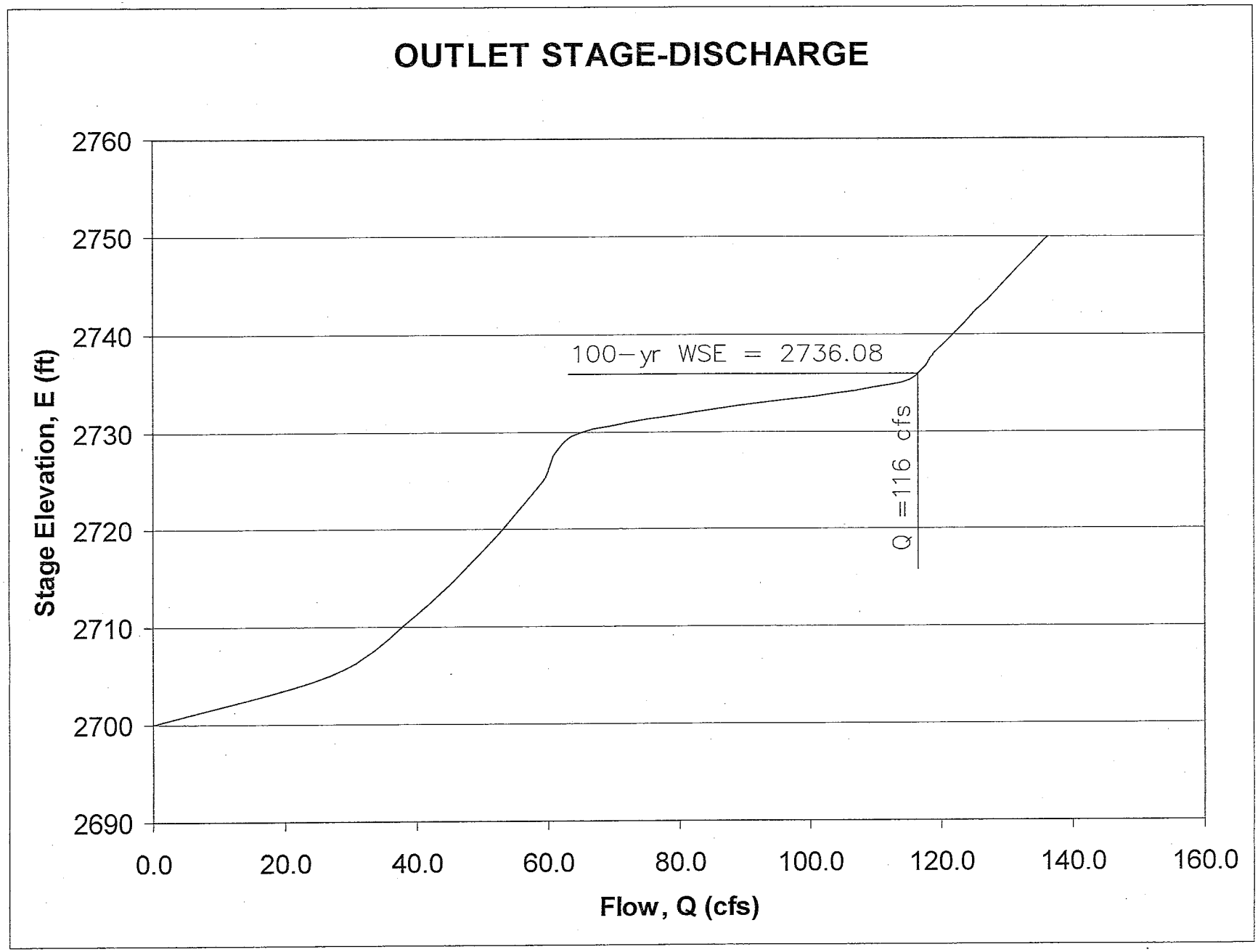
Second Level 26" Orifice Plate		
Centroid Elevation		2699.82
Δh (ft)	Q (cfs)	Elevation
0.18	0.0	2700
0.28	10.1	2700.1
0.38	11.8	2700.2
0.48	13.3	2700.3
0.58	14.6	2700.4
0.68	15.8	2700.5
0.78	16.9	2700.6
0.88	18.0	2700.7
0.98	19.0	2700.8
1.08	19.9	2700.9
1.18	20.9	2701
1.28	21.7	2701.1
1.38	22.6	2701.2
1.48	23.4	2701.3
1.58	24.1	2701.4
1.68	24.9	2701.5
1.78	25.6	2701.6
1.88	26.3	2701.7
1.98	27.0	2701.8
2.08	27.7	2701.9
2.18	28.4	2702
2.28	29.0	2702.1
2.38	29.6	2702.2
2.48	30.3	2702.3
2.58	30.9	2702.4
2.68	31.4	2702.5
2.78	32.0	2702.6

Second Level 26" Orifice Plate		
Centroid Elevation		2699.82
Δh (ft)	Q (cfs)	Elevation
0.18	0.0	2700
1.18	20.9	2701
2.18	28.4	2702
3.18	34.3	2703
4.18	39.3	2704
5.18	43.7	2705
6.18	47.8	2706
7.18	51.5	2707
8.18	55.0	2708
9.18	58.2	2709
10.18	61.3	2710
11.18	64.3	2711
12.18	67.1	2712
13.18	69.8	2713
14.18	72.4	2714
15.18	74.9	2715
16.18	77.3	2716
17.18	79.7	2717
18.18	82.0	2718
19.18	84.2	2719
20.18	86.3	2720
21.18	88.5	2721
22.18	90.5	2722
23.18	92.5	2723
24.18	94.5	2724
25.18	96.5	2725
26.18	98.3	2726

2.88	32.6	2702.7
2.98	33.2	2702.8
3.08	33.7	2702.9
3.18	34.3	2703
3.28	34.8	2703.1
3.38	35.3	2703.2
3.48	35.8	2703.3
3.58	36.4	2703.4
3.68	36.9	2703.5
3.78	37.4	2703.6
3.88	37.8	2703.7
3.98	38.3	2703.8
4.08	38.8	2703.9
4.18	39.3	2704
4.28	39.8	2704.1
4.38	40.2	2704.2
4.48	40.7	2704.3
4.58	41.1	2704.4
4.68	41.6	2704.5
4.78	42.0	2704.6
4.88	42.4	2704.7
4.98	42.9	2704.8
5.08	43.3	2704.9
5.18	43.7	2705
5.28	44.2	2705.1
5.38	44.6	2705.2
5.48	45.0	2705.3
5.58	45.4	2705.4
5.68	45.8	2705.5
5.78	46.2	2705.6
5.88	46.6	2705.7
5.98	47.0	2705.8
6.08	47.4	2705.9
6.18	47.8	2706
6.28	48.2	2706.1
6.38	48.5	2706.2
6.48	48.9	2706.3
6.58	49.3	2706.4
6.68	49.7	2706.5
6.78	50.0	2706.6
6.88	50.4	2706.7
6.98	50.8	2706.8
7.08	51.1	2706.9
7.18	51.5	2707
7.28	51.9	2707.1
7.38	52.2	2707.2
7.48	52.6	2707.3
7.58	52.9	2707.4
7.68	53.3	2707.5
7.78	53.6	2707.6
7.88	53.9	2707.7
7.98	54.3	2707.8

27.18	100.2	2727
28.18	102.0	2728
29.18	103.8	2729
30.18	105.6	2730
31.18	107.3	2731
32.18	109.0	2732
33.18	110.7	2733
34.18	112.4	2734
35.18	114.0	2735
36.18	115.6	2736
37.18	117.2	2737
38.18	118.8	2738
39.18	120.3	2739
40.18	121.8	2740
41.18	123.3	2741

8.08	54.6	2707.9
8.18	55.0	2708
8.28	55.3	2708.1
8.38	55.6	2708.2
8.48	56.0	2708.3
8.58	56.3	2708.4
8.68	56.6	2708.5
8.78	56.9	2708.6
8.88	57.3	2708.7
8.98	57.6	2708.8
9.08	57.9	2708.9
9.18	58.2	2709
9.28	58.5	2709.1
9.38	58.9	2709.2
9.48	59.2	2709.3
9.58	59.5	2709.4
9.68	59.8	2709.5
9.78	60.1	2709.6
9.88	60.4	2709.7
9.98	60.7	2709.8
10.08	61.0	2709.9
10.18	61.3	2710
10.28	61.6	2710.1
10.38	61.9	2710.2
10.48	62.2	2710.3
10.58	62.5	2710.4
10.68	62.8	2710.5
10.78	63.1	2710.6
10.88	63.4	2710.7
10.98	63.7	2710.8
11.08	64.0	2710.9
11.18	64.3	2711
11.28	64.6	2711.1
11.38	64.8	2711.2
11.48	65.1	2711.3
11.58	65.4	2711.4
11.68	65.7	2711.5
11.78	66.0	2711.6
11.88	66.2	2711.7


OUTLET STAGE-DISCHARGE
Stage Elevation, E (ft)
2760
2750
2740
2730
2720
2710
2700
2690
100-yr WSE = 2736.08
Q =116 cfs
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
Flow, Q (cfs)

DROP INLET CALCULATIONS
(SECOND LEVEL OUTFALL INLET & RISER PIPE)

Grate Inlet Headwater Depth Calculation
48" RCP Riser Pipe

Known:

Q=	Flow (cfs)	116.0
W=	Width of Grate (ft)	0.00
L=	Length of Grate (ft)	0.00
D=	Diameter of Circle (in)	48.00
Cf=	Clogging Factor (%)	0

Weir Conditions:

$Hw=(Q/(Cw*P))2/3$

Cw=	Weir Coefficient	3.00
P=	Perimeter of grate (ft)	12.6
Pc=	Perimeter (w/clogging) (ft)	12.6
Hw=	Headwater depth (ft)	2.12

Orifice Conditions:

$Hw=(Q/(Co*Ac))^2/2*g$

Co=	Orifice Coefficient	1.00
Ag=	Grate Area (ft2)	12.57
Gf=	Grate Opening Factor	1.00
Ac=	Grate Open Area (w/ clogging) (ft2)	12.57
Hw=	Headwater depth (ft)	1.32

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth = **2.12** ft with Circ Grate

Grated Inlet Sizing
6' X 6' Grate Inlet

Known:

Q=	Flow (cfs)	116.0
Hw=	Available Headwater Depth (ft)	6.08
Cf=	Clogging factor (%)	50

Weir Conditions:

$P=Q/(Hw3/2*Cw)$

Cw=	Weir Coefficient	3.00
P=	Perimeter of grate (ft)	2.58
Pc=	Perimeter (w/clogging) (ft)	5.16
Ar=	Area Rectangular grate (ft2)	1.66
Ac=	Area of Circular Grate (ft2)	2.12

Orifice Conditions:

$Ag=Q/(Co*(Hw*2g)1/2)$

Co=	Orifice Coefficient	0.65
Ag=	Grate Area (ft2)	9.02
Gf=	Grate Opening Factor	0.67
Ac=	Area Req (w/clogging) (ft2)	26.92

Worst Case Scenario Occurs Under Orifice Conditions

Calculated Square Grate Size L= **5.19** ft
W= **5.19** ft

Worst Case Scenario Occurs Under Orifice Conditions

Calculated Circular Size D= 70.3 in

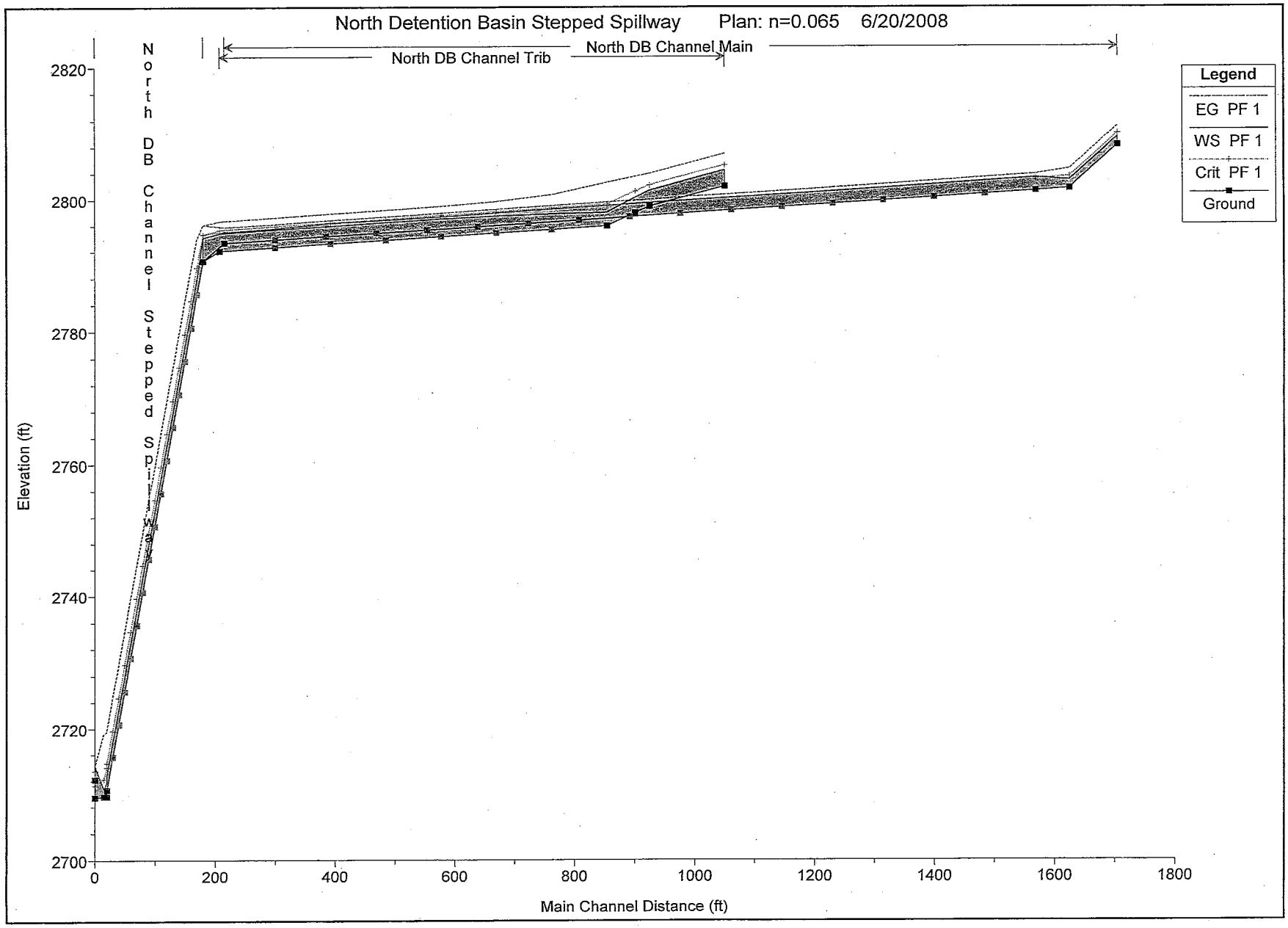
The above calculations show the minimum required grate area is 26.92 ft^2. Therefore, a 6-ft x 6-ft grate inlet with area of 36 ft^2 is sufficient. The above calculations show both the 48-inch riser pipe and the 6-ft x 6-ft grate inlet are more than sufficient of passing the peak outfall discharge flow of 116 cfs at the peak stage elevation 2736.08 (at 6-ft headwater or less). Therefore, the flow entering the grate will be able to fill the riser pipe because it is equal to or greater than the peak second stage orifice (26" plate opening) outflow.

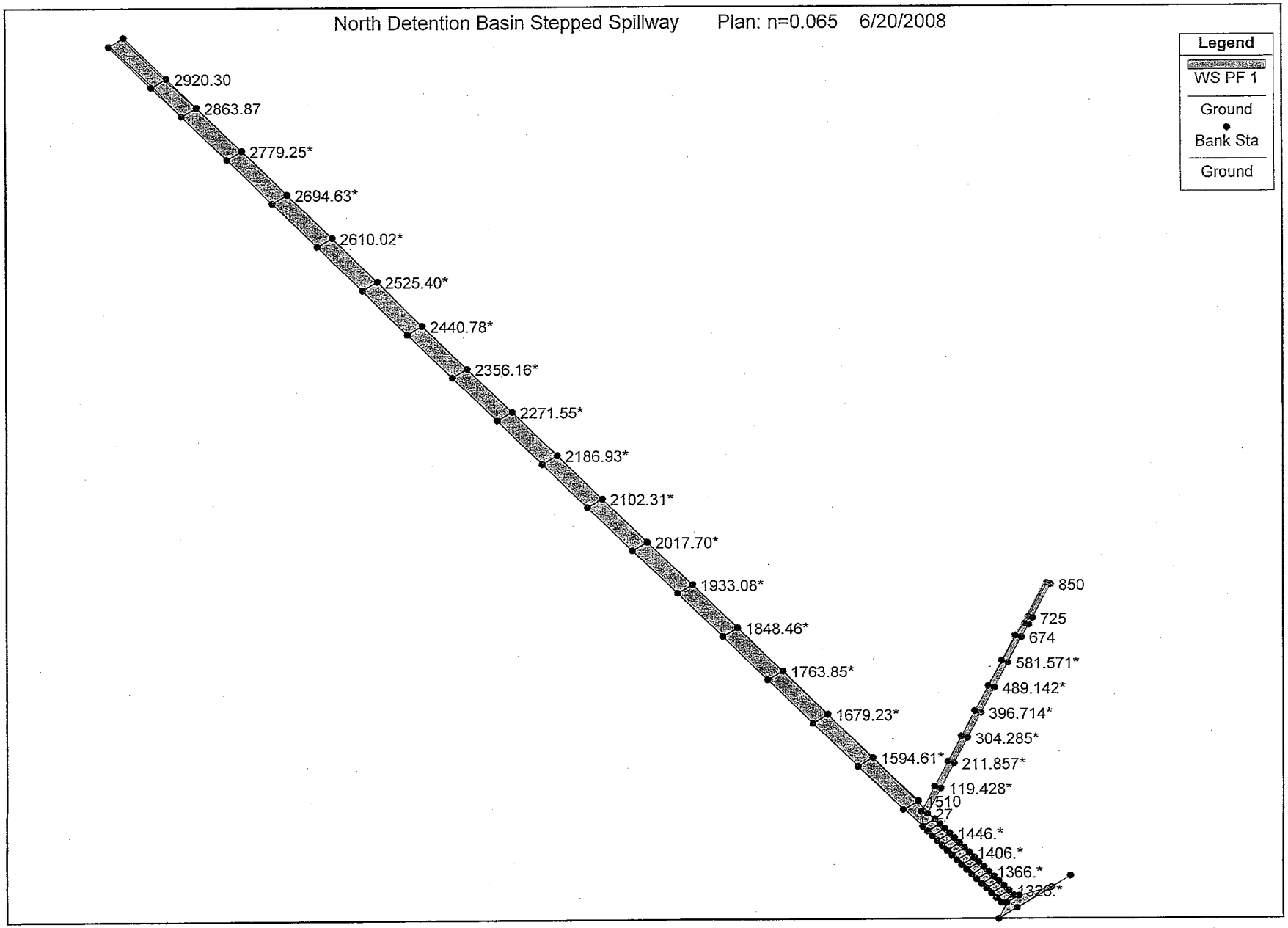
HEC-RAS MODELS

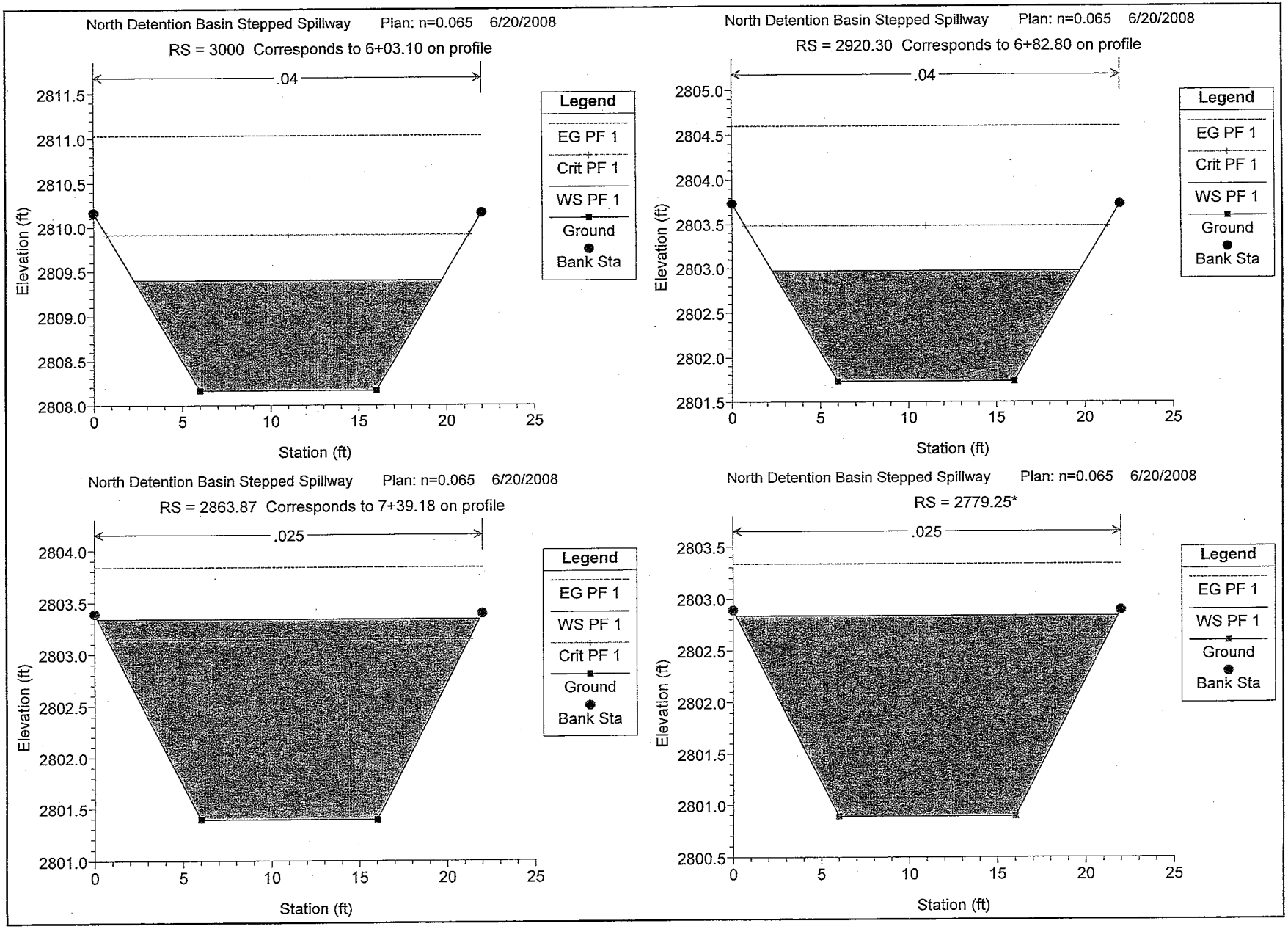
NORTH DETENTION BASIN INFLOW CHANNELS AND STEPPED SPILLWAY

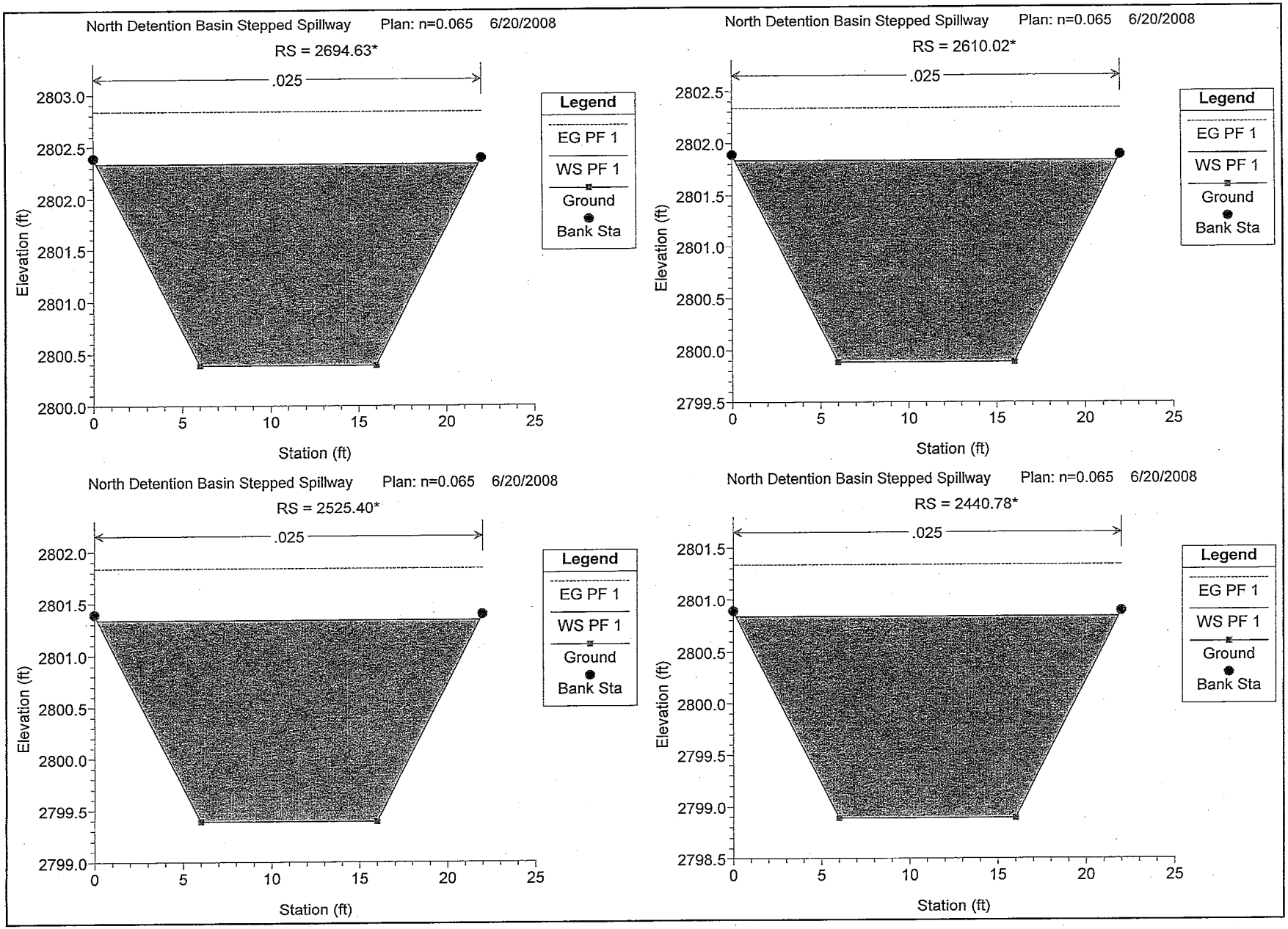
HEC-RAS Plan: n=0.065 Profile: PF 1

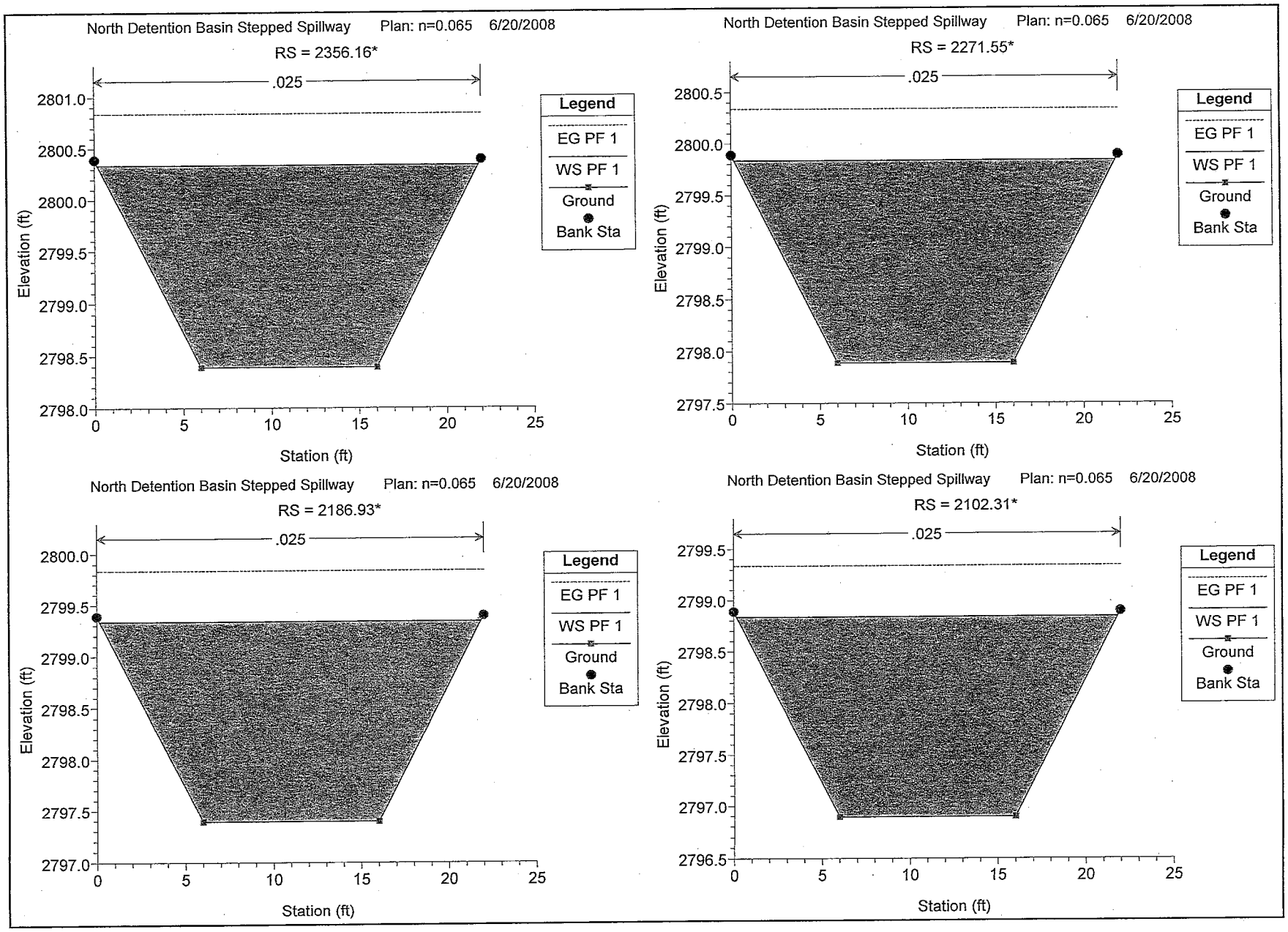
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	3000	PF 1	175.00	2808.16	2809.40	2809.91	2811.03	0.080654	10.24	17.09	17.47	1.82
Main	2920.30	PF 1	175.00	2801.73	2802.98	2803.49	2804.60	0.080597	10.24	17.09	17.47	1.82
Main	2863.87	PF 1	175.00	2801.39	2803.34	2803.14	2803.84	0.005910	5.67	30.86	21.69	0.84
Main	2779.25*	PF 1	175.00	2800.89	2802.84		2803.34	0.005910	5.67	30.86	21.69	0.84
Main	2694.63*	PF 1	175.00	2800.39	2802.34		2802.84	0.005910	5.67	30.86	21.69	0.84
Main	2610.02*	PF 1	175.00	2799.89	2801.84		2802.34	0.005910	5.67	30.86	21.69	0.84
Main	2525.40*	PF 1	175.00	2799.39	2801.34		2801.84	0.005910	5.67	30.86	21.69	0.84
Main	2440.78*	PF 1	175.00	2798.89	2800.84		2801.34	0.005910	5.67	30.86	21.69	0.84
Main	2356.16*	PF 1	175.00	2798.39	2800.34		2800.84	0.005910	5.67	30.86	21.69	0.84
Main	2271.55*	PF 1	175.00	2797.89	2799.84		2800.34	0.005910	5.67	30.86	21.69	0.84
Main	2186.93*	PF 1	175.00	2797.39	2799.34		2799.84	0.005910	5.67	30.86	21.69	0.84
Main	2102.31*	PF 1	175.00	2796.89	2798.84		2799.34	0.005910	5.67	30.86	21.69	0.84
Main	2017.70*	PF 1	175.00	2796.39	2798.34		2798.84	0.005910	5.67	30.86	21.69	0.84
Main	1933.08*	PF 1	175.00	2795.89	2797.84		2798.34	0.005910	5.67	30.86	21.69	0.84
Main	1848.46*	PF 1	175.00	2795.39	2797.34		2797.84	0.005907	5.67	30.86	21.69	0.84
Main	1763.85*	PF 1	175.00	2794.89	2796.84		2797.34	0.005845	5.65	30.98	21.72	0.83
Main	1679.23*	PF 1	175.00	2794.39	2796.43	2796.15	2796.87	0.004856	5.31	32.98	22.00	0.76
Main	1594.61*	PF 1	175.00	2793.89	2795.64	2795.64	2796.31	0.008811	6.54	26.76	20.52	1.01
Main	1510	PF 1	175.00	2793.39	2795.04	2795.15	2795.82	0.003961	7.08	24.73	19.92	1.12
Trib	850	PF 1	323.00	2802.00	2804.45	2805.21	2806.92	0.024022	13.22	27.51	15.91	1.67
Trib	725	PF 1	323.00	2799.00	2801.46	2802.21	2803.92	0.023993	13.22	27.53	15.91	1.67
Trib	700.95	PF 1	323.00	2798.00	2800.36	2801.29	2803.47	0.011252	14.65	25.97	15.71	1.90
Trib	674	PF 1	323.00	2796.00	2798.07	2799.30	2802.62	0.020576	17.14	18.85	13.26	2.53
Trib	581.571*	PF 1	323.00	2795.45	2797.86	2798.76	2800.76	0.011116	13.68	23.62	14.63	1.90
Trib	489.142*	PF 1	323.00	2794.89	2797.55	2798.19	2799.70	0.007385	11.77	27.45	15.64	1.56
Trib	396.714*	PF 1	323.00	2794.34	2797.12	2797.64	2799.00	0.006150	11.00	29.37	16.12	1.44
Trib	304.285*	PF 1	323.00	2793.78	2796.56	2797.08	2798.44	0.006150	11.00	29.37	16.12	1.44
Trib	211.857*	PF 1	323.00	2793.23	2796.02	2796.53	2797.88	0.006055	10.93	29.54	16.17	1.43
Trib	119.428*	PF 1	323.00	2792.67	2795.46	2795.97	2797.32	0.006055	10.93	29.54	16.17	1.43
Trib	27	PF 1	323.00	2792.12	2794.91	2795.42	2796.77	0.006055	10.93	29.54	16.17	1.43
Stepped Spillway	1476	PF 1	498.00	2790.64	2794.19	2794.69	2796.19	0.099136	11.35	43.88	18.19	1.29
Stepped Spillway	1466.*	PF 1	498.00	2785.64	2788.02	2789.69	2793.99	0.428733	19.60	25.41	13.54	2.52
Stepped Spillway	1456.*	PF 1	498.00	2780.64	2782.95	2784.68	2789.42	0.477649	20.41	24.40	13.24	2.65
Stepped Spillway	1446.*	PF 1	498.00	2775.64	2777.93	2779.68	2784.55	0.492971	20.65	24.11	13.15	2.69
Stepped Spillway	1436.*	PF 1	498.00	2770.64	2772.92	2774.68	2779.59	0.497732	20.73	24.03	13.12	2.70
Stepped Spillway	1426.*	PF 1	498.00	2765.64	2767.92	2769.68	2774.60	0.498974	20.75	24.00	13.12	2.70
Stepped Spillway	1416.*	PF 1	498.00	2760.64	2762.92	2764.68	2769.61	0.499686	20.76	23.99	13.11	2.70
Stepped Spillway	1406.*	PF 1	498.00	2755.64	2757.92	2759.68	2764.61	0.500043	20.76	23.99	13.11	2.71
Stepped Spillway	1396.*	PF 1	498.00	2750.64	2752.92	2754.68	2759.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1386.*	PF 1	498.00	2745.64	2747.92	2749.68	2754.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1376.*	PF 1	498.00	2740.64	2742.92	2744.68	2749.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1366.*	PF 1	498.00	2735.64	2737.92	2739.68	2744.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1356.*	PF 1	498.00	2730.64	2732.92	2734.68	2739.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1346.*	PF 1	498.00	2725.64	2727.92	2729.68	2734.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1336.*	PF 1	498.00	2720.64	2722.92	2724.68	2729.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1326.*	PF 1	498.00	2715.64	2717.92	2719.68	2724.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1316	PF 1	498.00	2710.64	2712.92	2714.68	2719.62	0.500578	20.77	23.98	13.11	2.71
Stepped Spillway	1315.9	PF 1	498.00	2709.64	2711.89	2714.04	2719.52	0.027939	22.17	22.46	10.00	2.61
Stepped Spillway	1310	PF 1	498.00	2709.61	2710.71	2712.31	2719.25	0.059000	23.46	21.23	20.00	4.01
Stepped Spillway	1300	PF 1	498.00	2709.45	2714.27	2711.31	2714.31	0.000047	1.57	316.82	86.00	0.14
Stepped Spillway	1299.9	PF 1	498.00	2712.24	2713.51	2713.51	2714.02	0.024253	5.73	86.86	86.00	1.01

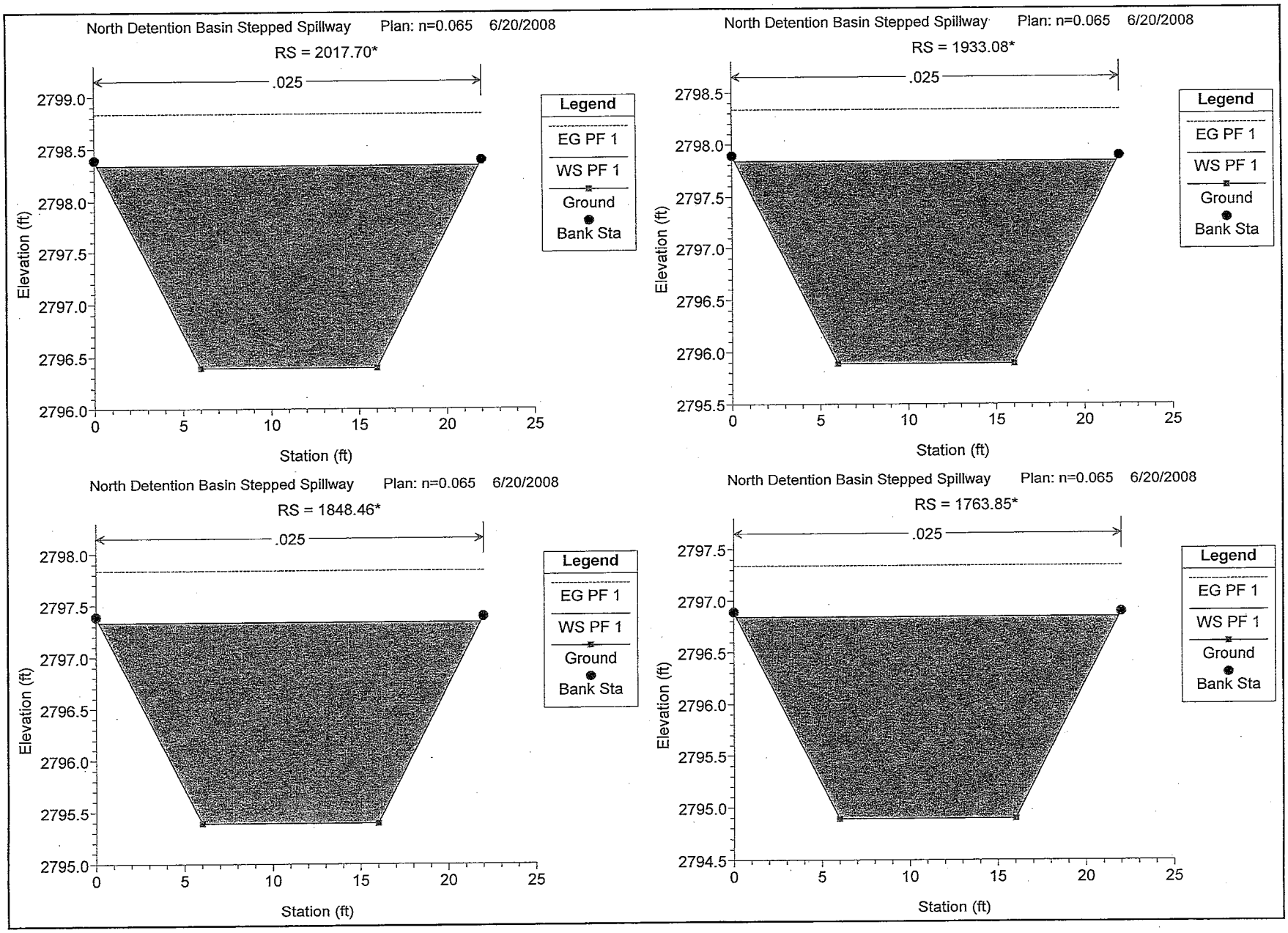

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
North DB Channel Trib
North DB Channel Main
North DB Channel Stepped Spillway
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2820
2800
2780
2760
2740
2720
2700
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)

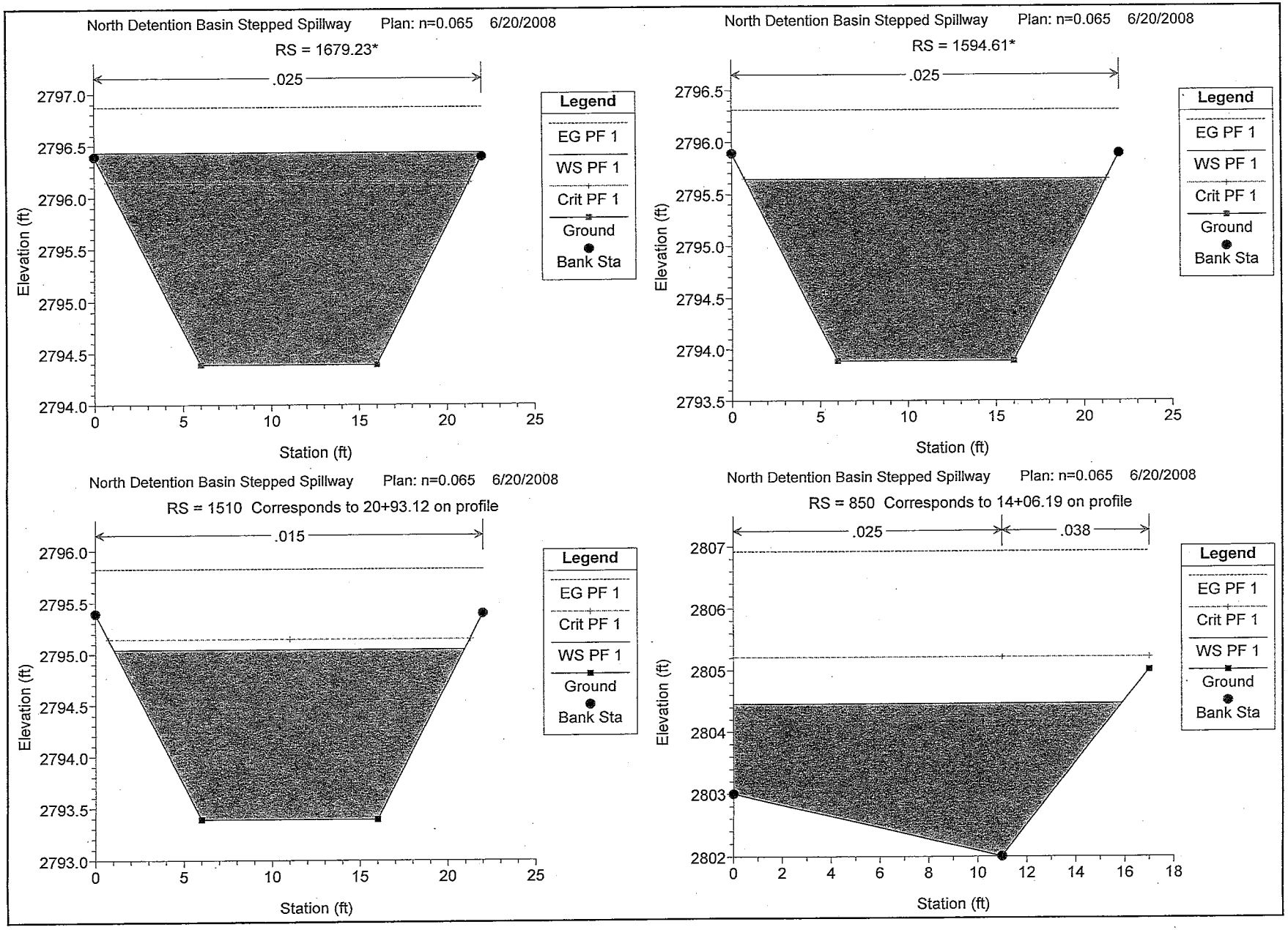

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
Legend
WS PF 1
Ground
Bank Sta
Ground
2920.30
2863.87
2779.25*
2694.63*
2610.02*
2525.40*
2440.78*
2356.16*
2271.55*
2186.93*
2102.31*
2017.70*
1933.08*
1848.46*
1763.85*
1679.23*
1594.61*
850
725
674
581.571*
489.142*
396.714*
304.285*
211.857*
119.428*
510
27
1446.*
1406.*
1366.*
1326.*

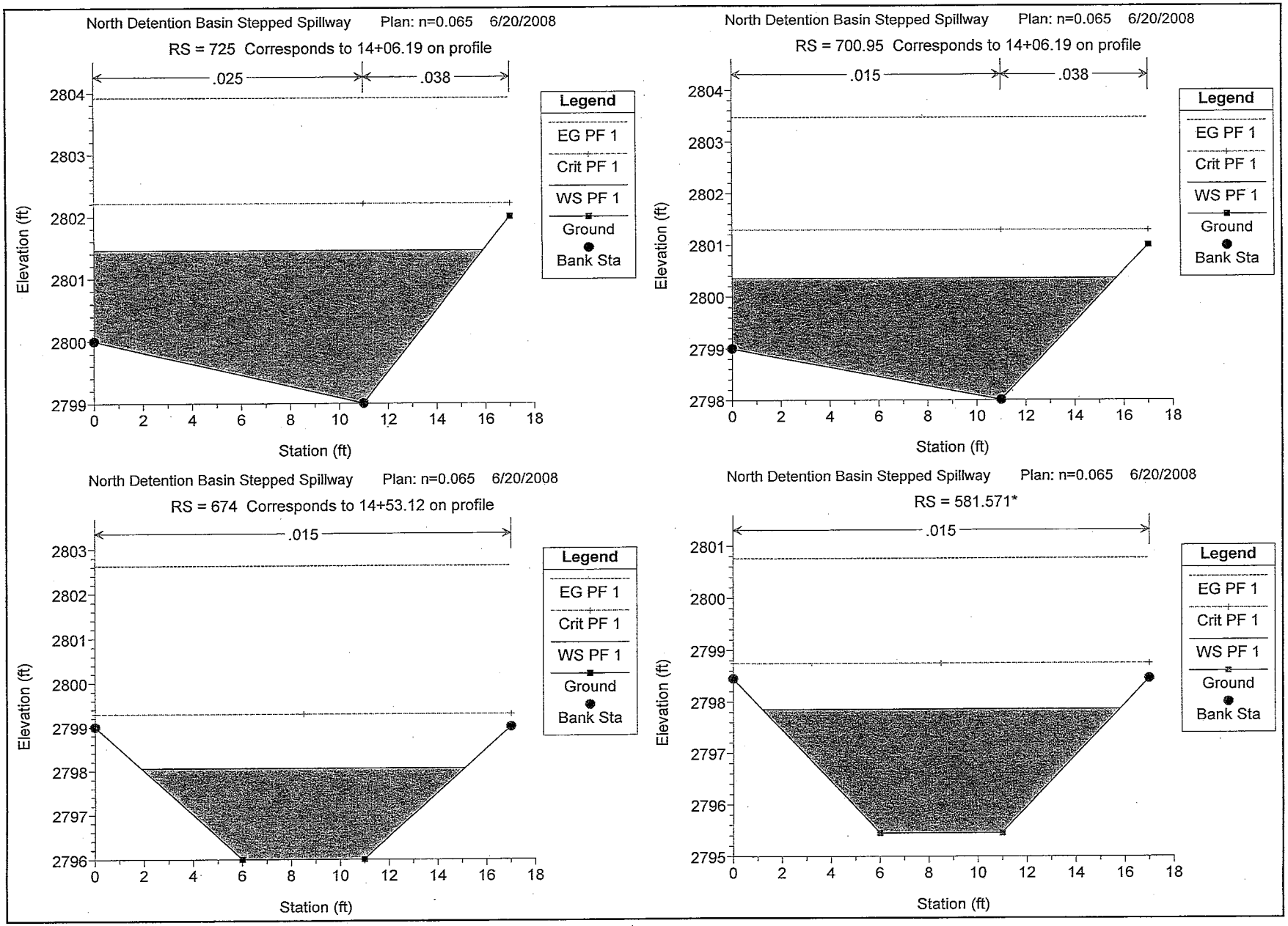

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 3000 Corresponds to 6+03.10 on profile
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2920.30 Corresponds to 6+82.80 on profile
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2863.87 Corresponds to 7+39.18 on profile
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2779.25*
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

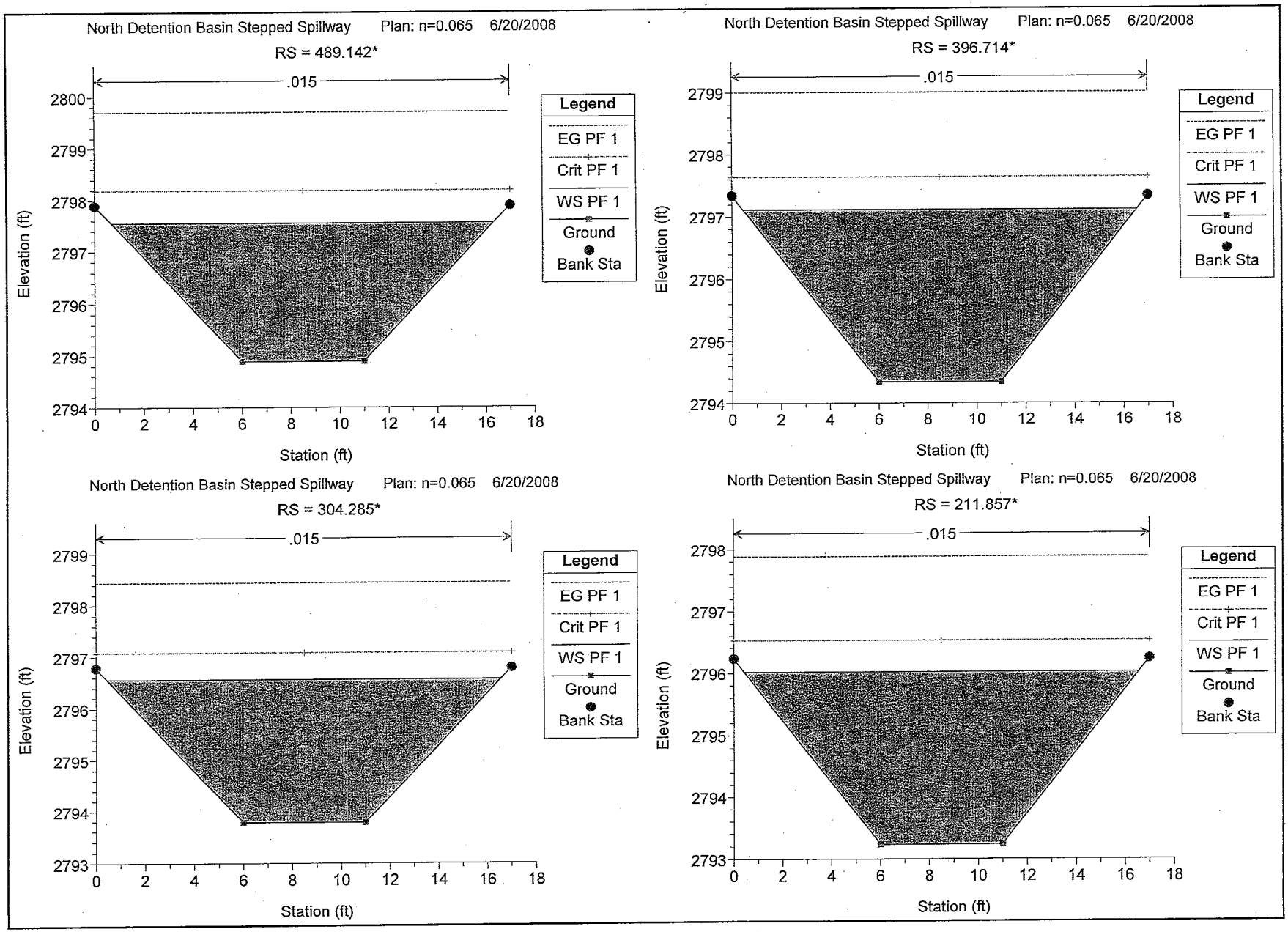

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2694.63*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2610.02*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2525.40*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2440.78*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

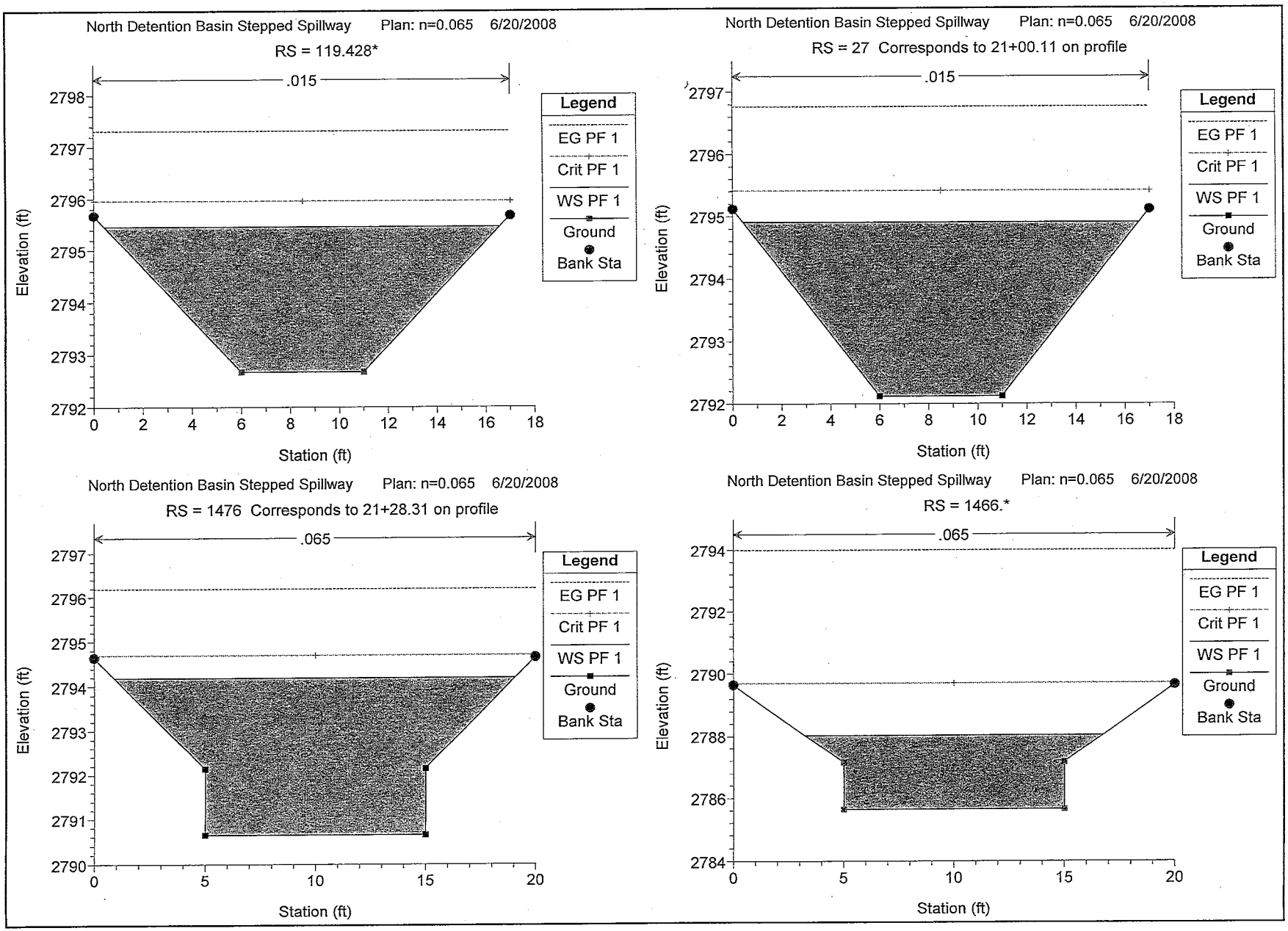

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2356.16*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2271.55*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2186.93*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2102.31*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

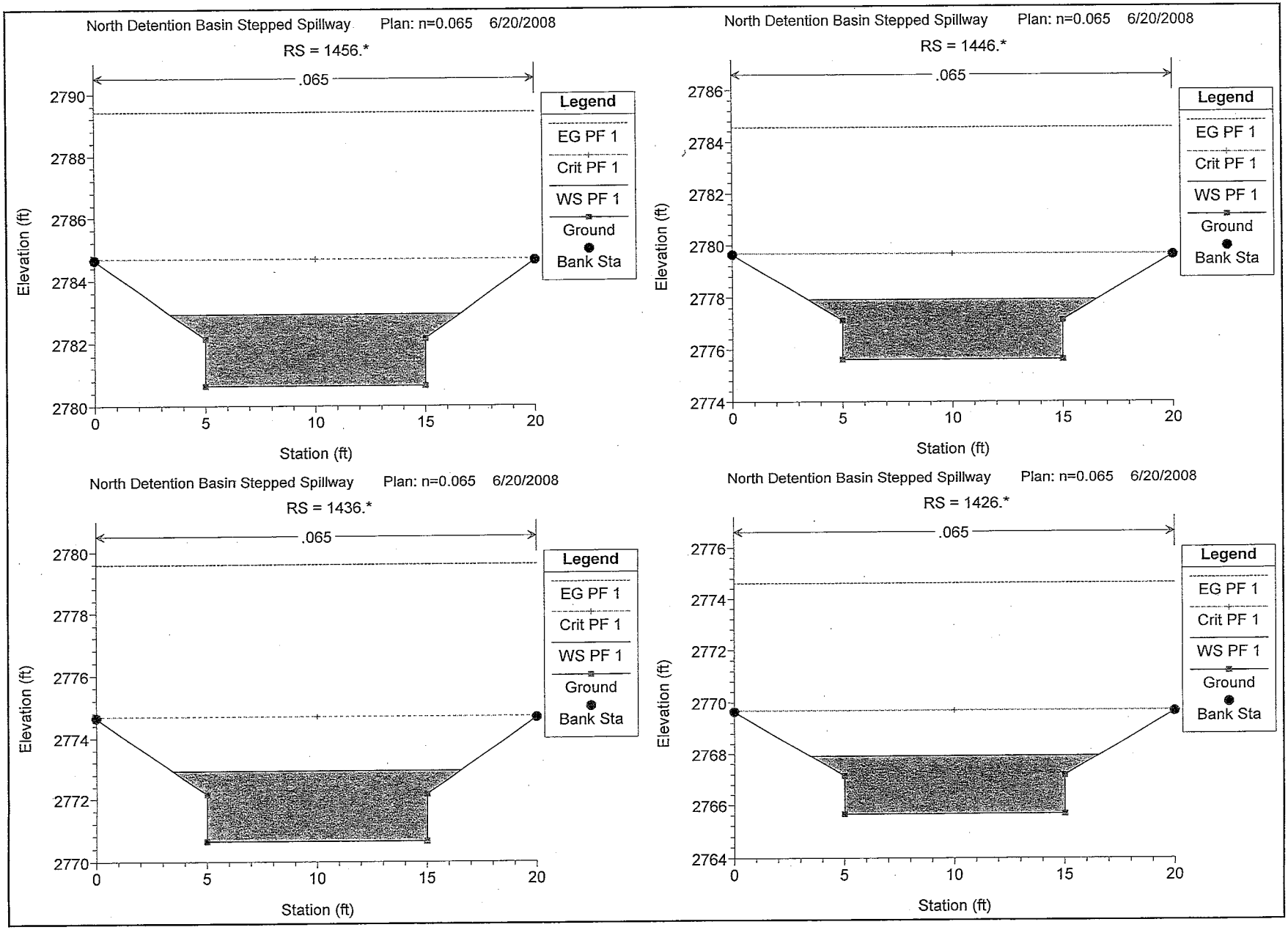

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 2017.70*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1933.08*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1848.46*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1763.85*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

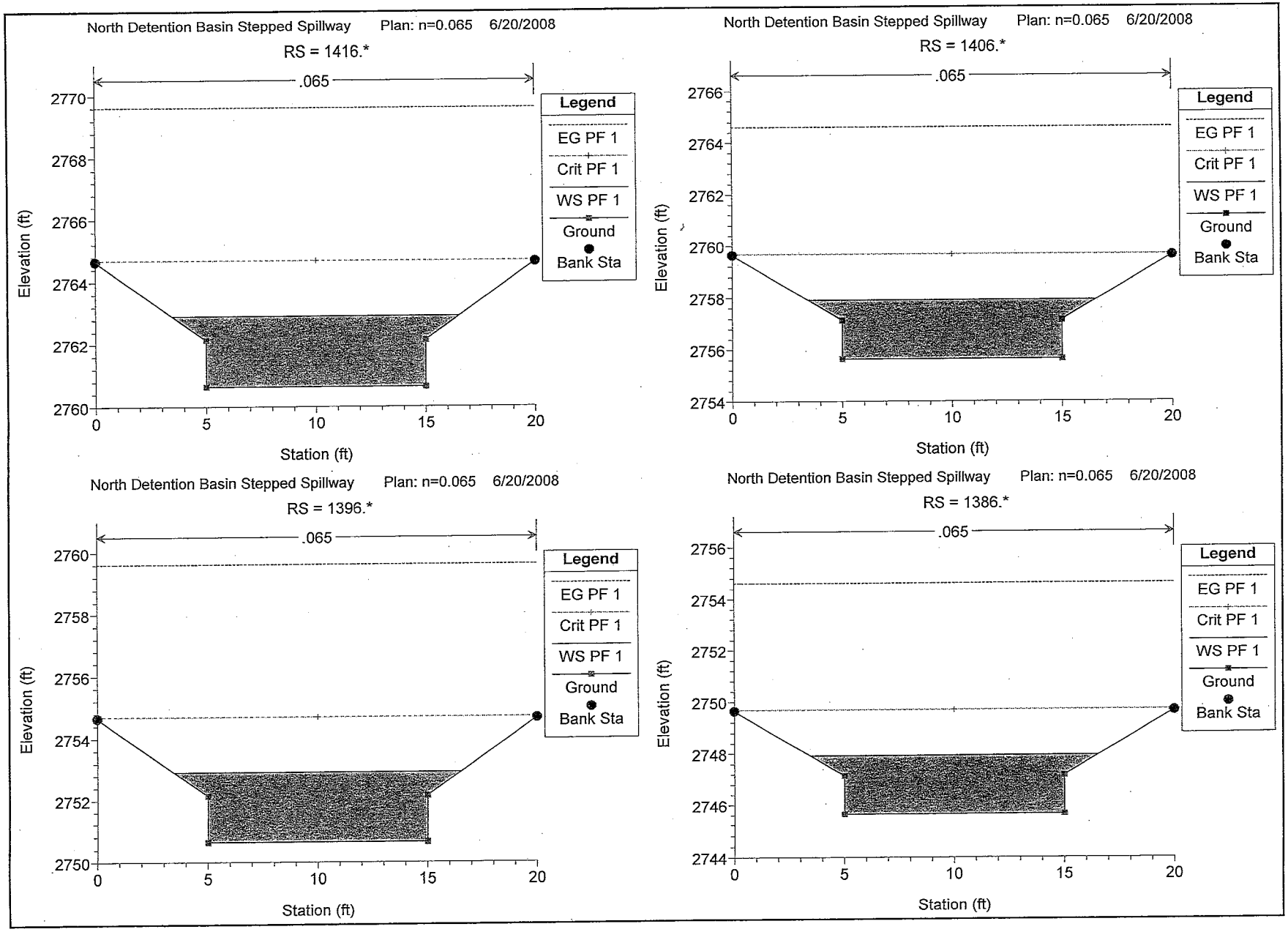

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1679.23*
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1594.61*
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1510 Corresponds to 20+93.12 on profile
.015
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 850 Corresponds to 14+06.19 on profile
.025
.038
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

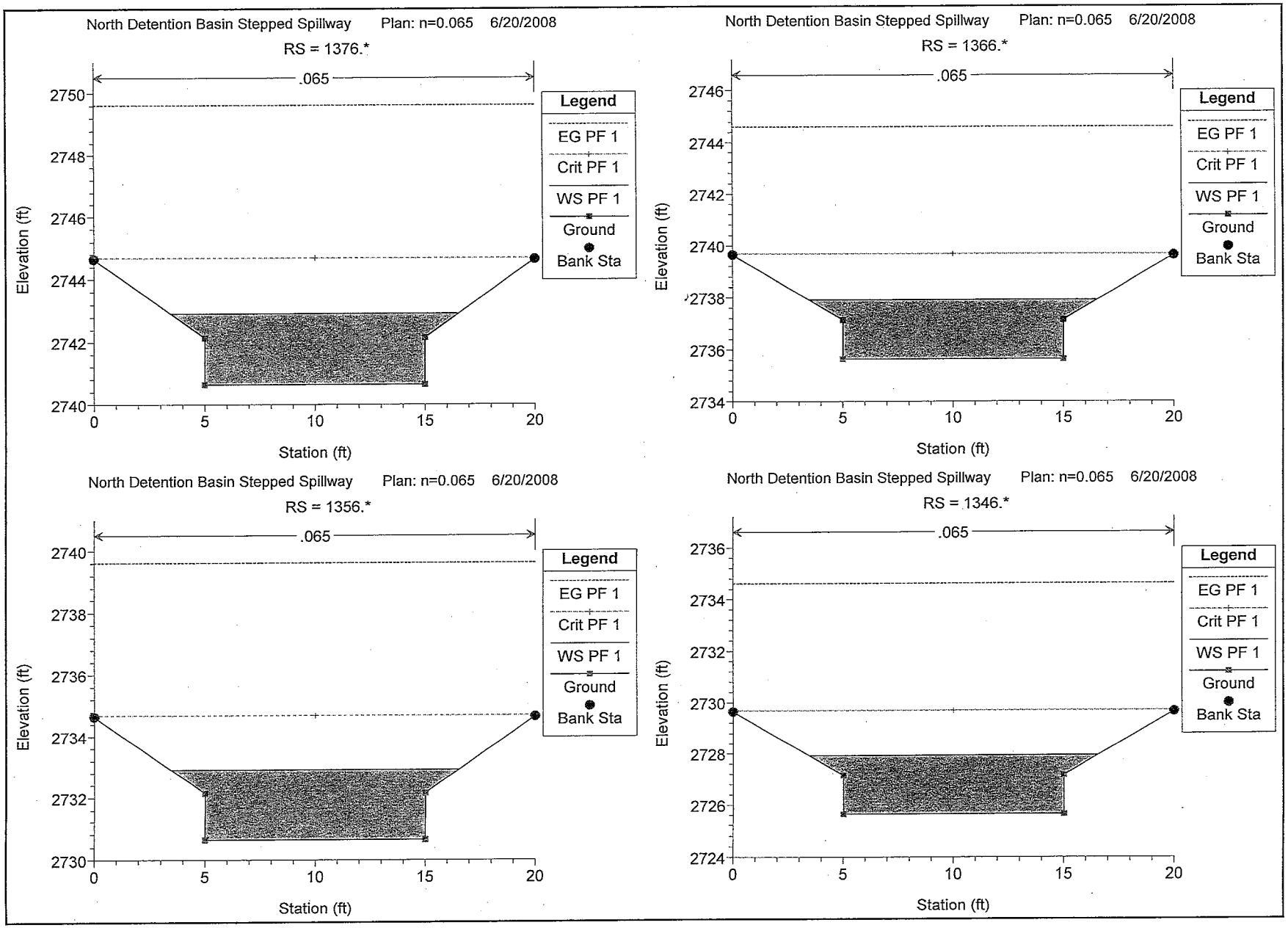

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 725 Corresponds to 14+06.19 on profile
.025
.038
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 700.95 Corresponds to 14+06.19 on profile
.015
.038
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 674 Corresponds to 14+53.12 on profile
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 581.571*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

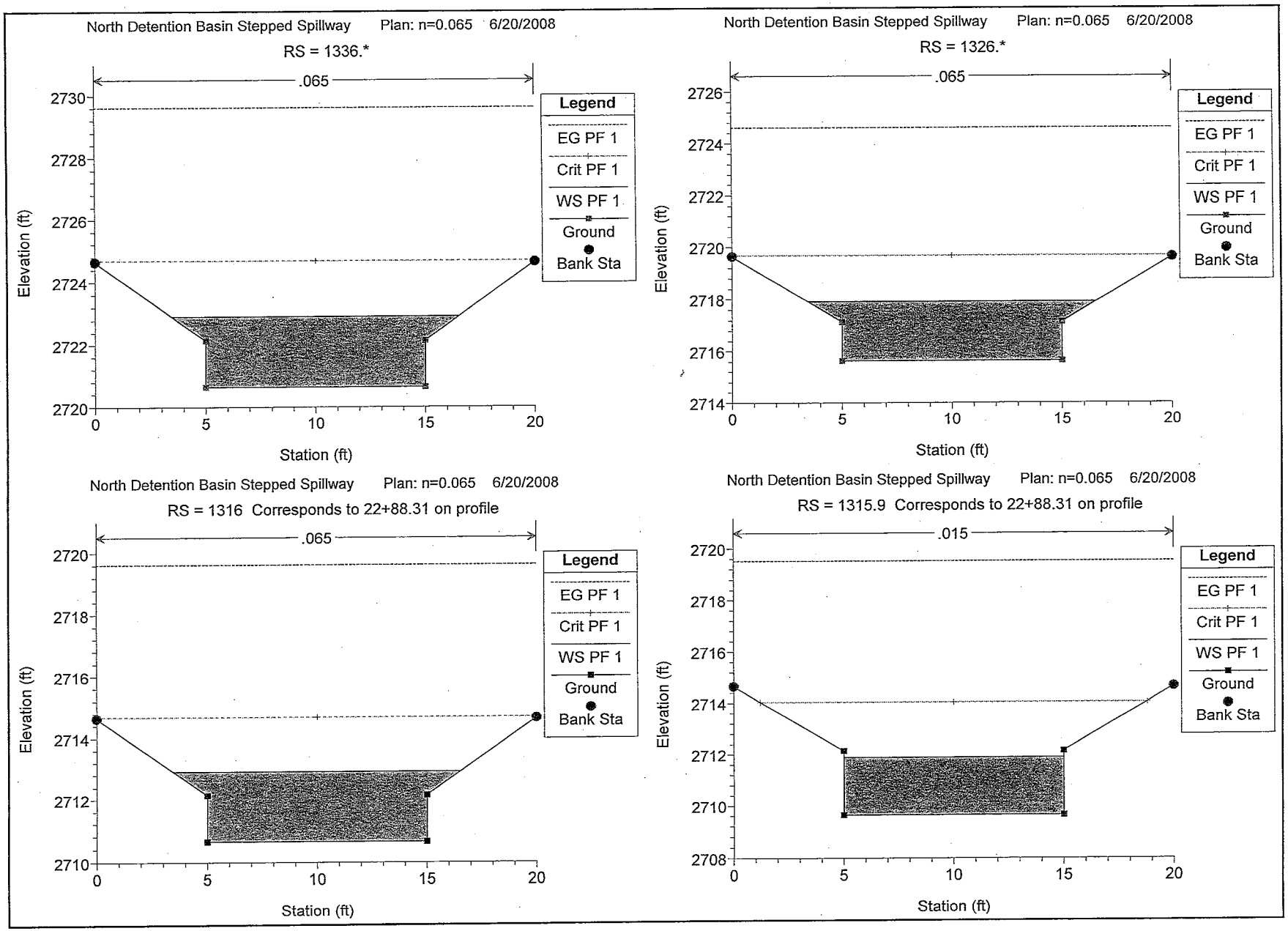

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 489.142*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 396.714*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 304.285*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 211.857*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

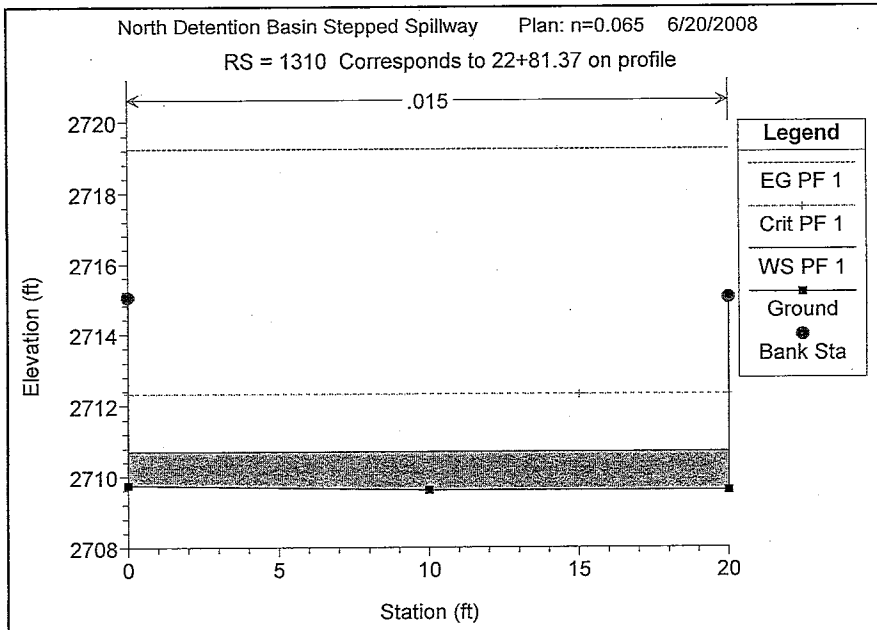

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 119.428*
.015
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 27 Corresponds to 21+00.11 on profile
.015
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1476 Corresponds to 21+28.31 on profile
.065
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1466.*
.065
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

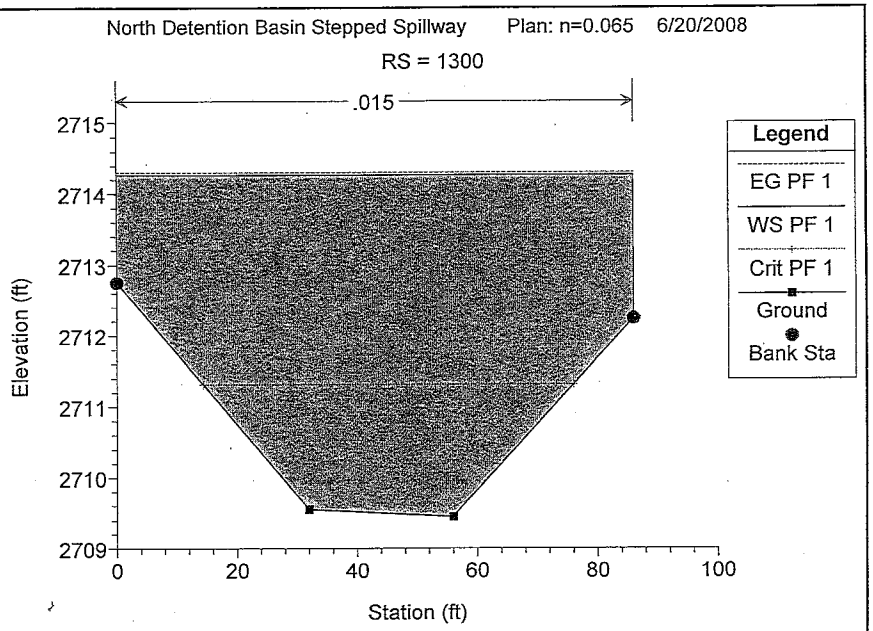

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1456.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2790
2788
2786
2784
2782
2780
0
5
10
15
20
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1446.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2786
2784
2782
2780
2778
2776
2774
0
5
10
15
20
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1436.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2780
2778
2776
2774
2772
2770
0
5
10
15
20
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1426.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2776
2774
2772
2770
2768
2766
2764
0
5
10
15
20

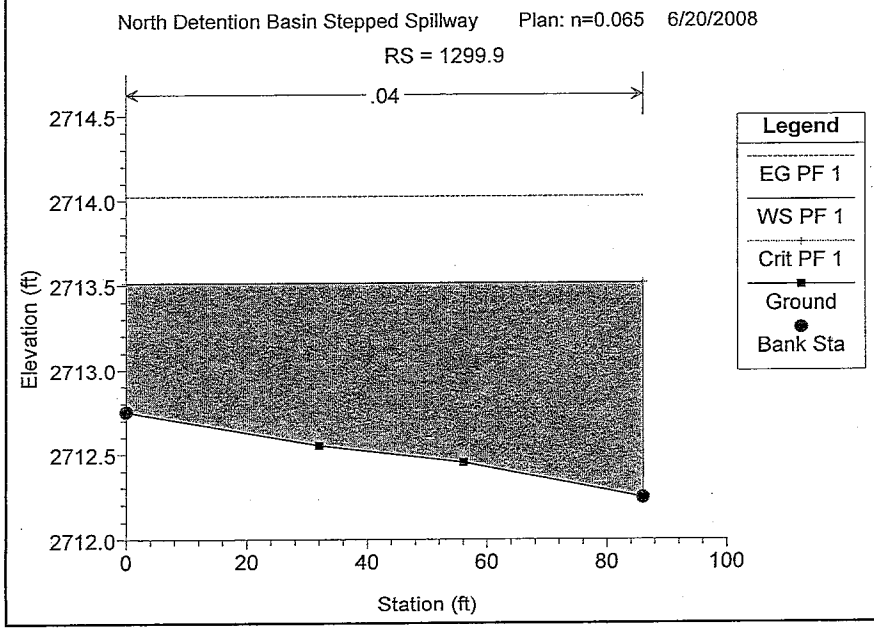

North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1416.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1406.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1396.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1386.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1376.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1366.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1356.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1346.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1336.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1326.*
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1316 Corresponds to 22+88.31 on profile
.065
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1315.9 Corresponds to 22+88.31 on profile
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1310 Corresponds to 22+81.37 on profile
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2720
2718
2716
2714
2712
2710
2708
0
5
10
15
20


North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1300
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2715
2714
2713
2712
2711
2710
2709
0
20
40
60
80
100


North Detention Basin Stepped Spillway Plan: n=0.065 6/20/2008
RS = 1299.9
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2714.5
2714.0
2713.5
2713.0
2712.5
2712.0
0
20
40
60
80
100

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: North Detention Basin Stepped Spillway
Project File : NDB2.prj
Run Date and Time: 6/20/2008 12:11:54 PM

Project in English units

PLAN DATA

Plan Title: n=0.065
Plan File : f:\451-002-001\Calc\Hydro\HECRAS\NDB2.p03

Geometry Title: Extended Concrete Pads
Geometry File : f:\451-002-001\Calc\Hydro\HECRAS\NDB2.g02

Flow Title : Trial1
Flow File : f:\451-002-001\Calc\Hydro\HECRAS\NDB2.f01

Plan Summary Information:
Number of: Cross Sections = 51 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

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

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

FLOW DATA

Flow Title: Trial1
Flow File : f:\451-002-001\Calc\Hydro\HECRAS\NDB2.f01

Flow Data (cfs)

River	Reach	RS	PF 1
North DB Channel	Main	3000	175
North DB Channel	Trib	850	323
North DB Channel	Stepped Spillway	1476	498

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
North DB Channel	Main	PF 1	Normal S = 0.0806	
North DB Channel	Trib	PF 1	Normal S = 0.024	
North DB Channel	Stepped Spillway	PF 1		Normal S = 0.5

GEOMETRY DATA

Geometry Title: Extended Concrete Pads
Geometry File : f:\451-002-001\Calc\Hydro\HECRAS\NDB2.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
North DB Channel	Main		NDB Junction
North DB Channel	Trib		NDB Junction
North DB Channel	Stepped Spillway	NDB Junction	

JUNCTION INFORMATION

Name: NDB Junction
Description:
Energy computation Method

Length across Junction		Tributary			
River	Reach	River	Reach	Length	Angle
North DB Channel	Main	to North DB Channel	Stepped Spillway	35.5	
North DB Channel	Trib	to North DB Channel	Stepped Spillway	27.6	

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 3000

INPUT
Description: Corresponds to 6+03.10 on profile
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2810.16	6	2808.16	16	2808.16	22	2810.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	22	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	79.7	79.7	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2920.30

INPUT
Description: Corresponds to 6+82.80 on profile
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2803.73	6	2801.73	16	2801.73	22	2803.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	22	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	56.38	56.38	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2863.87

INPUT
Description: Corresponds to 7+39.18 on profile
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2803.39	6	2801.39	16	2801.39	22	2803.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2779.25*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2802.89	6	2800.89	16	2800.89	22	2802.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2694.63*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2802.39	6	2800.39	16	2800.39	22	2802.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2610.02*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2801.89	6	2799.89	16	2799.89	22	2801.89

```
Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2525.40*

INPUT
Description:
Station Elevation Data    num=        4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2801.39         6 2799.39        16 2799.39        22 2801.39

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2440.78*

INPUT
Description:
Station Elevation Data    num=        4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2800.89         6 2798.89        16 2798.89        22 2800.89

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2356.16*

INPUT
Description:
Station Elevation Data    num=        4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2800.39         6 2798.39        16 2798.39        22 2800.39

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2271.55*

INPUT
Description:
Station Elevation Data    num=        4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2799.89         6 2797.89        16 2797.89        22 2799.89

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2186.93*

INPUT
Description:
Station Elevation Data    num=        4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2799.39         6 2797.39        16 2797.39        22 2799.39

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .025        0    .025       22    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      22             84.61   84.61   84.61             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Main               RS: 2102.31*
```

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2798.89	6	2796.89	16	2796.89	22	2798.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 2017.70*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2798.39	6	2796.39	16	2796.39	22	2798.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1933.08*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2797.89	6	2795.89	16	2795.89	22	2797.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1848.46*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2797.39	6	2795.39	16	2795.39	22	2797.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1763.85*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2796.89	6	2794.89	16	2794.89	22	2796.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1679.23*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2796.39	6	2794.39	16	2794.39	22	2796.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1594.61*

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2795.89	6	2793.89	16	2793.89	22	2795.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	84.61	84.61	84.61	.1 .3

CROSS SECTION

RIVER: North DB Channel
REACH: Main RS: 1510

INPUT
Description: Corresponds to 20+93.12 on profile
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2795.39	6	2793.39	16	2793.39	22	2795.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	22	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	22	35.19	35.19	35.19	.1 .3

CROSS SECTION

RIVER: North DB Channel
REACH: Trib RS: 850

INPUT
Description: Corresponds to 14+06.19 on profile
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2803	11	2802	17	2805

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	11	.038

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	11	125	125	125	.1 .3

CROSS SECTION

RIVER: North DB Channel
REACH: Trib RS: 725

INPUT
Description: Corresponds to 14+06.19 on profile
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2800	11	2799	17	2802

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	11	.038

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	11	24.05	24.05	24.05	.1 .3

CROSS SECTION

RIVER: North DB Channel
REACH: Trib RS: 700.95

INPUT
Description: Corresponds to 14+06.19 on profile
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2799	11	2798	17	2801

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.015	11	.038

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	11	46.95	46.95	46.95	.1 .3

CROSS SECTION

RIVER: North DB Channel
REACH: Trib RS: 674

INPUT
Description: Corresponds to 14+53.12 on profile
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2799	6	2796	11	2796	17	2799

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 581.571*

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2798.45         6 2795.45        11 2795.45        17 2798.45

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 489.142*

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2797.89         6 2794.89        11 2794.89        17 2797.89

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 396.714*

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2797.34         6 2794.34        11 2794.34        17 2797.34

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 304.285*

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2796.78         6 2793.78        11 2793.78        17 2796.78

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 211.857*

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2796.23         6 2793.23        11 2793.23        17 2796.23

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       0    .015      17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 119.428*

INPUT
```

```
Description:
Station Elevation Data    num=       4
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2795.67         6 2792.67        11 2792.67        17 2795.67

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .015        0    .015       17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             92.43   92.43   92.43             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Trib               RS: 27

INPUT
Description: Corresponds to 21+00.11 on profile
Station Elevation Data    num=       4
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2795.12         6 2792.12        11 2792.12        17 2795.12

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .015        0    .015       17    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      17             28.2    28.2    28.2             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1476

INPUT
Description: Corresponds to 21+28.31 on profile
Station Elevation Data    num=       6
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2794.64         5 2792.14         5 2790.64        15 2790.64        15 2792.14
       20 2794.64

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .065        0    .065       20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20             10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1466.*

INPUT
Description:
Station Elevation Data    num=       6
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2789.64         5 2787.14         5 2785.64        15 2785.64        15 2787.14
       20 2789.64

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .065        0    .065       20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20             10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1456.*

INPUT
Description:
Station Elevation Data    num=       6
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2784.64         5 2782.14         5 2780.64        15 2780.64        15 2782.14
       20 2784.64

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .065        0    .065       20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20             10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1446.*

INPUT
Description:
Station Elevation Data    num=       6
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2779.64         5 2777.14         5 2775.64        15 2775.64        15 2777.14
       20 2779.64

Manning's n Values        num=       3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .065        0    .065       20    .065
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1436.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2774.64       5 2772.14       5 2770.64      15 2770.64      15 2772.14
      20 2774.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1426.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2769.64       5 2767.14       5 2765.64      15 2765.64      15 2767.14
      20 2769.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1416.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2764.64       5 2762.14       5 2760.64      15 2760.64      15 2762.14
      20 2764.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1406.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2759.64       5 2757.14       5 2755.64      15 2755.64      15 2757.14
      20 2759.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1396.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2754.64       5 2752.14       5 2750.64      15 2750.64      15 2752.14
      20 2754.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20               10      10      10             .1      .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1386.*
```

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2749.64	5	2747.14	5	2745.64	15	2745.64	15	2747.14
20	2749.64								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.065	0	.065	20	.065

Bank Sta: Left	Right	Lengths: Left Channel	Channel	Right	Coeff Contr.	Expan.
0	20	10	10	10	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1376.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2744.64	5	2742.14	5	2740.64	15	2740.64	15	2742.14
20	2744.64								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.065	0	.065	20	.065

Bank Sta: Left	Right	Lengths: Left Channel	Channel	Right	Coeff Contr.	Expan.
0	20	10	10	10	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1366.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2739.64	5	2737.14	5	2735.64	15	2735.64	15	2737.14
20	2739.64								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.065	0	.065	20	.065

Bank Sta: Left	Right	Lengths: Left Channel	Channel	Right	Coeff Contr.	Expan.
0	20	10	10	10	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1356.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2734.64	5	2732.14	5	2730.64	15	2730.64	15	2732.14
20	2734.64								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.065	0	.065	20	.065

Bank Sta: Left	Right	Lengths: Left Channel	Channel	Right	Coeff Contr.	Expan.
0	20	10	10	10	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1346.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2729.64	5	2727.14	5	2725.64	15	2725.64	15	2727.14
20	2729.64								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.065	0	.065	20	.065

Bank Sta: Left	Right	Lengths: Left Channel	Channel	Right	Coeff Contr.	Expan.
0	20	10	10	10	.1	.3

CROSS SECTION

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1336.*

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2724.64	5	2722.14	5	2720.64	15	2720.64	15	2722.14
20	2724.64								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20              10      10      10             .1       .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1326.*

INPUT
Description:
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2719.64        5 2717.14        5 2715.64       15 2715.64       15 2717.14
      20 2719.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20              10      10      10             .1       .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1316

INPUT
Description: Corresponds to 22+88.31 on profile
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2714.64        5 2712.14        5 2710.64       15 2710.64       15 2712.14
      20 2714.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .065       0    .065      20    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20             .01     .01     .01             .1       .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1315.9

INPUT
Description: Corresponds to 22+88.31 on profile
Station Elevation Data    num=       6
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2714.64        5 2712.14        5 2709.64       15 2709.64       15 2712.14
      20 2714.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      20    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20            4.55    4.55    4.55             .1       .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1310

INPUT
Description: Corresponds to 22+81.37 on profile
Station Elevation Data    num=       5
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2715.03        0 2709.75       10 2709.61       20 2709.61       20 2715.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      20    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      20           35.34      15   37.16             .1       .3

CROSS SECTION


RIVER: North DB Channel
REACH: Stepped Spillway   RS: 1300

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2712.75       32 2709.55       56 2709.45       86 2712.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015       0    .015      86    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      86              .1      .1      .1             .6       .8

CROSS SECTION
```

RIVER: North DB Channel
REACH: Stepped Spillway RS: 1299.9

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2712.75	32	2712.55	56	2712.45	86	2712.24

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	86	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	86	0	0	0	.6	.8

SUMMARY OF MANNING'S N VALUES

River:North DB Channel

Reach	River Sta.	n1	n2	n3
Main	3000	.04	.04	.04
Main	2920.30	.04	.04	.04
Main	2863.87	.025	.025	.025
Main	2779.25*	.025	.025	.025
Main	2694.63*	.025	.025	.025
Main	2610.02*	.025	.025	.025
Main	2525.40*	.025	.025	.025
Main	2440.78*	.025	.025	.025
Main	2356.16*	.025	.025	.025
Main	2271.55*	.025	.025	.025
Main	2186.93*	.025	.025	.025
Main	2102.31*	.025	.025	.025
Main	2017.70*	.025	.025	.025
Main	1933.08*	.025	.025	.025
Main	1848.46*	.025	.025	.025
Main	1763.85*	.025	.025	.025
Main	1679.23*	.025	.025	.025
Main	1594.61*	.025	.025	.025
Main	1510	.015	.015	.015
Trib	850	.025	.025	.038
Trib	725	.025	.025	.038
Trib	700.95	.025	.015	.038
Trib	674	.015	.015	.015
Trib	581.571*	.015	.015	.015
Trib	489.142*	.015	.015	.015
Trib	396.714*	.015	.015	.015
Trib	304.285*	.015	.015	.015
Trib	211.857*	.015	.015	.015
Trib	119.428*	.015	.015	.015
Trib	27	.015	.015	.015
Stepped Spillway	1476	.065	.065	.065
Stepped Spillway	1466.*	.065	.065	.065
Stepped Spillway	1456.*	.065	.065	.065
Stepped Spillway	1446.*	.065	.065	.065
Stepped Spillway	1436.*	.065	.065	.065
Stepped Spillway	1426.*	.065	.065	.065
Stepped Spillway	1416.*	.065	.065	.065
Stepped Spillway	1406.*	.065	.065	.065
Stepped Spillway	1396.*	.065	.065	.065
Stepped Spillway	1386.*	.065	.065	.065
Stepped Spillway	1376.*	.065	.065	.065
Stepped Spillway	1366.*	.065	.065	.065
Stepped Spillway	1356.*	.065	.065	.065
Stepped Spillway	1346.*	.065	.065	.065
Stepped Spillway	1336.*	.065	.065	.065
Stepped Spillway	1326.*	.065	.065	.065
Stepped Spillway	1316	.065	.065	.065
Stepped Spillway	1315.9	.015	.015	.015
Stepped Spillway	1310	.015	.015	.015
Stepped Spillway	1300	.015	.015	.015
Stepped Spillway	1299.9	.04	.04	.04

SUMMARY OF REACH LENGTHS

River: North DB Channel

Reach	River Sta.	Left	Channel	Right
Main	3000	79.7	79.7	79.7
Main	2920.30	56.38	56.38	56.38
Main	2863.87	84.61	84.61	84.61
Main	2779.25*	84.61	84.61	84.61
Main	2694.63*	84.61	84.61	84.61
Main	2610.02*	84.61	84.61	84.61
Main	2525.40*	84.61	84.61	84.61
Main	2440.78*	84.61	84.61	84.61
Main	2356.16*	84.61	84.61	84.61
Main	2271.55*	84.61	84.61	84.61
Main	2186.93*	84.61	84.61	84.61
Main	2102.31*	84.61	84.61	84.61
Main	2017.70*	84.61	84.61	84.61
Main	1933.08*	84.61	84.61	84.61
Main	1848.46*	84.61	84.61	84.61
Main	1763.85*	84.61	84.61	84.61
Main	1679.23*	84.61	84.61	84.61
Main	1594.61*	84.61	84.61	84.61
Main	1510	35.19	35.19	35.19
Trib	850	125	125	125
Trib	725	24.05	24.05	24.05
Trib	700.95	46.95	46.95	46.95
Trib	674	92.43	92.43	92.43

Trib	581.571*	92.43	92.43	92.43
Trib	489.142*	92.43	92.43	92.43
Trib	396.714*	92.43	92.43	92.43
Trib	304.285*	92.43	92.43	92.43
Trib	211.857*	92.43	92.43	92.43
Trib	119.428*	92.43	92.43	92.43
Trib	27	28.2	28.2	28.2
Stepped Spillway	1476	10	10	10
Stepped Spillway	1466.*	10	10	10
Stepped Spillway	1456.*	10	10	10
Stepped Spillway	1446.*	10	10	10
Stepped Spillway	1436.*	10	10	10
Stepped Spillway	1426.*	10	10	10
Stepped Spillway	1416.*	10	10	10
Stepped Spillway	1406.*	10	10	10
Stepped Spillway	1396.*	10	10	10
Stepped Spillway	1386.*	10	10	10
Stepped Spillway	1376.*	10	10	10
Stepped Spillway	1366.*	10	10	10
Stepped Spillway	1356.*	10	10	10
Stepped Spillway	1346.*	10	10	10
Stepped Spillway	1336.*	10	10	10
Stepped Spillway	1326.*	10	10	10
Stepped Spillway	1316	.01	.01	.01
Stepped Spillway	1315.9	4.55	4.55	4.55
Stepped Spillway	1310	35.34	15	37.16
Stepped Spillway	1300	.1	.1	.1
Stepped Spillway	1299.9	0	0	0

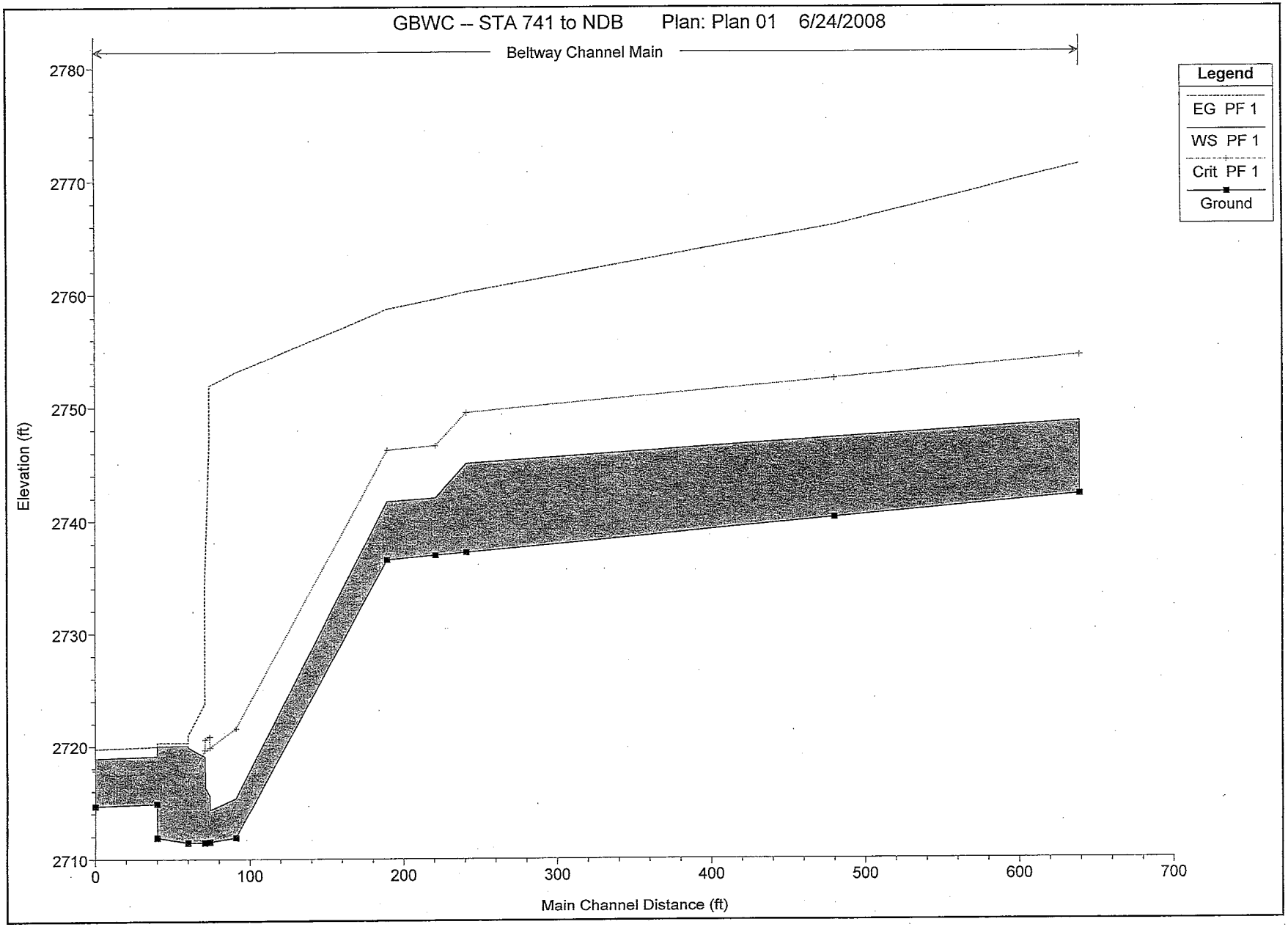
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: North DB Channel

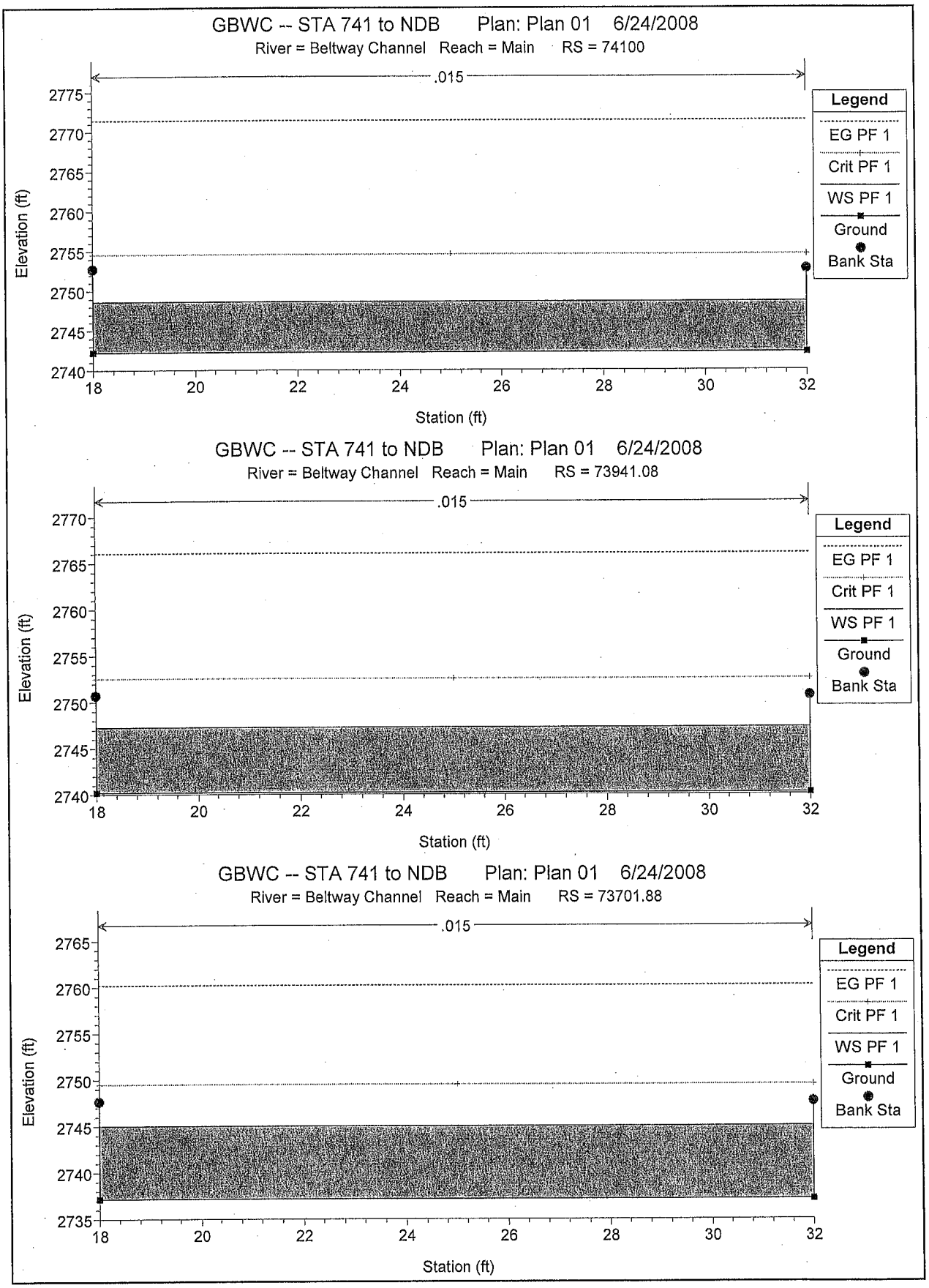
Reach	River Sta.	Contr.	Expan.
Main	3000	.1	.3
Main	2920.30	.1	.3
Main	2863.87	.1	.3
Main	2779.25*	.1	.3
Main	2694.63*	.1	.3
Main	2610.02*	.1	.3
Main	2525.40*	.1	.3
Main	2440.78*	.1	.3
Main	2356.16*	.1	.3
Main	2271.55*	.1	.3
Main	2186.93*	.1	.3
Main	2102.31*	.1	.3
Main	2017.70*	.1	.3
Main	1933.08*	.1	.3
Main	1848.46*	.1	.3
Main	1763.85*	.1	.3
Main	1679.23*	.1	.3
Main	1594.61*	.1	.3
Main	1510	.1	.3
Trib	850	.1	.3
Trib	725	.1	.3
Trib	700.95	.1	.3
Trib	674	.1	.3
Trib	581.571*	.1	.3
Trib	489.142*	.1	.3
Trib	396.714*	.1	.3
Trib	304.285*	.1	.3
Trib	211.857*	.1	.3
Trib	119.428*	.1	.3
Trib	27	.1	.3
Stepped Spillway	1476	.1	.3
Stepped Spillway	1466.*	.1	.3
Stepped Spillway	1456.*	.1	.3
Stepped Spillway	1446.*	.1	.3
Stepped Spillway	1436.*	.1	.3
Stepped Spillway	1426.*	.1	.3
Stepped Spillway	1416.*	.1	.3
Stepped Spillway	1406.*	.1	.3
Stepped Spillway	1396.*	.1	.3
Stepped Spillway	1386.*	.1	.3
Stepped Spillway	1376.*	.1	.3
Stepped Spillway	1366.*	.1	.3
Stepped Spillway	1356.*	.1	.3
Stepped Spillway	1346.*	.1	.3
Stepped Spillway	1336.*	.1	.3
Stepped Spillway	1326.*	.1	.3
Stepped Spillway	1316	.1	.3
Stepped Spillway	1315.9	.1	.3
Stepped Spillway	1310	.1	.3
Stepped Spillway	1300	.6	.8
Stepped Spillway	1299.9	.6	.8

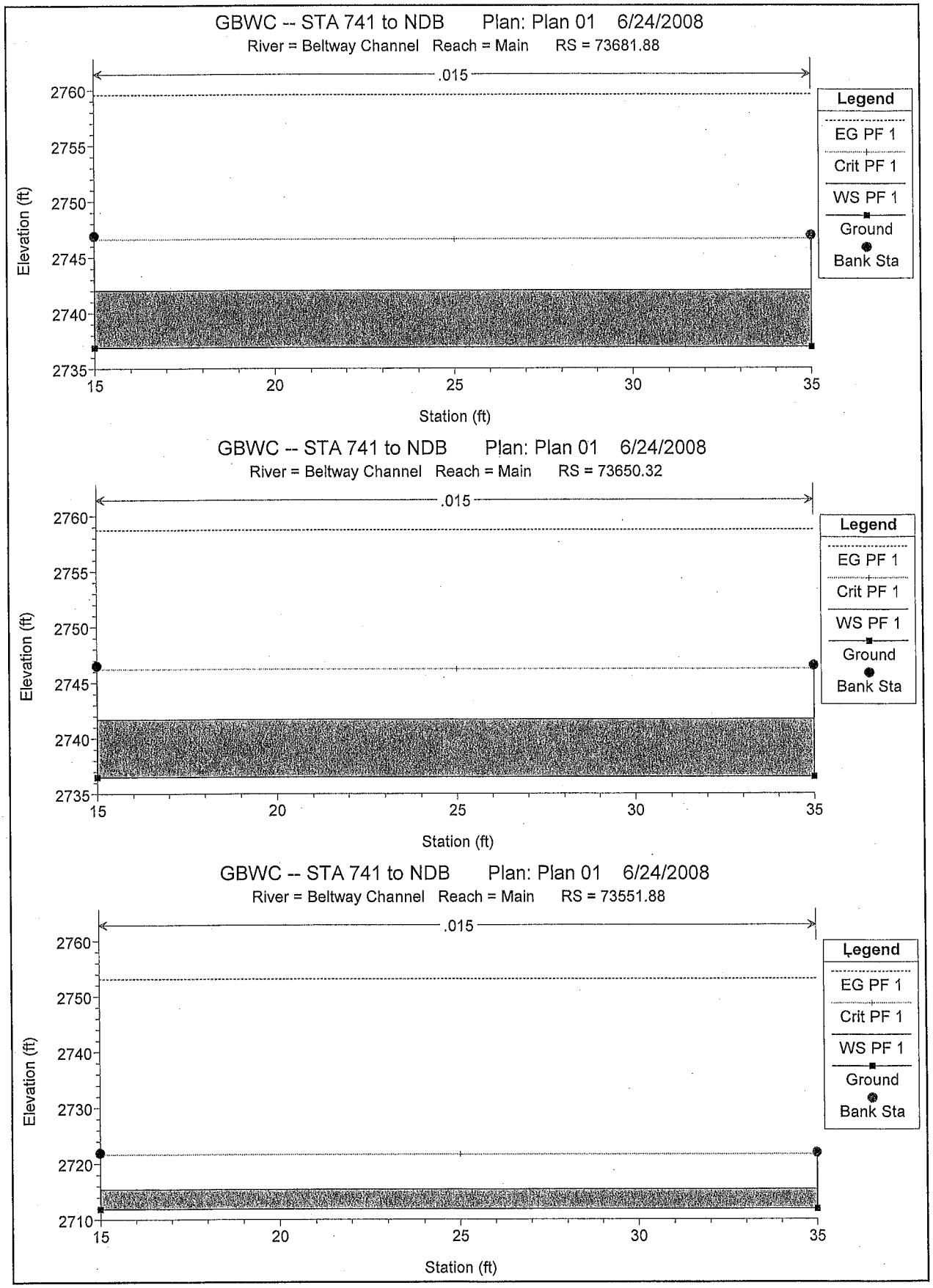
GOWAN BELTWAY WEST CHANNEL STA. 734+60 TO 741+00 (OPEN CHANNEL)

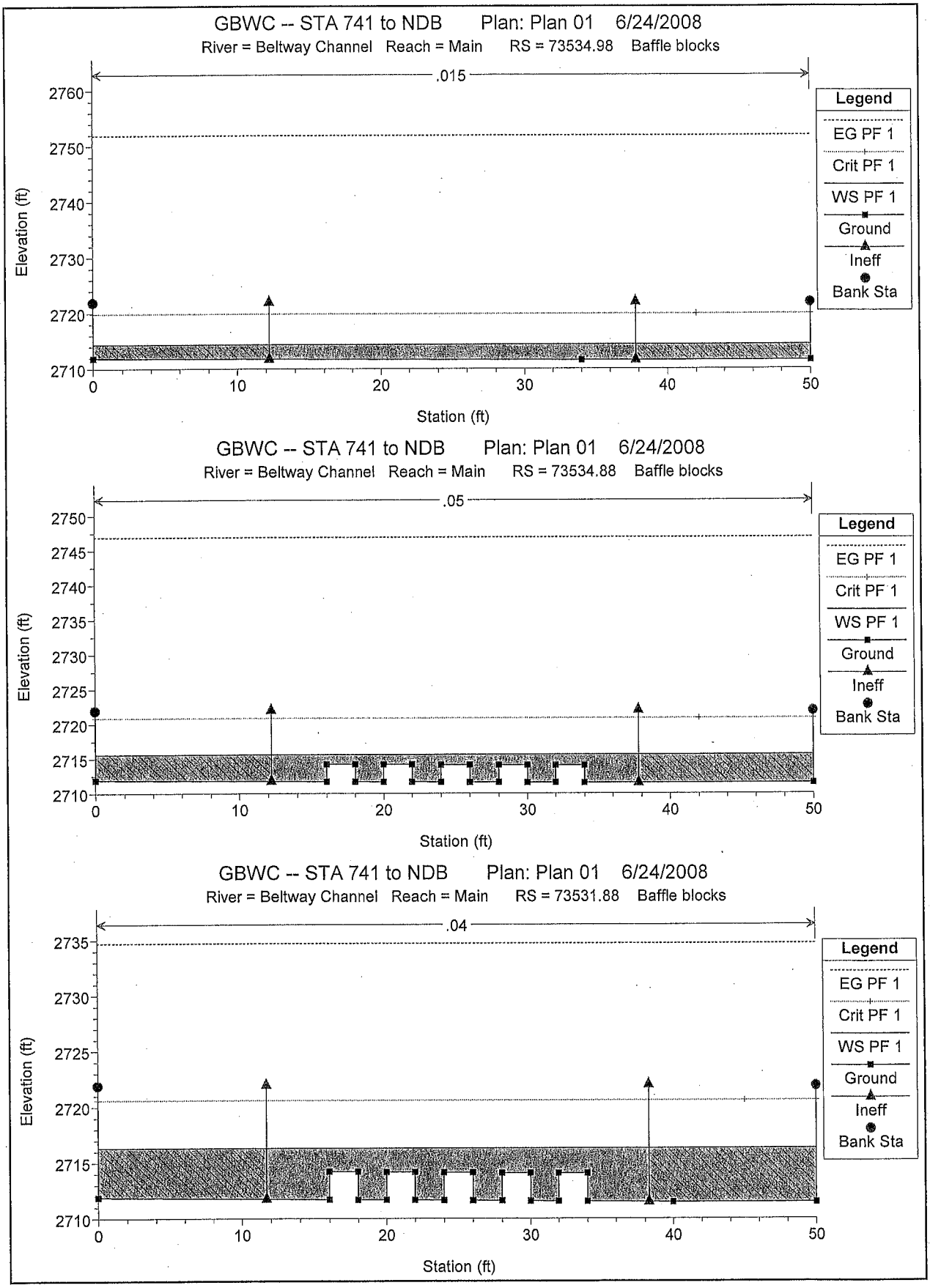
HEC-RAS Plan: Plan 01 River: Beltway Channel Reach: Main Profile: PF 1

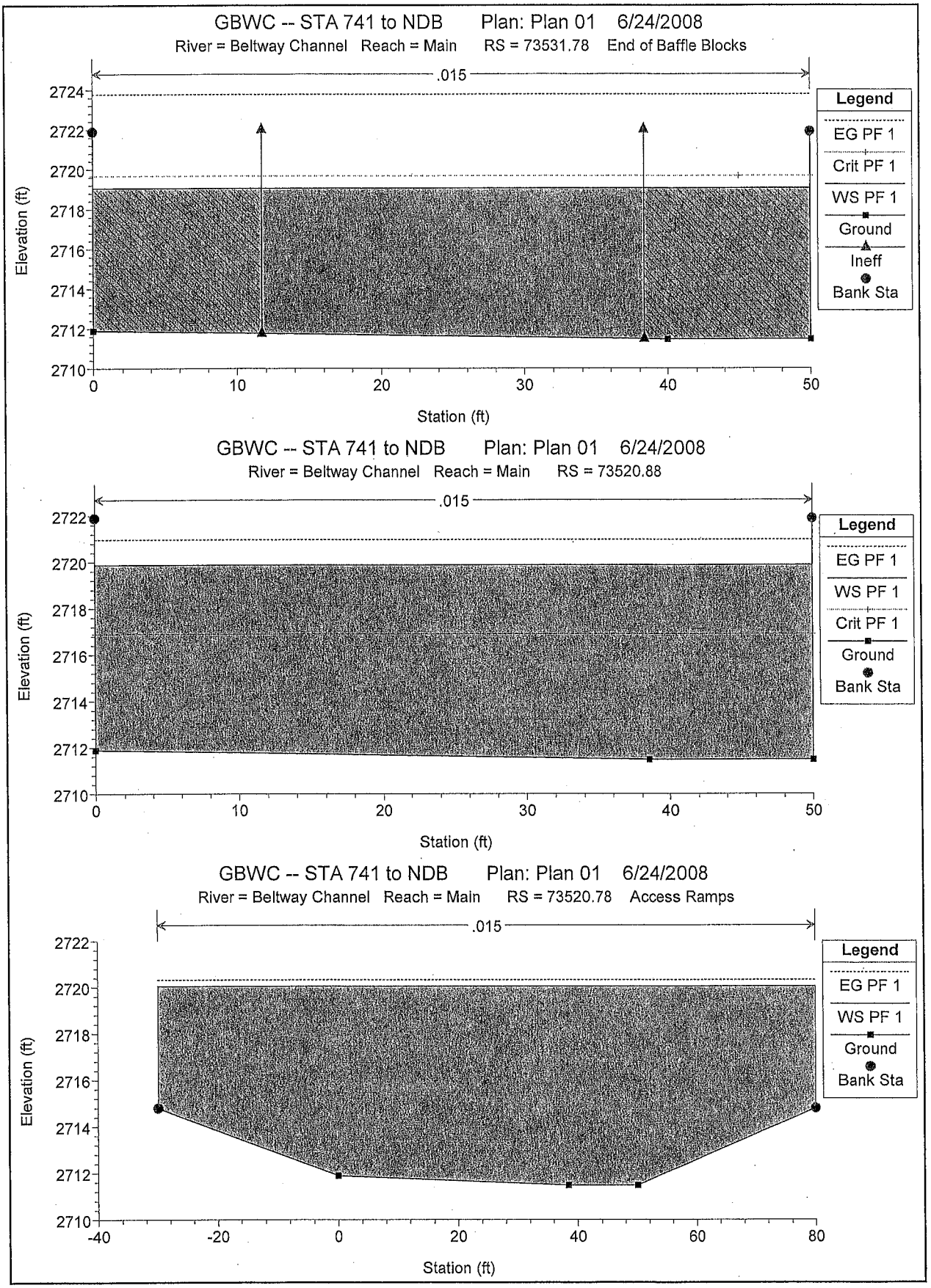
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	74100	PF 1	3443.00	2742.22	2748.64	2754.55	2771.43	0.029848	38.31	89.88	14.00	2.66
Main	73941.08	PF 1	3443.00	2740.20	2747.27	2752.53	2766.08	0.023094	34.81	98.91	14.00	2.31
Main	73701.88	PF 1	3443.00	2737.16	2745.02	2749.49	2760.21	0.017399	31.28	110.08	14.00	1.97
Main	73681.88	PF 1	3443.00	2736.90	2742.02	2746.60	2759.58	0.022667	33.63	102.38	20.00	2.62
Main	73650.32	PF 1	3443.00	2736.50	2741.70	2746.20	2758.72	0.021664	33.10	104.00	20.00	2.56
Main	73551.88	PF 1	3443.00	2711.89	2715.38	2721.59	2753.12	0.069697	49.30	69.84	20.00	4.65
Main	73534.98	PF 1	3443.00	2711.53	2714.36	2719.88	2751.94	0.064505	49.19	69.99	50.00	5.24
Main	73534.88	PF 1	3443.00	2711.53	2715.60	2720.85	2746.90	1.314659	44.90	76.68	50.00	4.57
Main	73531.88	PF 1	3443.00	2711.47	2716.32	2720.58	2734.73	0.356511	34.43	99.99	50.00	3.13
Main	73531.78	PF 1	3443.00	2711.47	2719.06	2719.67	2723.77	0.002130	17.41	197.74	50.00	1.13
Main	73520.88	PF 1	3443.00	2711.48	2719.88	2716.90	2720.97	0.000623	8.35	412.17	50.00	0.51
Main	73520.78	PF 1	3443.00	2711.48	2720.04		2720.31	0.000135	4.15	828.72	110.00	0.27
Main	73500.88	PF 1	3443.00	2711.89	2720.02		2720.30	0.000147	4.27	807.18	110.00	0.28
Main	73500.78	PF 1	3443.00	2714.89	2719.09		2719.95	0.005005	7.45	462.32	110.00	0.64
Main	73460.88	PF 1	3443.00	2714.69	2718.89	2717.80	2719.75	0.005004	7.45	462.34	110.00	0.64

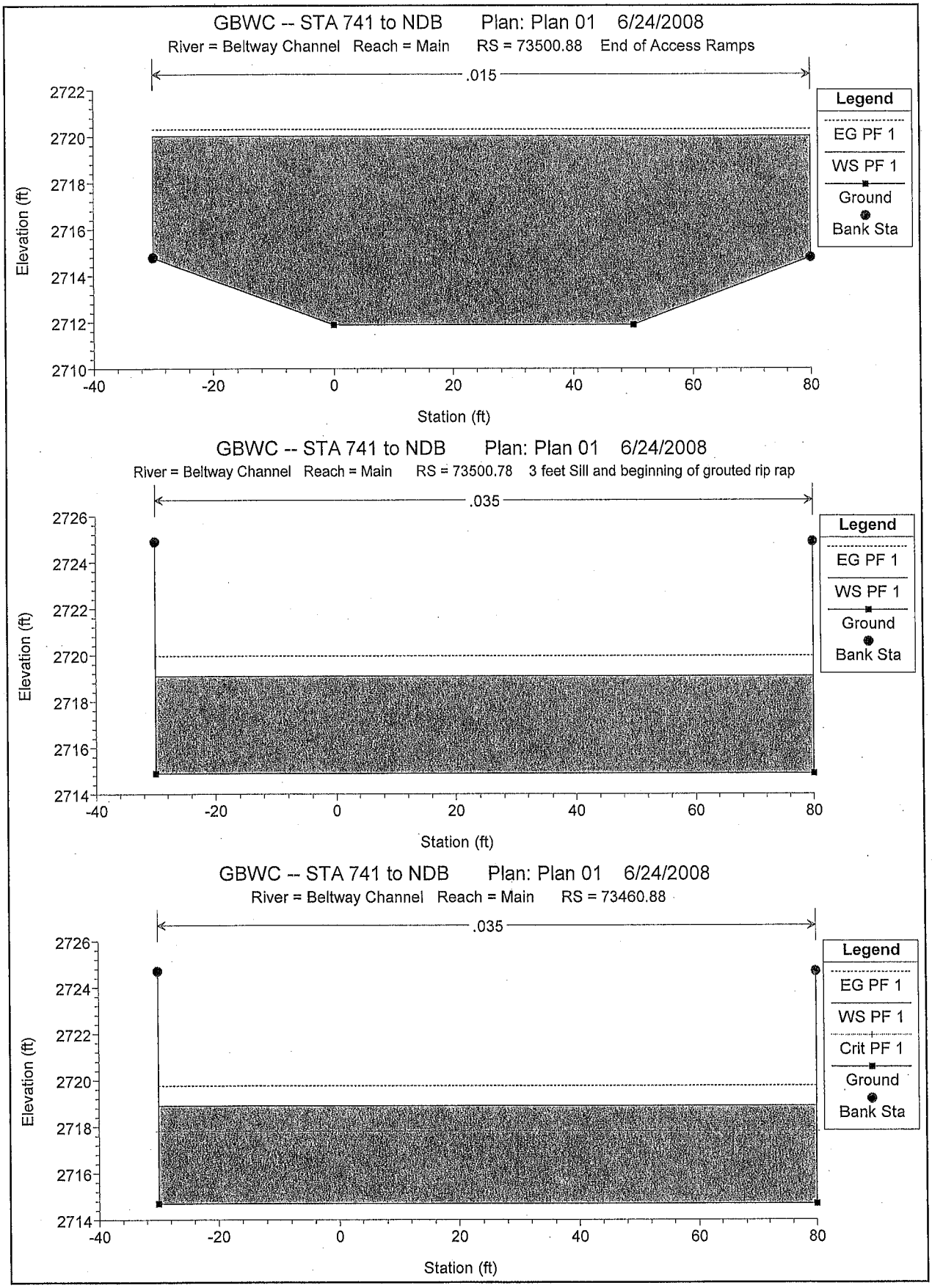

GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
Beltway Channel Main
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2780
2770
2760
2750
2740
2730
2720
2710
0
100
200
300
400
500
600
700
Main Channel Distance (ft)


GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 74100
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73941.08
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73701.88
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73681.88
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73650.32
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73551.88
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73534.98 Baffle blocks
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73534.88 Baffle blocks
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73531.88 Baffle blocks
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73531.78 End of Baffle Blocks
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73520.88
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73520.78 Access Ramps
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73500.88 End of Access Ramps
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73500.78 3 feet Sill and beginning of grouted rip rap
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
GBWC -- STA 741 to NDB Plan: Plan 01 6/24/2008
River = Beltway Channel Reach = Main RS = 73460.88
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: GBWC -- STA 741 to NDB
Project File : GBWC.prj
Run Date and Time: 6/24/2008 10:25:59 AM

Project in English units

Project Description:
Model from Start of Open Channel to North Detention Basin (STA 741+00 TO STA 734+60)
Model ties into the downstream ends of BOX.PRJ and CHANNEL.PRJ
SEE
PLAN SHEETS RSD-4 AND 5.
SEE PROFILE SHEETS RSD-12 AND 13.

PLAN DATA

Plan Title: Plan 01
Plan File : f:\451-002-001\Calc\Hydro\HECRAS\GBWC.p01

Geometry Title: Geo1
Geometry File : f:\451-002-001\Calc\Hydro\HECRAS\GBWC.g01

Flow Title : Flow1
Flow File : f:\451-002-001\Calc\Hydro\HECRAS\GBWC.f01

Plan Summary Information:
Number of: Cross Sections = 15 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

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

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

FLOW DATA

Flow Title: Flow1
Flow File : f:\451-002-001\Calc\Hydro\HECRAS\GBWC.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Beltway Channel	Main	74100	3443

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Beltway Channel	Main	PF 1	Known WS = 2748.64	Normal S = 0.005

GEOMETRY DATA

Geometry Title: Geo1
Geometry File : f:\451-002-001\Calc\Hydro\HECRAS\GBWC.g01

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 74100

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
18	2752.72	18	2742.22	32	2742.22	32	2752.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
18	.015	18	.015	32	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18	32	157.2 158.92	161.65	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2771.43	Element	Left OB	Channel	Right OB	
Vel Head (ft)	22.79	Wt. n-Val.		0.015		
W.S. Elev (ft)	2748.64	Reach Len. (ft)	157.20	158.92	161.65	
Crit W.S. (ft)	2754.55	Flow Area (sq ft)		89.88		
E.G. Slope (ft/ft)	0.029848	Area (sq ft)		89.88		
Q Total (cfs)	3443.00	Flow (cfs)		3443.00		
Top Width (ft)	14.00	Top Width (ft)		14.00		
Vel Total (ft/s)	38.31	Avg. Vel. (ft/s)		38.31		
Max Chl Dpth (ft)	6.42	Hydr. Depth (ft)		6.42		
Conv. Total (cfs)	19928.8	Conv. (cfs)		19928.8		
Length Wtd. (ft)	158.92	Wetted Per. (ft)		26.84		
Min Ch El (ft)	2742.22	Shear (lb/sq ft)		6.24		
Alpha	1.00	Stream Power (lb/ft s)		239.04		
Frctn Loss (ft)		Cum Volume (acre-ft)		2.19		
C & E Loss (ft)		Cum SA (acres)		0.38		

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73941.08

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
18	2750.7	18	2740.2	32	2740.2	32	2750.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
18	.015	18	.015	32	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18	32	239.2	239.2	239.2	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2766.08	Element	Left OB	Channel	Right OB	
Vel Head (ft)	18.82	Wt. n-Val.		0.015		
W.S. Elev (ft)	2747.27	Reach Len. (ft)	239.20	239.20	239.20	
Crit W.S. (ft)	2752.53	Flow Area (sq ft)		98.91		
E.G. Slope (ft/ft)	0.023094	Area (sq ft)		98.91		
Q Total (cfs)	3443.00	Flow (cfs)		3443.00		
Top Width (ft)	14.00	Top Width (ft)		14.00		
Vel Total (ft/s)	34.81	Avg. Vel. (ft/s)		34.81		
Max Chl Dpth (ft)	7.06	Hydr. Depth (ft)		7.06		
Conv. Total (cfs)	22656.2	Conv. (cfs)		22656.2		
Length Wtd. (ft)	239.20	Wetted Per. (ft)		28.13		
Min Ch El (ft)	2740.20	Shear (lb/sq ft)		5.07		
Alpha	1.00	Stream Power (lb/ft s)		176.47		
Frctn Loss (ft)	4.16	Cum Volume (acre-ft)		1.85		
C & E Loss (ft)	1.19	Cum SA (acres)		0.33		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73701.88

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
18	2747.66	18	2737.16	32	2737.16	32	2747.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
18	.015	18	.015	32	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18	32	20	20	20	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2760.21	Element	Left OB	Channel	Right OB	
Vel Head (ft)	15.19	Wt. n-Val.		0.015		
W.S. Elev (ft)	2745.02	Reach Len. (ft)	20.00	20.00	20.00	
Crit W.S. (ft)	2749.49	Flow Area (sq ft)		110.08		
E.G. Slope (ft/ft)	0.017399	Area (sq ft)		110.08		
Q Total (cfs)	3443.00	Flow (cfs)		3443.00		
Top Width (ft)	14.00	Top Width (ft)		14.00		
Vel Total (ft/s)	31.28	Avg. Vel. (ft/s)		31.28		
Max Chl Dpth (ft)	7.86	Hydr. Depth (ft)		7.86		
Conv. Total (cfs)	26102.1	Conv. (cfs)		26102.1		
Length Wtd. (ft)	20.00	Wetted Per. (ft)		29.73		
Min Ch El (ft)	2737.16	Shear (lb/sq ft)		4.02		
Alpha	1.00	Stream Power (lb/ft s)		125.81		
Frctn Loss (ft)	4.77	Cum Volume (acre-ft)		1.27		
C & E Loss (ft)	1.09	Cum SA (acres)		0.25		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73681.88

INPUT
Description:

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
15	2746.9	15	2736.9	35	2736.9	35	2746.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
15	.015	15	.015	35	.015

Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
15	35	31.56 31.56	31.56	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2759.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	2742.02	Reach Len. (ft)	31.56	31.56	31.56
Crit W.S. (ft)	2746.60	Flow Area (sq ft)		102.38	
E.G. Slope (ft/ft)	0.022667	Area (sq ft)		102.38	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	33.63	Avg. Vel. (ft/s)		33.63	
Max Chl Dpth (ft)	5.12	Hydr. Depth (ft)		5.12	
Conv. Total (cfs)	22868.9	Conv. (cfs)		22868.9	
Length Wtd. (ft)	31.56	Wetted Per. (ft)		30.24	
Min Ch El (ft)	2736.90	Shear (lb/sq ft)		4.79	
Alpha	1.00	Stream Power (lb/ft s)		161.12	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		1.22	
C & E Loss (ft)	0.24	Cum SA (acres)		0.24	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73650.32

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
15	2746.5	15	2736.5	35	2736.5	35	2746.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
15	.015	15	.015	35	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
15	35	98.52 98.52	98.52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2758.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.02	Wt. n-Val.		0.015	
W.S. Elev (ft)	2741.70	Reach Len. (ft)	98.52	98.52	98.52
Crit W.S. (ft)	2746.20	Flow Area (sq ft)		104.00	
E.G. Slope (ft/ft)	0.021664	Area (sq ft)		104.00	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	33.10	Avg. Vel. (ft/s)		33.10	
Max Chl Dpth (ft)	5.20	Hydr. Depth (ft)		5.20	
Conv. Total (cfs)	23392.0	Conv. (cfs)		23392.0	
Length Wtd. (ft)	98.52	Wetted Per. (ft)		30.40	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		4.63	
Alpha	1.00	Stream Power (lb/ft s)		153.18	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		1.15	
C & E Loss (ft)	0.16	Cum SA (acres)		0.23	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73551.88

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
15	2721.89	15	2711.89	35	2711.89	35	2721.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
15	.015	15	.015	35	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
15	35	16.9 16.9	16.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2753.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	37.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	2715.38	Reach Len. (ft)	16.90	16.90	16.90
Crit W.S. (ft)	2721.59	Flow Area (sq ft)		69.84	
E.G. Slope (ft/ft)	0.069697	Area (sq ft)		69.84	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	49.30	Avg. Vel. (ft/s)		49.30	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		3.49	
Conv. Total (cfs)	13041.6	Conv. (cfs)		13041.6	
Length Wtd. (ft)	16.90	Wetted Per. (ft)		26.98	
Min Ch El (ft)	2711.89	Shear (lb/sq ft)		11.26	
Alpha	1.00	Stream Power (lb/ft s)		555.19	
Frctn Loss (ft)	3.52	Cum Volume (acre-ft)		0.95	
C & E Loss (ft)	2.07	Cum SA (acres)		0.18	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

ER: Beltway Channel
REACH: Main RS: 73534.98

INPUT
Description: Baffle blocks
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2721.89	0	2711.89	34	2711.53	50	2711.53	50	2721.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	50	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	50	.1	.1	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	12.2	2722	T
37.8	50	2722	T

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2751.94	Element			
Vel Head (ft)	37.57	Wt. n-Val.		0.015	
W.S. Elev (ft)	2714.36	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2719.88	Flow Area (sq ft)		69.99	
E.G. Slope (ft/ft)	0.064505	Area (sq ft)		135.50	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	49.19	Avg. Vel. (ft/s)		49.19	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	13556.2	Conv. (cfs)		13556.2	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		25.60	
Min Ch El (ft)	2711.53	Shear (lb/sq ft)		11.01	
Alpha	1.00	Stream Power (lb/ft s)		541.58	
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)		0.91	
C & E Loss (ft)	0.05	Cum SA (acres)		0.17	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
CH: Main RS: 73534.88

UT
Description: Baffle blocks
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2721.89	0	2711.89	16	2711.71	16	2714.21	18	2714.21
18	2711.69	20	2711.67	20	2714.17	22	2714.17	22	2711.65
24	2711.63	24	2714.13	26	2714.13	26	2711.61	28	2711.59
28	2714.09	30	2714.09	30	2711.57	32	2711.55	32	2714.05
34	2714.05	34	2711.53	50	2711.53	50	2721.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	0	.05	50	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	50	3	3	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	12.2	2722	T
37.8	50	2722	T

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2746.90	Element			
Vel Head (ft)	31.30	Wt. n-Val.		0.050	
W.S. Elev (ft)	2715.60	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2720.85	Flow Area (sq ft)		76.68	
E.G. Slope (ft/ft)	1.314659	Area (sq ft)		172.42	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	44.90	Avg. Vel. (ft/s)		44.90	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.00	
Conv. Total (cfs)	3002.8	Conv. (cfs)		3002.8	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		50.70	
Min Ch El (ft)	2711.53	Shear (lb/sq ft)		124.14	
Alpha	1.00	Stream Power (lb/ft s)		5573.54	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		0.91	
C & E Loss (ft)	5.02	Cum SA (acres)		0.17	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73531.88

INPUT
Description: Baffle blocks
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2721.89	0	2711.89	16	2711.71	16	2714.21	18	2714.21
18	2711.69	20	2711.67	20	2714.17	22	2714.17	22	2711.65
24	2711.63	24	2714.13	26	2714.13	26	2711.61	28	2711.59
28	2714.09	30	2714.09	30	2711.57	32	2711.55	32	2714.05
34	2714.05	34	2711.53	40	2711.47	50	2711.47	50	2721.89

ning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	50	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 50 .1 .1 .1 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	11.7	2722	T
38.3	50	2722	T

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2734.73	Element			
Vel Head (ft)	18.41	Wt. n-Val.		0.040	
W.S. Elev (ft)	2716.32	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2720.58	Flow Area (sq ft)		99.99	
E.G. Slope (ft/ft)	0.356511	Area (sq ft)		209.40	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	34.43	Avg. Vel. (ft/s)		34.43	
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)		3.76	
Conv. Total (cfs)	5766.3	Conv. (cfs)		5766.3	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		51.70	
Min Ch El (ft)	2711.47	Shear (lb/sq ft)		43.05	
Alpha	1.00	Stream Power (lb/ft s)		1482.20	
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	10.31	Cum SA (acres)		0.16	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73531.78

INPUT
Description: End of Baffle Blocks
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2721.89	0	2711.89	40	2711.47	50	2711.47	50	2721.89

ning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	50	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 50 10.9 10.9 10.9 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	11.7	2722	T
38.3	50	2722	T

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2723.77	Element			
Vel Head (ft)	4.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	2719.06	Reach Len. (ft)	10.90	10.90	10.90
Crit W.S. (ft)	2719.67	Flow Area (sq ft)		197.74	
E.G. Slope (ft/ft)	0.002130	Area (sq ft)		371.17	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	17.41	Avg. Vel. (ft/s)		17.41	
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)		7.43	
Conv. Total (cfs)	74609.0	Conv. (cfs)		74609.0	
Length Wtd. (ft)	10.90	Wetted Per. (ft)		26.60	
Min Ch El (ft)	2711.47	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		17.21	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	10.96	Cum SA (acres)		0.16	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73520.88

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2721.89	0	2711.89	38.5	2711.48	50	2711.48	50	2721.89

nning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	50	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 50 .1 .1 .1 .6 .8

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2720.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	2719.88	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2716.90	Flow Area (sq ft)		412.17	
E.G. Slope (ft/ft)	0.000623	Area (sq ft)		412.17	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.35	Avg. Vel. (ft/s)		8.35	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		8.24	
Conv. Total (cfs)	137911.8	Conv. (cfs)		137911.8	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		66.39	
Min Ch El (ft)	2711.48	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		2.02	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.80	
C & E Loss (ft)	0.65	Cum SA (acres)		0.15	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73520.78

INPUT
Description: Access Ramps
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30	2714.79	0	2711.89	38.5	2711.48	50	2711.48	80	2714.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30	.015	-30	.015	80	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30	80	19.9	19.9	19.9	.6	.8

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2720.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.015	
W.S. Elev (ft)	2720.04	Reach Len. (ft)	19.90	19.90	19.90
Crit W.S. (ft)		Flow Area (sq ft)		828.72	
E.G. Slope (ft/ft)	0.000135	Area (sq ft)		828.72	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	110.00	Top Width (ft)		110.00	
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)		4.15	
Max Chl Dpth (ft)	8.56	Hydr. Depth (ft)		7.53	
Conv. Total (cfs)	296344.1	Conv. (cfs)		296344.1	
Length Wtd. (ft)	19.90	Wetted Per. (ft)		120.83	
Min Ch El (ft)	2711.48	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.24	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.80	
C & E Loss (ft)	0.01	Cum SA (acres)		0.15	

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

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73500.88

INPUT
Description: End of Access Ramps
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30	2714.79	0	2711.89	50	2711.89	80	2714.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30	.015	-30	.015	80	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30	80	.1	.1	.1	.6	.8

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2720.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.015	
W.S. Elev (ft)	2720.02	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)		Flow Area (sq ft)		807.18	
E.G. Slope (ft/ft)	0.000147	Area (sq ft)		807.18	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	110.00	Top Width (ft)		110.00	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	8.13	Hydr. Depth (ft)		7.34	
Conv. Total (cfs)	283763.3	Conv. (cfs)		283763.3	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		120.74	
Min Ch El (ft)	2711.89	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.26	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.42	
C & E Loss (ft)	0.35	Cum SA (acres)		0.10	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73500.78

INPUT
Description: 3 feet Sill and beginning of grouted rip rap
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30	2724.89	-30	2714.89	80	2714.89	80	2724.89

ning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30	.035	-30	.035	80	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30	80	39.9	39.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2719.95	Element			
Vel Head (ft)	0.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	2719.09	Reach Len. (ft)	39.90	39.90	39.90
Crit W.S. (ft)		Flow Area (sq ft)		462.32	
E.G. Slope (ft/ft)	0.005005	Area (sq ft)		462.32	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	110.00	Top Width (ft)		110.00	
Vel Total (ft/s)	7.45	Avg. Vel. (ft/s)		7.45	
Max Chl Dpth (ft)	4.20	Hydr. Depth (ft)		4.20	
Conv. Total (cfs)	48668.2	Conv. (cfs)		48668.2	
Length Wtd. (ft)	39.90	Wetted Per. (ft)		118.41	
Min Ch El (ft)	2714.89	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)		9.09	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		0.42	
C & E Loss (ft)	0.00	Cum SA (acres)		0.10	

CROSS SECTION

RIVER: Beltway Channel
REACH: Main RS: 73460.88

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30	2724.69	-30	2714.69	80	2714.69	80	2724.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30	.035	-30	.035	80	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
-30	80	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2719.75	Element			
el Head (ft)	0.86	Wt. n-Val.		0.035	
S. Elev (ft)	2718.89	Reach Len. (ft)			
rit W.S. (ft)	2717.80	Flow Area (sq ft)		462.34	
E.G. Slope (ft/ft)	0.005004	Area (sq ft)		462.34	
Q Total (cfs)	3443.00	Flow (cfs)		3443.00	
Top Width (ft)	110.00	Top Width (ft)		110.00	
Vel Total (ft/s)	7.45	Avg. Vel. (ft/s)		7.45	
Max Chl Dpth (ft)	4.20	Hydr. Depth (ft)		4.20	
Conv. Total (cfs)	48672.7	Conv. (cfs)		48672.7	
Length Wtd. (ft)		Wetted Per. (ft)		118.41	
Min Ch El (ft)	2714.69	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)		9.08	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Beltway Channel

Reach	River Sta.	n1	n2	n3
Main	74100	.015	.015	.015
Main	73941.08	.015	.015	.015
Main	73701.88	.015	.015	.015
Main	73681.88	.015	.015	.015
Main	73650.32	.015	.015	.015
Main	73551.88	.015	.015	.015
Main	73534.98	.015	.015	.015
Main	73534.88	.05	.05	.05
Main	73531.88	.04	.04	.04
Main	73531.78	.015	.015	.015
Main	73520.88	.015	.015	.015
Main	73520.78	.015	.015	.015
Main	73500.88	.015	.015	.015
Main	73500.78	.035	.035	.035
Main	73460.88	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: Beltway Channel

Reach	River Sta.	Left	Channel	Right
in	74100	157.2	158.92	161.65
ain	73941.08	239.2	239.2	239.2
Main	73701.88	20	20	20
Main	73681.88	31.56	31.56	31.56
Main	73650.32	98.52	98.52	98.52
Main	73551.88	16.9	16.9	16.9
Main	73534.98	.1	.1	.1
Main	73534.88	3	3	3
Main	73531.88	.1	.1	.1

Main	73531.78	10.9	10.9	10.9
Main	73520.88	.1	.1	.1
Main	73520.78	19.9	19.9	19.9
Main	73500.88	.1	.1	.1
Main	73500.78	39.9	39.9	39.9
Main	73460.88			

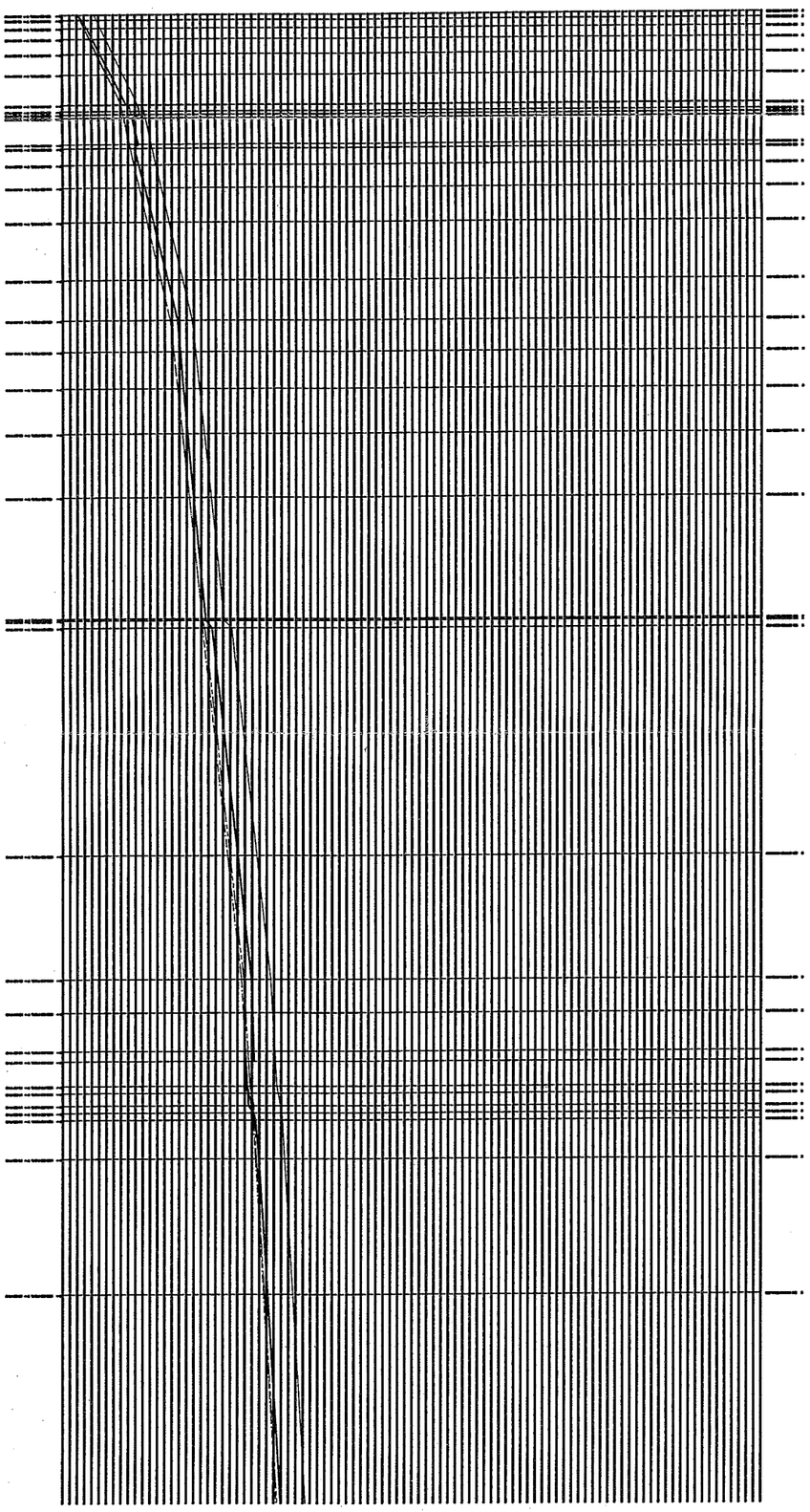
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Beltway Channel

Reach	River Sta.	Contr.	Expan.
Main	74100	.1	.3
Main	73941.08	.1	.3
Main	73701.88	.1	.3
Main	73681.88	.1	.3
Main	73650.32	.1	.3
Main	73551.88	.1	.3
Main	73534.98	.6	.8
Main	73534.88	.6	.8
Main	73531.88	.6	.8
Main	73531.78	.6	.8
Main	73520.88	.6	.8
Main	73520.78	.6	.8
Main	73500.88	.6	.8
Main	73500.78	.1	.3
Main	73460.88	.1	.3

WSPGW MODELS

GOWAN BELTWAY WEST CHANNEL STA. 736+50 TO 838+30 (RCB)

WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE)



GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WIDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	73650.320	2736.500	4.974	11.000	RECTANGULAR	.015	0	3443.000	34.611	20.000	20.000	.000	.000	.000	.000	.000	9.727	.000	
[2]	REACH	73681.880	2736.900	4.915	11.000	RECTANGULAR	.015	0	3443.000	35.027	20.000	20.000	.000	.000	.000	.000	.000	9.727	.000	
[3]	TRANSITION	73701.880	2737.160	7.413	11.000	RECTANGULAR	.015	0	3443.000	33.177	14.000	14.000	.000	.000	.000	.000	.000	12.340	.000	
[4]	REACH	73804.410	2738.463	7.185	11.000	RECTANGULAR	.015	0	3443.000	34.227	14.000	14.000	.000	.000	.000	.000	.000	12.340	.000	
[5]	REACH	73941.080	2740.200	6.851	11.000	RECTANGULAR	.015	0	3443.000	35.898	14.000	14.000	.000	.000	.000	1.120	-.560	12.340	500.305	
[6]	REACH	73985.270	2740.762	6.736	11.000	RECTANGULAR	.015	0	3443.000	36.509	14.000	14.000	.000	.000	.000	1.158	-.579	12.340	500.305	
[7]	REACH	74100.000	2742.220	6.423	11.000	RECTANGULAR	.013	0	3443.000	38.291	14.000	14.000	.000	.000	.000	1.278	-.639	12.340	498.730	
[8]	WALL EXIT	74100.000	2742.220	6.421	9.000	BOX	.013	0	3443.000	38.298	14.000	14.000	.000	.000	.000	1.279	-1.279	9.000	498.730	
[9]	REACH	74189.660	2743.360	6.274	9.000	BOX	.013	0	3443.000	39.197	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[10]	REACH	74314.000	2744.940	6.055	9.000	BOX	.013	0	3443.000	40.612	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[11]	REACH	74414.890	2747.860	6.095	9.000	BOX	.013	0	3443.000	40.348	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[12]	JUNCTION	74420.890	2748.040	5.480	9.000	BOX	.013	0	3132.000	40.825	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[13]	REACH	74622.650	2753.870	5.490	9.000	BOX	.013	0	3132.000	40.751	14.000	14.000	.000	.000	.000	1.454	-1.454	9.000	496.478	
[14]	REACH	74713.630	2756.500	5.496	9.000	BOX	.013	0	3132.000	40.708	14.000	14.000	.000	.000	.000	.249	.000	9.000	2892.195	
[15]	REACH	75496.050	2779.140	5.673	9.000	BOX	.013	0	3132.000	39.436	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[16]	REACH	75585.100	2781.994	5.752	9.000	BOX	.013	0	3132.000	38.890	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[17]	REACH	75801.370	2788.923	6.033	9.000	BOX	.013	0	3132.000	37.080	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[18]	REACH	75945.490	2793.541	6.327	9.000	BOX	.013	0	3132.000	35.355	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[19]	REACH	76050.110	2796.893	6.636	9.000	BOX	.013	0	3132.000	33.710	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[20]	REACH	76129.670	2799.442	6.960	9.000	BOX	.013	0	3132.000	32.141	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[21]	REACH	76191.830	2801.433	7.301	9.000	BOX	.013	0	3132.000	30.645	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[22]	REACH	76241.130	2803.013	7.656	9.000	BOX	.013	0	3132.000	29.219	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[23]	REACH	76280.480	2804.274	8.030	9.000	BOX	.013	0	3132.000	27.859	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[24]	REACH	76311.890	2805.280	8.422	9.000	BOX	.013	0	3132.000	26.563	14.000	14.000	.000	.000	.000	-.050	.100	9.000	.000	
[25]	JUNCTION	76331.880	2805.920	6.191	9.000	BOX	.013	0	2728.000	31.475	14.000	14.000	.000	.000	.000	-.070	.140	9.000	3075.986	
[26]	REACH	76353.920	2807.021	6.398	9.000	BOX	.013	0	2728.000	30.457	14.000	14.000	.000	.000	.000	-.066	.131	9.000	3075.986	
[27]	REACH	76381.160	2808.382	6.710	9.000	BOX	.013	0	2728.000	29.039	14.000	14.000	.000	.000	.000	-.059	.119	9.000	3075.986	
[28]	REACH	76403.750	2809.510	7.038	9.000	BOX	.013	0	2728.000	27.688	14.000	14.000	.000	.000	.000	-.054	.108	9.000	3075.986	
[29]	REACH	76422.400	2810.442	7.381	9.000	BOX	.013	0	2728.000	26.399	14.000	14.000	.000	.000	.000	-.049	.098	9.000	3075.986	
[30]	REACH	76437.670	2811.204	7.742	9.000	BOX	.013	0	2728.000	25.171	14.000	14.000	.000	.000	.000	-.044	.089	9.000	3075.986	
[31]	REACH	76450.000	2811.820	8.119	9.000	BOX	.013	0	2728.000	23.999	14.000	14.000	.000	.000	.000	-.041	.081	9.000	3109.359	
[32]	REACH	76571.280	2812.732	8.117	9.000	BOX	.013	0	2728.000	24.007	14.000	14.000	.000	.000	.000	-.040	.080	9.000	3109.359	
[33]	REACH	77543.450	2820.042	7.739	9.000	BOX	.013	0	2728.000	25.179	14.000	14.000	.000	.000	.000	-.088	.088	9.000	3109.359	
[34]	REACH	77931.530	2822.960	7.379	9.000	BOX	.013	0	2728.000	26.408	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[35]	REACH	77933.550	2822.981	7.380	9.000	BOX	.013	0	2728.000	26.406	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[36]	REACH	78391.020	2827.780	7.740	9.000	BOX	.013	0	2728.000	25.177	14.000	14.000	.000	.000	.000	-.550	.550	9.000	500.989	
[37]	REACH	78458.350	2828.490	7.835	9.000	BOX	.013	0	2728.000	24.871	14.000	14.000	.000	.000	.000	.000	.000	9.000	.000	
[38]	JUNCTION	78478.350	2828.700	4.930	9.000	BOX	.013	0	2063.000	29.890	14.000	14.000	.000	.000	.000	.000	.000	8.770	.000	
[39]	REACH	78550.000	2829.450	4.831	9.000	BOX	.013	0	2063.000	30.500	14.000	14.000	.000	.000	.000	.000	.000	8.770	.000	
[40]	REACH	78609.950	2831.111	4.969	9.000	BOX	.013	0	2063.000	29.660	14.000	14.000	.000	.000	.000	.000	.000	8.770	.000	
[41]	REACH	78690.000	2833.330	5.211	9.000	BOX	.013	0	2063.000	28.280	14.000	14.000	.000	.000	.000	.000	.000	8.770	.000	
[42]	JUNCTION	78710.000	2833.890	2.789	9.000	BOX	.013	0	1230.000	31.502	14.000	14.000	.000	.000	.000	.000	.000	6.213	.000	
[43]	REACH	78955.440	2840.710	2.694	9.000	BOX	.013	0	1230.000	32.609	14.000	14.000	.000	.000	.000	.000	.793	6.213	.000	
[44]	TRANSITION	78975.440	2842.260	4.038	8.000	BOX	.013	0	1230.000	30.460	10.000	10.000	.000	.000	.000	-1.441	1.441	7.774	199.974	
[45]	REACH	79034.420	2843.900	4.075	8.000	BOX	.013	0	1230.000	30.184	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[46]	REACH	79216.980	2848.968	4.252	8.000	BOX	.013	0	1230.000	28.931	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[47]	REACH	79340.000	2852.384	4.459	8.000	BOX	.013	0	1230.000	27.584	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[48]	REACH	79423.010	2854.688	4.677	8.000	BOX	.013	0	1230.000	26.301	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[49]	REACH	79483.270	2856.361	4.905	8.000	BOX	.013	0	1230.000	25.077	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[50]	REACH	79528.750	2857.624	5.144	8.000	BOX	.013	0	1230.000	23.910	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[51]	REACH	79563.800	2858.597	5.396	8.000	BOX	.013	0	1230.000	22.797	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[52]	REACH	79591.040	2859.353	5.659	8.000	BOX	.013	0	1230.000	21.736	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[53]	REACH	79612.160	2859.940	5.935	8.000	BOX	.013	0	1230.000	20.725	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[54]	REACH	79628.320	2860.388	6.225	8.000	BOX	.013	0	1230.000	19.760	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[55]	REACH	79640.370	2860.723	6.528	8.000	BOX	.013	0	1230.000	18.840	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[56]	REACH	79648.910	2860.960	6.847	8.000	BOX	.013	0	1230.000	17.964	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[57]	REACH	80279.300	2864.742	6.848	8.000	BOX	.013	0	1230.000	17.964	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[58]	REACH	80653.160	2866.986	7.066	8.000	BOX	.013	0	1230.000	17.406	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[59]	REACH	80759.210	2867.622	7.411	8.000	BOX	.013	0	1230.000	16.596	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[60]	REACH	80778.910	2867.740	7.774	8.000	BOX	.013	0	1230.000	15.822	10.000	10.000	.000	.000	.000	.000	.000	7.774	.000	
[61]	JUNCTION	80798.910	2868.110	8.777	8.000	BOX	.013	0	1125.000	14.063	10.000	10.000	.000	.000	.000	.000	.000	7.326	.000	
[62]	REACH	80833.910	2868.750	8.320	8.000	BOX	.013	0	1125.000	14.063	10.000	10.000	.000	.000	.000	.000	.000	7.326	.000	
[63]	JUNCTION	80853.910	2869.110	8.466	8.000	BOX	.013	0	1020.000	14.167	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[64]	HYD JUMP	80922.300	2869.521	8.440	8.000	BOX	.013	0	1020.000	14.167	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	HYD JUMP
[65]	REACH	80922.300	2869.521	5.834	8.000	BOX	.013	0	1020.000	19.428	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[66]	REACH	80950.770	2869.692	5.775	8.000	BOX	.013	0	1020.000	19.627	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[67]	REACH	81056.790	2870.330	5.505	8.000	BOX	.013	0	1020.000	20.585	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[68]	REACH	81150.000	2870.890	5.249	8.000	BOX	.013	0	1020.000	21.589	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[69]	REACH	81492.790	2874.647	5.250	8.000	BOX	.013	0	1020.000	21.589	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[70]	REACH	82128.910	2881.620	5.372	8.000	BOX	.013	0	1020.000	21.097	9.000	9.000	.000	.000	.000	.000	.000	7.361	.000	
[71]	JUNCTION	82148.910	2883.620	5.068	6.000	BOX	.013	0	834.000	20.571	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[72]	REACH	82154.050	2883.674	5.066	6.000	BOX	.013	0	834.000	20.579	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[73]	REACH	82489.660	2887.220	4.830	6.000	BOX	.013	0	834.000	21.583	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[74]	REACH	82666.520	2889.088	4.605	6.000	BOX	.013	0	834.000	22.637	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[75]	REACH	82792.940	2890.424	4.390	6.000	BOX	.013	0	834.000	23.742	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[76]	REACH	82894.150	2891.493	4.186	6.000	BOX	.013	0	834.000	24.901	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[77]	REACH	82980.000	2892.400	3.991	6.000	BOX	.013	0	834.000	26.116	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[78]	REACH	83091.340	2894.969	4.068	6.000	BOX	.013	0	834.000	25.628	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[79]	REACH	83252.340	2898.686	4.266	6.000	BOX	.013	0	834.000	24.436	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[80]	REACH	83346.730	2900.865	4.474	6.000	BOX	.013	0	834.000	23.299	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[81]	REACH	83410.060	2902.326	4.693	6.000	BOX	.013	0	834.000	22.214	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[82]	REACH	83455.270	2903.370	4.922	6.000	BOX	.013	0	834.000	21.181	8.000	8.000	.000	.000	.000	.000	.000	6.000	.000	
[83]	JUNCTION	83467.060	2903.608	3.552	6.000	BOX	.013	0	656.000	23.082	8.000	8.000	.000	.000	.000	.000	.000	5.932	.000	
[84]	REACH	83540.790	2905.099	3.617	6.000	BOX	.013	0	656.000	22.673	8.000	8.000	.000	.000	.000	.000	.000	5.932	.000	
[85]	JUNCTION	83550.790	2905.301	1.417	6.000	BOX	.013	0	327.000	28.840	8.000	8.000	.000	.000	.000	.000	.000	3.730	.000	
[86]	REACH	83560.070	2905.490	1.395	6.000	BOX	.013	0	327.000	29.298	8.000	8.000	.000	.000	.000	.000	.000	3.730	-45.000	
[87]	REACH	83578.000	2905.850	1.351	6.000	BOX	.013	0	327.000	30.247	8.000	8.000	.000	.000	.000	.000	.000	3.730	.000	
[88]	TRANSITION	83578.990	2907.308	3.162	4.500	PIPE	.013	0	327.000	27.384	4.114	4.500	.000	.000	.000	.000	.000	4.419	.000	
[89]	REACH	83663.650	2911.302	3.295	4.500	PIPE	.013	0	327.000	26.202	3.985	4.500	.000	.000	.000	.000	.000	4.419	.000	
[90]	REACH	83722.660	2914.086	3.452	4.500	PIPE	.013	0	327.000	24.983	3.805	4.500	.000	.000	.000	.000	.000	4.419	.000	
[91]	REACH	83764.070	2916.040	3.624	4.500	PIPE	.013	0	327.000	23.820	3.563	4.500	.000	.000	.000	.000	.000	4.419	.000	
[92]	REACH	83794.470	2917.474	3.821	4.500	PIPE	.013	0	327.000	22.712	3.220	4.500	.000	.000	.000	.000	.000	4.419	.000	
[93]	REACH	83816.790	2918.527	4.059	4.500	PIPE	.013	0	327.000	21.655	2.676	4.500	.000	.000	.000	.000	.000	4.419	.000	
[94]	HEADWORKS	83830.200	2919.160	4.419	4.500	PIPE	.013	0	327.000	20.645	1.199	4.500	.000	.000	.000	.000	.000	4.419	.000	

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T1 GOWAN BELTWAY WEST CHANNEL
T2 CENTENNIAL TO NORTH DETENTION BASIN
T3 GCW JOB #451-002-001
SO  73650.3202736.500  1
    73681.8802736.900  1       .015
    73701.8802737.160  2       .015
R   73941.0802740.200  2       .015
R   74100.0002742.220  2       .015                                  -18.200
WX  74100.0002742.220  5       .013
R   74189.6602743.360  5       .013                                  -10.300
R   74314.0002744.940  5       .013
R   74414.8902747.860  5       .013
JX  74420.8902748.040  5 72    .013  311.000          2753.350         -45.000
R   74622.6502753.870  5       .013
R   74713.6302756.500  5       .013                                  -10.500
R   75496.0502779.140  5       .013                                  -15.500
R   76311.8902805.280  5       .013
JX  76331.8902805.920  5 10    .013  404.000          2806.960         -10.000
R   76450.0002811.820  5       .013                                    2.200
R   77931.5302822.960  5       .013                                   27.300
R   78391.0202827.780  5       .013
R   78458.3502828.490  5       .013                                    7.700
JX  78478.3502828.700  5 78    .013  665.000          2830.200         -30.000
R   78550.0002829.450  5       .013
R   78690.0002833.330  5       .013
JX  78710.0002833.890  5 78    .013  833.000          2837.610         -30.000
R   78955.4402840.710  5       .013
TS  78975.4402842.260  7       .013
R   79034.4202843.900  7       .013                                   16.900
R   79648.9102860.960  7       .013
R   80778.9102867.740  7       .013
JX  80798.9102868.110  7 60    .013  105.000          2869.610         -45.000
R   80833.9102868.750  7       .013
    80853.9102869.110  9 60    .013  105.000          2870.610         -45.000
    81150.0002870.890  9       .013
R   82128.9102881.620  9       .013
JX  82148.9102883.620 10 60    .013  186.000          2885.120         -45.000
R   82980.0002892.400 10       .013
R   83455.2702903.370 10       .013                                              -45.000
JX  83467.0602903.608 10 48    .013  178.000          2905.880         -45.000
R   83540.7902905.099 10       .013
JX  83550.7902905.301 10 72    .013  329.000          2905.250         -45.000
R   83560.0702905.490 10       .013                                         -45.000
R   83578.0002905.850 10       .013
TS  83579.0002907.308 54       .013
R   83830.2002919.160 54       .013
SH  83830.2002919.160 54
CD   1  2                    11.000   20.000
CD   2  2                    11.000   14.000
CD   3  3                     8.000   16.000
CD   4  3                     8.000   15.000
CD   5  3                     9.000   14.000
CD   6  3                     8.000   12.000
CD   7  3                     8.000   10.000
CD   8  3                     6.000   10.000
CD   9  3                     8.000    9.000
CD  10  3                     6.000    8.000
CD  11  3                     5.000    8.000
CD  12  2                    10.000   16.000
CD  48  4                     4.000
CD  54  4                     4.500
CD  60  4                     5.000
    66  4                     5.500
CD  72  4                     6.000
CD  78  4                     6.500
Q            327.000   .0
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GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT or "N"	Base Wt I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp		X-Fall	ZR	Type Ch
73650.320	2736.500	4.974	2741.474	3443.00	34.61	18.60	2760.07	.00	9.73	20.00	11.000	20.000	.00	0 .0
31.563	.0127					.0251	.79	4.97	2.73	6.28	.015	.00	.00	RECTANG
73681.880	2736.900	4.915	2741.815	3443.00	35.03	19.05	2760.87	.00	9.73	20.00	11.000	20.000	.00	0 .0
TRANS STR	.0130					.0229	.46	4.91	2.78		.015	.00	.00	RECTANG
73701.880	2737.160	7.413	2744.573	3443.00	33.18	17.09	2761.66	.00	12.34	14.00	11.000	14.000	.00	0 .0
102.523	.0127					.0212	2.17	7.41	2.15	8.87	.015	.00	.00	RECTANG
73804.410	2738.463	7.185	2745.648	3443.00	34.23	18.19	2763.84	.00	12.34	14.00	11.000	14.000	.00	0 .0
136.672	.0127					.0236	3.22	7.19	2.25	8.87	.015	.00	.00	RECTANG
73941.080	2740.200	6.851	2747.051	3443.00	35.90	20.01	2767.06	1.12	12.34	14.00	11.000	14.000	.00	0 .0
44.195	.0127					.0256	1.13	7.97	2.42	8.87	.015	.00	.00	RECTANG
73985.270	2740.762	6.736	2747.498	3443.00	36.51	20.70	2768.20	1.16	12.34	14.00	11.000	14.000	.00	0 .0
114.727	.0127					.0280	3.21	7.89	2.48	8.87	.015	.00	.00	RECTANG
74100.000	2742.220	6.423	2748.643	3443.00	38.29	22.77	2771.41	1.28	12.34	14.00	11.000	14.000	.00	0 .0
WALL EXIT														
74100.000	2742.220	6.421	2748.641	3443.00	38.30	22.78	2771.42	1.28	9.00	14.00	9.000	14.000	.00	0 .0
89.656	.0127					.0231	2.07	7.70	2.66	7.94	.013	.00	.00	BOX
74189.660	2743.360	6.274	2749.634	3443.00	39.20	23.86	2773.49	.00	9.00	14.00	9.000	14.000	.00	0 .0
124.344	.0127					.0251	3.12	6.27	2.76	7.95	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
74314.000	2744.940	6.056	2750.995	3443.00	40.61	25.61	2776.61	.00	9.00	14.00	9.000	14.000	.00	0 .0
100.891	.0289					.0260	2.63	6.06	2.91	5.84	.013	.00	.00	BOX
74414.890	2747.860	6.095	2753.955	3443.00	40.35	25.28	2779.23	.00	9.00	14.00	9.000	14.000	.00	0 .0
JUNCT STR	.0300					.0272	.16	6.10	2.88		.013	.00	.00	BOX
74420.890	2748.040	5.480	2753.520	3132.00	40.83	25.88	2779.40	.00	9.00	14.00	9.000	14.000	.00	0 .0
201.758	.0289					.0285	5.74	5.48	3.07	5.46	.013	.00	.00	BOX
74622.650	2753.870	5.490	2759.360	3132.00	40.75	25.79	2785.15	1.45	9.00	14.00	9.000	14.000	.00	0 .0
90.984	.0289					.0284	2.58	6.94	3.06	5.45	.013	.00	.00	BOX
74713.630	2756.500	5.496	2761.996	3132.00	40.71	25.73	2787.73	.25	9.00	14.00	9.000	14.000	.00	0 .0
782.414	.0289					.0271	21.23	5.74	3.06	5.45	.013	.00	.00	BOX
75496.050	2779.140	5.673	2784.813	3132.00	39.44	24.15	2808.96	.00	9.00	14.00	9.000	14.000	.00	0 .0
89.055	.0320					.0255	2.27	5.67	2.92	5.25	.013	.00	.00	BOX
75585.100	2781.994	5.752	2787.746	3132.00	38.89	23.49	2811.23	.00	9.00	14.00	9.000	14.000	.00	0 .0
216.266	.0320					.0235	5.08	5.75	2.86	5.25	.013	.00	.00	BOX
75801.370	2788.923	6.033	2794.956	3132.00	37.08	21.35	2816.31	.00	9.00	14.00	9.000	14.000	.00	0 .0
144.125	.0320					.0206	2.97	6.03	2.66	5.25	.013	.00	.00	BOX
75945.490	2793.541	6.328	2799.868	3132.00	35.35	19.41	2819.28	.00	9.00	14.00	9.000	14.000	.00	0 .0
104.617	.0320					.0181	1.90	6.33	2.48	5.25	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

ation / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
76050.110	2796.893	6.637	2803.529	3132.00	33.71	17.64	2821.17	.00	9.00	14.00	9.000	14.000	.00	0 .0
79.563	.0320					.0159	1.27	6.64	2.31	5.25	.013	.00	.00	BOX
76129.670	2799.442	6.960	2806.402	3132.00	32.14	16.04	2822.44	.00	9.00	14.00	9.000	14.000	.00	0 .0
62.156	.0320					.0140	.87	6.96	2.15	5.25	.013	.00	.00	BOX
76191.830	2801.433	7.300	2808.734	3132.00	30.65	14.58	2823.32	.00	9.00	14.00	9.000	14.000	.00	0 .0
49.297	.0320					.0124	.61	7.30	2.00	5.25	.013	.00	.00	BOX
76241.130	2803.013	7.656	2810.669	3132.00	29.22	13.26	2823.93	.00	9.00	14.00	9.000	14.000	.00	0 .0
39.359	.0320					.0109	.43	7.66	1.86	5.25	.013	.00	.00	BOX
76280.480	2804.274	8.030	2812.304	3132.00	27.86	12.05	2824.36	.00	9.00	14.00	9.000	14.000	.00	0 .0
31.406	.0320					.0096	.30	8.03	1.73	5.25	.013	.00	.00	BOX
76311.890	2805.280	8.422	2813.702	3132.00	26.56	10.96	2824.66	.00	9.00	14.00	9.000	14.000	.00	0 .0
JUNCT STR	.0320					.0123	.25	8.52	1.61		.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
76331.880	2805.920	6.191	2812.111	2728.00	31.48	15.38	2827.49	.14	9.00	14.00	9.000	14.000	.00	0 .0
22.039	.0500					.0149	.33	6.33	2.23	4.06	.013	.00	.00	BOX
76353.920	2807.021	6.398	2813.419	2728.00	30.46	14.40	2827.82	.13	9.00	14.00	9.000	14.000	.00	0 .0
27.242	.0500					.0134	.36	6.53	2.12	4.06	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

ation	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
76381.160	2808.382	6.710	2815.092	2728.00	29.04	13.09	2828.19	.12	9.00	14.00	9.000	14.000	.00	0 .0
22.586	.0500					.0117	.27	6.83	1.98	4.06	.013	.00	.00	BOX
76403.750	2809.510	7.038	2816.548	2728.00	27.69	11.90	2828.45	.11	9.00	14.00	9.000	14.000	.00	0 .0
18.648	.0500					.0103	.19	7.15	1.84	4.06	.013	.00	.00	BOX
76422.400	2810.442	7.381	2817.823	2728.00	26.40	10.82	2828.64	.10	9.00	14.00	9.000	14.000	.00	0 .0
15.273	.0500					.0091	.14	7.48	1.71	4.06	.013	.00	.00	BOX
76437.670	2811.204	7.741	2818.946	2728.00	25.17	9.84	2828.78	.09	9.00	14.00	9.000	14.000	.00	0 .0
12.328	.0500					.0080	.10	7.83	1.59	4.06	.013	.00	.00	BOX
76450.000	2811.820	8.119	2819.939	2728.00	24.00	8.94	2828.88	.08	9.00	14.00	9.000	14.000	.00	0 .0
121.281	.0075					.0075	.92	8.20	1.48	8.13	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

76571.280	2812.732	8.117	2820.849	2728.00	24.01	8.95	2829.80	.08	9.00	14.00	9.000	14.000	.00	0 .0
972.172	.0075					.0081	7.83	8.20	1.49	8.13	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

77543.450	2820.042	7.739	2827.781	2728.00	25.18	9.84	2837.63	.09	9.00	14.00	9.000	14.000	.00	0 .0
388.078	.0075					.0091	3.54	7.83	1.60	8.13	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) /	Water Elev /	Q (CFS) /	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. /	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
77931.530	2822.960	7.379	2830.339	2728.00	26.41	10.83	2841.17	.00	9.00	14.00	9.000	14.000	.00	0 .0
2.016	.0105					.0097	.02	7.38	1.71	7.16	.013	.00	.00	BOX
77933.550	2822.981	7.379	2830.361	2728.00	26.41	10.83	2841.19	.00	9.00	14.00	9.000	14.000	.00	0 .0
457.477	.0105					.0091	4.17	7.38	1.71	7.16	.013	.00	.00	BOX
78391.020	2827.780	7.740	2835.520	2728.00	25.18	9.84	2845.36	.55	9.00	14.00	9.000	14.000	.00	0 .0
67.328	.0105					.0084	.57	8.29	1.59	7.15	.013	.00	.00	BOX
78458.350	2828.490	7.835	2836.325	2728.00	24.87	9.61	2845.93	.00	9.00	14.00	9.000	14.000	.00	0 .0
JUNCT STR	.0105					.0124	.25	7.83	1.57		.013	.00	.00	BOX
78478.350	2828.700	4.930	2833.630	2063.00	29.89	13.87	2847.50	.00	8.77	14.00	9.000	14.000	.00	0 .0
71.648	.0105					.0171	1.22	4.93	2.37	5.83	.013	.00	.00	BOX
78550.000	2829.450	4.831	2834.281	2063.00	30.50	14.44	2848.73	.00	8.77	14.00	9.000	14.000	.00	0 .0
59.945	.0277					.0169	1.01	4.83	2.45	4.11	.013	.00	.00	BOX
78609.950	2831.111	4.968	2836.080	2063.00	29.66	13.66	2849.74	.00	8.77	14.00	9.000	14.000	.00	0 .0
80.055	.0277					.0152	1.22	4.97	2.34	4.11	.013	.00	.00	BOX
78690.000	2833.330	5.211	2838.541	2063.00	28.28	12.42	2850.96	.00	8.77	14.00	9.000	14.000	.00	0 .0
JUNCT STR	.0280					.0222	.44	5.21	2.18		.013	.00	.00	BOX
78710.000	2833.890	2.789	2836.679	1230.00	31.50	15.41	2852.09	.00	6.21	14.00	9.000	14.000	.00	0 .0
245.438	.0278					.0319	7.82	2.79	3.32	2.87	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT "N"	Base Wt or I.D. X-Fall	ZL ZR	No Wth Prs/Pip Type Ch
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp				
78955.440	2840.710	2.694	2843.404	1230.00	32.61	16.51	2859.92	.00	6.21	14.00	9.000	14.000	.00	0 .0
TRANS STR	.0775					.0289	.58	2.69	3.50		.013	.00	.00	BOX
78975.440	2842.260	4.038	2846.298	1230.00	30.46	14.41	2860.70	1.44	7.77	10.00	8.000	10.000	.00	0 .0
58.984	.0278					.0240	1.42	5.48	2.67	3.85	.013	.00	.00	BOX
79034.420	2843.900	4.075	2847.975	1230.00	30.18	14.15	2862.12	.00	7.77	10.00	8.000	10.000	.00	0 .0
182.563	.0278					.0224	4.09	4.08	2.63	3.85	.013	.00	.00	BOX
79216.980	2848.968	4.252	2853.220	1230.00	28.93	13.00	2866.22	.00	7.77	10.00	8.000	10.000	.00	0 .0
123.016	.0278					.0198	2.44	4.25	2.47	3.85	.013	.00	.00	BOX
79340.000	2852.384	4.459	2856.843	1230.00	27.58	11.82	2868.66	.00	7.77	10.00	8.000	10.000	.00	0 .0
83.008	.0278					.0174	1.45	4.46	2.30	3.85	.013	.00	.00	BOX
79423.010	2854.688	4.677	2859.365	1230.00	26.30	10.74	2870.11	.00	7.77	10.00	8.000	10.000	.00	0 .0
60.258	.0278					.0153	.92	4.68	2.14	3.85	.013	.00	.00	BOX
79483.270	2856.361	4.905	2861.266	1230.00	25.08	9.76	2871.03	.00	7.77	10.00	8.000	10.000	.00	0 .0
45.484	.0278					.0135	.61	4.90	2.00	3.85	.013	.00	.00	BOX
79528.750	2857.624	5.144	2862.768	1230.00	23.91	8.88	2871.65	.00	7.77	10.00	8.000	10.000	.00	0 .0
35.055	.0278					.0119	.42	5.14	1.86	3.85	.013	.00	.00	BOX
79563.800	2858.597	5.395	2863.993	1230.00	22.80	8.07	2872.06	.00	7.77	10.00	8.000	10.000	.00	0 .0
27.234	.0278					.0105	.29	5.40	1.73	3.85	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
79591.040	2859.353	5.659	2865.012	1230.00	21.74	7.34	2872.35	.00	7.77	10.00	8.000	10.000	.00	0 .0
21.117	.0278					.0093	.20	5.66	1.61	3.85	.013	.00	.00	BOX
79612.160	2859.940	5.935	2865.875	1230.00	20.72	6.67	2872.54	.00	7.77	10.00	8.000	10.000	.00	0 .0
16.164	.0278					.0082	.13	5.93	1.50	3.85	.013	.00	.00	BOX
79628.320	2860.388	6.225	2866.613	1230.00	19.76	6.06	2872.68	.00	7.77	10.00	8.000	10.000	.00	0 .0
12.047	.0278					.0072	.09	6.22	1.40	3.85	.013	.00	.00	BOX
79640.370	2860.723	6.528	2867.251	1230.00	18.84	5.51	2872.76	.00	7.77	10.00	8.000	10.000	.00	0 .0
8.539	.0278					.0064	.05	6.53	1.30	3.85	.013	.00	.00	BOX
79648.910	2860.960	6.847	2867.807	1230.00	17.96	5.01	2872.82	.00	7.77	10.00	8.000	10.000	.00	0 .0
630.391	.0060					.0060	3.78	6.85	1.21	6.85	.013	.00	.00	BOX
80279.300	2864.742	6.847	2871.590	1230.00	17.96	5.01	2876.60	.00	7.77	10.00	8.000	10.000	.00	0 .0
373.867	.0060					.0058	2.16	6.85	1.21	6.85	.013	.00	.00	BOX
80653.160	2866.986	7.066	2874.052	1230.00	17.41	4.70	2878.76	.00	7.77	10.00	8.000	10.000	.00	0 .0
106.047	.0060					.0052	.55	7.07	1.15	6.85	.013	.00	.00	BOX
80759.210	2867.622	7.411	2875.033	1230.00	16.60	4.28	2879.31	.00	7.77	10.00	8.000	10.000	.00	0 .0
19.695	.0060					.0046	.09	7.41	1.07	6.85	.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
80778.910	2867.740	7.774	2875.514	1230.00	15.82	3.89	2879.40	.00	7.77	10.00	8.000	10.000	.00	0 .0
JUNCT STR	.0185					.0052	.10	7.77	1.00		.013	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
80798.910	2868.110	8.777	2876.887	1125.00	14.06	3.07	2879.96	.00	7.33	10.00	8.000	10.000	.00	0 .0
35.000	.0183					.0052	.18	8.78	.88	4.20	.013	.00	.00	BOX
80833.910	2868.750	8.320	2877.070	1125.00	14.06	3.07	2880.14	.00	7.33	10.00	8.000	10.000	.00	0 .0
JUNCT STR	.0180					.0056	.11	8.32	.88		.013	.00	.00	BOX
80853.910	2869.110	8.466	2877.576	1020.00	14.17	3.12	2880.69	.00	7.36	9.00	8.000	9.000	.00	0 .0
68.391	.0060					.0056	.39	8.47	.88	6.63	.013	.00	.00	BOX
80922.300	2869.521	8.440	2877.961	1020.00	14.17	3.12	2881.08	.00	7.36	9.00	8.000	9.000	.00	0 .0
HYDRAULIC JUMP														
80922.300	2869.521	5.833	2875.355	1020.00	19.43	5.86	2881.22	.00	7.36	9.00	8.000	9.000	.00	0 .0
28.477	.0060					.0084	.24	5.83	1.42	6.63	.013	.00	.00	BOX
80950.770	2869.692	5.774	2875.467	1020.00	19.63	5.98	2881.45	.00	7.36	9.00	8.000	9.000	.00	0 .0
106.016	.0060					.0091	.97	5.77	1.44	6.63	.013	.00	.00	BOX
81056.790	2870.330	5.506	2875.835	1020.00	20.58	6.58	2882.42	.00	7.36	9.00	8.000	9.000	.00	0 .0
93.211	.0060					.0103	.96	5.51	1.55	6.63	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) /	Water Elev /	Q (CFS) /	Vel (FPS) /	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
81150.000	2870.890	5.249	2876.139	1020.00	21.59	7.24	2883.38	.00	7.36	9.00	8.000	9.000	.00	0 .0
342.789	.0110					.0110	3.76	5.25	1.66	5.25	.013	.00	.00	BOX
81492.790	2874.647	5.249	2879.897	1020.00	21.59	7.24	2887.13	.00	7.36	9.00	8.000	9.000	.00	0 .0
636.117	.0110					.0106	6.77	5.25	1.66	5.25	.013	.00	.00	BOX
82128.910	2881.620	5.372	2886.992	1020.00	21.10	6.91	2893.90	.00	7.36	9.00	8.000	9.000	.00	0 .0
JUNCT STR	.1000					.0107	.21	5.37	1.60		.013	.00	.00	BOX
82148.910	2883.620	5.068	2888.688	834.00	20.57	6.57	2895.26	.00	6.00	8.00	6.000	8.000	.00	0 .0
5.141	.0106					.0111	.06	5.07	1.61	5.16	.013	.00	.00	BOX
82154.050	2883.674	5.066	2888.740	834.00	20.58	6.58	2895.32	.00	6.00	8.00	6.000	8.000	.00	0 .0
335.609	.0106					.0118	3.97	5.07	1.61	5.16	.013	.00	.00	BOX
82489.660	2887.220	4.830	2892.050	834.00	21.58	7.23	2899.28	.00	6.00	8.00	6.000	8.000	.00	0 .0
176.859	.0106					.0134	2.37	4.83	1.73	5.16	.013	.00	.00	BOX
82666.520	2889.088	4.605	2893.693	834.00	22.64	7.96	2901.65	.00	6.00	8.00	6.000	8.000	.00	0 .0
126.414	.0106					.0152	1.92	4.61	1.86	5.16	.013	.00	.00	BOX
82792.940	2890.424	4.391	2894.814	834.00	23.74	8.75	2903.57	.00	6.00	8.00	6.000	8.000	.00	0 .0
101.211	.0106					.0172	1.74	4.39	2.00	5.16	.013	.00	.00	BOX
82894.150	2891.493	4.187	2895.679	834.00	24.90	9.63	2905.31	.00	6.00	8.00	6.000	8.000	.00	0 .0
85.852	.0106					.0195	1.67	4.19	2.14	5.16	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

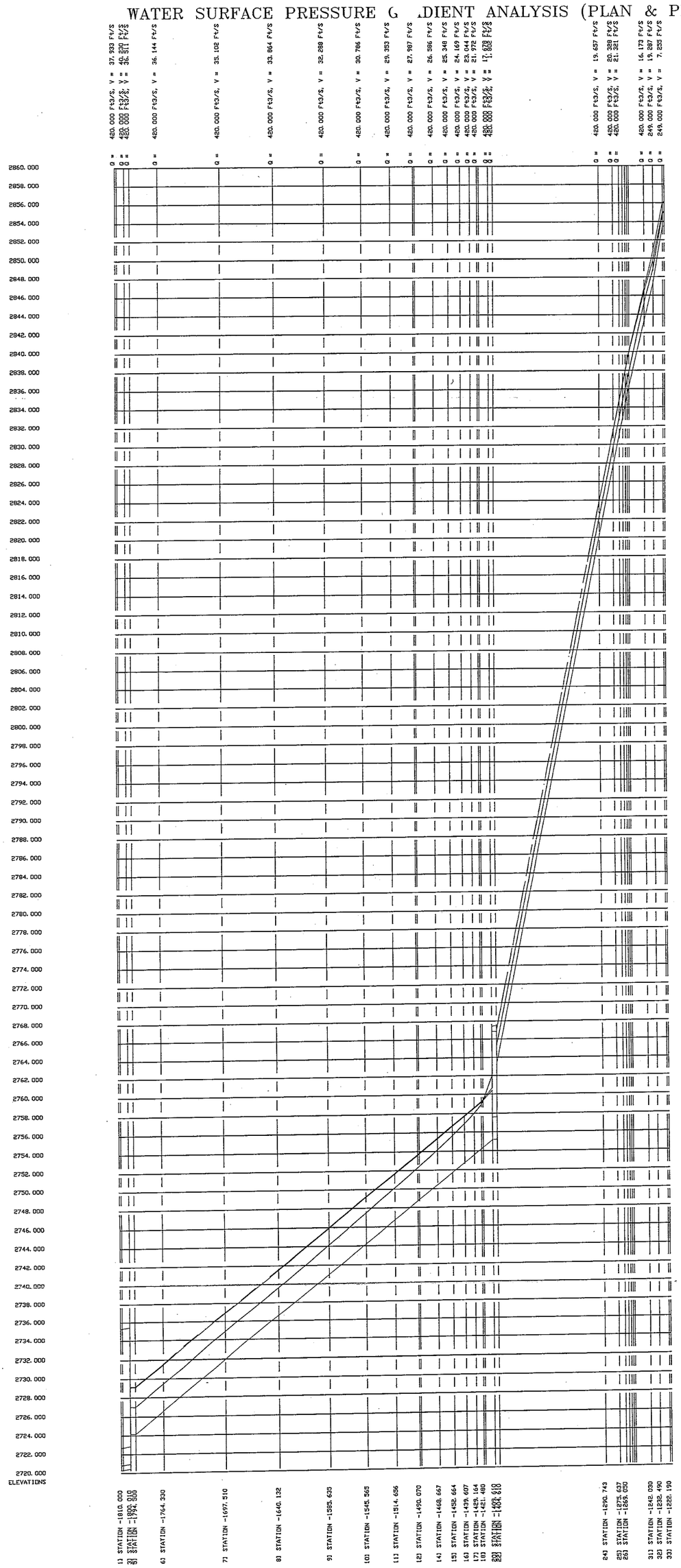
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
82980.000	2892.400	3.992	2896.391	834.00	26.12	10.59	2906.98	.00	6.00	8.00	6.000	8.000	.00	0 .0
111.336	.0231					.0202	2.25	3.99	2.30	3.84	.013	.00	.00	BOX
83091.340	2894.969	4.068	2899.037	834.00	25.63	10.20	2909.24	.00	6.00	8.00	6.000	8.000	.00	0 .0
161.000	.0231					.0186	2.99	4.07	2.24	3.84	.013	.00	.00	BOX
83252.340	2898.686	4.266	2902.952	834.00	24.44	9.27	2912.22	.00	6.00	8.00	6.000	8.000	.00	0 .0
94.391	.0231					.0164	1.54	4.27	2.08	3.84	.013	.00	.00	BOX
83346.730	2900.865	4.475	2905.339	834.00	23.30	8.43	2913.77	.00	6.00	8.00	6.000	8.000	.00	0 .0
63.336	.0231					.0144	.91	4.47	1.94	3.84	.013	.00	.00	BOX
83410.060	2902.326	4.693	2907.019	834.00	22.21	7.66	2914.68	.00	6.00	8.00	6.000	8.000	.00	0 .0
45.211	.0231					.0127	.58	4.69	1.81	3.84	.013	.00	.00	BOX
83455.270	2903.370	4.922	2908.292	834.00	21.18	6.97	2915.26	.00	6.00	8.00	6.000	8.000	.00	0 .0
JUNCT STR	.0202					.0148	.17	4.92	1.68		.013	.00	.00	BOX
83467.060	2903.608	3.552	2907.160	656.00	23.08	8.27	2915.43	.00	5.93	8.00	6.000	8.000	.00	0 .0
73.727	.0202					.0171	1.26	3.55	2.16	3.37	.013	.00	.00	BOX
83540.790	2905.099	3.617	2908.716	656.00	22.67	7.98	2916.70	.00	5.93	8.00	6.000	8.000	.00	0 .0
JUNCT STR	.0202					.0383	.38	3.62	2.10		.013	.00	.00	BOX
83550.790	2905.301	1.417	2906.718	327.00	28.84	12.92	2919.63	.00	3.73	8.00	6.000	8.000	.00	0 .0
9.281	.0204					.0614	.57	1.42	4.27	2.05	.013	.00	.00	BOX

GOWAN BELTWAY WEST CHANNEL
CENTENNIAL TO NORTH DETENTION BASIN
GCW JOB #451-002-001

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT or "N"	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp		X-Fall	ZR	Type Ch
83560.070	2905.490	1.395	2906.885	327.00	29.30	13.33	2920.21	.00	3.73	8.00	6.000	8.000	.00	0 .0
17.930	.0201					.0659	1.18	1.40	4.37	2.06	.013	.00	.00	BOX
83578.000	2905.850	1.351	2907.201	327.00	30.25	14.21	2921.41	.00	3.73	8.00	6.000	8.000	.00	0 .0
TRANS STR	1.4580					.0541	.05	1.35	4.59		.013	.00	.00	BOX
83578.990	2907.308	3.162	2910.470	327.00	27.38	11.64	2922.11	.00	4.42	4.11	4.500	.000	.00	0 .0
84.656	.0472					.0371	3.14	3.16	2.83	2.95	.013	.00	.00	PIPE
83663.650	2911.302	3.295	2914.597	327.00	26.20	10.66	2925.26	.00	4.42	3.99	4.500	.000	.00	0 .0
59.016	.0472					.0334	1.97	3.30	2.61	2.95	.013	.00	.00	PIPE
83722.660	2914.086	3.451	2917.538	327.00	24.98	9.69	2927.23	.00	4.42	3.80	4.500	.000	.00	0 .0
41.406	.0472					.0301	1.25	3.45	2.37	2.95	.013	.00	.00	PIPE
83764.070	2916.040	3.625	2919.664	327.00	23.82	8.81	2928.47	.00	4.42	3.56	4.500	.000	.00	0 .0
30.398	.0472					.0273	.83	3.62	2.14	2.95	.013	.00	.00	PIPE
83794.470	2917.474	3.822	2921.295	327.00	22.71	8.01	2929.30	.00	4.42	3.22	4.500	.000	.00	0 .0
22.320	.0472					.0252	.56	3.82	1.89	2.95	.013	.00	.00	PIPE
83816.790	2918.527	4.059	2922.586	327.00	21.65	7.28	2929.87	.00	4.42	2.68	4.500	.000	.00	0 .0
13.414	.0472					.0246	.33	4.06	1.61	2.95	.013	.00	.00	PIPE
83830.200	2919.160	4.419	2923.579	327.00	20.65	6.62	2930.20	.00	4.42	1.20	4.500	.000	.00	0 .0

FACILITY SDPD-1 – PEACEFUL DAWN COLLECTION SYSTEM

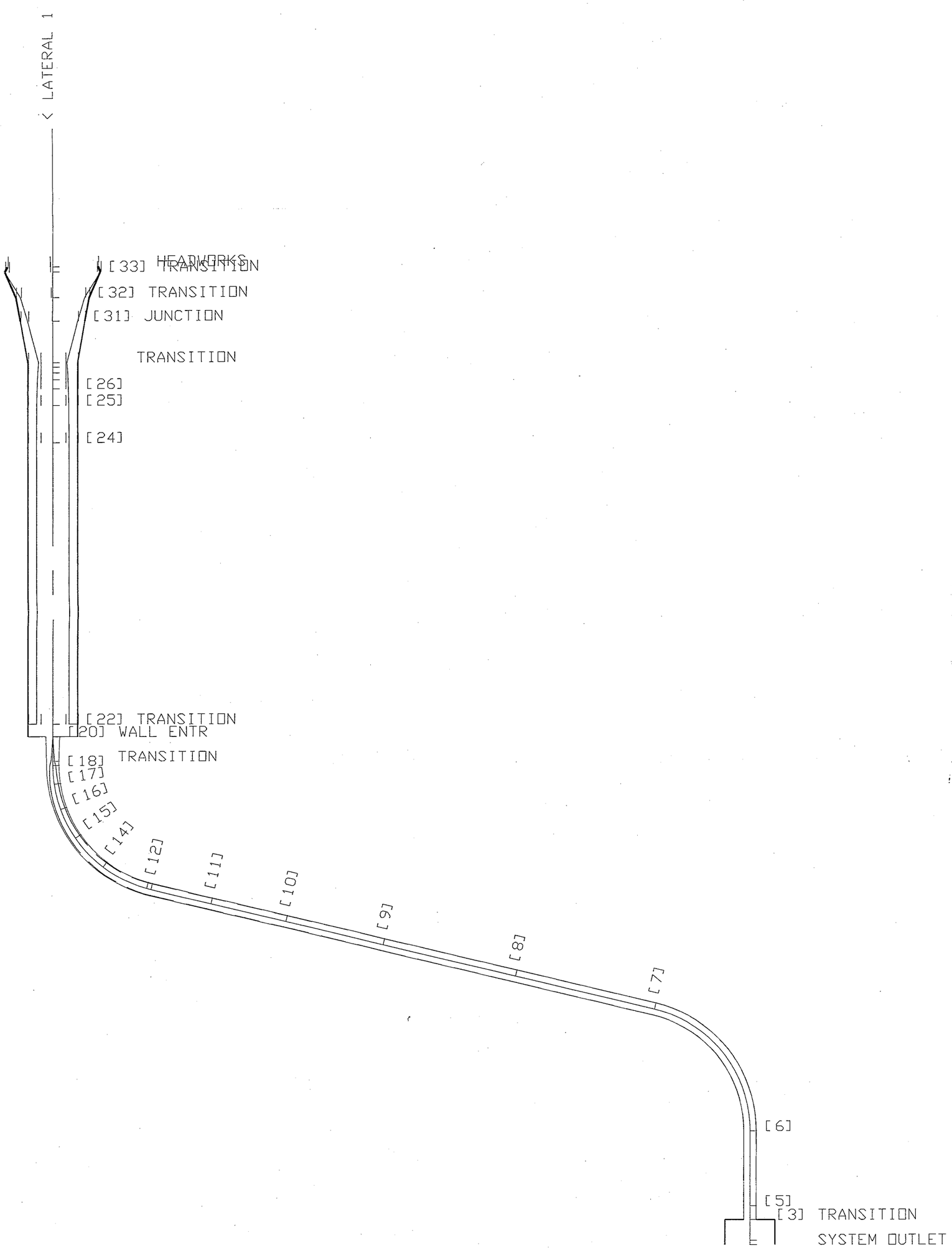
WATER SURFACE PRESSURE G ADIENT ANALYSIS (PLAN & PROFILE)



Program Package Serial Number: 1622 Date: 6-30-2008 Time: 2:48:22 File: SDPD-1.WSW

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDPD-1 - COLLECTOR, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDPD-1.WSW

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	-1810.000	2720.270	.554	15.000	BOX	.013	0	420.000	37.933	20.000	20.000	.000	.000	.000	.000	.000	2.392	.000	
[2]	REACH	-1808.176	2720.299	.548	15.000	BOX	.013	0	420.000	38.358	20.000	20.000	.000	.000	.000	.000	.000	2.392	.000	
[3]	REACH	-1800.010	2720.430	.522	15.000	BOX	.013	0	420.000	40.230	20.000	20.000	.000	.000	.000	.000	.000	2.392	.000	
[4]	TRANSITION	-1800.000	2724.150	2.861	5.000	PIPE	.013	0	420.000	36.160	4.948	5.000	.000	.000	.000	.000	.000	4.905	.000	
[5]	REACH	-1794.500	2724.150	2.838	5.000	PIPE	.013	0	420.000	36.511	4.954	5.000	.000	.000	.000	.000	.000	4.905	.000	
[6]	REACH	-1764.330	2726.580	2.862	5.000	PIPE	.013	0	420.000	36.144	4.947	5.000	.000	.000	.000	.000	.000	4.905	50.000	
[7]	REACH	-1697.510	2731.960	2.932	5.000	PIPE	.013	0	420.000	35.102	4.925	5.000	.000	.000	.000	.000	.000	4.905	.000	
[8]	REACH	-1640.132	2736.585	3.020	5.000	PIPE	.013	0	420.000	33.864	4.891	5.000	.000	.000	.000	.000	.000	4.905	.000	
[9]	REACH	-1585.635	2740.977	3.145	5.000	PIPE	.013	0	420.000	32.288	4.831	5.000	.000	.000	.000	.000	.000	4.905	.000	
[10]	REACH	-1545.565	2744.207	3.277	5.000	PIPE	.013	0	420.000	30.786	4.752	5.000	.000	.000	.000	.000	.000	4.905	.000	
11]	REACH	-1514.656	2746.698	3.419	5.000	PIPE	.013	0	420.000	29.353	4.650	5.000	.000	.000	.000	.000	.000	4.905	.000	
12]	REACH	-1490.070	2748.680	3.572	5.000	PIPE	.013	0	420.000	27.987	4.517	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[13]	REACH	-1488.261	2748.826	3.584	5.000	PIPE	.013	0	420.000	27.883	4.505	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[14]	REACH	-1468.667	2750.406	3.750	5.000	PIPE	.013	0	420.000	26.586	4.330	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[15]	REACH	-1452.664	2751.696	3.933	5.000	PIPE	.013	0	420.000	25.348	4.097	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[16]	REACH	-1439.607	2752.749	4.138	5.000	PIPE	.013	0	420.000	24.169	3.777	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[17]	REACH	-1429.164	2753.591	4.377	5.000	PIPE	.013	0	420.000	23.044	3.302	5.000	.000	.000	.000	.000	.000	4.905	51.324	
[18]	REACH	-1421.480	2754.210	4.684	5.000	PIPE	.013	0	420.000	21.972	2.433	5.000	.000	.000	.000	.000	.000	4.905	.000	
[19]	REACH	-1419.610	2754.360	4.905	5.000	PIPE	.013	0	420.000	21.485	1.365	5.000	.000	.000	.000	.000	.000	4.905	.000	
[20]	REACH	-1409.610	2755.170	6.837	5.500	PIPE	.013	0	420.000	17.678	.000	5.500	.000	.000	.000	.000	.000	5.242	.000	
[21]	WALL ENTR	-1409.610	2755.170	11.703	12.280	RECTANGULAR	.013	0	420.000	1.794	20.000	20.000	.000	.000	.000	.000	.000	2.392	.000	
[22]	REACH	-1404.610	2755.220	11.653	12.280	RECTANGULAR	.065	0	420.000	1.802	20.000	20.000	.000	.000	.000	.000	.000	2.392	.000	
[23]	TRANSITION	-1404.600	2763.250	2.018	3.750	IREG-OPEN	.065	0	420.000	19.657	13.074	20.000	.000	.000	.000	.000	.000	3.620	.000	
[24]	REACH	-1290.743	2820.182	2.019	3.750	IREG-OPEN	.065	0	420.000	19.657	13.074	20.000	.000	.000	.000	.000	.000	3.620	.000	
[25]	REACH	-1275.637	2827.736	1.964	3.750	IREG-OPEN	.065	0	420.000	20.328	12.856	20.000	.000	.000	.000	.000	.000	3.620	.000	
[26]	REACH	-1269.050	2831.030	1.888	3.750	IREG-OPEN	.065	0	420.000	21.321	12.552	20.000	.000	.000	.000	.000	.000	3.620	.000	
[27]	REACH	-1265.267	2832.921	1.814	3.750	IREG-OPEN	.065	0	420.000	22.361	12.256	20.000	.000	.000	.000	.000	.000	3.620	.000	
[28]	REACH	-1262.553	2834.278	1.743	3.750	IREG-OPEN	.065	0	420.000	23.453	11.968	20.000	.000	.000	.000	.000	.000	3.620	.000	
[29]	REACH	-1260.407	2835.352	1.671	3.750	IREG-OPEN	.065	0	420.000	24.597	11.684	20.000	.000	.000	.000	.000	.000	3.620	.000	
[30]	REACH	-1258.610	2836.250	1.603	3.750	IREG-OPEN	.013	0	420.000	25.798	11.412	20.000	.000	.000	.000	.000	.000	3.620	.000	
[31]	TRANSITION	-1242.030	2843.280	1.981	3.480	IREG-OPEN	.013	0	420.000	16.173	20.072	25.850	.000	.000	.000	.000	.000	3.118	.000	
[32]	JUNCTION	-1232.490	2847.350	1.550	3.350	IREG-OPEN	.013	0	249.000	19.287	25.760	29.380	.000	.000	.000	.000	.000	2.479	.000	
[33]	TRANSITION	-1222.190	2853.470	1.339	2.530	IREG-OPEN	.013	0	249.000	7.255	38.320	38.320	.000	.000	.000	.000	.000	1.538	.000	
[34]	TRANSITION	-1220.190	2853.510	1.581	2.640	IREG-OPEN	.013	0	249.000	6.053	36.230	36.230	.000	.000	.000	.000	.000	1.581	.000	


LATERAL 1
HEADWORKS
[33] TRANSITION
[32] TRANSITION
[31] JUNCTION
TRANSITION
[26]
[25]
[24]
[22] TRANSITION
[20] WALL ENTR
TRANSITION
[18]
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[8]
[7]
[6]
[5]
[3] TRANSITION
SYSTEM OUTLET

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T1 WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
T2 FACILITY SDPD-1 - COLLECTOR, RCP & STEPPED SPILLWAY
T3 FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDPD-1.WSW
SO  -1810.0002720.270 11                                  2727.630
WE  -1810.0002720.270  9       .013
R   -1800.0102720.430  9       .013
TS  -1800.0002724.150 60       .013
R   -1794.5002724.150 60       .013
R   -1764.3302726.580 60       .013                                    .000    .000 0
R   -1697.5102731.960 60       .013                                 -76.570    .000 0
R   -1490.0702748.680 60       .013                                    .000    .000 0
R   -1421.4802754.210 60       .013                                  76.570    .000 0
R   -1419.6102754.360 60       .013
TS  -1409.6102755.170 66       .013
WE  -1409.6102755.170  3       .013
R   -1404.6102755.220  3       .013
TS  -1404.6002763.250 10       .065
R   -1258.6102836.250 10       .065
TS  -1242.0302843.280 12       .013
JX  -1232.4902847.350 13 42    .013  171.000          2847.350          -0.000
TS  -1222.1902853.470 14       .013
TS  -1220.1902853.510 15       .013
SH  -1220.1902853.510 15
CD   1  2                     4.000    6.000
CD   2  2                     4.000   20.000
CD   3  2                    12.280   20.000
CD   4  3                     4.000    6.000
CD   5  3                     7.000   12.000
CD   6  3                    19.200   12.000
CD   7  3                     3.000   20.000
CD   8  3                    12.000   20.000
CD   9  3                    15.000   20.000
CD  18  4                     1.500
CD  36  4                     3.000
CD  42  4                     3.500
CD  48  4                     4.000
CD  54  4                     4.500
CD  60  4                     5.000
CD  66  4                     5.500
CD  72  4                     6.000
CD  84  4                     7.000
CD  90  4                     7.500
CD  10  5
CD  11  6
CD  12  5
CD  13  5
CD  14  5
CD  15  5
PTS 10 6  0.000  3.750  5.000  1.250  5.000  0.000 15.000  0.000 15.000  1.250
PTS      20.000  3.750
PTS 1112  0.000  0.000 20.000  0.000 20.000  3.330 10.000  3.330 10.000 12.500
PTS      20.000 12.500 20.000 15.000  0.000 15.000  0.000 12.500 10.000 12.500
PTS      10.000  3.330  0.000  3.330
PTS 12 7  0.000 46.760  3.060 45.230  3.060 43.280 12.470 44.270 23.070 43.990
PTS      23.070 45.370 26.070 46.87
PTS 13 7  0.000 50.700  1.940 49.730  1.940 47.350 13.900 48.880 27.700 48.410
PTS      27.700 49.860 29.540 50.780
PTS 14 7  0.000 56.000  0.000 53.470  1.550 53.470 18.080 53.860 36.790 54.400
PTS      38.320 54.400 38.320 57.00
PTS 15 5  0.000 56.150  0.000 53.510 16.770 53.900 36.230 54.440 36.230 57.100
Q           249.000   .0
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Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1545.565	2744.207	3.277	2747.484	420.00	30.79	14.72	2762.20	.00	4.91	4.75	5.000	.000	.00	0 .0
30.909	.0806					.0419	1.30	3.28	3.20	2.70	.013	.00	.00	PIPE
-1514.656	2746.698	3.419	2750.117	420.00	29.35	13.38	2763.50	.00	4.91	4.65	5.000	.000	.00	0 .0
24.586	.0806					.0373	.92	3.42	2.95	2.70	.013	.00	.00	PIPE
-1490.070	2748.680	3.572	2752.252	420.00	27.99	12.16	2764.41	5.00	4.91	4.52	5.000	.000	.00	0 .0
1.809	.0806					.0351	.06	5.00	2.71	2.70	.013	.00	.00	PIPE
-1488.261	2748.826	3.584	2752.410	420.00	27.88	12.07	2764.48	5.00	4.91	4.51	5.000	.000	.00	0 .0
19.595	.0806					.0331	.65	5.00	2.69	2.70	.013	.00	.00	PIPE
-1468.667	2750.406	3.750	2754.156	420.00	26.59	10.98	2765.13	5.00	4.91	4.33	5.000	.000	.00	0 .0
16.003	.0806					.0297	.48	5.00	2.45	2.70	.013	.00	.00	PIPE
-1452.664	2751.696	3.933	2755.629	420.00	25.35	9.98	2765.61	5.00	4.91	4.10	5.000	.000	.00	0 .0
13.057	.0806					.0269	.35	5.00	2.22	2.70	.013	.00	.00	PIPE
-1439.607	2752.749	4.138	2756.887	420.00	24.17	9.07	2765.96	5.00	4.91	3.78	5.000	.000	.00	0 .0
10.443	.0806					.0246	.26	5.00	1.99	2.70	.013	.00	.00	PIPE
-1429.164	2753.591	4.377	2757.968	420.00	23.04	8.25	2766.21	5.00	4.91	3.30	5.000	.000	.00	0 .0
7.684	.0806					.0230	.18	5.00	1.73	2.70	.013	.00	.00	PIPE
-1421.480	2754.210	4.684	2758.894	420.00	21.97	7.50	2766.39	.00	4.91	2.43	5.000	.000	.00	0 .0
1.870	.0803					.0229	.04	4.68	1.38	2.70	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 6-30-2008 Time: 2:48:22

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDPD-1 - COLLECTOR, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDPD-1.WSW

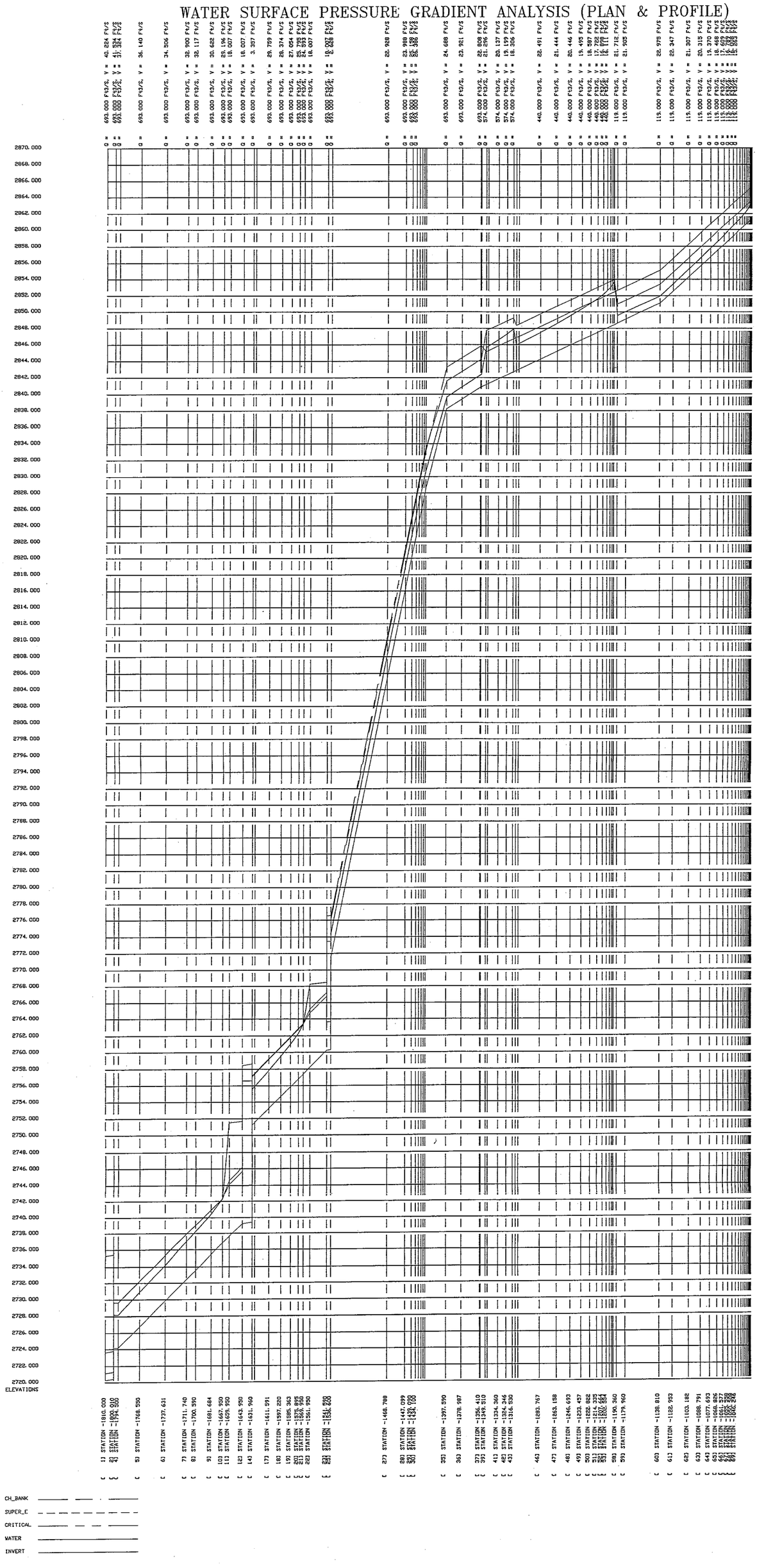
Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1419.610	2754.360	4.905	2759.265	420.00	21.49	7.17	2766.43	.00	4.91	1.37	5.000	.000	.00	0 .0
TRANS STR	.0810					.0195	.19	4.91	1.00		.013	.00	.00	PIPE
-1409.610	2755.170	6.837	2762.007	420.00	17.68	4.85	2766.86	.00	5.24	.00	5.500	.000	.00	0 .0
WALL ENTRANCE														
-1409.610	2755.170	11.703	2766.873	420.00	1.79	.05	2766.92	.00	2.39	20.00	12.280	20.000	.00	0 .0
5.000	.0100					.0000	.00	11.70	.09	1.52	.013	.00	.00	RECTANG
-1404.610	2755.220	11.653	2766.873	420.00	1.80	.05	2766.92	.00	2.39	20.00	12.280	20.000	.00	0 .0
TRANS STR	*******							11.65	.09		.065	.00	.00	RECTANG
-1404.600	2763.250	2.019	2765.268	420.00	19.66	6.00	2771.27	.00	3.62	13.07		10		0 .0
113.857	.5000					.5001	56.94	2.02	2.71	2.019	.065			IR-OPEN
-1290.743	2820.182	2.019	2822.201	420.00	19.66	6.00	2828.20	.00	3.62	13.07		10		0 .0
15.106	.5000					.5240	7.92	2.02	2.71	2.019	.065			IR-OPEN
-1275.637	2827.736	1.964	2829.700	420.00	20.33	6.42	2836.12	.00	3.62	12.86		10		0 .0
6.587	.5000					.5859	3.86	1.96	2.83	2.019	.065			IR-OPEN
-1269.050	2831.030	1.888	2832.918	420.00	21.32	7.06	2839.98	.00	3.62	12.55		10		0 .0
3.783	.5000					.6671	2.52	1.89	3.00	2.019	.065			IR-OPEN
-1265.267	2832.921	1.814	2834.735	420.00	22.36	7.76	2842.50	.00	3.62	12.26		10		0 .0
2.714	.5000					.7596	2.06	1.81	3.18	2.019	.065			IR-OPEN

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDPD-1 - COLLECTOR, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDPD-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1262.553	2834.278	1.742	2836.021	420.00	23.45	8.54	2844.56	.00	3.62	11.97		10		0 .0
2.146	.5000					.8649	1.86	1.74	3.38	2.019	.065			IR-OPEN
-1260.407	2835.352	1.671	2837.023	420.00	24.60	9.39	2846.42	.00	3.62	11.68		10		0 .0
1.797	.5000					.9850	1.77	1.67	3.59	2.019	.065			IR-OPEN
-1258.610	2836.250	1.603	2837.853	420.00	25.80	10.33	2848.19	.00	3.62	11.41		10		0 .0
TRANS STR	.4240					.0297	.49	1.60	3.81		.013			IR-OPEN
-1242.030	2843.280	1.981	2845.261	420.00	16.17	4.06	2849.32	.00	3.12	20.07		12		0 .0
JUNCT STR	.4266					.0485	.46	1.98	2.51		.013			IR-OPEN
---------- WARNING - Junction Analysis - Irregular Channel----------														
-1232.490	2847.350	1.550	2848.900	249.00	19.29	5.78	2854.68	.00	2.48	25.76		13		0 .0
TRANS STR	.5942					.0423	.44	1.55	4.80		.013			IR-OPEN
-1222.190	2853.470	1.339	2854.809	249.00	7.26	.82	2855.63	.00	1.54	38.32		14		0 .0
TRANS STR	.0200					.0038	.01	1.34	1.35		.013			IR-OPEN
-1220.190	2853.510	1.581	2855.091	249.00	6.05	.57	2855.66	.00	1.58	36.23		15		0 .0

FACILITY SDLM-1 - LONE MOUNTAIN COLLECTION SYSTEM

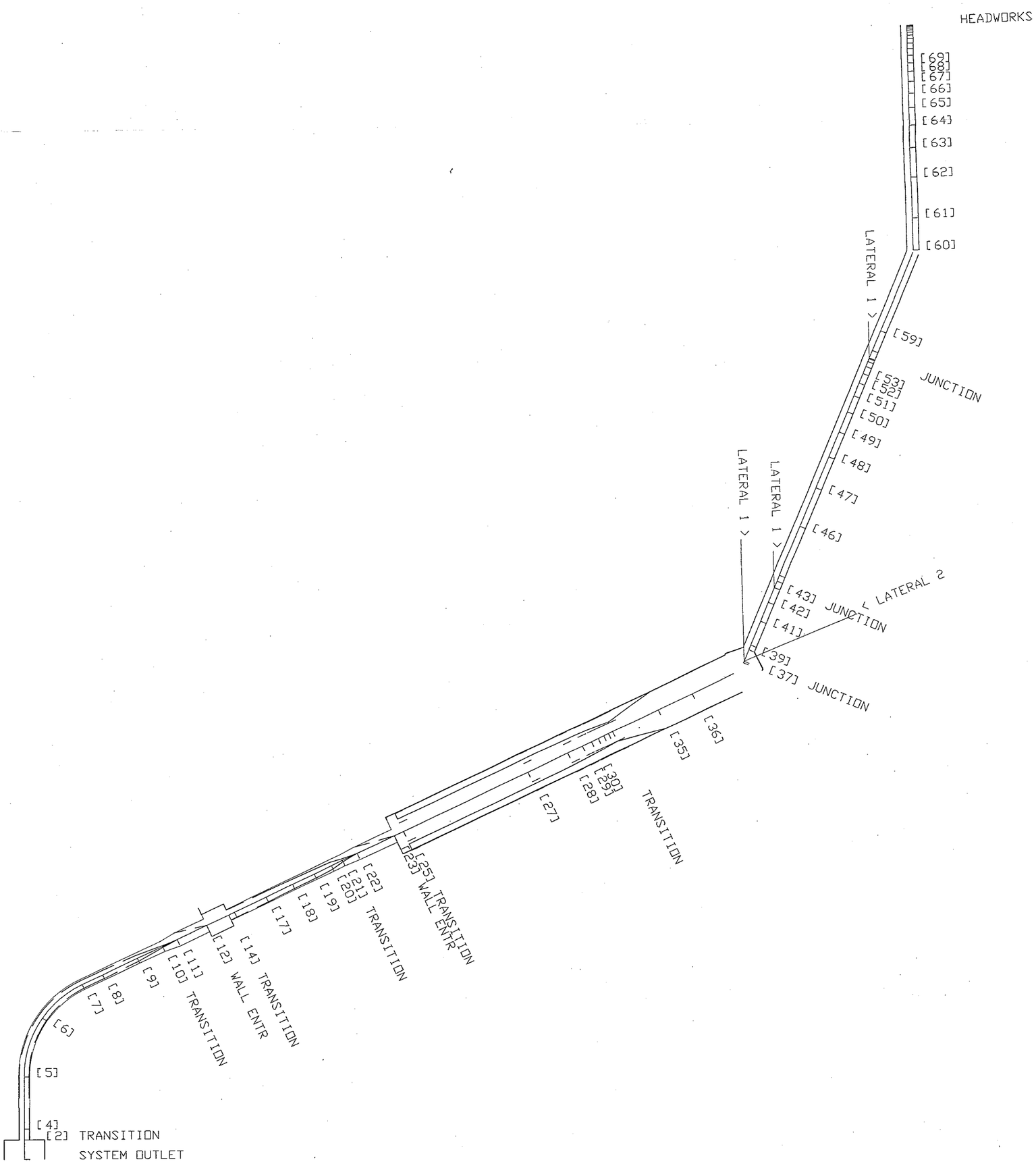
WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE)



Program Package Serial Number: 1622 Date: 7- 2-2008 Time: 8:34:33 File: SDLM-1.WSW

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	-1810.000	2720.270	.861	15.000	BOX	.013	0	693.000	40.224	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[2]	REACH	-1800.010	2720.430	.834	15.000	BOX	.013	0	693.000	41.534	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[3]	TRANSITION	-1800.000	2724.150	4.041	5.500	PIPE	.013	0	693.000	37.040	4.856	5.500	.000	.000	.000	.000	.000	5.463	.000	
[4]	REACH	-1794.500	2724.150	4.012	5.500	PIPE	.013	0	693.000	37.324	4.887	5.500	.000	.000	.000	.000	.000	5.463	.000	
[5]	REACH	-1768.550	2726.750	4.138	5.500	PIPE	.013	0	693.000	36.140	4.748	5.500	.000	.000	.000	.000	.000	5.463	50.077	
[6]	REACH	-1737.631	2729.841	4.334	5.500	PIPE	.013	0	693.000	34.506	4.496	5.500	.000	.000	.000	.000	.000	5.463	50.077	
[7]	REACH	-1711.740	2732.430	4.561	5.500	PIPE	.013	0	693.000	32.900	4.139	5.500	.000	.000	.000	.000	.000	5.463	.000	
[8]	REACH	-1700.590	2733.545	4.688	5.500	PIPE	.013	0	693.000	32.117	3.902	5.500	.000	.000	.000	.000	.000	5.463	.000	
[9]	REACH	-1681.684	2735.436	4.983	5.500	PIPE	.013	0	693.000	30.622	3.210	5.500	.000	.000	.000	.000	.000	5.463	.000	
[10]	REACH	-1667.950	2736.810	5.463	5.500	PIPE	.013	0	693.000	29.196	.899	5.500	.000	.000	.000	.000	.000	5.463	.000	
[11]	TRANSITION	-1659.950	2737.610	13.890	7.000	PIPE	.013	0	693.000	18.007	.000	7.000	.000	.000	.000	.000	.000	6.531	.000	
[12]	REACH	-1643.950	2739.210	12.479	7.000	PIPE	.013	0	693.000	18.007	.000	7.000	.000	.000	.000	.000	.000	6.531	.000	
[13]	WALL ENTR	-1643.950	2739.210	17.406	19.200	BOX	.013	0	693.000	3.318	12.000	12.000	.000	.000	.000	.000	.000	4.696	.000	
[14]	REACH	-1631.960	2739.410	17.203	19.200	BOX	.013	0	693.000	3.357	12.000	12.000	.000	.000	.000	.000	.000	4.696	.000	
[15]	TRANSITION	-1631.950	2751.210	4.364	6.000	PIPE	.013	0	693.000	31.459	5.344	6.000	.000	.000	.000	.000	.000	5.905	.000	
[16]	REACH	-1628.815	2751.523	4.396	6.000	PIPE	.013	0	693.000	31.212	5.311	6.000	.000	.000	.000	.000	.000	5.905	.000	
[17]	REACH	-1611.591	2753.246	4.605	6.000	PIPE	.013	0	693.000	29.759	5.069	6.000	.000	.000	.000	.000	.000	5.905	.000	
[18]	REACH	-1597.220	2754.683	4.836	6.000	PIPE	.013	0	693.000	28.374	4.745	6.000	.000	.000	.000	.000	.000	5.905	.000	
[19]	REACH	-1585.363	2755.869	5.100	6.000	PIPE	.013	0	693.000	27.054	4.285	6.000	.000	.000	.000	.000	.000	5.905	.000	
[20]	REACH	-1575.895	2756.815	5.417	6.000	PIPE	.013	0	693.000	25.795	3.554	6.000	.000	.000	.000	.000	.000	5.905	.000	
[21]	REACH	-1569.950	2757.410	5.905	6.000	PIPE	.013	0	693.000	24.593	1.500	6.000	.000	.000	.000	.000	.000	5.905	.000	
[22]	TRANSITION	-1561.950	2758.210	10.041	7.000	PIPE	.013	0	693.000	18.007	.000	7.000	.000	.000	.000	.000	.000	6.531	.000	
[23]	REACH	-1541.590	2760.250	8.240	7.000	PIPE	.013	0	693.000	18.007	.000	7.000	.000	.000	.000	.000	.000	6.531	.000	
[24]	WALL ENTR	-1541.590	2760.250	13.233	16.290	RECTANGULAR	.013	0	693.000	2.618	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[25]	REACH	-1536.600	2760.300	13.183	16.290	RECTANGULAR	.065	0	693.000	2.628	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[26]	TRANSITION	-1536.590	2771.500	2.871	4.500	IREG-OPEN	.065	0	693.000	22.928	13.483	20.000	.000	.000	.000	.000	.000	4.965	.000	
[27]	REACH	-1468.788	2805.400	2.871	4.500	IREG-OPEN	.065	0	693.000	22.928	13.483	20.000	.000	.000	.000	.000	.000	4.965	.000	
[28]	REACH	-1447.099	2816.245	2.770	4.500	IREG-OPEN	.065	0	693.000	23.988	13.080	20.000	.000	.000	.000	.000	.000	4.965	.000	
[29]	REACH	-1439.090	2820.250	2.665	4.500	IREG-OPEN	.065	0	693.000	25.158	12.660	20.000	.000	.000	.000	.000	.000	4.965	.000	
[30]	REACH	-1434.100	2822.745	2.562	4.500	IREG-OPEN	.065	0	693.000	26.386	12.248	20.000	.000	.000	.000	.000	.000	4.965	.000	
[31]	REACH	-1430.389	2824.600	2.462	4.500	IREG-OPEN	.065	0	693.000	27.674	11.844	20.000	.000	.000	.000	.000	.000	4.965	.000	
[32]	REACH	-1427.387	2826.102	2.361	4.500	IREG-OPEN	.065	0	693.000	29.025	11.444	20.000	.000	.000	.000	.000	.000	4.965	.000	
[33]	REACH	-1424.834	2827.378	2.262	4.500	IREG-OPEN	.065	0	693.000	30.442	11.048	20.000	.000	.000	.000	.000	.000	4.965	.000	
[34]	REACH	-1422.590	2828.500	2.165	4.500	IREG-OPEN	.013	0	693.000	31.927	10.660	20.000	.000	.000	.000	.000	.000	4.965	.000	
[35]	TRANSITION	-1397.590	2838.250	1.404	5.000	RECTANGULAR	.013	0	693.000	24.688	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[36]	REACH	-1378.987	2839.411	1.449	5.000	RECTANGULAR	.013	0	693.000	23.921	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[37]	REACH	-1356.410	2840.820	1.519	5.000	RECTANGULAR	.013	0	693.000	22.808	20.000	20.000	.000	.000	.000	.000	.000	3.341	-42.000	
[38]	REACH	-1355.510	2840.870	1.522	5.000	RECTANGULAR	.013	0	693.000	22.771	20.000	20.000	.000	.000	.000	.000	.000	3.341	.000	
[39]	JUNCTION	-1349.510	2841.150	4.492	4.000	RECTANGULAR	.013	0	574.000	21.296	6.000	6.000	.000	.000	.000	.000	.000	6.575	.000	
[40]	REACH	-1346.991	2841.268	4.530	4.000	RECTANGULAR	.013	0	574.000	21.119	6.000	6.000	.000	.000	.000	.000	.000	6.575	.000	
[41]	REACH	-1334.360	2841.862	4.751	4.000	RECTANGULAR	.013	0	574.000	20.137	6.000	6.000	.000	.000	.000	.000	.000	6.575	.000	
[42]	REACH	-1324.346	2842.333	4.982	4.000	RECTANGULAR	.013	0	574.000	19.199	6.000	6.000	.000	.000	.000	.000	.000	6.575	.000	
[43]	REACH	-1316.530	2842.700	5.226	4.000	RECTANGULAR	.013	0	574.000	18.306	6.000	6.000	.000	.000	.000	.000	.000	6.575	.000	
[44]	JUNCTION	-1313.030	2842.871	3.094	4.000	RECTANGULAR	.013	0	440.000	23.702	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[45]	REACH	-1309.920	2843.017	3.109	4.000	RECTANGULAR	.013	0	440.000	23.588	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[46]	REACH	-1283.767	2844.247	3.260	4.000	RECTANGULAR	.013	0	440.000	22.491	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[47]	REACH	-1263.158	2845.216	3.419	4.000	RECTANGULAR	.013	0	440.000	21.444	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[48]	REACH	-1246.693	2845.990	3.586	4.000	RECTANGULAR	.013	0	440.000	20.446	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[49]	REACH	-1233.457	2846.612	3.762	4.000	RECTANGULAR	.013	0	440.000	19.495	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[50]	REACH	-1222.822	2847.112	3.945	4.000	RECTANGULAR	.013	0	440.000	18.587	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[51]	REACH	-1214.335	2847.511	4.138	4.000	RECTANGULAR	.013	0	440.000	17.722	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[52]	REACH	-1207.664	2847.825	4.340	4.000	RECTANGULAR	.013	0	440.000	16.898	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[53]	REACH	-1202.554	2848.065	4.552	4.000	RECTANGULAR	.013	0	440.000	16.111	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[54]	REACH	-1198.808	2848.241	4.774	4.000	RECTANGULAR	.013	0	440.000	15.361	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[55]	REACH	-1196.272	2848.360	5.007	4.000	RECTANGULAR	.013	0	440.000	14.647	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[56]	REACH	-1194.822	2848.428	5.251	4.000	RECTANGULAR	.013	0	440.000	13.965	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[57]	REACH	-1194.360	2848.450	5.508	4.000	RECTANGULAR	.013	0	440.000	13.313	6.000	6.000	.000	.000	.000	.000	.000	5.509	.000	
[58]	JUNCTION	-1190.360	2848.650	.913	4.000	RECTANGULAR	.013	0	119.000	21.712	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[59]	REACH	-1179.960	2849.140	.906	4.000	RECTANGULAR	.013	0	119.000	21.905	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[60]	REACH	-1138.810	2851.080	.863	4.000	RECTANGULAR	.013	0	119.000	22.975	6.000	6.000	.000	.000	.000	.000	.000	2.303	-24.000	
[61]	REACH	-1122.953	2852.547	.888	4.000	RECTANGULAR	.013	0	119.000	22.347	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[62]	REACH	-1103.182	2854.376	.931	4.000	RECTANGULAR	.013	0	119.000	21.307	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[63]	REACH	-1088.791	2855.708	.976	4.000	RECTANGULAR	.013	0	119.000	20.315	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[64]	REACH	-1077.693	2856.735	1.024	4.000	RECTANGULAR	.013	0	119.000	19.370	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[65]	REACH	-1068.826	2857.555	1.074	4.000	RECTANGULAR	.013	0	119.000	18.468	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[66]	REACH	-1061.577	2858.226	1.126	4.000	RECTANGULAR	.013	0	119.000	17.609	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[67]	REACH	-1055.558	2858.783	1.181	4.000	RECTANGULAR	.013	0	119.000	16.789	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[68]	REACH	-1050.508	2859.250	1.239	4.000	RECTANGULAR	.013	0	119.000	16.008	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[69]	REACH	-1046.246	2859.644	1.300	4.000	RECTANGULAR	.013	0	119.000	15.263	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[70]	REACH	-1042.636	2859.978	1.363	4.000	RECTANGULAR	.013	0	119.000	14.553	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[71]	REACH	-1039.577	2860.261	1.430	4.000	RECTANGULAR	.013	0	119.000	13.876	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[72]	REACH	-1036.991	2860.500	1.500	4.000	RECTANGULAR	.013	0	119.000	13.230	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[73]	REACH	-1034.817	2860.702	1.572	4.000	RECTANGULAR	.013	0	119.000	12.614	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[74]	REACH	-1033.004	2860.869	1.649	4.000	RECTANGULAR	.013	0	119.000	12.027	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[75]	REACH	-1031.514	2861.007	1.730	4.000	RECTANGULAR	.013	0	119.000	11.467	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[76]	REACH	-1030.311	2861.119	1.814	4.000	RECTANGULAR	.013	0	119.000	10.934	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[77]	REACH	-1029.370	2861.206	1.902	4.000	RECTANGULAR	.013	0	119.000	10.425	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[78]	REACH	-1028.667	2861.271	1.995	4.000	RECTANGULAR	.013	0	119.000	9.940	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[79]	REACH	-1028.183	2861.315	2.093	4.000	RECTANGULAR	.013	0	119.000	9.477	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[80]	REACH	-1027.902	2861.342	2.194	4.000	RECTANGULAR	.013	0	119.000	9.036	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	
[81]	HEADWORKS	-1027.810	2861.350	2.303	4.000	RECTANGULAR	.013	0	119.000	8.612	6.000	6.000	.000	.000	.000	.000	.000	2.303	.000	


HEADWORKS
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T1 WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
T2 FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
T3 FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW
SO  -1810.0002720.270 11                                  2727.630
WE  -1810.0002720.270  9      .013
R   -1800.0102720.430  9      .013
TS  -1800.0002724.150 66      .013
R   -1794.5002724.150 66      .013
R   -1768.5502726.750 66      .013
R   -1711.7402732.430 66      .013                                  65.000    .000 0
R   -1667.9502736.810 66      .013
TS  -1659.9502737.610 84      .013
R   -1643.9502739.210 84      .013
WE  -1643.9502739.210  6      .013
R   -1631.9602739.410  6      .013
TS  -1631.9502751.210 72      .013
R   -1569.9502757.410 72      .013
TS  -1561.9502758.210 84      .013
R   -1541.5902760.250 84      .013
WE  -1541.5902760.250  3      .013
R   -1536.6002760.300  3      .013
TS  -1536.5902771.500 10      .065
R   -1422.5902828.500 10      .065
TS  -1397.5902838.250  2      .013
R   -1356.4102840.820  2      .013                                  0.000 -42.000 0
R   -1355.5102840.870  2      .013
JX  -1349.5102841.150  1  1 30.013  118.000    1.0002840.8602841.060-24.00045.00
R   -1316.5302842.700  1      .013
JX  -1313.0302842.870  1 42   .013  134.000          2842.870        -24.000
R   -1194.3602848.450  1      .013
JX  -1190.3602848.650  1 48   .013  321.000          2848.650        -24.000
R   -1138.8102851.080  1      .013                                  0.000 -24.000 0
R   -1027.8102861.350  1      .013
SH  -1027.8102861.350  1
CD   1  2                4.000    6.000
CD   2  2                5.000   20.000
CD   3  2               16.290   20.000
CD   4  3                4.000    6.000
CD   5  3                7.000   12.000
CD   6  3               19.200   12.000
CD   7  3                3.000   20.000
CD   8  3               12.000   20.000
CD   9  3               15.000   20.000
CD  18  4                1.500
CD  30  4                2.500
CD  36  4                3.000
CD  42  4                3.500
CD  48  4                4.000
CD  54  4                4.500
CD  60  4                5.000
CD  66  4                5.500
CD  72  4                6.000
CD  84  4                7.000
CD  90  4                7.500
CD  10  5
CD  11  6
PTS 10 6  0.000  4.500  5.000  2.000  5.000  0.000 15.000  0.000 15.000  2.000
PTS       20.000  4.500
PTS 1112  0.000  0.000 20.000  0.000 20.000  3.330 10.000  3.330 10.000 12.500
PTS      20.000 12.500 20.000 15.000  0.000 15.000  0.000 12.500 10.000 12.500
PTS      10.000  3.330  0.000  3.330
Q           119.000   .0
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Program Package Serial Number: 1622

WATER SURFACE PROFILE LISTING Date: 7- 2-2008 Time: 8:34:33

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN

FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY

FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1810.000	2720.270	.861	2721.131	693.00	40.22	25.12	2746.25	.00	3.34	20.00	15.000	20.000	.00	0 .0
9.990	.0160					.1779	1.78	.86	7.64	1.81	.013	.00	.00	BOX
-1800.010	2720.430	.834	2721.264	693.00	41.53	26.79	2748.05	.00	3.34	20.00	15.000	20.000	.00	0 .0
TRANS STR	*******					.1204	.00	.83	8.01		.013	.00	.00	BOX
-1800.000	2724.150	4.041	2728.191	693.00	37.04	21.30	2749.49	.00	5.46	4.86	5.500	.000	.00	0 .0
5.500	.0000					.0543	.30	4.04	3.33	.00	.013	.00	.00	PIPE
-1794.500	2724.150	4.012	2728.162	693.00	37.32	21.63	2749.79	.00	5.46	4.89	5.500	.000	.00	0 .0
25.950	.1002					.0528	1.37	4.01	3.37	3.24	.013	.00	.00	PIPE
-1768.550	2726.750	4.138	2730.888	693.00	36.14	20.28	2751.17	5.50	5.46	4.75	5.500	.000	.00	0 .0
30.919	.1000					.0484	1.50	5.50	3.17	3.24	.013	.00	.00	PIPE
-1737.631	2729.841	4.334	2734.175	693.00	34.51	18.49	2752.66	5.50	5.46	4.50	5.500	.000	.00	0 .0
25.891	.1000					.0438	1.13	5.50	2.88	3.24	.013	.00	.00	PIPE
-1711.740	2732.430	4.561	2736.991	693.00	32.90	16.81	2753.80	.00	5.46	4.14	5.500	.000	.00	0 .0
11.150	.1000					.0408	.46	4.56	2.57	3.24	.013	.00	.00	PIPE
-1700.590	2733.545	4.688	2738.233	693.00	32.12	16.02	2754.25	.00	5.46	3.90	5.500	.000	.00	0 .0
18.906	.1000					.0386	.73	4.69	2.41	3.24	.013	.00	.00	PIPE
-1681.684	2735.436	4.983	2740.419	693.00	30.62	14.56	2754.98	.00	5.46	3.21	5.500	.000	.00	0 .0
13.734	.1000					.0385	.53	4.98	2.03	3.24	.013	.00	.00	PIPE

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1667.950	2736.810	5.463	2742.273	693.00	29.20	13.24	2755.51	.00	5.46	.90	5.500	.000	.00	0 .0
TRANS STR	.1000					.0258	.21	5.46	1.00		.013	.00	.00	PIPE
-1659.950	2737.610	13.890	2751.500	693.00	18.01	5.04	2756.54	.00	6.53	.00	7.000	.000	.00	0 .0
16.000	.1000					.0118	.19	13.89	.00	2.83	.013	.00	.00	PIPE
-1643.950	2739.210	12.479	2751.689	693.00	18.01	5.04	2756.72	.00	6.53	.00	7.000	.000	.00	0 .0
WALL ENTRANCE														
-1643.950	2739.210	17.406	2756.616	693.00	3.32	.17	2756.79	.00	4.70	12.00	19.200	12.000	.00	0 .0
11.990	.0167					.0001	.00	17.41	.14	2.62	.013	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
-1631.960	2739.410	17.203	2756.613	693.00	3.36	.17	2756.79	.00	4.70	12.00	19.200	12.000	.00	0 .0
TRANS STR *******								17.20	.14		.013	.00	.00	BOX
-1631.950	2751.210	4.364	2755.574	693.00	31.46	15.37	2770.94	.00	5.90	5.34	6.000	.000	.00	0 .0
3.135	.1000					.0343	.11	4.36	2.73	3.06	.013	.00	.00	PIPE
-1628.815	2751.523	4.396	2755.919	693.00	31.21	15.13	2771.05	.00	5.90	5.31	6.000	.000	.00	0 .0
17.224	.1000					.0323	.56	4.40	2.69	3.06	.013	.00	.00	PIPE
-1611.591	2753.246	4.605	2757.851	693.00	29.76	13.75	2771.60	.00	5.90	5.07	6.000	.000	.00	0 .0
14.371	.1000					.0291	.42	4.61	2.45	3.06	.013	.00	.00	PIPE

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1597.220	2754.683	4.836	2759.519	693.00	28.37	12.50	2772.02	.00	5.90	4.74	6.000	.000	.00	0 .0
11.857	.1000					.0264	.31	4.84	2.20	3.06	.013	.00	.00	PIPE
-1585.363	2755.869	5.100	2760.969	693.00	27.05	11.37	2772.33	.00	5.90	4.28	6.000	.000	.00	0 .0
9.469	.1000					.0244	.23	5.10	1.95	3.06	.013	.00	.00	PIPE
-1575.895	2756.815	5.417	2762.232	693.00	25.79	10.33	2772.56	.00	5.90	3.55	6.000	.000	.00	0 .0
5.945	.1000					.0239	.14	5.42	1.65	3.06	.013	.00	.00	PIPE
-1569.950	2757.410	5.905	2763.315	693.00	24.59	9.39	2772.71	.00	5.90	1.50	6.000	.000	.00	0 .0
TRANS STR	.1000					.0180	.14	5.90	1.00		.013	.00	.00	PIPE
-1561.950	2758.210	10.041	2768.251	693.00	18.01	5.04	2773.29	.00	6.53	.00	7.000	.000	.00	0 .0
20.360	.1002					.0118	.24	10.04	.00	2.83	.013	.00	.00	PIPE
-1541.590	2760.250	8.240	2768.490	693.00	18.01	5.04	2773.53	.00	6.53	.00	7.000	.000	.00	0 .0
WALL	ENTRANCE													
-1541.590	2760.250	13.233	2773.483	693.00	2.62	.11	2773.59	.00	3.34	20.00	16.290	20.000	.00	0 .0
4.990	.0100					.0001	.00	13.23	.13	2.10	.013	.00	.00	RECTANG
-1536.600	2760.300	13.183	2773.483	693.00	2.63	.11	2773.59	.00	3.34	20.00	16.290	20.000	.00	0 .0
TRANS STR	*******							13.18	.13		.065	.00	.00	RECTANG
-1536.590	2771.500	2.871	2774.371	693.00	22.93	8.16	2782.53	.00	4.97	13.48		10		0 .0
67.802	.5000					.5000	33.90	2.87	2.70	2.871	.065			IR-OPEN

WATER SURFACE PROFILE LISTING Date: 7- 2-2008 Time: 8:34:33
WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1468.788	2805.400	2.871	2808.271	693.00	22.93	8.16	2816.43	.00	4.97	13.48		10		0 .0
21.689	.5000					.5309	11.52	2.87	2.70	2.871	.065			IR-OPEN
-1447.099	2816.245	2.770	2819.015	693.00	23.99	8.93	2827.95	.00	4.97	13.08		10		0 .0
8.009	.5000					.5985	4.79	2.77	2.84	2.871	.065			IR-OPEN
-1439.090	2820.250	2.665	2822.915	693.00	25.16	9.83	2832.74	.00	4.97	12.66		10		0 .0
4.990	.5000					.6763	3.37	2.67	3.01	2.871	.065			IR-OPEN
-1434.100	2822.745	2.562	2825.307	693.00	26.39	10.81	2836.12	.00	4.97	12.25		10		0 .0
3.711	.5000					.7641	2.84	2.56	3.18	2.871	.065			IR-OPEN
-1430.389	2824.600	2.461	2827.062	693.00	27.67	11.89	2838.95	.00	4.97	11.84		10		0 .0
3.002	.5000					.8628	2.59	2.46	3.35	2.871	.065			IR-OPEN
-1427.387	2826.102	2.361	2828.463	693.00	29.02	13.08	2841.54	.00	4.97	11.44		10		0 .0
2.553	.5000					.9736	2.49	2.36	3.54	2.871	.065			IR-OPEN
-1424.834	2827.378	2.262	2829.640	693.00	30.44	14.39	2844.03	.00	4.97	11.05		10		0 .0
2.244	.5000					1.0981	2.46	2.26	3.74	2.871	.065			IR-OPEN
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS EQUATION, AVERAGE FRICTION SLOPE = 1.09810														
-1422.590	2828.500	2.165	2830.665	693.00	31.93	15.83	2846.49	.00	4.97	10.66		10		0 .0
TRANS STR	.3900					.0410	1.02	2.17	3.94		.013			IR-OPEN
-1397.590	2838.250	1.404	2839.654	693.00	24.69	9.46	2849.12	.00	3.34	20.00	5.000	20.000	.00	0 .0
18.603	.0624					.0337	.63	1.40	3.67	1.17	.013	.00	.00	RECTANG

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1378.987	2839.411	1.449	2840.860	693.00	23.92	8.89	2849.74	.00	3.34	20.00	5.000	20.000	.00	0 .0
22.577	.0624					.0298	.67	1.45	3.50	1.17	.013	.00	.00	RECTANG
-1356.410	2840.820	1.519	2842.339	693.00	22.81	8.08	2850.42	.00	3.34	20.00	5.000	20.000	.00	0 .0
.900	.0556					.0275	.02	1.52	3.26	1.22	.013	.00	.00	RECTANG
-1355.510	2840.870	1.522	2842.392	693.00	22.77	8.05	2850.44	.00	3.34	20.00	5.000	20.000	.00	0 .0
JUNCT STR	.0466					.0216	.13	1.52	3.25		.013	.00	.00	RECTANG
-1349.510	2841.150	4.492	2845.642	574.00	21.30	7.04	2852.68	.00	6.58	6.00	4.000	6.000	.00	0 .0
2.519	.0470					.0157	.04	4.49	1.77	2.96	.013	.00	.00	RECTANG
-1346.991	2841.268	4.530	2845.798	574.00	21.12	6.93	2852.72	.00	6.58	6.00	4.000	6.000	.00	0 .0
12.631	.0470					.0147	.19	4.53	1.75	2.96	.013	.00	.00	RECTANG
-1334.360	2841.862	4.751	2846.613	574.00	20.14	6.30	2852.91	.00	6.58	6.00	4.000	6.000	.00	0 .0
10.015	.0470					.0130	.13	4.75	1.63	2.96	.013	.00	.00	RECTANG
-1324.346	2842.333	4.983	2847.315	574.00	19.20	5.72	2853.04	.00	6.58	6.00	4.000	6.000	.00	0 .0
7.816	.0470					.0115	.09	4.98	1.52	2.96	.013	.00	.00	RECTANG
-1316.530	2842.700	5.226	2847.926	574.00	18.31	5.20	2853.13	.00	6.58	6.00	4.000	6.000	.00	0 .0
JUNCT STR	.0486					.0177	.06	5.23	1.41		.013	.00	.00	RECTANG
-1313.030	2842.871	3.094	2845.965	440.00	23.70	8.72	2854.69	.00	5.51	6.00	4.000	6.000	.00	0 .0
3.110	.0470					.0244	.08	3.09	2.37	2.43	.013	.00	.00	RECTANG

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1309.920	2843.017	3.109	2846.126	440.00	23.59	8.64	2854.77	.00	5.51	6.00	4.000	6.000	.00	0 .0
26.152	.0470					.0228	.60	3.11	2.36	2.43	.013	.00	.00	RECTANG
-1283.767	2844.247	3.261	2847.507	440.00	22.49	7.85	2855.36	.00	5.51	6.00	4.000	6.000	.00	0 .0
20.609	.0470					.0201	.41	3.26	2.19	2.43	.013	.00	.00	RECTANG
-1263.158	2845.216	3.420	2848.635	440.00	21.44	7.14	2855.78	.00	5.51	6.00	4.000	6.000	.00	0 .0
16.465	.0470					.0177	.29	3.42	2.04	2.43	.013	.00	.00	RECTANG
-1246.693	2845.990	3.587	2849.576	440.00	20.45	6.49	2856.07	.00	5.51	6.00	4.000	6.000	.00	0 .0
13.236	.0470					.0157	.21	3.59	1.90	2.43	.013	.00	.00	RECTANG
-1233.457	2846.612	3.762	2850.374	440.00	19.49	5.90	2856.27	.00	5.51	6.00	4.000	6.000	.00	0 .0
10.635	.0470					.0138	.15	3.76	1.77	2.43	.013	.00	.00	RECTANG
-1222.822	2847.112	3.945	2851.057	440.00	18.59	5.36	2856.42	.00	5.51	6.00	4.000	6.000	.00	0 .0
8.486	.0470					.0122	.10	3.95	1.65	2.43	.013	.00	.00	RECTANG
-1214.335	2847.511	4.138	2851.649	440.00	17.72	4.88	2856.53	.00	5.51	6.00	4.000	6.000	.00	0 .0
6.671	.0470					.0108	.07	4.14	1.54	2.43	.013	.00	.00	RECTANG
-1207.664	2847.825	4.340	2852.165	440.00	16.90	4.43	2856.60	.00	5.51	6.00	4.000	6.000	.00	0 .0
5.110	.0470					.0096	.05	4.34	1.43	2.43	.013	.00	.00	RECTANG
-1202.554	2848.065	4.552	2852.617	440.00	16.11	4.03	2856.65	.00	5.51	6.00	4.000	6.000	.00	0 .0
3.746	.0470					.0085	.03	4.55	1.33	2.43	.013	.00	.00	RECTANG

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1198.808	2848.241	4.774	2853.015	440.00	15.36	3.66	2856.68	.00	5.51	6.00	4.000	6.000	.00	0 .0
2.536	.0470					.0075	.02	4.77	1.24	2.43	.013	.00	.00	RECTANG
-1196.272	2848.360	5.007	2853.367	440.00	14.65	3.33	2856.70	.00	5.51	6.00	4.000	6.000	.00	0 .0
1.450	.0470					.0067	.01	5.01	1.15	2.43	.013	.00	.00	RECTANG
-1194.822	2848.428	5.251	2853.679	440.00	13.96	3.03	2856.71	.00	5.51	6.00	4.000	6.000	.00	0 .0
.462	.0470					.0059	.00	5.25	1.07	2.43	.013	.00	.00	RECTANG
-1194.360	2848.450	5.509	2853.958	440.00	13.31	2.75	2856.71	.00	5.51	6.00	4.000	6.000	.00	0 .0
JUNCT STR	.0500							5.51	1.00		.013	.00	.00	RECTANG
-1190.360	2848.650	.913	2849.563	119.00	21.71	7.32	2856.88	.00	2.30	6.00	4.000	6.000	.00	0 .0
10.400	.0471					.0588	.61	.91	4.00	.98	.013	.00	.00	RECTANG
-1179.960	2849.140	.905	2850.046	119.00	21.91	7.45	2857.50	.00	2.30	6.00	4.000	6.000	.00	0 .0
41.150	.0471					.0642	2.64	.91	4.06	.98	.013	.00	.00	RECTANG
-1138.810	2851.080	.863	2851.943	119.00	22.97	8.20	2860.14	.00	2.30	6.00	4.000	6.000	.00	0 .0
15.858	.0925					.0661	1.05	.86	4.36	.78	.013	.00	.00	RECTANG
-1122.953	2852.547	.888	2853.435	119.00	22.35	7.75	2861.19	.00	2.30	6.00	4.000	6.000	.00	0 .0
19.771	.0925					.0591	1.17	.89	4.18	.78	.013	.00	.00	RECTANG
-1103.182	2854.376	.931	2855.307	119.00	21.31	7.05	2862.36	.00	2.30	6.00	4.000	6.000	.00	0 .0
14.391	.0925					.0511	.74	.93	3.89	.78	.013	.00	.00	RECTANG

WATER SURFACE PROFILE LISTING Date: 7- 2-2008 Time: 8:34:33
WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1088.791	2855.708	.976	2856.684	119.00	20.32	6.41	2863.09	.00	2.30	6.00	4.000	6.000	.00	0 .0
11.098	.0925					.0443	.49	.98	3.62	.78	.013	.00	.00	RECTANG
-1077.693	2856.735	1.024	2857.759	119.00	19.37	5.83	2863.58	.00	2.30	6.00	4.000	6.000	.00	0 .0
8.867	.0925					.0384	.34	1.02	3.37	.78	.013	.00	.00	RECTANG
-1068.826	2857.555	1.074	2858.629	119.00	18.47	5.30	2863.93	.00	2.30	6.00	4.000	6.000	.00	0 .0
7.249	.0925					.0333	.24	1.07	3.14	.78	.013	.00	.00	RECTANG
-1061.577	2858.226	1.126	2859.352	119.00	17.61	4.81	2864.17	.00	2.30	6.00	4.000	6.000	.00	0 .0
6.019	.0925					.0289	.17	1.13	2.92	.78	.013	.00	.00	RECTANG
-1055.558	2858.783	1.181	2859.964	119.00	16.79	4.38	2864.34	.00	2.30	6.00	4.000	6.000	.00	0 .0
5.049	.0925					.0251	.13	1.18	2.72	.78	.013	.00	.00	RECTANG
-1050.508	2859.250	1.239	2860.489	119.00	16.01	3.98	2864.47	.00	2.30	6.00	4.000	6.000	.00	0 .0
4.263	.0925					.0218	.09	1.24	2.53	.78	.013	.00	.00	RECTANG
-1046.246	2859.644	1.299	2860.944	119.00	15.26	3.62	2864.56	.00	2.30	6.00	4.000	6.000	.00	0 .0
3.610	.0925					.0190	.07	1.30	2.36	.78	.013	.00	.00	RECTANG
-1042.636	2859.978	1.363	2861.341	119.00	14.55	3.29	2864.63	.00	2.30	6.00	4.000	6.000	.00	0 .0
3.059	.0925					.0165	.05	1.36	2.20	.78	.013	.00	.00	RECTANG
-1039.577	2860.261	1.429	2861.691	119.00	13.88	2.99	2864.68	.00	2.30	6.00	4.000	6.000	.00	0 .0
2.586	.0925					.0144	.04	1.43	2.05	.78	.013	.00	.00	RECTANG

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDLM-1 - COLLECTOR, RCB, RCP & STEPPED SPILLWAY
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDLM-1.WSW

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1036.991	2860.500	1.499	2862.000	119.00	13.23	2.72	2864.72	.00	2.30	6.00	4.000	6.000	.00	0 .0
2.174	.0925					.0125	.03	1.50	1.90	.78	.013	.00	.00	RECTANG
-1034.817	2860.702	1.572	2862.274	119.00	12.61	2.47	2864.74	.00	2.30	6.00	4.000	6.000	.00	0 .0
1.813	.0925					.0109	.02	1.57	1.77	.78	.013	.00	.00	RECTANG
-1033.004	2860.869	1.649	2862.518	119.00	12.03	2.25	2864.76	.00	2.30	6.00	4.000	6.000	.00	0 .0
1.491	.0925					.0095	.01	1.65	1.65	.78	.013	.00	.00	RECTANG
-1031.514	2861.007	1.730	2862.737	119.00	11.47	2.04	2864.78	.00	2.30	6.00	4.000	6.000	.00	0 .0
1.202	.0925					.0083	.01	1.73	1.54	.78	.013	.00	.00	RECTANG
-1030.311	2861.119	1.814	2862.933	119.00	10.93	1.86	2864.79	.00	2.30	6.00	4.000	6.000	.00	0 .0
.941	.0925					.0073	.01	1.81	1.43	.78	.013	.00	.00	RECTANG
-1029.370	2861.206	1.902	2863.108	119.00	10.42	1.69	2864.80	.00	2.30	6.00	4.000	6.000	.00	0 .0
.703	.0925					.0064	.00	1.90	1.33	.78	.013	.00	.00	RECTANG
-1028.667	2861.271	1.995	2863.266	119.00	9.94	1.53	2864.80	.00	2.30	6.00	4.000	6.000	.00	0 .0
.484	.0925					.0056	.00	2.00	1.24	.78	.013	.00	.00	RECTANG
-1028.183	2861.315	2.093	2863.408	119.00	9.48	1.39	2864.80	.00	2.30	6.00	4.000	6.000	.00	0 .0
.281	.0925					.0049	.00	2.09	1.15	.78	.013	.00	.00	RECTANG
-1027.902	2861.342	2.195	2863.536	119.00	9.04	1.27	2864.80	.00	2.30	6.00	4.000	6.000	.00	0 .0
.092	.0925					.0043	.00	2.19	1.07	.78	.013	.00	.00	RECTANG

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1027.810	2861.350	2.303	2863.653	119.00	8.61	1.15	2864.80	.00	2.30	6.00	4.000	6.000	.00	0 .0

FACILITY SDTR-1 - SOUTH DETENTION BASIN TRAPEZOIDAL RIPRAP CHANNEL

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-2169.500	2719.570	4.682	2724.252	1095.00	9.46	1.39	2725.64	.00	4.73	43.45	5.500	6.000	4.00	0 .0
.001	1.0000					.0136	.00	4.68	1.02	1.80	.035	.00	4.00	TRAP
-2169.499	2719.571	4.727	2724.298	1095.00	9.30	1.34	2725.64	.00	4.73	43.82	5.500	6.000	4.00	0 .0
.996	.0049					.0125	.01	4.73	1.00	5.82	.035	.00	4.00	TRAP
-2168.503	2719.576	4.857	2724.433	1095.00	8.87	1.22	2725.65	.00	4.73	44.85	5.500	6.000	4.00	0 .0
3.597	.0049					.0110	.04	4.86	.94	5.82	.035	.00	4.00	TRAP
-2164.906	2719.594	4.989	2724.583	1095.00	8.45	1.11	2725.69	.00	4.73	45.92	5.500	6.000	4.00	0 .0
7.409	.0049					.0097	.07	4.99	.89	5.82	.035	.00	4.00	TRAP
-2157.497	2719.630	5.126	2724.756	1095.00	8.06	1.01	2725.76	.00	4.73	47.00	5.500	6.000	4.00	0 .0
7.997	.0049					.0087	.07	5.13	.84	5.82	.035	.00	4.00	TRAP
-2149.500	2719.670	5.217	2724.887	1095.00	7.81	.95	2725.83	.00	4.73	47.74	5.500	6.000	4.00	0 .0
19.453	.0050					.0078	.15	5.22	.80	5.81	.035	.00	4.00	TRAP
-2130.047	2719.767	5.359	2725.126	1095.00	7.45	.86	2725.99	.00	4.73	48.87	5.500	6.000	4.00	0 .0
34.876	.0050					.0069	.24	5.36	.76	5.81	.035	.00	4.00	TRAP
-2095.171	2719.941	5.504	2725.445	1095.00	7.10	.78	2726.23	.00	4.73	50.03	5.500	6.000	4.00	0 .0
71.086	.0050					.0061	.43	5.50	.71	5.81	.035	.00	4.00	TRAP
-2024.085	2720.295	5.653	2725.948	1095.00	6.77	.71	2726.66	.00	4.73	51.22	5.500	6.000	4.00	0 .0
165.415	.0050					.0054	.90	5.65	.67	5.81	.035	.00	4.00	TRAP

WESTERN BELTWAY/LONE MOUNTAIN SOUTH DETENTION BASIN
FACILITY SDTR-1 - RIP RAP CHANNEL
FILE PATH: F:\451-002-001\CALC\HYDRO\WSPGW\SDTR-1.WSW

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1858.670	2721.120	5.776	2726.896	1095.00	6.51	.66	2727.55	.00	4.73	52.21	5.500	6.000	4.00	0 .0
30.000	.0050					.0051	.15	5.78	.64	5.81	.035	.00	4.00	TRAP
-1828.670	2721.270	5.782	2727.052	1095.00	6.50	.66	2727.71	.00	4.73	52.26	5.500	6.000	4.00	0 .0
TRANS STR	*******					.0004	.00	5.78	.64		.013	.00	4.00	TRAP
-1828.660	2720.270	7.357	2727.627	1095.00	3.56	.20	2727.82	.00	2.83	42.30		5		0 .0
18.560	.0000					.0001	.00	7.36	.23	.000	.013			IR-OPEN
-1810.100	2720.270	7.360	2727.630	1095.00	3.56	.20	2727.83	.00	2.83	42.30		5		0 .0

FACILITY SBD-54-1 – 54" RCP

WATER SURFACE PROFILE LISTING

Date: 6-19-2008 Time:11:21:34

WESTERN BELTWAY - LONE MOUNTAIN SOUTH DETENTION BASIN
54-INCH DIAMETER RCP FROM THE SOUTH CHANNEL - WEST LEG
Q=790/2= 395 CFS LOCATION: F:\451-002\Drainage\calcs\wspgw\SDB-5

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1215.160	2708.820	2.945	2711.765	395.00	35.82	19.92	2731.68	.00	4.46	4.28	4.500	.000	.00	1 .0
41.062	.0938					.0666	2.74	2.94	3.93	2.66	.013	.00	.00	PIPE
-1174.098	2712.671	3.026	2715.697	395.00	34.72	18.72	2734.41	.00	4.46	4.22	4.500	.000	.00	1 .0
47.200	.0938					.0606	2.86	3.03	3.73	2.66	.013	.00	.00	PIPE
-1126.897	2717.098	3.159	2720.257	395.00	33.10	17.02	2737.27	.00	4.46	4.12	4.500	.000	.00	1 .0
35.299	.0938					.0540	1.91	3.16	3.43	2.66	.013	.00	.00	PIPE
-1091.599	2720.409	3.303	2723.712	395.00	31.56	15.47	2739.18	.00	4.46	3.98	4.500	.000	.00	1 .0
27.520	.0938					.0484	1.33	3.30	3.14	2.66	.013	.00	.00	PIPE
-1064.079	2722.990	3.461	2726.451	395.00	30.09	14.06	2740.51	.00	4.46	3.79	4.500	.000	.00	1 .0
22.020	.0938					.0436	.96	3.46	2.85	2.66	.013	.00	.00	PIPE
-1042.058	2725.055	3.635	2728.690	395.00	28.69	12.78	2741.47	.00	4.46	3.55	4.500	.000	.00	1 .0
17.789	.0938					.0396	.71	3.64	2.57	2.66	.013	.00	.00	PIPE
-1024.269	2726.724	3.834	2730.558	395.00	27.36	11.62	2742.18	.00	4.46	3.20	4.500	.000	.00	1 .0
14.277	.0938					.0366	.52	3.83	2.27	2.66	.013	.00	.00	PIPE
-1009.992	2728.063	4.074	2732.137	395.00	26.08	10.57	2742.70	.00	4.46	2.63	4.500	.000	.00	1 .0
9.992	.0938					.0364	.36	4.07	1.92	2.66	.013	.00	.00	PIPE
-1000.000	2729.000	4.462	2733.461	395.00	24.87	9.60	2743.07	.00	4.46	.83	4.500	.000	.00	1 .0

FACILITY SBD-54-2 – 54" RCP

WESTERN BELTWAY - LONE MOUNTAIN SOUTH DETENTION BASIN
54-INCH DIAMETER RCP FROM THE SOUTH CHANNEL - EAST LEG
Q=790/2= 395 CFS LOCATION: F:\451-002\Drainage\calcs\wspgw\SDB-54

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1223.300	2709.920	3.016	2712.937	395.00	34.85	18.86	2731.80	.00	4.46	4.23	4.500	.000	.00	1 .0
6.019	.0854					.0644	.39	3.02	3.75	2.74	.013	.00	.00	PIPE
-1217.281	2710.435	3.026	2713.461	395.00	34.72	18.72	2732.18	.00	4.46	4.22	4.500	.000	.00	1 .0
63.026	.0854					.0606	3.82	3.03	3.73	2.74	.013	.00	.00	PIPE
-1154.255	2715.820	3.159	2718.979	395.00	33.10	17.02	2735.99	.00	4.46	4.12	4.500	.000	.00	1 .0
44.680	.0854					.0540	2.41	3.16	3.43	2.74	.013	.00	.00	PIPE
-1109.576	2719.637	3.303	2722.940	395.00	31.56	15.47	2738.41	.00	4.46	3.98	4.500	.000	.00	1 .0
33.724	.0854					.0484	1.63	3.30	3.14	2.74	.013	.00	.00	PIPE
-1075.852	2722.519	3.461	2725.980	395.00	30.09	14.06	2740.04	.00	4.46	3.79	4.500	.000	.00	1 .0
26.415	.0854					.0436	1.15	3.46	2.85	2.74	.013	.00	.00	PIPE
-1049.436	2724.776	3.635	2728.411	395.00	28.69	12.78	2741.20	.00	4.46	3.55	4.500	.000	.00	1 .0
21.030	.0854					.0396	.83	3.64	2.57	2.74	.013	.00	.00	PIPE
-1028.406	2726.573	3.834	2730.407	395.00	27.36	11.62	2742.03	.00	4.46	3.20	4.500	.000	.00	1 .0
16.716	.0854					.0366	.61	3.83	2.27	2.74	.013	.00	.00	PIPE
-1011.690	2728.001	4.074	2732.075	395.00	26.08	10.57	2742.64	.00	4.46	2.63	4.500	.000	.00	1 .0
11.690	.0854					.0364	.43	4.07	1.92	2.74	.013	.00	.00	PIPE
-1000.000	2729.000	4.462	2733.461	395.00	24.87	9.60	2743.07	.00	4.46	.83	4.500	.000	.00	1 .0

REVISED FLOW SPLIT CALCULATION
(AT PEACEFUL DAWN AND CLIFF SHADOWS)

FLOW SPLITS AT INTERSECTIONS

CITY OF TUCSON METHOD

Western Segment of the Las Vegas Beltway

Calculated by: JYL

NAME - MAIN STREET	W_M Feet	S_M Ft/Ft	Q_{TOT-M} CFS	Q_{REM-M} CFS	NAME - SIDE STREET	W_S Feet	Q_{LAT} CFS	Y_{OVBK} Feet	S_S Ft/Ft	$Q_{OVBK-TOT}$ CFS	Q_{TOT} CFS
Peaceful Dawn	50	0.06	467.0	363	Cliff Shadows	70.0	68.0	0.5	0.004	35.5	104

$$Q_{TOT} = Q_{LAT} + Q_{OVBK.\ DIV.}$$

$$Q_{LAT} = (0.042)\frac{(Q_M^{0.93})(W_{SS}^{0.85})}{(S_M^{0.41})(W_M^{0.79})}$$

$$Q_{OVBK.\ DIV.} = (46.8)(Y_{OVBK})(W_{SS})(S_S^{0.5}) - Q_{LAT}$$

File: 5/28/2008

LONE MOUNTAIN 48" RCP NORMAL DEPTH CALCULATION

LONE MOUNTAIN - 48" RCP LATERAL STUB @ 5.0% SLOPE

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.05000	ft/ft
Normal Depth	4.00	ft
Diameter	4.00	ft
Discharge	321.18	ft³/s

Results

Discharge	321.18	ft³/s
Normal Depth	4.00	ft
Flow Area	12.57	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.98	ft
Percent Full	100.0	%
Critical Slope	0.04685	ft/ft
Velocity	25.56	ft/s
Velocity Head	10.15	ft
Specific Energy	14.15	ft
Froude Number	0.00	
Maximum Discharge	345.49	ft³/s
Discharge Full	321.18	ft³/s
Slope Full	0.05000	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%

LONE MOUNTAIN - 48" RCP LATERAL STUB @ 5.0% SLOPE

GVF Output Data

Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.00	ft
Critical Depth	3.98	ft
Channel Slope	0.05000	ft/ft
Critical Slope	0.04685	ft/ft

LONE MOUNTAIN - 48" RCP LATERAL STUB @ 5.0%

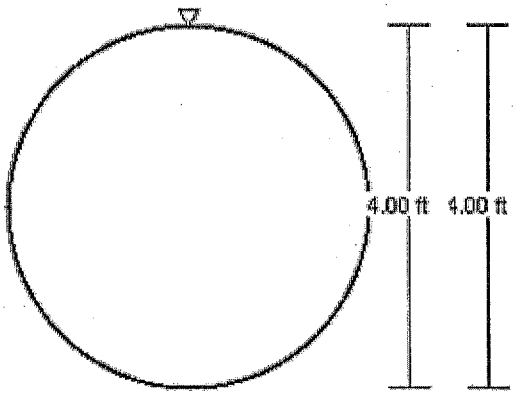
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.05000	ft/ft
Normal Depth	4.00	ft
Diameter	4.00	ft
Discharge	321.18	ft^3/s

Cross Section Image



V: 1
H: 1

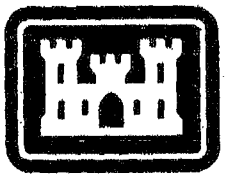
USBR TYPE-VI IMPACT BASIN ANALYSIS

ENGINEER MANUAL

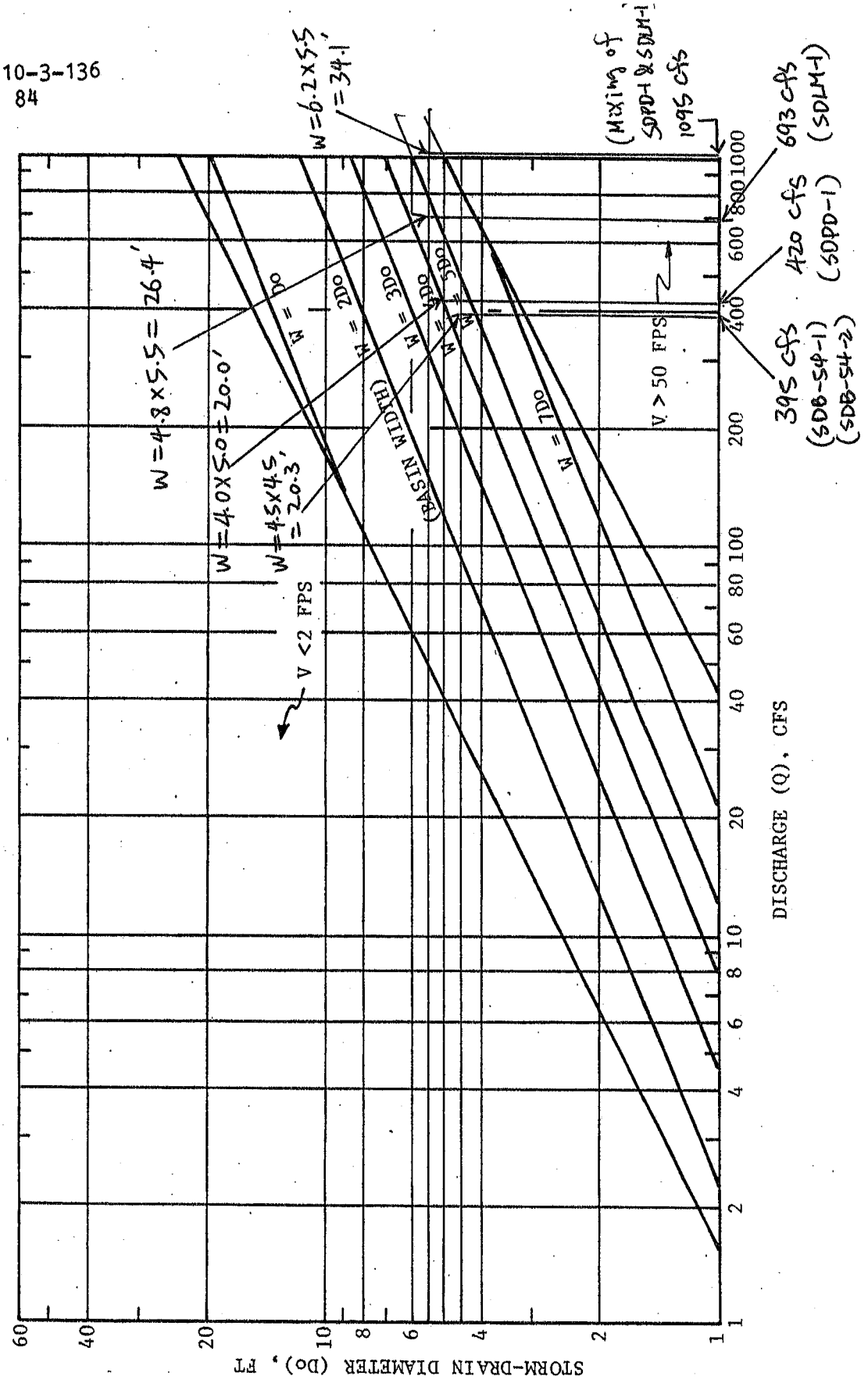
EM 1110-3-136
April 1984

ENGINEERING AND DESIGN

Drainage and Erosion Control Mobilization Construction

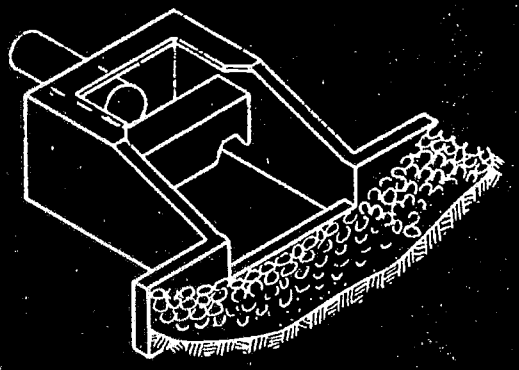


DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE CHIEF OF ENGINEERS



U.S. Army Corps of Engineers

FIGURE 20-4. STORM-DRAIN DIAMETER VERSUS DISCHARGE USBR TYPE VI BASIN



Hydraulic Design of Stilling Basin for Pipe or Channel Outlets

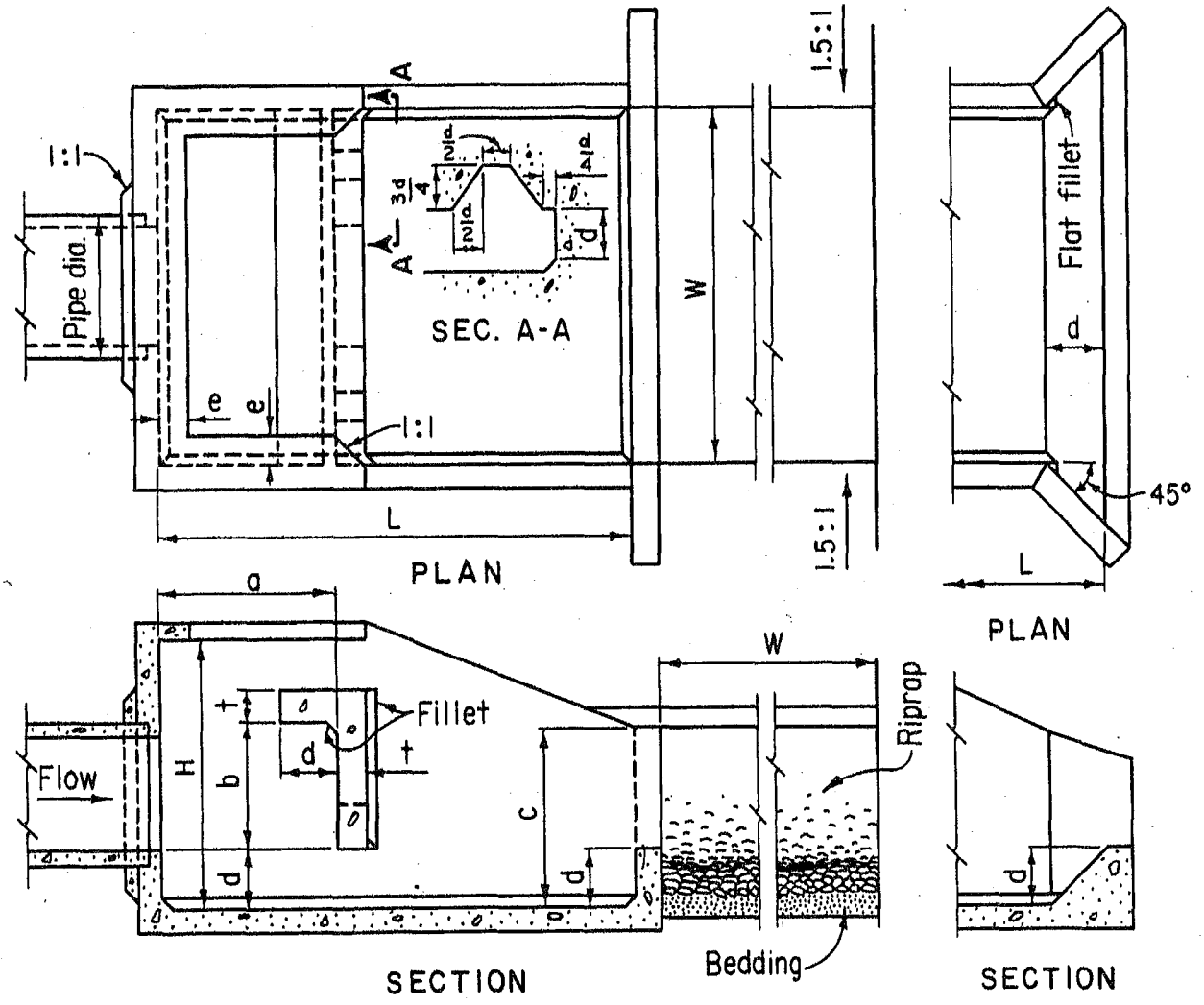
A Water Resources Technical Publication

RESEARCH REPORT NO. 24

United States Department of the

INTERIOR

Bureau of Reclamation



$H = 3W/4$ $\quad c = W/2$

$L = 4W/3$ $\quad d = W/6$

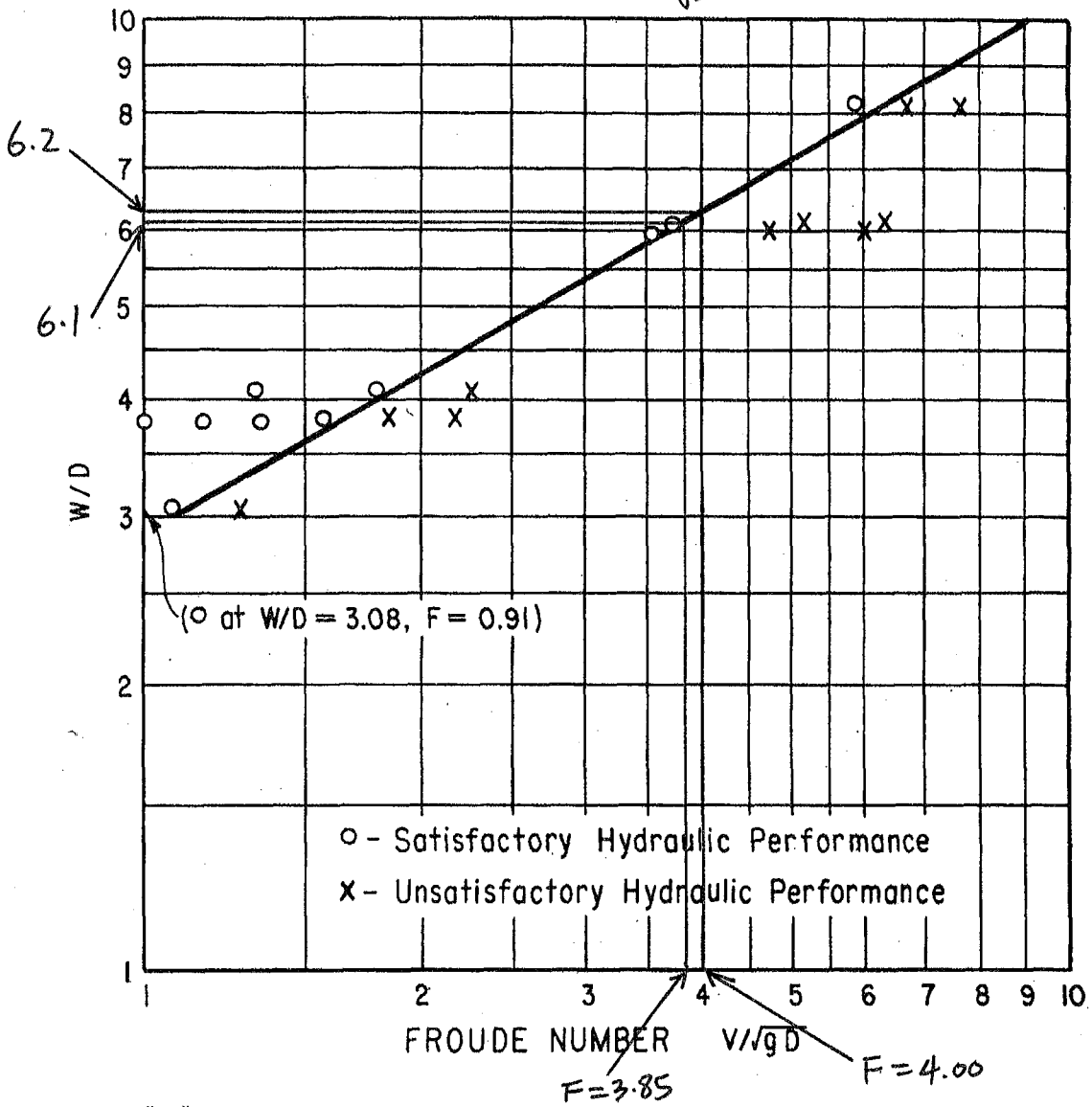
$a = W/2$ $\quad e = W/12$

$b = 3W/8$ $\quad t = W/12$ suggested minimum

Riprap stone size diameter = $W/20$

Figure 1.–General design of the type VI impact stilling basin.

Froude Numbers & Flow Areas Are Obtained From WSPG Analyses



"W" is the inside width of the basin.
"D" represents the depth of flow entering the basin and is the square root of the flow area.
"V" is the velocity of the incoming flow.
The tailwater depth is uncontrolled.

Figure 8.–Design width of basin.

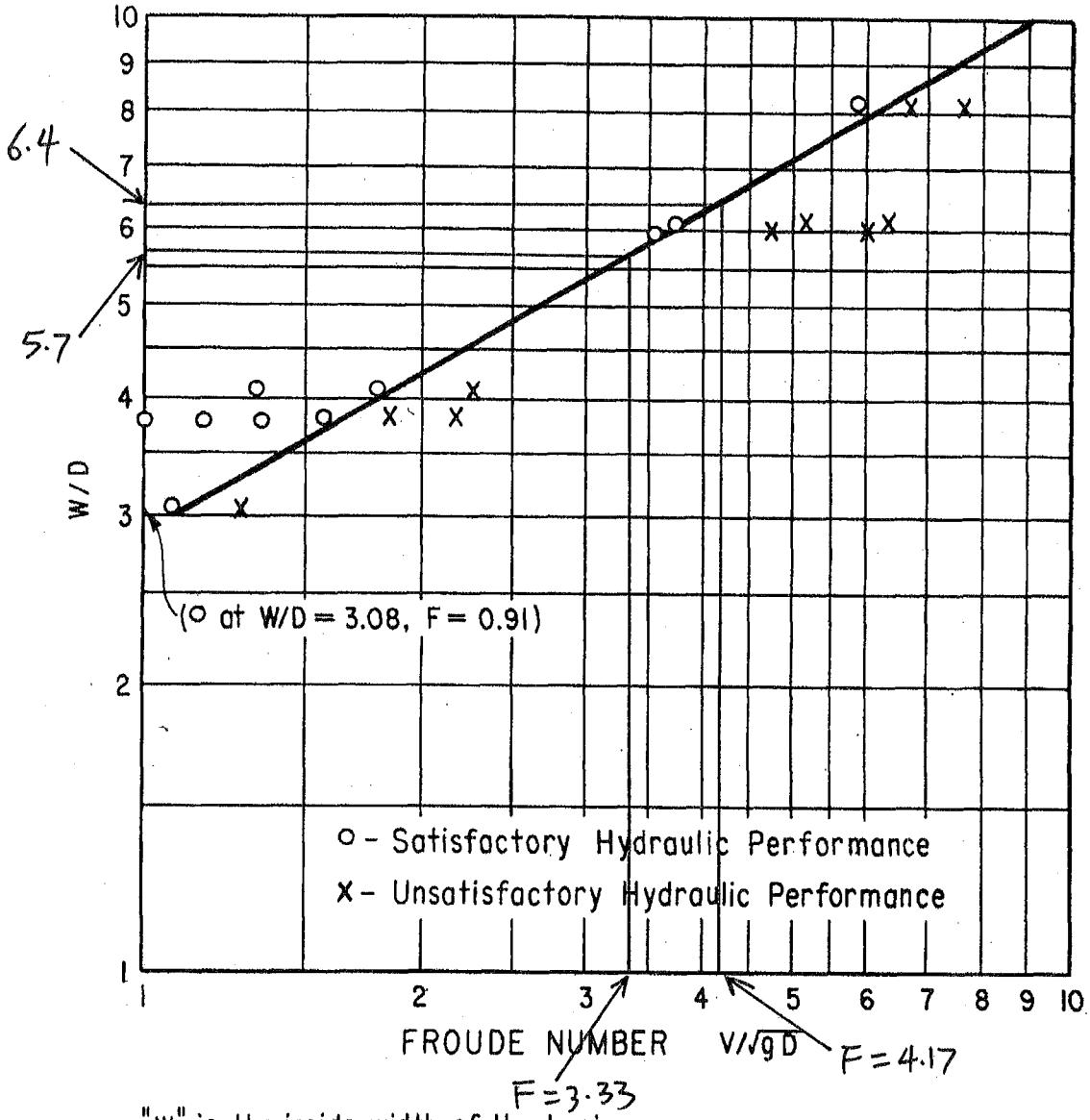
Facility SDB-54-1 (54" RCP)

$Q = 395$ cfs
$V = 36.19$ fps
$F = 4.00$
Flow Area $= 10.92$ ft^2
$D = \sqrt{10.92} = 3.30$ ft
$W/D = 6.2$
$W = 6.2(3.30) = 20.5'$

Facility SDB-54-2 (54" RCP)

$Q = 395$ cfs
$V = 35.36$ fps
$F = 3.85$
Flow Area $= 11.18$ ft^2
$D = \sqrt{11.18} = 3.34$ ft
$W/D = 6.1$
$W = 6.1(3.34) = 20.4'$

Froude Numbers & Flow Areas Are Obtained From WSPG Analyses



"W" is the inside width of the basin.
"D" represents the depth of flow entering the basin and is the square root of the flow area.
"V" is the velocity of the incoming flow.
The tailwater depth is uncontrolled.

Figure 8.–Design width of basin.

Facility SDPD-1 (60" RCP)

$Q = 420$ cfs
$V = 36.25$ fps
$F = 4.17$
Flow Area $= 11.61$ ft^2
$D = \sqrt{11.61} = 3.41$ ft
$W/D = 6.4$
$W = 6.4(3.41) = 21.8'$

Facility SDLM-1 (66" RCP)

$Q = 693$ cfs
$V = 37.04$ fps
$F = 3.33$
Flow Area $= 18.70$ ft^2
$D = \sqrt{18.70} = 4.32$
$W/D = 5.7$
$W = 5.7(4.32) = 24.6'$

DESIGN CONCLUSIONS AND RECOMMENDATIONS

The following procedures and rules are recommended in the design of the type VI basin:

1. Given a design discharge "Q," determine the velocity "V" and Froude number "F" of the incoming flow. If the Froude number is more than 10, use of this basin is not practicable. In computing the Froude number, assume the depth "D" to be the square root of the cross sectional area of the flow at the entrance "Q/V."

2. The flow is usually from a pipe. If the pipe flows partially full, it should be vented at the upstream end.

3. If the entrance pipe slopes downward, the outlet end of the pipe should be turned horizontal, or the invert filled to form a horizontal surface, for at least one pipe diameter upstream from the portal. For slopes 15° or greater, the horizontal length of pipe or fillet should be two or more diameters.

4. If the flow enters the basin from a rectangular open channel, the channel walls should be as high as the basin walls and the invert should be horizontal for a minimum of two channel widths upstream from the basin.

5. Having determined the Froude number, enter figure 8 to find the minimum required width of basin.

6. Figure 8 shows data points above the recommended width that provides satisfactory operation for basins larger then the design limit; however, if the basin is too large, the incoming jet will pass under the hanging baffle to reduce the effectiveness of the basin. Since the basin will be larger than need be for less than design flows, the basin should not be oversized for the design flow.

7. Relate the basin dimensions to the basin width in accordance with figure 1. The dimension "t" is a suggested minimum thickness for the hanging baffle and is not related to the hydraulic performance of the structure.

8. To prevent the possibility of cavitation or impact damage to the basin, the entrance velocity should be limited to about 50 feet per second (15 m/s).

9. Riprap with a well-graded mixture of stones, most of which have diameters equal to 5 percent of the basin width, should be placed to a depth equal to the height of end sill for a distance equivalent to one basin width downstream from the end sill.

If the elevation of the channel bed is below the end sill, the velocity of flow entering the channel will be increased and the riprap stone size should be increased as determined using figure 15. The drop in elevation from sill to bed must be added to the velocity head of the flow at the end sill, as determined from figure 14, to obtain the average velocity of flow entering the tailwater channel. This velocity can be used in figure 15 to determine the size of stones required.

10. Tailwater depth other than that created by the natural slope of the channel is not required. However, a smoother water surface will be obtained and smaller riprap stones can be used by increasing the tailwater depth in the channel to a depth of d+b/2 (see fig. 1 for definition of "d" and "b") above the basin floor. Compare figures 4 and 6 with figures 16 and 17.

11. This basin is more effective in the dissipation of energy than the hydraulic jump, figure 14. Prototype basins have operated successfully with entrance velocities up to 38 feet per second (11.6 m/s) (table 1 and fig. 13), and the recommended riprap size requirement has been verified by the performance of these basins.

12. The alternate end sill design (fig. 1) utilizing the 45° wingwall is not required but will reduce the drop in water surface elevation from end sill to channel (fig. 14) and reduce channel erosion.

13. No practical method of making the basin self-cleaning of debris, such as Russian thistles, was found. Where debris is a problem, screening devices are recommended at the entrance to and over the top of the structure. If thistles are allowed to enter the basin, they will not wash out.

14. During periods of nonoperation, sediment may accumulate in the basin. Notches in the baffle (fig. 1) are recommended to provide two jets that will start the erosion of the sediment which will eventually be washed from the basin. However, the basin is capable of satisfactorily discharging the entire design flow over the top of the baffle for short periods of time.

GOWAN BELTWAY WEST CHANNEL
COLLECTION FACILITIES CALCUALTIONS

NORMAL DEPTH STREET SECTION CALCULATIONS

Worksheet for Shaumber - North of Centennial (E2 - 21' DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.82	%
Discharge	137.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		0.79	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		23.88	ft²
Wetted Perimeter		77.22	ft
Top Width		75.73	ft

Worksheet for Shaumber - North of Centennial (E2 - 21' DIs)

Results

Normal Depth	0.79	ft
Critical Depth	0.94	ft
Critical Slope	0.00501	ft/ft
Velocity	5.74	ft/s
Velocity Head	0.51	ft
Specific Energy	1.30	ft
Froude Number	1.80	
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	0.79	ft
Critical Depth	0.94	ft
Channel Slope	0.01820	ft/ft
Critical Slope	0.00501	ft/ft

Cross Section for Shaumber - North of Centennial (E2 - 21' DIs)

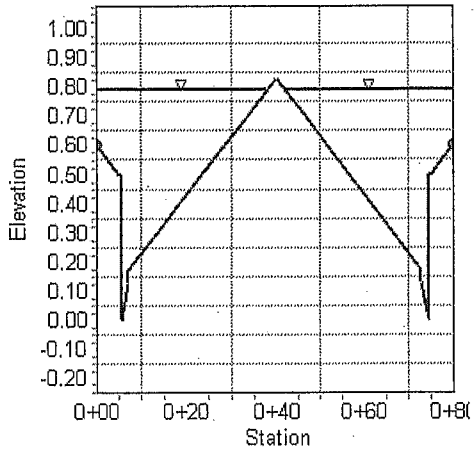
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.82	%
Normal Depth	0.79	ft
Discharge	137.00	ft³/s

Cross Section Image



Worksheet for Shaumber - North of Centennial (E2 - 12' DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.82	%
Discharge	30.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		0.52	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		7.54	ft²
Wetted Perimeter		42.16	ft
Top Width		41.06	ft

Worksheet for Shaumber - North of Centennial (E2 - 12' DIs)

Results

Normal Depth		0.52	ft
Critical Depth		0.60	ft
Critical Slope		0.00650	ft/ft
Velocity		3.98	ft/s
Velocity Head		0.25	ft
Specific Energy		0.77	ft
Froude Number		1.64	
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	0.52	ft
Critical Depth	0.60	ft
Channel Slope	0.01820	ft/ft
Critical Slope	0.00650	ft/ft

Cross Section for Shaumber - North of Centennial (E2 - 12' DIs)

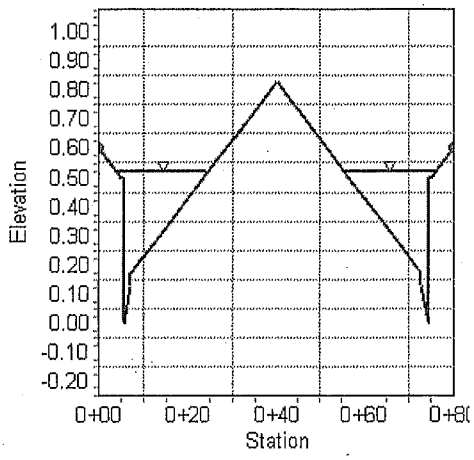
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.82	%
Normal Depth	0.52	ft
Discharge	30.00	ft³/s

Cross Section Image



Worksheet for Shaumber - North of Centennial - East (I1, U1)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.69	%
Discharge	4.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+40.00, 0.83)	0.016

Results

Normal Depth		0.32	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		0.92	ft²
Wetted Perimeter		9.25	ft
Top Width		8.89	ft
Normal Depth		0.32	ft
Critical Depth		0.40	ft
Critical Slope		0.00748	ft/ft
Velocity		4.33	ft/s
Velocity Head		0.29	ft
Specific Energy		0.61	ft

Worksheet for Shaumber - North of Centennial - East (I1, U1)

Results

Froude Number	2.36	
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	0.32	ft
Critical Depth	0.40	ft
Channel Slope	0.04690	ft/ft
Critical Slope	0.00748	ft/ft

Cross Section for Shaumber - North of Centennial - East (I1, U1)

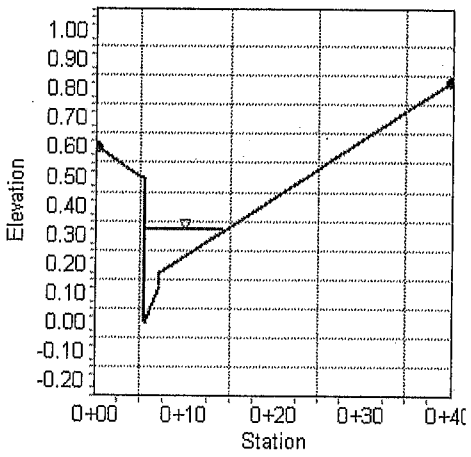
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.69	%
Normal Depth	0.32	ft
Discharge	4.00	ft^3/s

Cross Section Image



Worksheet for Shaumber - North of Centennial - West (I1, U1)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.81	%
Discharge	4.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+40.00, 0.83)	0.016

Results

Normal Depth		0.36	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		1.34	ft²
Wetted Perimeter		11.37	ft
Top Width		10.96	ft
Normal Depth		0.36	ft
Critical Depth		0.40	ft
Critical Slope		0.00748	ft/ft
Velocity		2.99	ft/s
Velocity Head		0.14	ft
Specific Energy		0.50	ft

Worksheet for Shaumber - North of Centennial - West (I1, U1)

Results

Froude Number	1.51	
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	0.36	ft
Critical Depth	0.40	ft
Channel Slope	0.01810	ft/ft
Critical Slope	0.00748	ft/ft

Cross Section for Shaumber - North of Centennial - West (I1, U1)

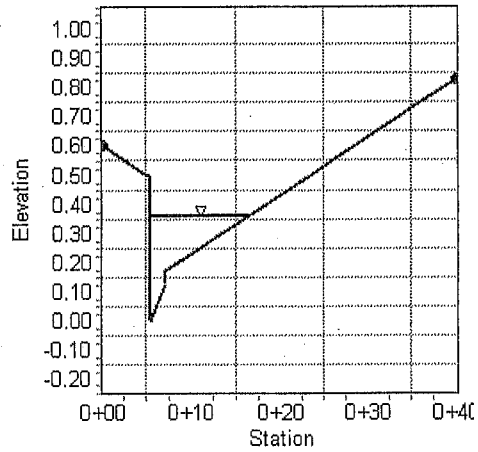
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.81	%
Normal Depth	0.36	ft
Discharge	4.00	ft³/s

Cross Section Image



Worksheet for Centennial - North Side (I2)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.91	%
Discharge	280.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.50
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(1+00.00, 0.60)	0.016

Results

Normal Depth		0.84	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		27.97	ft²
Wetted Perimeter		82.54	ft
Top Width		80.95	ft

Worksheet for Centennial - North Side (I2)

Results

Normal Depth		0.84	ft
Critical Depth		1.20	ft
Critical Slope		0.00450	ft/ft
Velocity		10.01	ft/s
Velocity Head		1.56	ft
Specific Energy		2.40	ft
Froude Number		3.00	
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	0.84	ft
Critical Depth	1.20	ft
Channel Slope	0.04910	ft/ft
Critical Slope	0.00450	ft/ft

Cross Section for Centennial - North Side (I2)

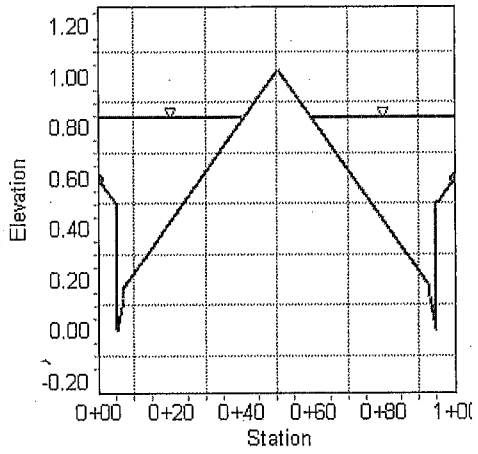
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.91	%
Normal Depth	0.84	ft
Discharge	280.00	ft³/s

Cross Section Image



Worksheet for Centennial - South Side (I2)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.66	%
Discharge	280.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03
0+93.00	0.17
0+93.00	0.13
0+94.50	0.00
0+94.50	0.50
0+95.00	0.50
1+00.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(1+00.00, 0.60)	0.016

Results

Normal Depth		0.85	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		28.51	ft²
Wetted Perimeter		83.22	ft
Top Width		81.62	ft

Worksheet for Centennial - South Side (I2)

Results

Normal Depth		0.85	ft
Critical Depth		1.20	ft
Critical Slope		0.00450	ft/ft
Velocity		9.82	ft/s
Velocity Head		1.50	ft
Specific Energy		2.34	ft
Froude Number		2.93	
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		0.85	ft
Critical Depth		1.20	ft
Channel Slope		0.04660	ft/ft
Critical Slope		0.00450	ft/ft

Cross Section for Centennial - South Side (I2)

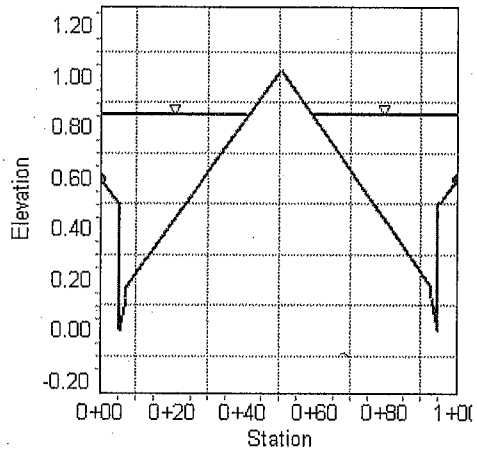
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.66	%
Normal Depth	0.85	ft
Discharge	280.00	ft³/s

Cross Section Image



Worksheet for Azure Street @ 4.12% (I5 - DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Discharge	88.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.63	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		13.04	ft²
Wetted Perimeter		60.88	ft
Top Width		59.72	ft

Worksheet for Azure Street @ 4.12% (I5 - DIs)

Results

Normal Depth		0.63	ft
Critical Depth		0.82	ft
Critical Slope		0.00521	ft/ft
Velocity		6.75	ft/s
Velocity Head		0.71	ft
Specific Energy		1.34	ft
Froude Number		2.55	
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	0.63	ft
Critical Depth	0.82	ft
Channel Slope	0.04120	ft/ft
Critical Slope	0.00521	ft/ft

Cross Section for Azure Street @ 4.12% (I5 - DIs)

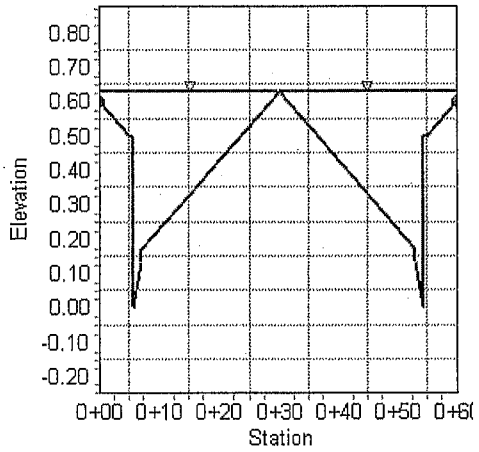
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Normal Depth	0.63	ft
Discharge	88.00	ft³/s

Cross Section Image



Worksheet for Azure Street @ 4.12% (I5 - Trench)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Discharge	13.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.37	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		2.82	ft²
Wetted Perimeter		23.43	ft
Top Width		22.60	ft

Worksheet for Azure Street @ 4.12% (I5 - Trench)

Results

Normal Depth		0.37	ft
Critical Depth		0.46	ft
Critical Slope		0.00701	ft/ft
Velocity		4.60	ft/s
Velocity Head		0.33	ft
Specific Energy		0.70	ft
Froude Number		2.30	
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	0.46	ft
Channel Slope	0.04120	ft/ft
Critical Slope	0.00701	ft/ft

Cross Section for Azure Street @ 4.12% (I5 - Trench)

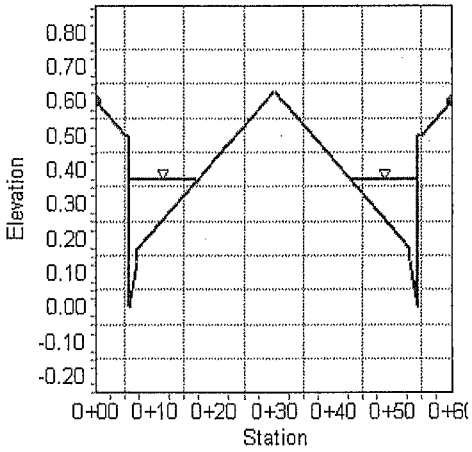
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Normal Depth	0.37	ft
Discharge	13.00	ft³/s

Cross Section Image



Worksheet for Tropical Street @ 0.95% (I8 - DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.95	%
Discharge	339.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		1.13	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		51.28	ft²
Wetted Perimeter		82.17	ft
Top Width		80.00	ft

Worksheet for Tropical Street @ 0.95% (I8 - DIs)

Results

Normal Depth		1.13	ft
Critical Depth		1.31	ft
Critical Slope		0.00415	ft/ft
Velocity		6.61	ft/s
Velocity Head		0.68	ft
Specific Energy		1.81	ft
Froude Number		1.46	
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	1.13	ft
Critical Depth	1.31	ft
Channel Slope	0.00950	ft/ft
Critical Slope	0.00415	ft/ft

Cross Section for Tropical Street @ 0.95% (I8 - DIs)

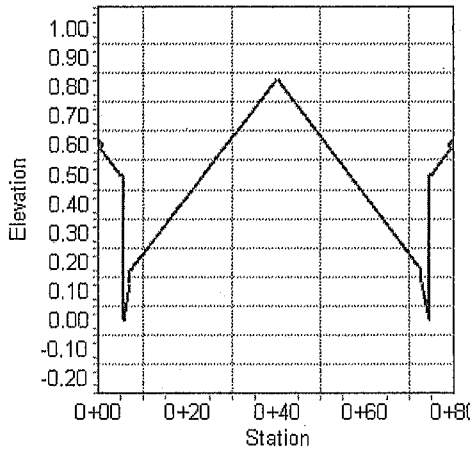
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.95	%
Normal Depth	1.13	ft
Discharge	339.00	ft^3/s

Cross Section Image



Worksheet for Tropical Street @ 0.14% (I8 - Trench)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.14	%
Discharge	32.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		0.75	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		21.12	ft²
Wetted Perimeter		73.39	ft
Top Width		71.99	ft

Worksheet for Tropical Street @ 0.14% (I8 - Trench)

Results

Normal Depth		0.75	ft
Critical Depth		0.61	ft
Critical Slope		0.00643	ft/ft
Velocity		1.52	ft/s
Velocity Head		0.04	ft
Specific Energy		0.79	ft
Froude Number		0.49	
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	0.75	ft
Critical Depth	0.61	ft
Channel Slope	0.00140	ft/ft
Critical Slope	0.00643	ft/ft

Cross Section for Tropical Street @ 0.14% (I8 - Trench)

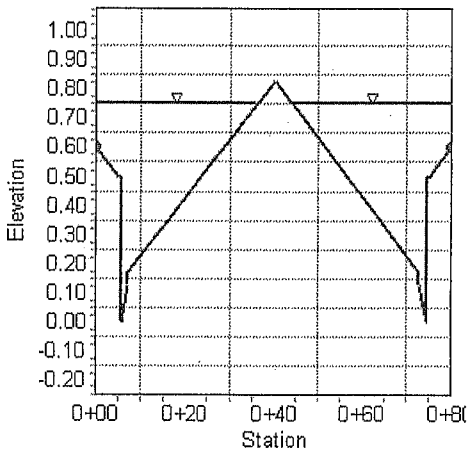
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.14	%
Normal Depth	0.75	ft
Discharge	32.00	ft³/s

Cross Section Image



Worksheet for Centennial - North Side - 1/2 Total Flow (U2)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.91	%
Discharge	178.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+50.00, 1.03)	0.016

Results

Normal Depth		0.90	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		16.69	ft²
Wetted Perimeter		44.55	ft
Top Width		43.69	ft
Normal Depth		0.90	ft
Critical Depth		1.31	ft
Critical Slope		0.00431	ft/ft
Velocity		10.69	ft/s
Velocity Head		1.78	ft
Specific Energy		2.68	ft

Worksheet for Centennial - North Side - 1/2 Total Flow (U2)

Results

Froude Number	3.05	
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	0.90	ft
Critical Depth	1.31	ft
Channel Slope	0.04910	ft/ft
Critical Slope	0.00431	ft/ft

Cross Section for Centennial - North Side - 1/2 Total Flow (U2)

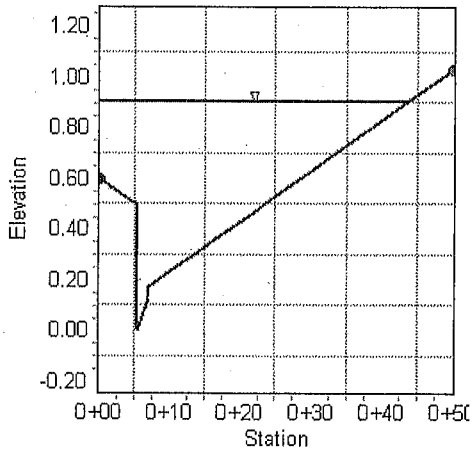
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.91	%
Normal Depth	0.90	ft
Discharge	178.50	ft³/s

Cross Section Image



Worksheet for Centennial - North Side - Half Street Capacity (U2)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	4.91	%
Normal Depth	1.03	ft

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+50.00, 1.03)	0.016

Results

Discharge		270.43	ft³/s
Elevation Range	0.00 to 1.03 ft		
Flow Area		22.60	ft²
Wetted Perimeter		50.99	ft
Top Width		50.00	ft
Normal Depth		1.03	ft
Critical Depth		1.55	ft
Critical Slope		0.00397	ft/ft
Velocity		11.96	ft/s
Velocity Head		2.22	ft
Specific Energy		3.25	ft

Worksheet for Centennial - North Side - Half Street Capacity (U2)

Results

Froude Number	3.14	
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	1.03	ft
Critical Depth	1.55	ft
Channel Slope	0.04910	ft/ft
Critical Slope	0.00397	ft/ft

Cross Section for Centennial - North Side - Half Street Capacity (U2)

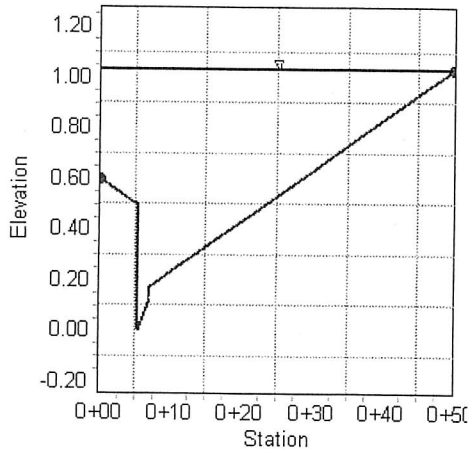
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Channel Slope	4.91	%
Normal Depth	1.03	ft
Discharge	270.43	ft³/s

Cross Section Image



Worksheet for Centennial - South Side (U2)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.66	%
Discharge	178.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+50.00	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+50.00, 1.03)	0.016

Results

Normal Depth		0.91	ft
Elevation Range	0.00 to 1.03 ft		
Flow Area		17.01	ft²
Wetted Perimeter		44.92	ft
Top Width		44.06	ft
Normal Depth		0.91	ft
Critical Depth		1.31	ft
Critical Slope		0.00431	ft/ft
Velocity		10.49	ft/s
Velocity Head		1.71	ft
Specific Energy		2.62	ft

Worksheet for Centennial - South Side (U2)

Results

Froude Number	2.98	
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	0.91	ft
Critical Depth	1.31	ft
Channel Slope	0.04660	ft/ft
Critical Slope	0.00431	ft/ft

Cross Section for Centennial - South Side (U2)

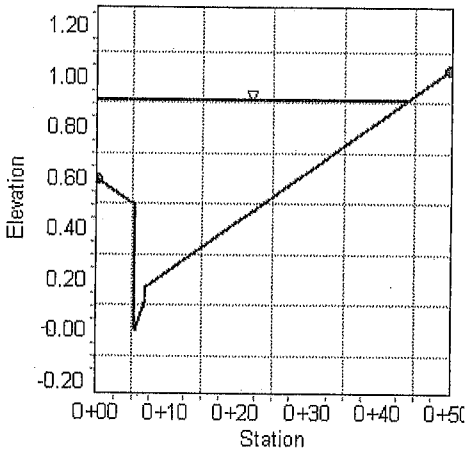
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.66	%
Normal Depth	0.91	ft
Discharge	178.50	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 829+50 (U3)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.54	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.68	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		11.21	ft²
Wetted Perimeter		46.57	ft
Top Width		45.50	ft
Normal Depth		0.68	ft

Worksheet for Shaumber @ Sta. 829+50 (U3)

Results

Critical Depth		0.77	ft
Critical Slope		0.00557	ft/ft
Velocity		4.46	ft/s
Velocity Head		0.31	ft
Specific Energy		0.99	ft
Froude Number		1.58	
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	0.68	ft
Critical Depth	0.77	ft
Channel Slope	0.01540	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 829+50 (U3)

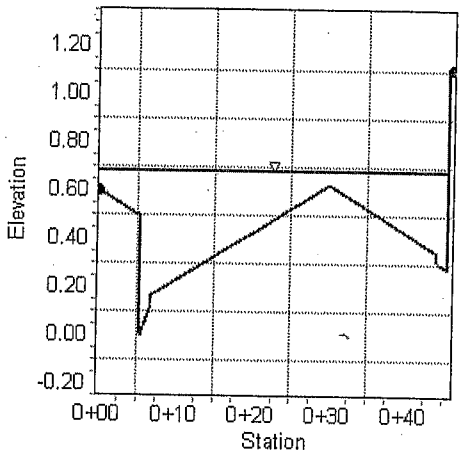
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.54	%
Normal Depth	0.68	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 824+00 (U4)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.85	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.73	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		13.42	ft²
Wetted Perimeter		46.67	ft
Top Width		45.50	ft
Normal Depth		0.73	ft

Worksheet for Shaumber @ Sta. 824+00 (U4)

Results

Critical Depth	0.77	ft
Critical Slope	0.00557	ft/ft
Velocity	3.73	ft/s
Velocity Head	0.22	ft
Specific Energy	0.94	ft
Froude Number	1.21	
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	0.73	ft
Critical Depth	0.77	ft
Channel Slope	0.00850	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 824+00 (U4)

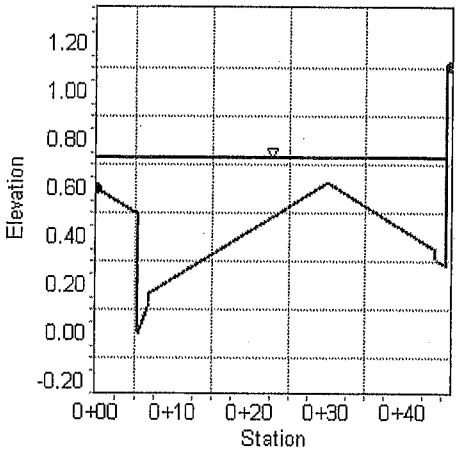
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.85	%
Normal Depth	0.73	ft
Discharge	50.00	ft^3/s

Cross Section Image



Worksheet for Shaumber @ Sta. 822+00 (U5)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.85	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.73	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		13.42	ft²
Wetted Perimeter		46.67	ft
Top Width		45.50	ft
Normal Depth		0.73	ft

Worksheet for Shaumber @ Sta. 822+00 (U5)

Results

Critical Depth		0.77	ft
Critical Slope		0.00557	ft/ft
Velocity		3.73	ft/s
Velocity Head		0.22	ft
Specific Energy		0.94	ft
Froude Number		1.21	
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	0.73	ft
Critical Depth	0.77	ft
Channel Slope	0.00850	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 822+00 (U5)

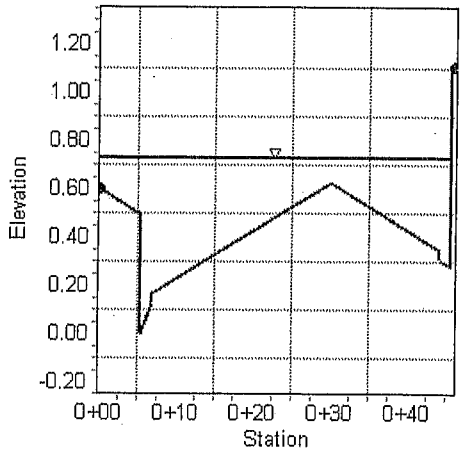
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.85	%
Normal Depth	0.73	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for Azure Street @ 4.12% (U6 - DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Discharge	230.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.80	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		23.30	ft²
Wetted Perimeter		61.50	ft
Top Width		60.00	ft

Worksheet for Azure Street @ 4.12% (U6 - DIs)

Results

Normal Depth		0.80	ft
Critical Depth		1.18	ft
Critical Slope		0.00428	ft/ft
Velocity		9.87	ft/s
Velocity Head		1.51	ft
Specific Energy		2.31	ft
Froude Number		2.79	
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	0.80	ft
Critical Depth	1.18	ft
Channel Slope	0.04120	ft/ft
Critical Slope	0.00428	ft/ft

Cross Section for Azure Street @ 4.12% (U6 - DIs)

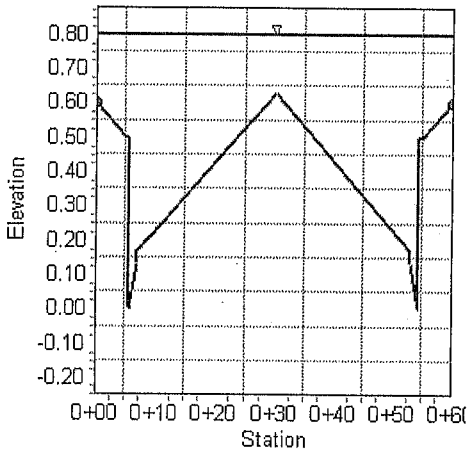
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Normal Depth	0.80	ft
Discharge	230.00	ft³/s

Cross Section Image



Worksheet for Azure Street @ 4.12% (U6 - Trench)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Discharge	90.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.63	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		13.24	ft²
Wetted Perimeter		61.16	ft
Top Width		60.00	ft

Worksheet for Azure Street @ 4.12% (U6 - Trench)

Results

Normal Depth		0.63	ft
Critical Depth		0.82	ft
Critical Slope		0.00519	ft/ft
Velocity		6.80	ft/s
Velocity Head		0.72	ft
Specific Energy		1.35	ft
Froude Number		2.55	
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	0.63	ft
Critical Depth	0.82	ft
Channel Slope	0.04120	ft/ft
Critical Slope	0.00519	ft/ft

Cross Section for Azure Street @ 4.12% (U6 - Trench)

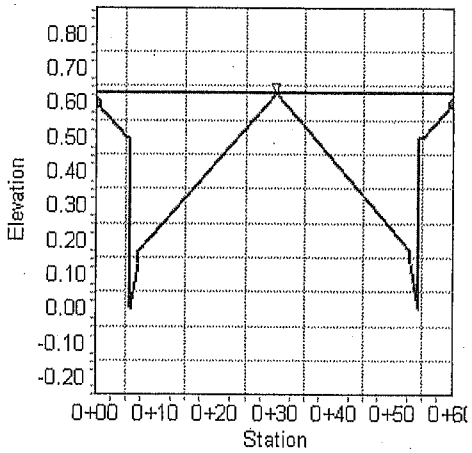
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.12	%
Normal Depth	0.63	ft
Discharge	90.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 817+00 (U7)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.32	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.69	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		11.74	ft²
Wetted Perimeter		46.59	ft
Top Width		45.50	ft
Normal Depth		0.69	ft

Worksheet for Shaumber @ Sta. 817+00 (U7)

Results

Critical Depth	0.77	ft
Critical Slope	0.00557	ft/ft
Velocity	4.26	ft/s
Velocity Head	0.28	ft
Specific Energy	0.97	ft
Froude Number	1.48	
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	0.69	ft
Critical Depth	0.77	ft
Channel Slope	0.01320	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 817+00 (U7)

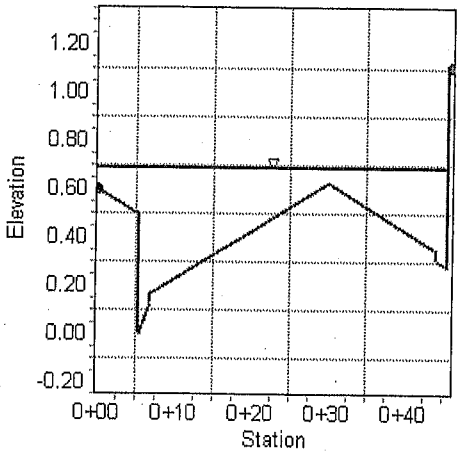
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.32	%
Normal Depth	0.69	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 812+50 (U8)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.32	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.69	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		11.74	ft²
Wetted Perimeter		46.59	ft
Top Width		45.50	ft
Normal Depth		0.69	ft

Worksheet for Shaumber @ Sta. 812+50 (U8)

Results

Critical Depth	0.77	ft
Critical Slope	0.00557	ft/ft
Velocity	4.26	ft/s
Velocity Head	0.28	ft
Specific Energy	0.97	ft
Froude Number	1.48	
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	0.69	ft
Critical Depth	0.77	ft
Channel Slope	0.01320	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 812+50 (U8)

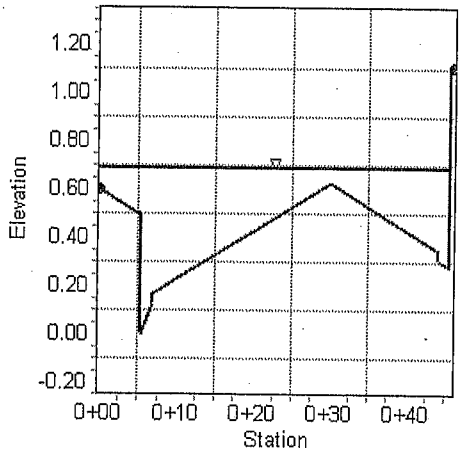
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.32	%
Normal Depth	0.69	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 809+00 (U9)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Discharge	100.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.97	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		24.37	ft²
Wetted Perimeter		47.15	ft
Top Width		45.50	ft
Normal Depth		0.97	ft

Worksheet for Shaumber @ Sta. 809+00 (U9)

Results

Critical Depth	0.96	ft
Critical Slope	0.00483	ft/ft
Velocity	4.10	ft/s
Velocity Head	0.26	ft
Specific Energy	1.23	ft
Froude Number	0.99	
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	0.97	ft
Critical Depth	0.96	ft
Channel Slope	0.00470	ft/ft
Critical Slope	0.00483	ft/ft

Cross Section for Shaumber @ Sta. 809+00 (U9)

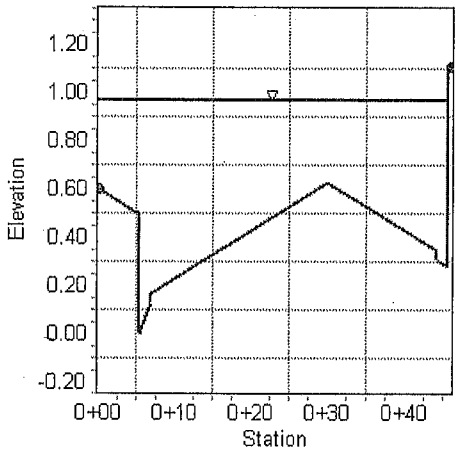
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	0.97	ft
Discharge	100.00	ft^3/s

Cross Section Image



Worksheet for Tropical Street @ 0.95% (U10 - DIs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.95	%
Discharge	239.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		1.01	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		41.52	ft²
Wetted Perimeter		81.92	ft
Top Width		80.00	ft

Worksheet for Tropical Street @ 0.95% (U10 - DIs)

Results

Normal Depth		1.01	ft
Critical Depth		1.14	ft
Critical Slope		0.00446	ft/ft
Velocity		5.76	ft/s
Velocity Head		0.51	ft
Specific Energy		1.52	ft
Froude Number		1.41	
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	1.01	ft
Critical Depth	1.14	ft
Channel Slope	0.00950	ft/ft
Critical Slope	0.00446	ft/ft

Cross Section for Tropical Street @ 0.95% (U10 - DIs)

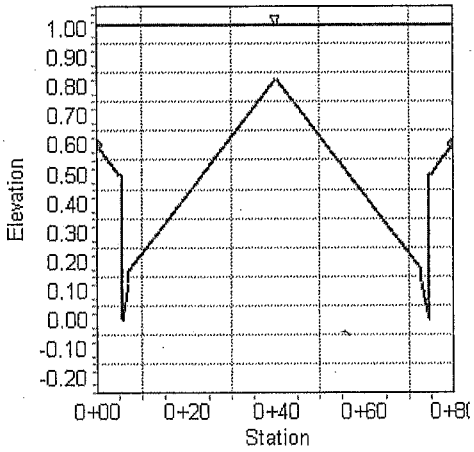
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.95	%
Normal Depth	1.01	ft
Discharge	239.00	ft³/s

Cross Section Image



Worksheet for Tropical Street @ 0.14% (U10 - Trench)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.14	%
Discharge	3.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+40.00	0.83
0+73.00	0.17
0+73.00	0.13
0+74.50	0.00
0+74.50	0.50
0+75.00	0.50
0+80.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+80.00, 0.60)	0.016

Results

Normal Depth		0.39	ft
Elevation Range	0.00 to 0.83 ft		
Flow Area		3.36	ft²
Wetted Perimeter		25.74	ft
Top Width		24.86	ft

Worksheet for Tropical Street @ 0.14% (U10 - Trench)

Results

Normal Depth		0.39	ft
Critical Depth		0.31	ft
Critical Slope		0.00850	ft/ft
Velocity		0.89	ft/s
Velocity Head		0.01	ft
Specific Energy		0.40	ft
Froude Number		0.43	
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	0.39	ft
Critical Depth	0.31	ft
Channel Slope	0.00140	ft/ft
Critical Slope	0.00850	ft/ft

Cross Section for Tropical Street @ 0.14% (U10 - Trench)

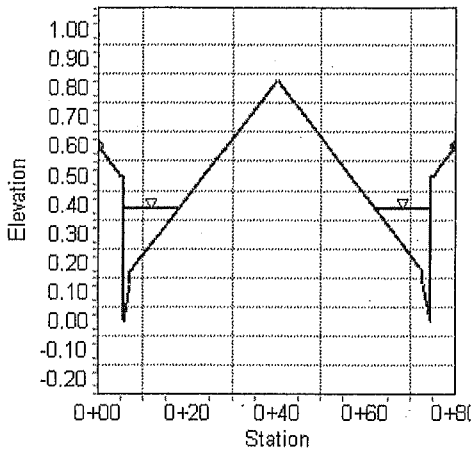
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.14	%
Normal Depth	0.39	ft
Discharge	3.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 805+50 (U11)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.78	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		16.02	ft²
Wetted Perimeter		46.78	ft
Top Width		45.50	ft
Normal Depth		0.78	ft

Worksheet for Shaumber @ Sta. 805+50 (U11)

Results

Critical Depth	0.77	ft
Critical Slope	0.00557	ft/ft
Velocity	3.12	ft/s
Velocity Head	0.15	ft
Specific Energy	0.93	ft
Froude Number	0.93	
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	0.78	ft
Critical Depth	0.77	ft
Channel Slope	0.00470	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 805+50 (U11)

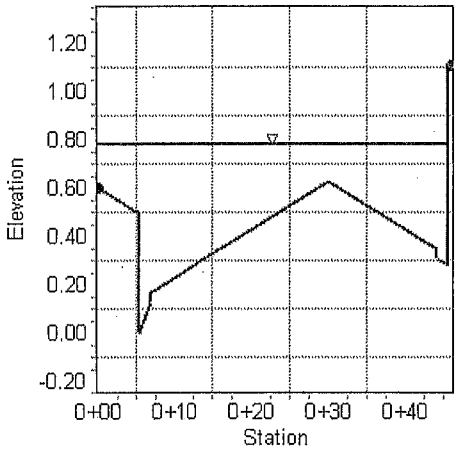
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	0.78	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 795+00 (U12)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Discharge	116.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		1.02	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		26.68	ft²
Wetted Perimeter		47.25	ft
Top Width		45.50	ft
Normal Depth		1.02	ft

Worksheet for Shaumber @ Sta. 795+00 (U12)

Results

Critical Depth		1.02	ft
Critical Slope		0.00469	ft/ft
Velocity		4.35	ft/s
Velocity Head		0.29	ft
Specific Energy		1.31	ft
Froude Number		1.00	
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	1.02	ft
Critical Depth	1.02	ft
Channel Slope	0.00470	ft/ft
Critical Slope	0.00469	ft/ft

Cross Section for Shaumber @ Sta. 795+00 (U12)

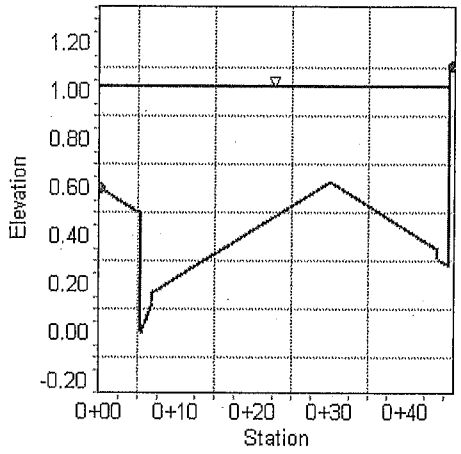
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	1.02	ft
Discharge	116.00	ft^3/s

Cross Section Image



Worksheet for Shaumber @ Sta. 792+50 (U13)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Discharge	50.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+44.00	0.35
0+44.00	0.31
0+45.50	0.28
0+45.50	1.11
0+46.00	1.11

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+46.00, 1.11)	0.016

Results

Normal Depth		0.78	ft
Elevation Range	0.00 to 1.11 ft		
Flow Area		16.02	ft²
Wetted Perimeter		46.78	ft
Top Width		45.50	ft
Normal Depth		0.78	ft

Worksheet for Shaumber @ Sta. 792+50 (U13)

Results

Critical Depth		0.77	ft
Critical Slope		0.00557	ft/ft
Velocity		3.12	ft/s
Velocity Head		0.15	ft
Specific Energy		0.93	ft
Froude Number		0.93	
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	0.78	ft
Critical Depth	0.77	ft
Channel Slope	0.00470	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 792+50 (U13)

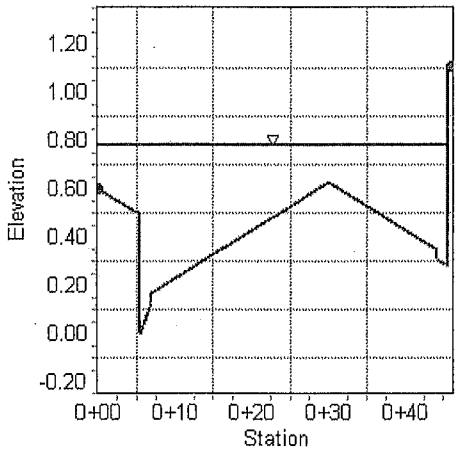
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	0.78	ft
Discharge	50.00	ft³/s

Cross Section Image



Worksheet for La Mancha Street @ 6.42% (U14 - Trench)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.42	%
Discharge	66.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.55	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		8.70	ft²
Wetted Perimeter		47.46	ft
Top Width		46.36	ft

Worksheet for La Mancha Street @ 6.42% (U14 - Trench)

Results

Normal Depth		0.55	ft
Critical Depth		0.75	ft
Critical Slope		0.00554	ft/ft
Velocity		7.59	ft/s
Velocity Head		0.89	ft
Specific Energy		1.44	ft
Froude Number		3.09	
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	0.55	ft
Critical Depth	0.75	ft
Channel Slope	0.06420	ft/ft
Critical Slope	0.00554	ft/ft

Cross Section for La Mancha Street @ 6.42% (U14 - Trench)

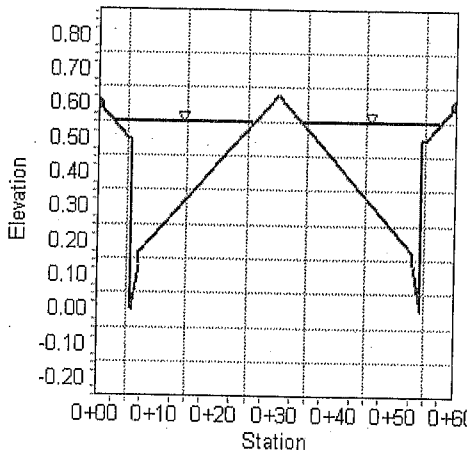
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.42	%
Normal Depth	0.55	ft
Discharge	66.00	ft³/s

Cross Section Image



Worksheet for La Mancha Street @ 6.42% (U14 - Dls)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.42	%
Discharge	210.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.50
0+55.00	0.50
0+60.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+60.00, 0.60)	0.016

Results

Normal Depth		0.73	ft
Elevation Range	0.00 to 0.63 ft		
Flow Area		19.29	ft²
Wetted Perimeter		61.37	ft
Top Width		60.00	ft

Worksheet for La Mancha Street @ 6.42% (U14 - DIs)

Results

Normal Depth	0.73	ft
Critical Depth	1.13	ft
Critical Slope	0.00435	ft/ft
Velocity	10.89	ft/s
Velocity Head	1.84	ft
Specific Energy	2.57	ft
Froude Number	3.39	
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	0.73	ft
Critical Depth	1.13	ft
Channel Slope	0.06420	ft/ft
Critical Slope	0.00435	ft/ft

Cross Section for La Mancha Street @ 6.42% (U14 - DIs)

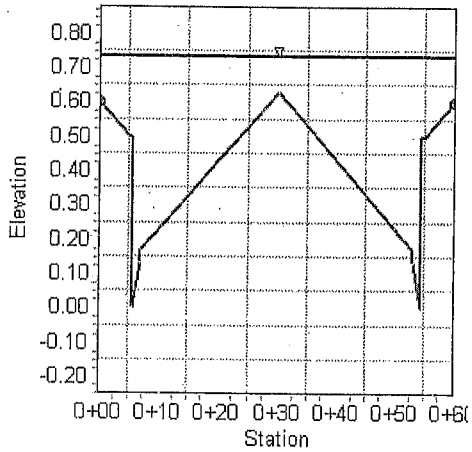
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.42	%
Normal Depth	0.73	ft
Discharge	210.00	ft³/s

Cross Section Image



Worksheet for Shaumber @ Sta. 785+00 (U17)

Results

Critical Depth		0.77	ft
Critical Slope		0.00557	ft/ft
Velocity		5.45	ft/s
Velocity Head		0.46	ft
Specific Energy		1.09	ft
Froude Number		2.14	
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	0.63	ft
Critical Depth	0.77	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for Shaumber @ Sta. 785+00 (U17)

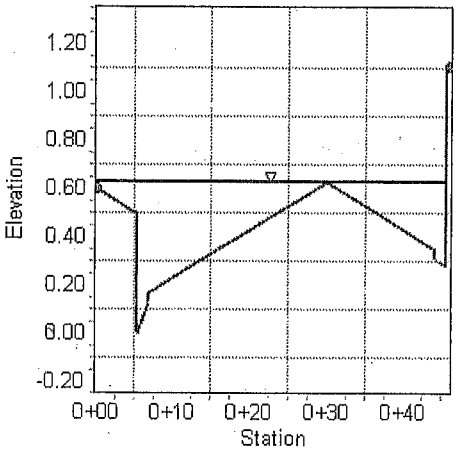
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.00	%
Normal Depth	0.63	ft
Discharge	50.00	ft³/s

Cross Section Image



DROP INLET CALCULATIONS

Type CM Drop Inlet Sizing on a C. G.

Existing 21' Drop inlets in Shaumber (E2)

Known:

Q_s=	Half Street Flow	68.5	cfs
S_o=	Longitudinal Slope	0.0182	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.74	fps
D=	Flow Depth	0.79	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	21.0	ft
L_c=	Length of Curb Opening	21.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	19.64 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.09
	Q_w= Frontal flow=A_w*V_s	6.44 cfs
	Q_x= Side flow = Q_s-Q_w	62.06 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.56
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	41.3 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.031 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	101.97 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	12.2 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	53.5 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	15.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.55 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	78 %

Type CM Drop Inlet Sizing on a C. G.

Existing 12' Drop inlets in Shaumber (E2)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0182	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.98	fps
D=	Flow Depth	0.52	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	12.0	ft
L_c=	Length of Curb Opening	12.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	10.76	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.19	
	Q_w= Frontal flow=A_w*V_s	2.86	cfs
	Q_x= Side flow = Q_s-Q_w	12.14	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.41	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	7.8	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.043	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	44.67	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	3.4	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	11.2	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	3.8	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.93	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	75	%

Type CM Drop Inlet Sizing on a C. G.

Proposed 12' Drop inlets in Shaumber - East (I1, U1)

Known:

Q_s=	Half Street Flow	4	cfs
S_o=	Longitudinal Slope	0.0469	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.33	fps
D=	Flow Depth	0.32	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	12.0	ft
L_c=	Length of Curb Opening	12.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	10.76 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.45
	Q_w= Frontal flow=A_w*V_s	1.81 cfs
	Q_x= Side flow = Q_s-Q_w	2.19 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.37
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	2.6 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.074 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	24.52 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	1.6 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	4.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.33 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Proposed 12' Drop inlets in Shaumber - West (I1, U1)

Known:

Q_s=	Half Street Flow	4	cfs
S_o=	Longitudinal Slope	0.0181	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	2.99	fps
D=	Flow Depth	0.36	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	12.0	ft
L_c=	Length of Curb Opening	12.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	10.76 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.36
	Q_w= Frontal flow=A_w*V_s	1.43 cfs
	Q_x= Side flow = Q_s-Q_w	2.57 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.53
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	2.8 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.062 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	20.36 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	1.9 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	4.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.33 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Proposed Drop Inlets in Centennial - North Side (I2)

Known:

Q_s=	Half Street Flow	140	cfs
S_o=	Longitudinal Slope	0.0491	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	10.01	fps
D=	Flow Depth	0.84	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	52.5	ft
L_c=	Length of Curb Opening	52.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	316.22	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.09	
	Q_w= Frontal flow=A_w*V_s	11.99	cfs
	Q_x= Side flow = Q_s-Q_w	128.01	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.79	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	113.7	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.030	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	189.10	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	33.0	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	140.0	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.67	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100	%

Type CM Drop Inlet Sizing on a C. G.

Proposed Drop Inlets in Centennial - South Side (I2)

Known:

Q_s=	Half Street Flow	140	cfs
S_o=	Longitudinal Slope	0.0466	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	9.82	fps
D=	Flow Depth	0.85	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	52.5	ft
L_c=	Length of Curb Opening	52.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	316.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.09
	Q_w= Frontal flow=A_w*V_s	11.91 cfs
	Q_x= Side flow = Q_s-Q_w	128.09 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.80
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	114.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.030 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	186.41 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	33.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	140.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.67 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Azure - West of Shaumber - Drop Inlets (I5)

Known:

Q_s=	Half Street Flow	44	cfs
S_o=	Longitudinal Slope	0.0412	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	6.75	fps
D=	Flow Depth	0.63	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	25.0	ft
L_c=	Length of Curb Opening	25.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	29.04 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.14
	Q_w= Frontal flow=A_w*V_s	5.96 cfs
	Q_x= Side flow = Q_s-Q_w	38.04 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.59
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	28.3 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.036 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	99.11 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	9.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	37.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	6.2 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.51 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	86 %

Type CM Drop Inlet Sizing on a C. G.

Azure - West of Shaumber - Trench Drain (I5)

Known:

Q_s=	Half Street Flow	6.5	cfs
S_o=	Longitudinal Slope	0.0412	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.60	fps
D=	Flow Depth	0.37	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	3.0	ft
L_c=	Length of Curb Opening	0.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	100	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	5.53 fps

Trench Intercept

Qint = Qs x Rf

Qint = 6.5 cfs x 1.0 = 6.5 cfs

Total Intercept

Qint = (37.5 + 6.5)x2 = 88 cfs

Qbyp = 88 cfs - 88 cfs = 0 cfs

Type CM Drop Inlet Sizing on a C. G.

Tropical - West of Shaumber - Drop Inlets (I8)

Known:

Q_s=	Half Street Flow	169.5	cfs
S_o=	Longitudinal Slope	0.0095	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	6.61	fps
D=	Flow Depth	1.13	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	30.0	ft
L_c=	Length of Curb Opening	30.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	48.56 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.06
	Q_w= Frontal flow=A_w*V_s	10.79 cfs
	Q_x= Side flow = Q_s-Q_w	158.71 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.69
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	120.8 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.028 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	132.16 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	33.0 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	153.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	15.7 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	5.13 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	91 %

Type CM Drop Inlet Sizing on a C. G.

Tropical - West of Shaumber - Trench Drain (I8)

Known:

Q_s=	Half Street Flow	16	cfs
S_o=	Longitudinal Slope	0.0014	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	1.52	fps
D=	Flow Depth	0.75	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	3.0	ft
L_c=	Length of Curb Opening	0.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	100	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	5.53 fps

Trench Intercept

Qint = Qs x Rf x (Width of grate/Total flow width)

Qint = 16 cfs x 1.0 x (9.5 ft/36 ft)= 4 cfs

Total Intercept

Qint = (153.5 + 4) x 2 = 315 cfs

Qbyp = 339 cfs - 315 cfs = 24 cfs

Type CM Drop Inlet Sizing on a C. G.

Proposed Drop Inlets in Centennial - North Side - 1/2 Total Flow (U2)

Known:

Q_s=	Half Street Flow	178.5	cfs
S_o=	Longitudinal Slope	0.0491	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	10.69	fps
D=	Flow Depth	0.9	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	52.5	ft
L_c=	Length of Curb Opening	52.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	316.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.08
	Q_w= Frontal flow=A_w*V_s	13.76 cfs
	Q_x= Side flow = Q_s-Q_w	164.74 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.77
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	141.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.029 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	213.74 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	37.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	178.5 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	3.40 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Proposed Drop Inlets in Centennial - North Side @ Flow Capacity (U2)

Known:

Q_s=	Half Street Flow	270	cfs
S_o=	Longitudinal Slope	0.0491	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	11.96	fps
D=	Flow Depth	1.03	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	52.5	ft
L_c=	Length of Curb Opening	52.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	316.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.07
	Q_w= Frontal flow=A_w*V_s	17.73 cfs
	Q_x= Side flow = Q_s-Q_w	252.27 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.74
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	203.8 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.028 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	261.69 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	46.8 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	250.6 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	19.4 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	4.77 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	93 %

Type CM Drop Inlet Sizing on a C. G.

Proposed Drop Inlets in Centennial - South Side (U2)

Known:

Q_s=	Half Street Flow	178.5	cfs
S_o=	Longitudinal Slope	0.0466	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	10.49	fps
D=	Flow Depth	0.91	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	52.5	ft
L_c=	Length of Curb Opening	52.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	316.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.08
	Q_w= Frontal flow=A_w*V_s	13.66 cfs
	Q_x= Side flow = Q_s-Q_w	164.84 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.78
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	142.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.029 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	210.70 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	38.0 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	178.5 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	3.40 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 829+50 - West (U3)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0154	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.46	fps
D=	Flow Depth	0.68	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.12	
	Q_w= Frontal flow=A_w*V_s	4.27	cfs
	Q_x= Side flow = Q_s-Q_w	30.73	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.48	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	19.1	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.034	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	68.85	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	6.6	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	25.6	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	9.4	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.71	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	73	%

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 829+50 - East (U3)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0154	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.46	fps
D=	Flow Depth	0.4	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00	
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	7.22	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.16	
	Q_w= Frontal flow=A_w*V_s	2.40	cfs
	Q_x= Side flow = Q_s-Q_w	12.60	cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.07	
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	3.3	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.039	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	44.82	ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	1.5	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	4.7	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	10.3	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.95	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	32	%

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 824+00 - West (U4)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0085	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.73	fps
D=	Flow Depth	0.73	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.11
	Q_w= Frontal flow=A_w*V_s	3.85 cfs
	Q_x= Side flow = Q_s-Q_w	31.15 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.56
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	21.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.033 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	59.08 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	7.6 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	28.9 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	6.1 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.93 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	83 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 824+00 - East (U4)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0085	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.73	fps
D=	Flow Depth	0.45	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	7.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.15
	Q_w= Frontal flow=A_w*V_s	2.28 cfs
	Q_x= Side flow = Q_s-Q_w	12.72 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.09
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	3.5 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.038 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	38.02 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	1.7 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	5.2 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	9.8 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.04 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	35 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 822+00 - West (U5)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0085	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.73	fps
D=	Flow Depth	0.73	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.11
	Q_w= Frontal flow=A_w*V_s	3.85 cfs
	Q_x= Side flow = Q_s-Q_w	31.15 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.56
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	21.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.033 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	59.08 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	7.6 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	28.9 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	6.1 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.93 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	83 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 822+00 - East (U5)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0085	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.73	fps
D=	Flow Depth	0.45	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	7.22	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.15	
	Q_w= Frontal flow=A_w*V_s	2.28	cfs
	Q_x= Side flow = Q_s-Q_w	12.72	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.09	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	3.5	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.038	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	38.02	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	1.7	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	5.2	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	9.8	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.04	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	35	%

Type CM Drop Inlet Sizing on a C. G.

Azure - West of Shaumber - Drop Inlets (U6)

Known:

Q_s=	Half Street Flow	115	cfs
S_o=	Longitudinal Slope	0.0412	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	9.87	fps
D=	Flow Depth	0.8	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	25.0	ft
L_c=	Length of Curb Opening	25.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	29.04 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.10
	Q_w= Frontal flow=A_w*V_s	11.23 cfs
	Q_x= Side flow = Q_s-Q_w	103.77 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.42
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	54.7 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.032 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	160.67 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	15.6 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	70.3 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	44.7 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.81 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	61 %

Type CM Drop Inlet Sizing on a C. G.

Azure - West of Shaumber - Trench Drain (U6)

Known:

Q_s=	Half Street Flow	45	cfs
S_o=	Longitudinal Slope	0.0412	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	6.80	fps
D=	Flow Depth	0.63	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	3.0	ft
L_c=	Length of Curb Opening	0.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	100	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	0.89
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	5.53 fps

Trench Intercept

Qint = Qs x Rf

Qint = 45 cfs x 0.89 = 40 cfs

Total Intercept

Qint = (70 + 40)x2 = 220 cfs

Qbyp = 230 cfs - 223 cfs = 10 cfs

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 817+00 - West (U7)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0132	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.26	fps
D=	Flow Depth	0.69	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.12	
	Q_w= Frontal flow=A_w*V_s	4.14	cfs
	Q_x= Side flow = Q_s-Q_w	30.86	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.50	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	19.7	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.034	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	66.23	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	6.8	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	26.5	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	8.5	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.76	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	76	%

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 817+00 - East (U7)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0132	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.26	fps
D=	Flow Depth	0.41	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	7.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.16
	Q_w= Frontal flow=A_w*V_s	2.35 cfs
	Q_x= Side flow = Q_s-Q_w	12.65 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.07
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	3.3 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.039 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	43.02 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	1.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	4.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	10.2 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.97 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	32 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 812+50 - West (U8)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0132	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.26	fps
D=	Flow Depth	0.69	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.12
	Q_w= Frontal flow=A_w*V_s	4.14 cfs
	Q_x= Side flow = Q_s-Q_w	30.86 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.50
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	19.7 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.034 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	66.23 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	6.8 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	26.5 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	8.5 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.76 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	76 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 812+50 - East (U8)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0132	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.26	fps
D=	Flow Depth	0.41	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	7.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.16
	Q_w= Frontal flow=A_w*V_s	2.35 cfs
	Q_x= Side flow = Q_s-Q_w	12.65 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.07
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	3.3 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.039 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	43.02 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	1.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	4.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	10.2 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.97 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	32 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 809+00 - West (U9)

Known:

Q_s=	Half Street Flow	69	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.10	fps
D=	Flow Depth	0.97	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	22.5	ft
L_c=	Length of Curb Opening	22.5	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	22.62 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.08
	Q_w= Frontal flow=A_w*V_s	5.71 cfs
	Q_x= Side flow = Q_s-Q_w	63.29 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.73
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	52.1 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.030 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	69.97 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	18.7 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	69.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	3.07 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 809+00 - East (U9)

Known:

Q_s=	Half Street Flow	31	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.10	fps
D=	Flow Depth	0.69	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	20.0	ft
L_c=	Length of Curb Opening	20.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	17.96 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.13
	Q_w= Frontal flow=A_w*V_s	3.99 cfs
	Q_x= Side flow = Q_s-Q_w	27.01 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.68
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	22.3 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.035 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	45.21 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	11.2 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	31.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.55 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Tropical - West of Shaumber - Drop Inlets (U10)

Known:

Q_s=	Half Street Flow	119.5	cfs
S_o=	Longitudinal Slope	0.0095	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.76	fps
D=	Flow Depth	1.01	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	30.0	ft
L_c=	Length of Curb Opening	30.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	48.56	fps
E_o=	Grate flow ratio = Q_w/Q_s	0.07	
	Q_w= Frontal flow=A_w*V_s	8.37	cfs
	Q_x= Side flow = Q_s-Q_w	111.13	cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.74	
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	90.9	cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)		

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.028	ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119	ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	112.28	ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	27.2	cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	118.1	cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	1.4	cfs
q=	Interception per unit ratio = Q_{ti}/L_g	3.94	cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	99	%

Type CM Drop Inlet Sizing on a C. G.

Tropical - West of Shaumber - Trench Drain (U10)

Known:

Q_s=	Half Street Flow	1.5	cfs
S_o=	Longitudinal Slope	0.0014	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	0.89	fps
D=	Flow Depth	0.39	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	3.0	ft
L_c=	Length of Curb Opening	0.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	100	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00	
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	5.53	fps

Trench Intercept

Qint = Qs x Rf x (Width of grate/Total flow width)

Qint = 1.5 cfs x 1.0 x (9.5 ft/12.43 ft)= 0.5 cfs

Total Intercept

Qint = (118 + 0.5) x 2 = 237 cfs

Qbyp = 239 cfs - 237 cfs = 2 cfs

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 805+50 - West (U11)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.12	fps
D=	Flow Depth	0.78	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.10
	Q_w= Frontal flow=A_w*V_s	3.46 cfs
	Q_x= Side flow = Q_s-Q_w	31.54 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.64
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	23.6 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.032 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	50.70 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	8.8 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	32.4 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	2.6 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.16 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	93 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 805+50 - East (U11)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.12	fps
D=	Flow Depth	0.5	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	7.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.14
	Q_w= Frontal flow=A_w*V_s	2.15 cfs
	Q_x= Side flow = Q_s-Q_w	12.86 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.12
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	3.7 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.037 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	32.40 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	2.0 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	5.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	9.2 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.15 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	38 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 795+00 - West (U12)

Known:

Q_s=	Half Street Flow	81	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.35	fps
D=	Flow Depth	1.02	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	25.0	ft
L_c=	Length of Curb Opening	25.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	29.04 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.08
	Q_w= Frontal flow=A_w*V_s	6.38 cfs
	Q_x= Side flow = Q_s-Q_w	74.62 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.76
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	63.0 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.029 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	75.55 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	22.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	81.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	3.24 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 795+00 - East (U12)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	4.35	fps
D=	Flow Depth	0.74	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	20.0	ft
L_c=	Length of Curb Opening	20.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	17.96 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.13
	Q_w= Frontal flow=A_w*V_s	4.56 cfs
	Q_x= Side flow = Q_s-Q_w	30.44 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.65
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	24.5 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.035 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	47.43 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	12.1 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	35.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	0.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.75 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	100 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 792+50 - West (U13)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.12	fps
D=	Flow Depth	0.78	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.10
	Q_w= Frontal flow=A_w*V_s	3.46 cfs
	Q_x= Side flow = Q_s-Q_w	31.54 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.64
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	23.6 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.032 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	50.70 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	8.8 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	32.4 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	2.6 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.16 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	93 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 792+50 - East (U13)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.0047	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	3.12	fps
D=	Flow Depth	0.5	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	5.0	ft
L_c=	Length of Curb Opening	5.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	7.22 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.14
	Q_w= Frontal flow=A_w*V_s	2.15 cfs
	Q_x= Side flow = Q_s-Q_w	12.86 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.12
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	3.7 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.037 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	32.40 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	2.0 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	5.8 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	9.2 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.15 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	38 %

Type CM Drop Inlet Sizing on a C. G.

La Mancha - West of Shaumber - Drop Inlets (U14)

Known:

Q_s=	Half Street Flow	105	cfs
S_o=	Longitudinal Slope	0.0642	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	10.89	fps
D=	Flow Depth	0.73	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	30.0	ft
L_c=	Length of Curb Opening	30.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	1.00
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	48.56 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.11
	Q_w= Frontal flow=A_w*V_s	11.24 cfs
	Q_x= Side flow = Q_s-Q_w	93.76 cfs
R_s=	Side flow factor = $1/(1+(0.15*V_s^{1.8})/(S_x*L_g^{2.3}))$	0.48
Q_{ig}=	Flow intercepted = $[R_f*E_o+R_s*(1-E_o)]*Q_s$	56.1 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.033 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = $0.60*Q_s^{0.42}*So^{0.30}*(1/n*S_e)^{0.6}$	172.99 ft
Q_{ic}=	Flow intercepted = $(1-(1-L_c/L_t)^{1.8})*Q_s$	15.8 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = $Q_{ig}+Q_{ic}$	72.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	33.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	2.40 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	69 %

Type CM Drop Inlet Sizing on a C. G.

La Mancha - West of Shaumber - Trench Drain (U14)

Known:

Q_s=	Half Street Flow	33	cfs
S_o=	Longitudinal Slope	0.0642	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	7.59	fps
D=	Flow Depth	0.55	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	3.0	ft
L_c=	Length of Curb Opening	0.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	100	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = $1-0.09*(V_s-V_o)$ if $V_s>V_o$; else $R_f=1$	0.81
	V_o= Splash over velocity=$p+q*L_g-r*L_g^2+s*L_g^3$†	5.53 fps

Trench Intercept

Qint = Qs x Rf

Qint = 33cfs x 0.81 = 27 cfs

Total Intercept

Qint = (72 + 27)x2 = 198 cfs

Qbyp = 210 cfs - 202 cfs = 12 cfs

Type CM Drop Inlet Sizing in Sump

Shaumber @ Sta 787+50 - East (U16)

Known:

D_p=	Ponding Depth at Inlet	0.83	ft
W=	Gutter Width	1.5	ft
L_g=	Length of Grate	10.0	ft
L_c=	Length of Curb Opening	10.0	ft
H_c=	Curb Opening Height	0.547	ft
C_{wc}=	Weir coefficient for curb opening	2.3	
C_{wg}=	Weir coefficient for grate	3.0	
C_o=	Orifice coefficient	0.67	
R_o=	Grate opening factor	0.60	
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

P_g=	Active grate weir length (agwl) = 2*W+Lg	13.00 ft
P_{agl}	Adjusted agwl = 2*(1-Cfg/100)*W+Lg	11.50 ft
A_g=	Grate area = W*L_g	15.00 ft^2
A_{aga}=	Adjusted open grate area = Ag*Ro*(1-Cfg/100)	4.50 ft^2
	check - If Dp<1.792*Aaga/Pagl; weir; else orifice	orifice
Q_{ig}=	Flow intercepted by grate If "weir" controls Qig=Cwg*Pagl*$Dp^{1.5}$ If "orifice" controls Qig=Co*Aaga*$(64.4*Dp)^{0.5}$	22.0 cfs

Curb Opening Capacity Calculations

Pc =	Active curb opening weir length (acowl) = Lc+1.8*W	12.70 ft
Pacl :	Adjusted acowl = Lc+1.8*(1-Cfc/100)*W	11.35 ft
Ac=	curb opening area (coa) = Lc*Hc	5.47 ft^2
A_{aca}=	Adjusted coa = Ac*(1-Cfc/100)	2.74 ft^2
	check - If Dp<Hc; weir; else orifice	orifice
Qic=	Flow intercepted by curb opening If "weir" controls Qic=Cwc*Pacl*Dp1.5 If "orifice" controls Qic=Co*Aaca*(64.4*Dp-Hc/2)0.5	13.4 cfs

Total Inlet Calculations

Qti =	Total flow intercepted = Qig+Qic	35.4 cfs
q =	Interception per unit ratio = Q_{ti}/L_g	3.54 cfs/ft

Type CM Drop Inlet Sizing in Sump

Shaumber @ Sta 787+50 - West (U16)

Known:

D_p=	Ponding Depth at Inlet	1.11	ft
W=	Gutter Width	1.5	ft
L_g=	Length of Grate	17.5	ft
L_c=	Length of Curb Opening	17.5	ft
H_c=	Curb Opening Height	0.547	ft
C_{wc}=	Weir coefficient for curb opening	2.3	
C_{wg}=	Weir coefficient for grate	3.0	
C_o=	Orifice coefficient	0.67	
R_o=	Grate opening factor	0.60	
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

P_g=	Active grate weir length (agwl) = 2*W+Lg	20.50 ft
P_{agl}	Adjusted agwl = 2*(1-Cfg/100)*W+Lg	19.00 ft
A_g=	Grate area = W*L_g	26.25 ft^2
A_{aga}=	Adjusted open grate area = Ag*Ro*(1-Cfg/100)	7.88 ft^2
	check - If Dp<1.792*Aaga/Pagl; weir; else orifice	orifice
Q_{ig}=	Flow intercepted by grate If "weir" controls Qig=Cwg*Pagl*$Dp^{1.5}$ If "orifice" controls Qig=Co*Aaga*$(64.4*Dp)^{0.5}$	44.6 cfs

Curb Opening Capacity Calculations

Pc =	Active curb opening weir length (acowl) = Lc+1.8*W	20.20 ft
Pacl :	Adjusted acowl = Lc+1.8*(1-Cfc/100)*W	18.85 ft
Ac=	curb opening area (coa) = Lc*Hc	9.57 ft^2
A_{aca}=	Adjusted coa = Ac*(1-Cfc/100)	4.79 ft^2
	check - If Dp<Hc; weir; else orifice	orifice
Qic=	Flow intercepted by curb opening If "weir" controls Qic=Cwc*Pacl*Dp1.5 If "orifice" controls Qic=Co*Aaca*(64.4*Dp-Hc/2)0.5	27.1 cfs

Total Inlet Calculations

Qti =	Total flow intercepted = Qig+Qic	71.7 cfs
q =	Interception per unit ratio = Q_{ti}/L_g	4.10 cfs/ft

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 785+00 - East (U17)

Known:

Q_s=	Half Street Flow	15	cfs
S_o=	Longitudinal Slope	0.03	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.45	fps
D=	Flow Depth	0.35	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	15.0	ft
L_c=	Length of Curb Opening	15.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	12.50 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.17
	Q_w= Frontal flow=A_w*V_s	2.52 cfs
	Q_x= Side flow = Q_s-Q_w	12.48 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.39
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	7.4 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.040 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	53.94 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	3.5 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	11.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	4.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	0.73 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	73 %

Type CM Drop Inlet Sizing on a C. G.

Shaumber @ Station 785+00 - West (U17)

Known:

Q_s=	Half Street Flow	35	cfs
S_o=	Longitudinal Slope	0.03	ft/ft
n=	Manning's Roughness Coefficient	0.016	
V_s=	Flow Velocity	5.45	fps
D=	Flow Depth	0.63	ft
S_x=	Street Transverse Slope	0.02	ft/ft
W=	Gutter Width	1.5	ft
a=	Gutter Depression	2.0	in
L_g=	Length of Grate	20.0	ft
L_c=	Length of Curb Opening	20.0	ft
C_{fg}=	Clogging Factor for Grate	50	%
C_{fc}=	Clogging Factor for Curb Opening	50	%

Grate Capacity Calculations:

R_f=	Frontal flow factor = 1-0.09*(V_s-V_o) if V_s>V_o; else R_f=1	1.00
	V_o= Splash over velocity=p+q*L_g-r*L_g^2+s*L_g^3†	17.96 fps
E_o=	Grate flow ratio = Q_w/Q_s	0.14
	Q_w= Frontal flow=A_w*V_s	4.81 cfs
	Q_x= Side flow = Q_s-Q_w	30.19 cfs
R_s=	Side flow factor = 1/(1+(0.15*$V_s^{1.8}$)/(S_x*$L_g^{2.3}$))	0.56
Q_{ig}=	Flow intercepted = [R_f*E_o+R_s*(1-E_o)]*Q_s	21.6 cfs
	†p=1.76;q=3.12;r=0.45;s=0.03 (based on Bar P 1-1/8 grate)	

Curb Opening Capacity Calculations

S_e=	Equivalent cross slope = Sx+Sw*Eo	0.036 ft/ft
S_w=	Gutter cross slope = (0.137+afeet)/W	0.119 ft/ft
L_t=	Total interception L = 0.60*$Q_s^{0.42}$*$So^{0.30}$*(1/n*S_e)$^{0.6}$	81.53 ft
Q_{ic}=	Flow intercepted = (1-(1-L_c/L_t)$^{1.8}$)*Q_s	7.3 cfs

Total Inlet Calculations

Q_{ti}=	Total flow intercepted = Q_{ig}+Q_{ic}	29.0 cfs
Q_{tq}=	Flow bypass = Q_s-Q_{ti}	6.0 cfs
q=	Interception per unit ratio = Q_{ti}/L_g	1.45 cfs/ft
E_q=	Efficiency = (Qti/Qs)*100	83 %

INLET CONTROL CALCULATIONS

PIPE CULVERT

Inlet control and outlet control.

Block out @ Sta. 829+50 (I3)

INPUT VARIABLES:

Pipe diameter	36.00 in
Slope	1.00 %
Number of pipes	1
Manning's 'n'	0.013
Culvert length	1.00 ft
Discharge	40.00 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:

Tapered throat	3.09 ft
45 degree bevels	3.15 ft
Sq. edge headwall	3.34 ft
Thin edge projecting	3.69 ft

OUTLET CONTROL HWo:

HWo depth	3.17 ft
Velocity	5.66 fps
Critical depth	2.02 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

BOX CULVERT

Inlet control and outlet control.

Block out @ Sta. 824+00 (I4)

INPUT VARIABLES:

Box Height	3.00 ft
Box Width	5.00 ft
Slope	1.00 %
Manning's 'n'	0.013
Number of boxes	1
Culvert length	1 ft
Discharge	113 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:

Tapered throat	3.79 ft
45 degree bevels	4.21 ft
Sq. edge headwall	4.57 ft

OUTLET CONTROL HWo:

HWo depth	3.94 ft
Velocity	7.53 fps
Critical depth	2.52 ft

Note: 1. Outlet control assumes full flow.
2. Critical depth can not exceed the box height

PIPE CULVERT

Inlet control and outlet control.

Block out @ Sta. 817+00 (I6)

INPUT VARIABLES:		OUTPUT VARIABLES:	
Pipe diameter	36.00 in	INLET CONTROL HWo:	
Slope	1.00 %	Tapered throat	2.15 ft
Number of pipes	1	45 degree bevels	2.23 ft
Manning's 'n'	0.013	Sq. edge headwall	2.29 ft
Culvert length	1.00 ft	Thin edge projecting	2.44 ft
Discharge	23.00 cfs		
		OUTLET CONTROL HWo:	
Ent. Coef. (Ke)	0.35	HWo depth	2.48 ft
		Velocity	3.25 fps
		Critical depth	1.53 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

PIPE CULVERT

Inlet control and outlet control.

Block out @ Sta. 812+50 (I7)

INPUT VARIABLES:

Pipe diameter	36.00 in
Slope	1.00 %
Number of pipes	1
Manning's 'n'	0.013
Culvert length	1.00 ft
Discharge	20.00 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:	
Tapered throat	1.97 ft
45 degree bevels	2.06 ft
Sq. edge headwall	2.10 ft
Thin edge projecting	2.23 ft
OUTLET CONTROL HWo:	
HWo depth	2.37 ft
Velocity	2.83 fps
Critical depth	1.43 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

BOX CULVERT

Inlet control and outlet control.

Block out @ Sta. 795+00 (I9)

INPUT VARIABLES:		OUTPUT VARIABLES:	
Box Height	3.00 ft	INLET CONTROL HWo:	
Box Width	8.00 ft	Tapered throat	3.45 ft
Slope	1.00 %	45 degree bevels	3.74 ft
Manning's 'n'	0.013	Sq. edge headwall	4.04 ft
Number of boxes	1		
Culvert length	1 ft		
Discharge	158 cfs	OUTLET CONTROL HWo:	
		HWo depth	3.55 ft
		Velocity	6.58 fps
Ent. Coef. (Ke)	0.35	Critical depth	2.30 ft

Note: 1. Outlet control assumes full flow.
2. Critical depth can not exceed the box height

PIPE CULVERT

Inlet control and outlet control.

Block out @ Sta. 792+50 (I10)

INPUT VARIABLES:

Pipe diameter	36.00 in
Slope	1.00 %
Number of pipes	1
Manning's 'n'	0.013
Culvert length	1.00 ft
Discharge	43.00 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:	
Tapered throat	3.25 ft
45 degree bevels	3.33 ft
Sq. edge headwall	3.54 ft
Thin edge projecting	3.95 ft
OUTLET CONTROL HWo:	
HWo depth	3.31 ft
Velocity	6.08 fps
Critical depth	2.09 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

BOX CULVERT

Inlet control and outlet control.

Block out @ La Manch - North DI (I11)

INPUT VARIABLES:		OUTPUT VARIABLES:	
Box Height	3.00 ft	INLET CONTROL HWo:	
Box Width	8.00 ft	Tapered throat	2.25 ft
Slope	1.00 %	45 degree bevels	2.35 ft
Manning's 'n'	0.013	Sq. edge headwall	2.55 ft
Number of boxes	1		
Culvert length	1 ft		
Discharge	84 cfs	OUTLET CONTROL HWo:	
		HWo depth	2.50 ft
		Velocity	3.50 fps
Ent. Coef. (Ke)	0.35	Critical depth	1.51 ft

Note: 1. Outlet control assumes full flow.
2. Critical depth can not exceed the box height

BOX CULVERT

Inlet control and outlet control.

Block out @ Sta. 785+00 (I12)

INPUT VARIABLES:

Box Height	5.00 ft
Box Width	15.00 ft
Slope	1.00 %
Manning's 'n'	0.013
Number of boxes	1
Culvert length	1 ft
Discharge	453 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:

Tapered throat	4.56 ft
45 degree bevels	4.79 ft
Sq. edge headwall	5.17 ft

OUTLET CONTROL HWo:

HWo depth	4.78 ft
Velocity	6.04 fps
Critical depth	3.05 ft

Note: 1. Outlet control assumes full flow.
2. Critical depth can not exceed the box height

PIPE CULVERT

Inlet control and outlet control.

48" Lateral from 3'x3' U-Channel (I14)

INPUT VARIABLES:

Pipe diameter	48.00 in
Slope	60.00 %
Number of pipes	1
Manning's 'n'	0.013
Culvert length	60.00 ft
Discharge	107.00 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:	
Tapered throat	5.01 ft
45 degree bevels	5.27 ft
Sq. edge headwall	5.64 ft
Thin edge projecting	6.48 ft
OUTLET CONTROL HWo:	
HWo depth	-30.62 ft
Velocity	8.51 fps
Critical depth	3.06 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

PIPE CULVERT

Inlet control and outlet control.

U-Channel Laterals (I15)

INPUT VARIABLES:		OUTPUT VARIABLES:	
Pipe diameter	36.00 in	INLET CONTROL HWo:	
Slope	50.00 %	Tapered throat	3.03 ft
Number of pipes	1	45 degree bevels	3.10 ft
Manning's 'n'	0.013	Sq. edge headwall	3.27 ft
Culvert length	100.00 ft	Thin edge projecting	3.61 ft
Discharge	39.00 cfs		
		OUTLET CONTROL HWo:	
Ent. Coef. (Ke)	0.35	HWo depth	-46.53 ft
		Velocity	5.52 fps
		Critical depth	1.99 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

PIPE CULVERT

Inlet control and outlet control.

36" Lateral from 3'x2' U-Channel (I16)

INPUT VARIABLES:

Pipe diameter	36.00	in
Slope	60.00	%
Number of pipes	1	
Manning's 'n'	0.013	
Culvert length	60.00	ft
Discharge	60.00	cfs
Ent. Coef. (Ke)	0.35	

OUTPUT VARIABLES:

INLET CONTROL HWo:		
Tapered throat	4.22	ft
45 degree bevels	4.58	ft
Sq. edge headwall	4.93	ft
Thin edge projecting	5.80	ft
OUTLET CONTROL HWo:		
HWo depth	-31.27	ft
Velocity	8.49	fps
Critical depth	2.47	ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

PIPE CULVERT

Inlet control and outlet control.

U-Channel Laterals (U22)

INPUT VARIABLES:

Pipe diameter	36.00 in
Slope	50 %
Number of pipes	1
Manning's 'n'	0.013
Culvert length	100.00 ft
Discharge	56 cfs
Ent. Coef. (Ke)	0.35

OUTPUT VARIABLES:

INLET CONTROL HWo:	
Tapered throat	5.47 ft
45 degree bevels	5.88 ft
Sq. edge headwall	6.32 ft
Thin edge projecting	7.39 ft
OUTLET CONTROL HWo:	
HWo depth	0.18 ft
Velocity	9.47 fps
Critical depth	3.23 ft

Note: 1. Outlet control assumes full pipe flow.
2. Critical depth can not exceed the pipe diameter.

NORMAL DEPTH FACILITY CALCULATIONS

Worksheet for 3'x3' Concrete U-Channel (I14)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.84	%
Bottom Width	3.00	ft
Discharge	107.00	ft^3/s

Results

Normal Depth	2.72	ft
Flow Area	8.15	ft^2
Wetted Perimeter	8.43	ft
Top Width	3.00	ft
Critical Depth	3.41	ft
Critical Slope	0.01058	ft/ft
Velocity	13.13	ft/s
Velocity Head	2.68	ft
Specific Energy	5.40	ft
Froude Number	1.41	
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	2.72	ft
Critical Depth	3.41	ft
Channel Slope	0.01840	ft/ft
Critical Slope	0.01058	ft/ft

Cross Section for 3'x3' Concrete U-Channel (I14)

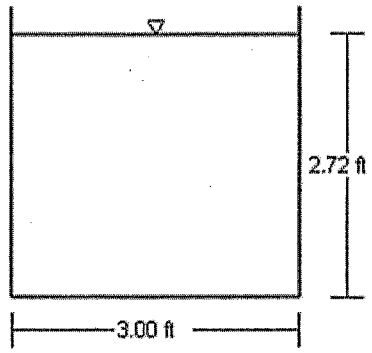
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.84	%
Normal Depth	2.72	ft
Bottom Width	3.00	ft
Discharge	107.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for 2'x3' Concrete U-Channel (I15)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.80	%
Bottom Width	3.00	ft
Discharge	39.00	ft^3/s

Results

Normal Depth	1.26	ft
Flow Area	3.78	ft^2
Wetted Perimeter	5.52	ft
Top Width	3.00	ft
Critical Depth	1.74	ft
Critical Slope	0.00761	ft/ft
Velocity	10.32	ft/s
Velocity Head	1.66	ft
Specific Energy	2.92	ft
Froude Number	1.62	
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	1.26	ft
Critical Depth	1.74	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.00761	ft/ft

Cross Section for 2'x3' Concrete U-Channel (I15)

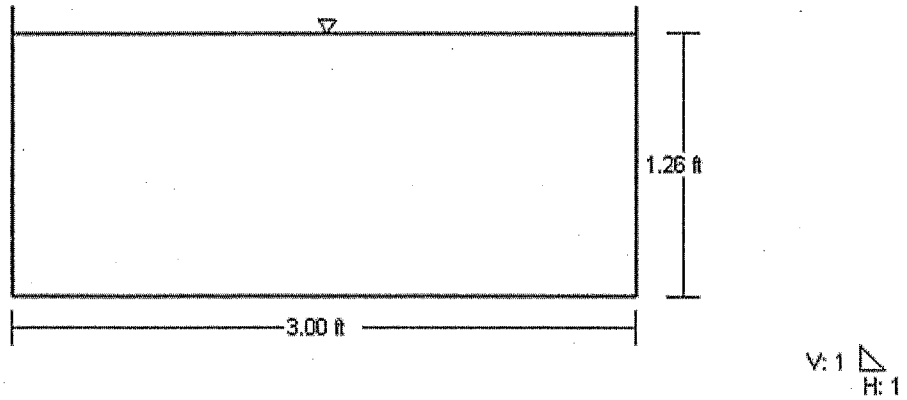
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.80	%
Normal Depth	1.26	ft
Bottom Width	3.00	ft
Discharge	39.00	ft³/s

Cross Section Image



Worksheet for 2'x3' Concrete U-Channel (I16)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Bottom Width	3.00	ft
Discharge	60.00	ft^3/s

Results

Normal Depth	1.86	ft
Flow Area	5.59	ft^2
Wetted Perimeter	6.73	ft
Top Width	3.00	ft
Critical Depth	2.32	ft
Critical Slope	0.00861	ft/ft
Velocity	10.73	ft/s
Velocity Head	1.79	ft
Specific Energy	3.65	ft
Froude Number	1.38	
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	1.86	ft
Critical Depth	2.32	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00861	ft/ft

Cross Section for 2'x3' Concrete U-Channel (I16)

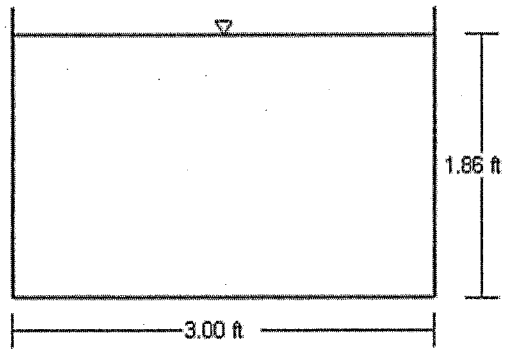
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.50	%
Normal Depth	1.86	ft
Bottom Width	3.00	ft
Discharge	60.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for 8' X 6' RCB - Max Slope (U19)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	9.40	%
Height	6.00	ft
Bottom Width	8.00	ft
Discharge	673.00	ft^3/s

Results

Normal Depth	2.20	ft
Flow Area	17.56	ft^2
Wetted Perimeter	12.39	ft
Top Width	8.00	ft
Critical Depth	6.04	ft
Percent Full	36.6	%
Critical Slope	0.00614	ft/ft
Velocity	38.32	ft/s
Velocity Head	22.82	ft
Specific Energy	25.02	ft
Froude Number	4.56	
Discharge Full	2088.16	ft^3/s
Slope Full	0.90496	ft/ft
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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	36.59	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s

Worksheet for 8' X 6' RCB - Max Slope (U19)

GVF Output Data

Normal Depth	2.20	ft
Critical Depth	6.04	ft
Channel Slope	9.40	%
Critical Slope	0.00614	ft/ft

Cross Section for 8' X 6' RCB - Max Slope (U19)

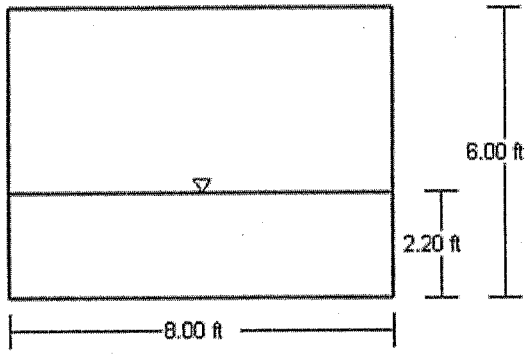
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	9.40	%
Normal Depth	2.20	ft
Height	6.00	ft
Bottom Width	8.00	ft
Discharge	673.00	ft³/s

Cross Section Image



V: 1
H: 1

Worksheet for 8' X 6' Rectangular Channel - Min Slope (U19)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.50	%
Bottom Width	8.00	ft
Discharge	673.00	ft^3/s

Results

Normal Depth	6.55	ft
Flow Area	52.39	ft^2
Wetted Perimeter	21.10	ft
Top Width	8.00	ft
Critical Depth	6.04	ft
Critical Slope	0.00614	ft/ft
Velocity	12.85	ft/s
Velocity Head	2.56	ft
Specific Energy	9.11	ft
Froude Number	0.88	
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	6.55	ft
Critical Depth	6.04	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00614	ft/ft

Cross Section for 8' X 6' Rectangular Channel - Min Slope (U19)

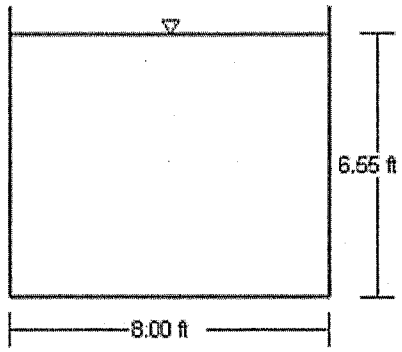
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	0.50	%
Normal Depth	6.55	ft
Bottom Width	8.00	ft
Discharge	673.00	ft^3/s

Cross Section Image



V: 1
H: 1

Worksheet for 2'x3' Concrete U-Channel (U20)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	2.95	%
Normal Depth	2.00	ft
Bottom Width	3.00	ft

Results

Discharge	92.12	ft^3/s
Flow Area	6.00	ft^2
Wetted Perimeter	7.00	ft
Top Width	3.00	ft
Critical Depth	3.08	ft
Critical Slope	0.00999	ft/ft
Velocity	15.35	ft/s
Velocity Head	3.66	ft
Specific Energy	5.66	ft
Froude Number	1.91	
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	2.00	ft
Critical Depth	3.08	ft
Channel Slope	0.02950	ft/ft
Critical Slope	0.00999	ft/ft

Cross Section for 2'x3' Concrete U-Channel (U20)

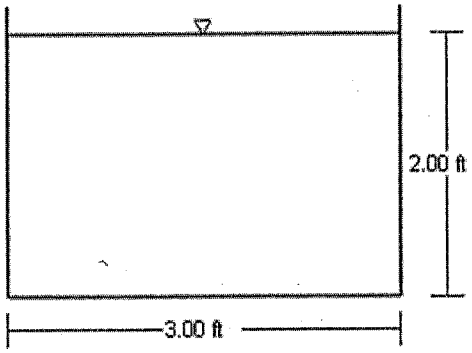
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.015	
Channel Slope	2.95	%
Normal Depth	2.00	ft
Bottom Width	3.00	ft
Discharge	92.12	ft³/s

Cross Section Image



V: 1
H: 1

STANDARD FORM 6 CALCULATIONS

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	5.56	9.06	13.52	12.73	13.00			HGL<1ft below FG	NO
2	1076.79	7.65	11.15	13.87	13.09	14.39			OK	NO
3	1085.29	8.08	11.08	13.95	12.66	14.39			OK	NO
4	1153.65	9.51	12.51	14.59	13.30	17.11			OK	NO
5	1165.65	9.67	12.67	15.53	14.64	17.11			OK	NO
6	1193.65	10.05	13.05	15.71	14.82	17.82			OK	NO
7	1214.65	10.34	13.34	15.85	14.96	17.82			OK	NO
8	1214.65	10.34	13.34	16.20	16.20	17.82			OK	NO
9										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Shaumber Road - West Side Lateral and DIs (U1/I1 & E2)

DATE 07/03/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= D Headwall:Square Edge (cut concrete and CMP)

	CONDUIT DATA									FLOW DATA									ENERGY LOSS DATA																										EGL & HGL				COMMENTS	
																			PIPE	TRANSITION																														
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
		1000.00		42							7.05																															15.05	14.26		
1																															Outlet K_o=	1.0													
2	1000.00	1009.75	R	42					1	7.05	7.64	9.8	6.07%	9.62	0.0049	68.5	7.12	0.79	0.0046	0.0046	0.05																				0.00	15.09	14.31			FULL	U/S
3	1009.75	1018.25	T	36					1	7.64	8.07	8.5	5.05%	7.07	0.0049	64.5	9.13	1.29	0.0093	0.0093		0.08				45	0.50	0.14												0.22			15.31	14.02	FULL	U/S
4	1018.25	1062.99	R	36					1	8.07	9.88	44.7	4.04%	7.07	0.0049	64.5	9.13	1.29	0.0093	0.0093	0.42																				0.00	15.73	14.44			FULL	U/S
5	1062.99	1074.99	T	36					1	9.88	10.22	12.0	2.83%	7.07	0.0049	53.5	7.57	0.89	0.0064	0.0079		0.09				45	0.50	0.85												0.94			16.67	15.78	FULL	U/S
6	1074.99	1102.99	R	36					1	10.22	11.34	28.0	4.00%	7.07	0.0049	53.5	7.57	0.89	0.0064	0.0064	0.18																				0.00	16.85	15.96			FULL	U/S
7	1102.99	1123.99	T	36					1	11.34	12.18	21.0	4.00%	7.07	0.0049	53.5	7.57	0.89	0.0064	0.0064		0.13																				0.13			16.99	16.10	FULL	U/S
8	1123.99	1123.99		36					1	12.18	12.18	0.0		7.07	0.0049	53.5	7.57	0.89	0.0064	0.0064									Ki=	0.4	0.36										0.36			17.34	17.34	FULL	U/S
9																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	7.05	10.55	15.05	14.26	15.30			OK	NO
2	1009.75	7.64	11.14	15.09	14.31	15.31			OK	NO
3	1018.25	8.07	11.07	15.31	14.02	15.31			OK	NO
4	1062.99	9.88	12.88	15.73	14.44	17.11			OK	NO
5	1074.99	10.22	13.22	16.67	15.78	17.11			OK	NO
6	1102.99	11.34	14.34	16.85	15.96	17.82			OK	NO
7	1123.99	12.18	15.18	16.99	16.10	17.82			OK	NO
8	1123.99	12.18	15.18	17.34	17.34	17.82			HGL<1ft below FG	NO
9										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility I3 | DATE: 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																														
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft^2/ft)	(ft^2/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		36							2891.61																		Outlet K_o=		1.0											2897.11	2896.61		
2	1000.00	1030.41	TR	36					1	2893.61	2894.22	30.4	2.00%	7.07	0.0049	40	5.66	0.50	0.0036	0.0036	0.11																		0.00	2897.72	2897.22			FULL	D/S
3	1030.41	1030.41	TR	36					1	2894.22	2894.22	0.0		7.07	0.0049	40	5.66	0.50	0.0036	0.0036	0.00							Ki=	0.25	0.12										0.12			2897.84	2897.84	FULL	U/S
4																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	2893.61	2896.61	2897.11	2896.61	2901.92			OK	NO
2	1030.41	2894.22	2897.22	2897.72	2897.22	2901.92			OK	NO
3	1030.41	2894.22	2897.22	2897.84	2897.84	2901.92			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility I4 | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																									
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		54						87.73																			Outlet K_o=	1.0											93.01	92.93		
2	1000.00	1030.41	R	54					1	87.73	88.34	30.4	2.01%	15.90	0.0049	113	7.11	0.78	0.0033	0.0033	0.10																			0.00	93.62	92.84			FULL	D/S
3	1030.41	1030.41	R	54					1	88.34	88.34	0.0		15.90	0.0049	113	7.11	0.78	0.0033	0.0033	0.00							Ki=	0.25	0.20									0.20			93.82	93.82	FULL	U/S
4																																												

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	87.73	92.23	93.01	92.23	95.39			OK	NO
2	1030.41	88.34	92.84	93.62	92.84	95.36			OK	NO
3	1030.41	88.34	92.84	93.82	93.82	95.36			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility I8 - North Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																														
	STATION			PIPE	BOX			IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend					Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		60							70.37																																				
																															Outlet K_o=		1.0															
2	1000.00	1022.22	R	60						70.37	70.81	22.2	1.98%	19.63	0.0049	1575	8.02	1.00	0.0037	0.0037	0.08																				0.00	78.32	77.32			FULL	U/S
3	1022.22	1068.91	R	60						70.81	71.75	46.7	2.01%	19.63	0.0049	1575	8.02	1.00	0.0037	0.0037	0.17		45	0.46	0.46																0.46	78.49	77.49	78.95	77.95	FULL	U/S
4	1068.91	1068.91	R	60						71.75	71.75	0.0		19.63	0.0049	1575	8.02	1.00	0.0037	0.0037	0.00							Ki=	0.25	0.25										0.25			79.20	79.20	FULL	U/S
5																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	70.37	75.37	78.24	77.24	80.00			OK	NO
2	1022.22	70.81	75.81	78.32	77.32	80.10			OK	NO
3	1068.91	71.75	76.75	78.95	77.95	80.10			OK	NO
4	1068.91	71.75	76.75	79.20	79.20	79.72			HGL<1ft below FG	NO
5										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility I8 - South Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																													
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		60						69.33																																				
																																Outlet K_o=	1.0													
2	1000.00	1022.63	R	60					18	69.33	69.78	22.6	1.99%	19.63	0.0049	157.5	8.02	1.00	0.0037	0.0037	0.08																					0.00	76.91	75.91			FULL	U/S
3	1022.63	1067.96	R	60					18	69.78	70.69	45.3	2.01%	19.63	0.0049	157.5	8.02	1.00	0.0037	0.0037	0.17		45	0.46	0.46																	0.46	77.08	76.08	77.54	76.54	FULL	U/S
4	1067.96	1067.96	R	60					18	70.69	70.69	0.0		19.63	0.0049	157.5	8.02	1.00	0.0037	0.0037	0.00							Ki=	0.25	0.25										0.25			77.79	77.79	FULL	U/S
5																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	69.33	74.33	76.83	75.83	79.87			OK	NO
2	1022.63	69.78	74.78	76.91	75.91	80.10			OK	NO
3	1067.96	70.69	75.69	77.54	76.54	80.10			OK	NO
4	1067.96	70.69	75.69	77.79	77.79	79.85			OK	NO
5										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility I9 | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																						CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		Total	U/S	U/S	U/S	U/S	PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
1		1000.00		54							57.15																		Outlet K_o=	1.0											63.18	63.65		
2	1000.00	1041.00	R	54					15	57.15	57.97	41.0	2.00%	15.90	0.0049	1.58	9.93	1.53	0.0065	0.0065	0.26																			0.00	64.00	62.47			FULL	D/S
3	1041.00	1041.00	R	54					15	57.97	57.97	0.0		15.90	0.0049	1.58	9.93	1.53	0.0065	0.0065	0.00								Ki=	0.25	0.38										0.38			64.39	64.39	FULL	U/S
4																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	57.15	61.65	63.18	61.65	73.49			OK	NO
2	1041.00	57.97	62.47	64.00	62.47	73.49			OK	NO
3	1041.00	57.97	62.47	64.39	64.39	73.49			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Facility I12 | DATE 07/03/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= J | Projecting Entrance:Grooved Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																					CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			U/S	U/S	U/S	U/S	PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_i (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	EGL	HGL	EGL	HGL	FLOW	
1		1000.00		78							29.91																			Outlet K_o=	1.0									39.30	36.41		
2	1000.00	1070.24	R	78					1	29.91	44.64	70.2	20.96%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075	0.52																			0.00	54.03	51.14			PART	D/S
3	1070.24	1075.24	T	78					1	44.64	45.68	5.0	20.97%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075		0.04	42	0.32	0.93														0.96			55.08	52.18	FULL	D/S
4	1075.24	1157.04	R	78					1	45.68	62.87	81.8	21.01%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075	0.61																			0.00	72.26	69.37			PART	D/S
5	1157.04	1162.04	T	78					1	62.87	63.07	5.0	4.00%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075		0.04	0	0.02	0.06														0.10			72.46	69.57	FULL	D/S
6	1162.04	1199.04	R	78					1	63.07	64.35	37.0	3.46%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075	0.28																			0.00	73.74	70.85			FULL	D/S
7	1199.04	1204.04	T	78					1	64.35	64.55	5.0	4.00%	33.18	0.0049	453	13.65	2.89	0.0075	0.0075		0.04	0	0.02	0.06														0.10			73.94	71.05	FULL	D/S
8	1204.04								1	64.55																																			
9																																												

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	29.91	36.41	39.30	36.41	52.00			OK	NO
2	1070.24	44.64	51.14	54.03	51.14	56.00			OK	NO
3	1075.24	45.68	52.18	55.08	52.18	56.00			OK	NO
4	1157.04	62.87	69.37	72.26	69.37	74.87			OK	NO
5	1162.04	63.07	69.57	72.46	69.57	74.87			OK	NO
6	1199.04	64.35	70.85	73.74	70.85	74.31			OK	NO
7	1204.04	64.55	71.05	73.94	71.05	74.31			OK	NO
8										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U2/I2 - North Side | DATE 07/03/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																														
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend						Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		48						19.66																																	26.79	23.66		
																																Outlet K_o=		1.0												
2	1000.00	1018.41	BR	48					#1	19.66	20.03	18.4	2.01%	12.57	0.0049	11/8.5	14.20	3.13	0.0154	0.0154	0.28																					0.00	27.16	24.03			FULL	D/S
3	1018.41	1043.41	TE	48					#1	20.03	20.53	25.0	2.00%	12.57	0.0049	10.6|0	8.44	1.10	0.0054	0.0054		0.14	45	0.46	0.51																			0.64			27.81	26.70	FULL	U/S
4	1043.41	1053.41	RC	48					#1	20.53	20.73	10.0	2.00%	12.57	0.0049	10.6|0	8.44	1.10	0.0054	0.0054	0.05																					0.00	27.86	26.76			FULL	U/S
5	1053.41	1053.41	BR	48					#1	20.73	20.73	0.0		12.57	0.0049	10.6|0	8.44	1.10	0.0054	0.0054								Ki=	0.5	0.55											0.55			28.41	28.41	FULL	U/S

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	19.66	23.66	26.79	23.66	27.70			OK	NO
2	1018.41	20.03	24.03	27.16	24.03	27.50			OK	NO
3	1043.41	20.53	24.53	27.81	26.70	28.00			OK	NO
4	1053.41	20.73	24.73	27.86	26.76	29.50			OK	NO
5	1053.41	20.73	24.73	28.41	28.41	30.00			OK	NO
6										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U2/I2 - South Side | DATE 07/25/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																														
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet				Bend			Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_e (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		48						5.05																				Outlet K_o=	1.0												12.18	9.05		
2	1000.00	1091.35	R	48					1	5.05	8.08	91.3	3.32%	12.57	0.0049	178.5	14.20	3.13	0.0154	0.0154	1.41																				0.00	15.21	12.08			PART	D/S
3	1091.35	1116.35	T	48					1	8.08	8.83	25.0	3.00%	12.57	0.0049	106.0	8.44	1.10	0.0054	0.0054		0.14	45	0.46	0.51																0.64			15.86	14.75	FULL	U/S
4	1116.35	1126.35	R	48					1	8.83	9.13	10.0	3.00%	12.57	0.0049	106.0	8.44	1.10	0.0054	0.0054	0.05																				0.00	15.91	14.81			FULL	U/S
5	1126.35	1126.35		48					1	9.13	9.13	0.0		12.57	0.0049	106.0	8.44	1.10	0.0054	0.0054								Ki=	0.5	0.55										0.55			16.46	16.46	FULL	U/S

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	5.05	9.05	12.18	9.05	12.42			OK	NO
2	1091.35	8.08	12.08	15.21	12.08	16.17			OK	NO
3	1116.35	8.83	12.83	15.86	14.75	17.31			OK	NO
4	1126.35	9.13	13.13	15.91	14.81	17.78			OK	NO
5	1126.35	9.13	13.13	16.46	16.46	17.78			OK	NO
6										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U3 - East Side

DATE: 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K Projecting Entrance;Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																					CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave	Frict	Frict	Manhole		Junction			Contraction/ Inlet			Expansion/Outlet			Bend			Misc								PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(S_f) (ft/ft)	(S_f) (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	FLOW	
1		1000100		18							2896.76																		Outlet K_o=		1.0								0.00	2898.57	2898.47			FULL	D/S
2	1000.00	1010161	TR	18						2896.76	2896.97	10.6	1.98%	1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.02																			0.03			2898.60	2898.60	FULL	U/S
3	1010.61	1010161	TR	18						2896.97	2896.97	0.0		1.77	0.0049	4.5	2.55	0.10	0.0018	0.0018	0.00							Ki=	0.25	0.03																
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	2896.76	2898.26	2898.36	2898.26	2902.43			OK	NO
2	1010.61	2896.97	2898.47	2898.57	2898.47	2902.43			OK	NO
3	1010.61	2896.97	2898.47	2898.60	2898.60	2902.43			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U4 - East Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																												
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		18						90.88																																92.50	92.38		
																													Outlet K_o=		1.0															
2	1000.00	1010.61	R	18					1	90.88	91.09	10.6	1.98%	1.77	0.0049	5	2.83	0.12	0.0023	0.0023	0.02																			0.00	92.71	92.59			FULL	D/S
3	1010.61	1010.61	R	18					1	91.09	91.09	0.0		1.77	0.0049	5	2.83	0.12	0.0023	0.0023	0.00							Ki=	0.25	0.03										0.03			92.75	92.75	FULL	U/S
4																																												

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	90.88	92.38	92.50	92.38	97.24			OK	NO
2	1010.61	91.09	92.59	92.71	92.59	97.24			OK	NO
3	1010.61	91.09	92.59	92.75	92.75	97.24			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U5 - East Side

DATE 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS
																				PIPE	TRANSITION																							CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX			IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend			Misc		Total	U/S	U/S	U/S	U/S	PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
		1000.00		18							88.70																		Outlet K_o=	1.0																
1																																											90.32	90.20		
2	1000.00	1010.61	R	18							88.91	10.6	1.98%	1.77	0.0049	3.5	2.83	0.12	0.0023	0.0023	0.02																			0.00	90.53	90.41			FULL	D/S
3	1010.61	1010.61	R	18							88.91	0.0		1.77	0.0049	3.5	2.83	0.12	0.0023	0.0023	0.00							Ki=	0.25	0.03										0.03			90.57	90.57	FULL	U/S
4																																													

Summary of Results

						(Optional)		HGL with respect	Pressure Gasket
	STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1	1000.00	88.70	90.20	90.32	90.20	95.39			OK	NO
2	1010.61	88.91	90.41	90.53	90.41	95.36			OK	NO
3	1010.61	88.91	90.41	90.57	90.57	95.36			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U5 - West Side

DATE 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	PIPE	TRANSITION																					CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	Frict H_f (ft)	Frict H_f (ft)	Manhole Θ (deg)	Manhole K_{mh}	Manhole H_{mh} (ft)	Junction Θ (deg)	Junction K_j	Junction H_j (ft)	Contraction/ Inlet Inlet/ Cont	Contraction/ Inlet K_i	Contraction/ Inlet H_c (ft)	Expansion/Outlet Θ (deg)	Expansion/Outlet K_o	Expansion/Outlet H_o (ft)	Bend R_{bend} (ft)	Bend Θ (deg)	Bend K_b	Bend H_b (ft)	Misc H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
		1000.00		30						85.80	86.41																															89.84	89.90		
1																														Outlet K_o=	1.0															
2	1000.00	1030.41	R	30					1	85.80	86.41	30.4	2.01%	4.91	0.0049	29	5.91	0.54	0.0050	0.0050	0.15																					0.00	89.99	89.45			FULL	U/S
3	1030.41	1030.41	R	30					1	86.41	86.81	0.0		4.91	0.0049	29	5.91	0.54	0.0050	0.0050	0.00								Ki=	0.25	0.14											0.14			90.13	90.13	FULL	U/S
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	85.80	88.30	89.84	89.30	95.17			OK	NO
2	1030.41	86.41	88.91	89.99	89.45	95.17			OK	NO
3	1030.41	86.81	89.31	90.13	90.13	95.17			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U6

DATE 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K Projecting Entrance;Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																					CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend			Misc												PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_e (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	FLOW	
		1000.00		60							84.38																														91.38	89.38		
1		1000.00		60							84.38																				Outlet K_o=	1.0							0.00	91.96	89.96			FULL	D/S
2	1000.00	1028.64	R	60					CI	84.38	84.96	28.6	2.03%	19.63	0.0049	223	11.36	2.00	0.0073	0.0073	0.21																			0.95			92.91	90.91	FULL	U/S
3	1028.64	1032.64	R	60					CI	84.96	85.04	4.0	2.00%	19.63	0.0049	223	11.36	2.00	0.0073	0.0073		0.03	45	0.46	0.92															0.00	93.19	91.19			FULL	U/S
4	1032.64	1070.76	R	60					CI	85.04	85.80	38.1	1.99%	19.63	0.0049	223	11.36	2.00	0.0073	0.0073	0.28								Ki=	0.5	1.00							1.00			94.19	94.19	FULL	U/S
5	1070.76	1070.76	R	60					CI	85.80	83.30	0.0		19.63	0.0049	223	11.36	2.00	0.0073	0.0073	0.00																										

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	84.38	89.38	91.38	89.38	95.00			OK	NO
2	1028.64	84.96	89.96	91.96	89.96	94.74			OK	NO
3	1032.64	85.04	90.04	92.91	90.91	94.74			OK	NO
4	1070.76	85.80	90.80	93.19	91.19	95.96			OK	NO
5	1070.76	83.30	88.30	94.19	94.19	95.96			OK	YES
6										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U7 - East Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance;Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	PIPE	TRANSITION																								CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	Frict H_f (ft)	Frict H_f (ft)	Manhole Θ (deg)	Manhole K_{mh}	Manhole H_{mh} (ft)	Junction Θ (deg)	Junction K_j	Junction H_j (ft)	Contraction/ Inlet Inlet/ Cont	Contraction/ Inlet K_j	Contraction/ Inlet H_c (ft)	Expansion/Outlet Θ (deg)	Expansion/Outlet K_o	Expansion/Outlet H_o (ft)	Bend R_{bend} (ft)	Bend Θ (deg)	Bend K_b	Bend H_b (ft)	Misc H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		18						83.34																			Outlet K_o=	1.0												84.96	84.84		
2	1000.00	1009.90	IR	18					1	83.34	83.54	9.9	2.02%	1.77	0.0049	5	2.83	0.12	0.0023	0.0023	0.02																					0.00	85.16	85.04			FULL	D/S
3	1009.90	1009.90	IR	18					1	83.54	83.54	0.0		1.77	0.0049	5	2.83	0.12	0.0023	0.0023	0.00								Ki=	0.25	0.03										0.03			85.20	85.20	FULL	U/S
4																																															

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	83.34	84.84	84.96	84.84	90.14			OK	NO
2	1009.90	83.54	85.04	85.16	85.04	90.14			OK	NO
3	1009.90	83.54	85.04	85.20	85.20	90.14			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U7 - West Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																														
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend					Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_e (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		30						78.19	78.19																		Outlet K_o=		1.0												82.42	81.97		
2	1000.00	1029.70	R	30					16	78.19	78.78	29.7	1.99%	4.91	0.0049	26.5	5.40	0.45	0.0042	0.0042	0.12																			0.00	82.55	82.09			FULL	U/S
3	1029.70	1029.70	R	30					17	78.78	78.78	0.0		4.91	0.0049	26.5	5.40	0.45	0.0042	0.0042	0.00							Ki=	0.25	0.11										0.11			82.66	82.66	FULL	U/S
4																																															

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	78.19	80.69	82.42	81.97	89.63			OK	NO
2	1029.70	78.78	81.28	82.55	82.09	89.63			OK	NO
3	1029.70	78.78	81.28	82.66	82.66	89.63			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U8 - East Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																											
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		18						78.41	78.41																																80.03	79.91		
																													Outlet K_o=		1.0															
2	1000.00	1009.90	FR	18					1	78.41	78.61	9.9	2.02%	1.77	0.0049	CS	2.83	0.12	0.0023	0.0023	0.02																			0.00	80.23	80.11			FULL	D/S
3	1009.90	1009.90	FR	18					1	78.61	78.61	0.0		1.77	0.0049	CS	2.83	0.12	0.0023	0.0023	0.00								Ki=	0.25	0.03									0.03			80.27	80.27	FULL	U/S
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	78.41	79.91	80.03	79.91	84.21			OK	NO
2	1009.90	78.61	80.11	80.23	80.11	84.21			OK	NO
3	1009.90	78.61	80.11	80.27	80.27	84.21			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U8 - West Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= Ki | Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																						EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																						CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc													
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		30							78.26																																77.46	77.61		
																												Outlet K_o=				1.0															
2	1000.00	1029.70	R	30					1	73.26	78.85	29.7	1.99%	4.91	0.0049	26.5	5.40	0.45	0.0042	0.0042	0.12																			0.00	77.59	77.13			FULL	U/S
3	1029.70	1029.70	R	30					1	73.85	78.85	0.0		4.91	0.0049	26.5	5.40	0.45	0.0042	0.0042	0.00							Ki=	0.25	0.11										0.11			77.70	77.70	FULL	U/S
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	73.26	75.76	77.46	77.01	83.70			OK	NO
2	1029.70	73.85	76.35	77.59	77.13	83.70			OK	NO
3	1029.70	73.85	76.35	77.70	77.70	83.70			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. — Lateral @ Facility U9 - East Side — DATE 07/02/08 — FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 — Inlet Structure Type or K_i= K — Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA											FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																					PIPE	TRANSITION																												
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
		1000.00		24							75.24																			Outlet K_o=	1.0															
1	1000.00	1009.90	R	24					1	75.24	75.44	9.9	2.02%	3.14	0.0049	3.1	9.87	1.51	0.0187	0.0187	0.19																			0.00	79.39	77.88			FULL	U/S
2	1009.90	1009.90	R	24					1	75.44	75.44	0.0		3.14	0.0049	3.1	9.87	1.51	0.0187	0.0187	0.00							Ki=	0.25	0.38										0.38			79.77	79.77	FULL	U/S
3																																														
4																																														

Summary of Results

						(Optional)		HGL with respect	Pressure Gasket
	STATION	INVERT	SOFFIT	EGL	HGL	GRADE	LOCATION	DESCRIPTION	to FG	Required?
1	1000.00	75.24	77.24	79.20	77.69	81.50			OK	NO
2	1009.90	75.44	77.44	79.39	77.88	81.50			OK	NO
3	1009.90	75.44	77.44	79.77	79.77	81.50			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U9 - West Side

DATE 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																				CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG.		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			U/S	U/S	U/S	U/S	PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	EGL	HGL	EGL	HGL	FLOW	
1		1000.00		42						70.85																			Outlet K_o=	1.0										78.60	77.80		
2	1000.00	1029.70	R	42					1	70.85	71.44	29.7	1.99%	9.62	0.0049	69	7.17	0.80	0.0047	0.0047	0.14																		0.00	78.74	77.94			FULL	U/S
3	1029.70	1029.70	R	42					1	71.44	71.44	0.0		9.62	0.0049	69	7.17	0.80	0.0047	0.0047	0.00							Ki=	0.25	0.20									0.20			78.94	78.94	FULL	U/S
4																																												

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	70.85	74.35	78.60	77.80	81.16			OK	NO
2	1029.70	71.44	74.94	78.74	77.94	81.16			OK	NO
3	1029.70	71.44	74.94	78.94	78.94	81.16			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. — Lateral @ Facility U11 - East Side — DATE 07/02/08 — FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 — Inlet Structure Type or K_i= K — Projecting Entrance:Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																													
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet				Bend				Misc			CONDUIT		TRANSITION		FULL/	
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_c (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
1		1000.00		18						73.01	73.01																		Outlet K_o=	1.0											74.66	74.51			
2	1000.00	1009.19	R	18					#1	73.01	73.19	9.2	1.96%	1.77	0.0049	5.5	3.11	0.15	0.0027	0.0027	0.03																				0.00	74.84	74.69			FULL	D/S
3	1009.19	1009.19	R	18					#1	73.19	73.91	0.0		1.77	0.0049	5.5	3.11	0.15	0.0027	0.0027	0.00							Ki=	0.25	0.04										0.04			74.88	74.88	FULL	U/S
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	73.01	74.51	74.66	74.51	79.87			OK	NO
2	1009.19	73.19	74.69	74.84	74.69	79.87			OK	NO
3	1009.19	73.19	74.69	74.88	74.88	79.87			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc. | Lateral @ Facility U11 - West Side | DATE 07/02/08 | FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= K | Projecting Entrance:Square Edge (RCP)

CONDUIT DATA											FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																												
STATION			PIPE	BOX		IRREG		#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			CONDUIT		TRANSITION		FULL/	
FROM	TO	T/R	D	SPAN	RISE	AREA	HYD RAD		D/S	U/S									S_f	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_j	H_j	Inlet/	K_i	H_e	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S	U/S	U/S	U/S	PART	CRTL
(ft)	(ft)		(in)	(ft)	(ft)	(ft^2)	(ft)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	(ft)	(ft)	(deg)		(ft)	(deg)		(ft)	Cont		(ft)	(deg)		(ft)	(ft)	(deg)		(ft)	(ft)	(ft)	EGL	HGL	EGL	HGL	FLOW	
1	1000.00		30							67.90																		Outlet K_o=		1.0													74.05	73.41		
2	1000.00	1028.99	CR	30					M1	67.90	68.48	29.0	2.00%	4.91	0.0049	3.15	6.42	0.64	0.0059	0.0059	0.17																					0.00	74.22	73.58			FULL	U/S
3	1028.99	1029.99	CR	30					M1	68.48	68.48	0.0		4.91	0.0049	3.15	6.42	0.64	0.0059	0.0059	0.00							Ki=	0.25	0.16										0.16			74.38	74.38	FULL	U/S
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	67.90	70.40	74.05	73.41	79.43			OK	NO
2	1028.99	68.48	70.98	74.22	73.58	79.43			OK	NO
3	1028.99	68.48	70.98	74.38	74.38	79.43			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U12 - East Side

DATE 07/02/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= K_i Projecting Entrance;Square Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																				PIPE	TRANSITION																				CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc.			U/S	U/S	U/S	U/S	PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_e (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	EGL	HGL	EGL	HGL	FLOW	
		1000.00		24							62.29																				Outlet K_o=		1.0							0.00	66.44	64.51			FULL	U/S
1	1000.00	1009.19	R	24					1	62.29	62.47	9.2	1.96%	3.14	0.0049	35	11.14	1.93	0.0239	0.0239	0.22																				0.48			66.92	66.92	FULL	U/S
2	1009.19	1009.19	R	24					1	62.47	62.47	0.0		3.14	0.0049	35	11.14	1.93	0.0239	0.0239	0.00							Ki=	0.25	0.48																
3																																													
4																																													

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	62.29	64.29	66.22	64.29	73.98			OK	NO
2	1009.19	62.47	64.47	66.44	64.51	73.98			OK	NO
3	1009.19	62.47	64.47	66.92	66.92	73.98			OK	NO
4										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Facility U15

DATE 07/25/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= J Projecting Entrance;Grooved Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																								EGL & HGL				COMMENTS
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV										PIPE	TRANSITION																							CONDUIT		TRANSITION		FULL/	
	FROM	TO	T/R	D	SPAN	RISE	AREA	HYD RAD		D/S	U/S	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc			U/S	U/S	U/S	U/S	PART	CRTL
	(ft)	(ft)		(in)	(ft)	(ft)	(ft^2)	(ft)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(S_f) (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_j	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	EGL	HGL	EGL	HGL	FLOW	
																													Outlet K_o=		1.0												47.35	41.61		
1		1000.00		78							35.11																													0.00	52.68	46.94			PART	D/S
2	1000.00	1029.45	R	78					1	35.11	40.44	29.5	18.09%	33.18	0.0049	638	19.23	5.74	0.0148	0.0148	0.44																			3.55			56.22	52.14	FULL	U/S
3	1029.45	1033.45	T	78					1	40.44	41.16	4.0	18.10%	33.18	0.0049	538	16.21	4.08	0.0105	0.0127		0.05				44	0.55	3.50											0.00	71.51	67.43			PART	D/S
4	1033.45	1142.67	R	78					1	41.16	60.93	109.2	18.10%	33.18	0.0049	538	16.21	4.08	0.0105	0.0105	1.15																			1.93			73.44	69.36	FULL	U/S
5	1142.67	1147.67	T	78					1	60.93	61.48	5.0	11.05%	33.18	0.0049	538	16.21	4.08	0.0105	0.0105		0.05	45	0.46	1.88															0.00	73.84	69.76			FULL	U/S
6	1147.67	1186.04	R	78					1	61.48	63.02	38.4	4.01%	33.18	0.0049	538	16.21	4.08	0.0105	0.0105	0.40																			0.05			73.90	69.81	FULL	U/S
7	1186.04	1191.04	T	78					1	63.02	63.25	5.0	4.60%	33.18	0.0049	538	16.21	4.08	0.0105	0.0105		0.05																			0.00	74.93	70.85			FULL	D/S
8	1191.04	1218.58	R	78					1	63.25	64.35	27.5	3.99%	33.18	0.0049	538	16.21	4.08	0.0105	0.0105	0.29																											
9	1218.58								1	64.35																																				
10																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	35.11	41.61	47.35	41.61	47.00			OK	NO
2	1029.45	40.44	46.94	52.68	46.94	73.00			OK	NO
3	1033.45	41.16	47.66	56.22	52.14	73.00			OK	NO
4	1142.67	60.93	67.43	71.51	67.43	72.00			OK	NO
5	1147.67	61.48	67.98	73.44	69.36	72.00			OK	NO
6	1186.04	63.02	69.52	73.84	69.76	74.00			OK	NO
7	1191.04	63.25	69.75	73.90	69.81	74.00			OK	NO
8	1218.58	64.35	70.85	74.93	70.85	76.00			OK	NO
9										

Storm Drain Hydraulics Calculations

G.C. Wallace, Inc.

Lateral @ Facility U16

DATE 07/25/08 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 | Inlet Structure Type or K_i= J | Projecting Entrance;Grooved Edge (RCP)

	CONDUIT DATA										FLOW DATA								ENERGY LOSS DATA																			EGL & HGL				COMMENTS	
																			PIPE	TRANSITION																			CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc						PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_o (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	FLOW	
																																										53.12	52.14		
																													Outlet K_o=		1.0														
1		1000.00		48						48.30																														0.00	66.94	65.96			PART	D/S
2	1000.00	1041.47	RP	48					1	43.30	61.96	41.5	45.00%	12.57	0.0049	100	7.96	0.98	0.0048	0.0048	0.20																		0.77			67.71	67.24	FULL	U/S
3	1041.47	1046.47	HS	48					1	61.96	62.16	5.0	4.00%	12.57	0.0049	69.0	5.49	0.47	0.0023	0.0036		0.02				45	0.50	0.75											0.00	68.11	67.64			FULL	D/S
4	1046.47	1083.47	R	48					2	62.16	63.64	37.0	4.00%	12.57	0.0049	69.0	5.49	0.47	0.0023	0.0023	0.09																		0.12			68.23	68.23	FULL	U/S
5	1083.47	1083.47		48					1	63.64	63.64	0.0		12.57	0.0049	69.0	5.49	0.47	0.0023	0.0023									Ki=	0.25	0.12														
6																																														

Summary of Results

	STATION	INVERT	SOFFIT	EGL	HGL	(Optional) GRADE	(Optional) LOCATION	(Optional) DESCRIPTION	HGL with respect to FG	Pressure Gasket Required?
1	1000.00	43.30	47.30	53.12	52.14	65.00			OK	NO
2	1041.47	61.96	65.96	66.94	65.96	71.39			OK	NO
3	1046.47	62.16	66.16	67.71	67.24	71.39			OK	NO
4	1083.47	63.64	67.64	68.11	67.64	69.88			OK	NO
5	1083.47	63.64	67.64	68.23	68.23	69.88			OK	NO
6										

INTERIM BERM CALCULATIONS

RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

South Berm @ Azure

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	85 cfs	VELOCITY	6.90 ft/sec
MANNING's 'n'	0.039	DEPTH	1.38 ft
SLOPE	5.5 %	FREEBOARD	1.19 ft
BOTTOM WIDTH	0 ft	TOTAL DEPTH	2.57 ft
SIDE SLOPE (Lt)	3H:1V	FROUD No.	1.48
SIDE SLOPE (Rt)	10H:1V	d50 Rip RAP SIZE	10.5 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

North Berm @ Azure

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	85 cfs	VELOCITY	7.65 ft/sec
MANNING's 'n'	0.041	DEPTH	1.31 ft
SLOPE	8 %	FREEBOARD	1.21 ft
BOTTOM WIDTH	0 ft	TOTAL DEPTH	2.52 ft
SIDE SLOPE (Lt)	3H:1V	FROUD No.	1.68
SIDE SLOPE (Rt)	10H:1V	d50 Rip RAP SIZE	14.7 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

South Berm @ Tropical

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	262 cfs	VELOCITY	6.13 ft/sec
MANNING's 'n'	0.035	DEPTH	2.57 ft
SLOPE	1.5 %	FREEBOARD	1.08 ft
BOTTOM WIDTH	0 ft	TOTAL DEPTH	3.65 ft
SIDE SLOPE (Lt)	3H:1V	FROUD No.	0.96
SIDE SLOPE (Rt)	10H:1V	d50 Rip RAP SIZE	5.3 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

North Berm @ Tropical

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	262 cfs	VELOCITY	7.44 ft/sec
MANNING's 'n'	0.038	DEPTH	2.34 ft
SLOPE	3 %	FREEBOARD	1.25 ft
BOTTOM WIDTH	0 ft	TOTAL DEPTH	3.59 ft
SIDE SLOPE (Lt)	3H:1V	FROUD No.	1.22
SIDE SLOPE (Rt)	10H:1V	d50 Rip RAP SIZE	10.0 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

Berm south of Ann Road

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	58 cfs	VELOCITY	5.91 ft/sec
MANNING's 'n'	0.036	DEPTH	1.23 ft
SLOPE	4.0 %	FREEBOARD	1.16 ft
BOTTOM WIDTH	0 ft	TOTAL DEPTH	2.39 ft
SIDE SLOPE (Lt)	3H:1V	FROUD No.	1.34
SIDE SLOPE (Rt)	10H:1V	d50 Rip RAP SIZE	6.9 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

APPENDIX C

Reference

ORIGINAL DESIGN REPORT

DESIGN REPORT
FOR THE
LONE MOUNTAIN/BELTWAY DETENTION BASINS
AND THE
GOWAN BELTWAY WEST CHANNEL

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

451.002

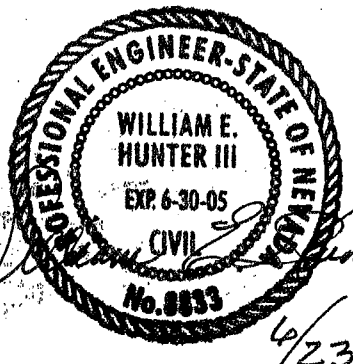
JUNE 2005

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4/23/05

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EXECUTIVE SUMMARY

INTRODUCTION

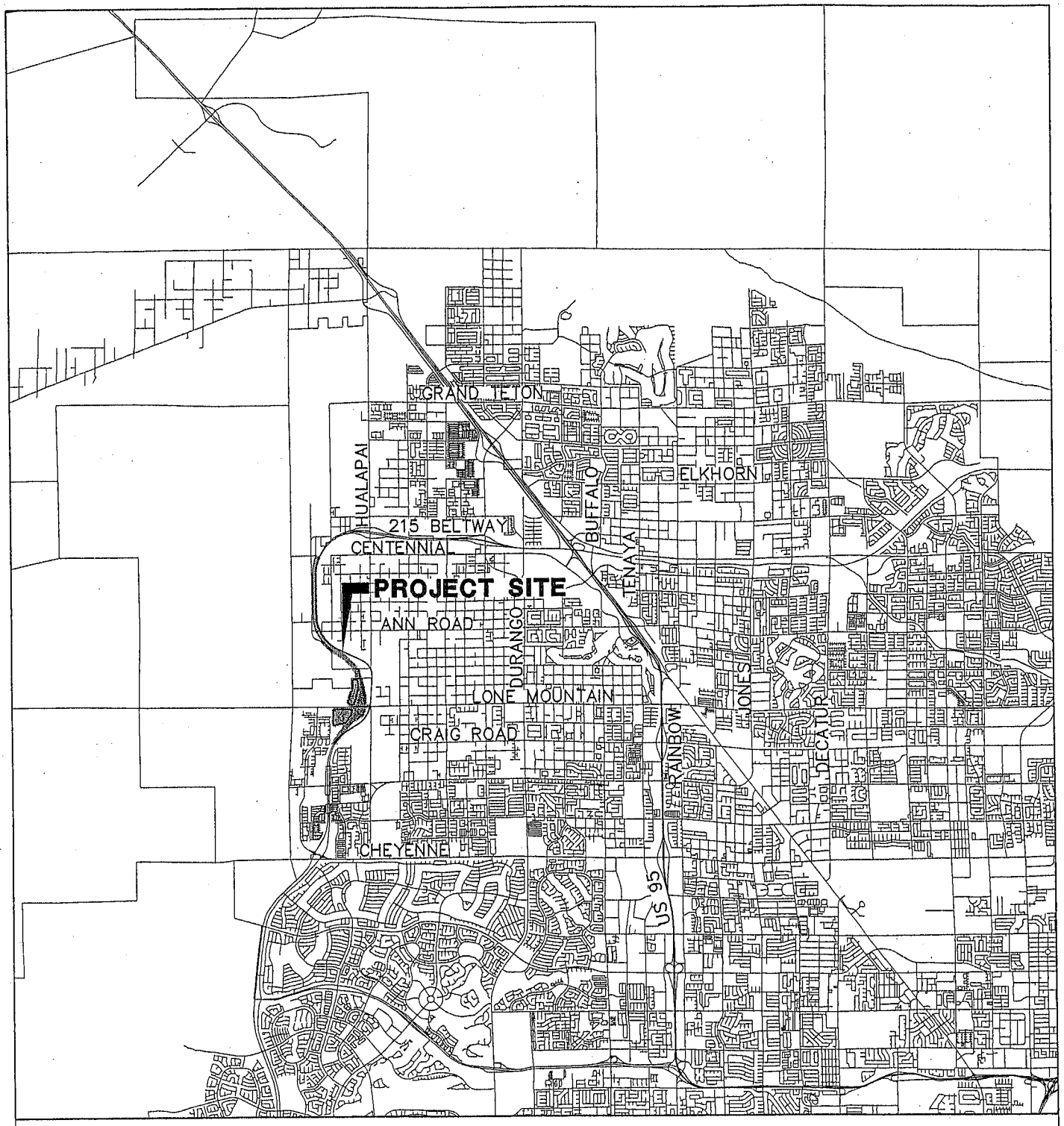
CH2M HILL, as the prime consultant for the design of the segment of the Las Vegas Beltway from Craig Road to Hualapai Way, has contracted with G. C. Wallace, Inc. (GCW) to provide engineering and design services for the Gowan Beltway West Channel facilities from Centennial Parkway to the Lone Mountain – Beltway Detention Basins, and for the Lone Mountain - Beltway Detention Basin facilities. A vicinity map and location map showing the location of the project are included as Figures E-1 and E-2.

PURPOSE

The purpose of this report is to present the results of the design for the Gowan Beltway West Channel and the Lone Mountain – Beltway Detention Basins and appurtenant facilities.

The project has been divided into two phases. Phase 1 addresses the hydrologic analysis for the project and provides estimated flows and their corresponding discharge locations to the future storm drain facilities. Phase 2 addresses hydraulic design of the future regional flood control facilities. Previous memoranda have addressed the hydrologic and hydraulic analysis for the project. This is a compiled report detailing the results of the previous efforts. The following is a list of the regional facilities shown in the 2002 Master Plan Update, Clark County Regional Flood Control District, that are to be addressed in this project:

GOBW 0277 is a 1,400-linear foot (LF) 10-foot wide by 4.5-foot deep concrete channel;
GOBW 0250 is a 1,400 LF 10-foot wide by 7.5-foot deep concrete channel;
GOBW 0248 is a 100 LF 10-foot wide by 8-foot high RCB;
GOBW 0220 is a 1,500 LF 15-foot wide by 7.5-foot deep concrete channel;
GOBW 0194 is a 1,400 LF 15-foot wide by 10-foot deep concrete channel;
GOBW 0124 is a 3,700 LF 14-foot wide by 7-foot deep concrete channel;
GOBW 0096 is a 1,500 LF 15-foot wide by 7.5-foot deep concrete channel;
GOBW 0054 is a 200 LF 8-foot wide by 8-foot high RCB connector pipe;
GOBW 0053 is a 300 LF 8-foot wide by 8-foot high RCB connector pipe;
GOBW 0052 is a 555 acre-foot Detention Basin System;
GOBW 0051 is a 100 LF 18-inch RCP outlet; and
GOBW 0050 is a 32,890 cfs PMF spillway.



GRAPHIC SCALE

10000 0 5000 10000

(IN FEET)

1 inch =10000 ft.

NORTH

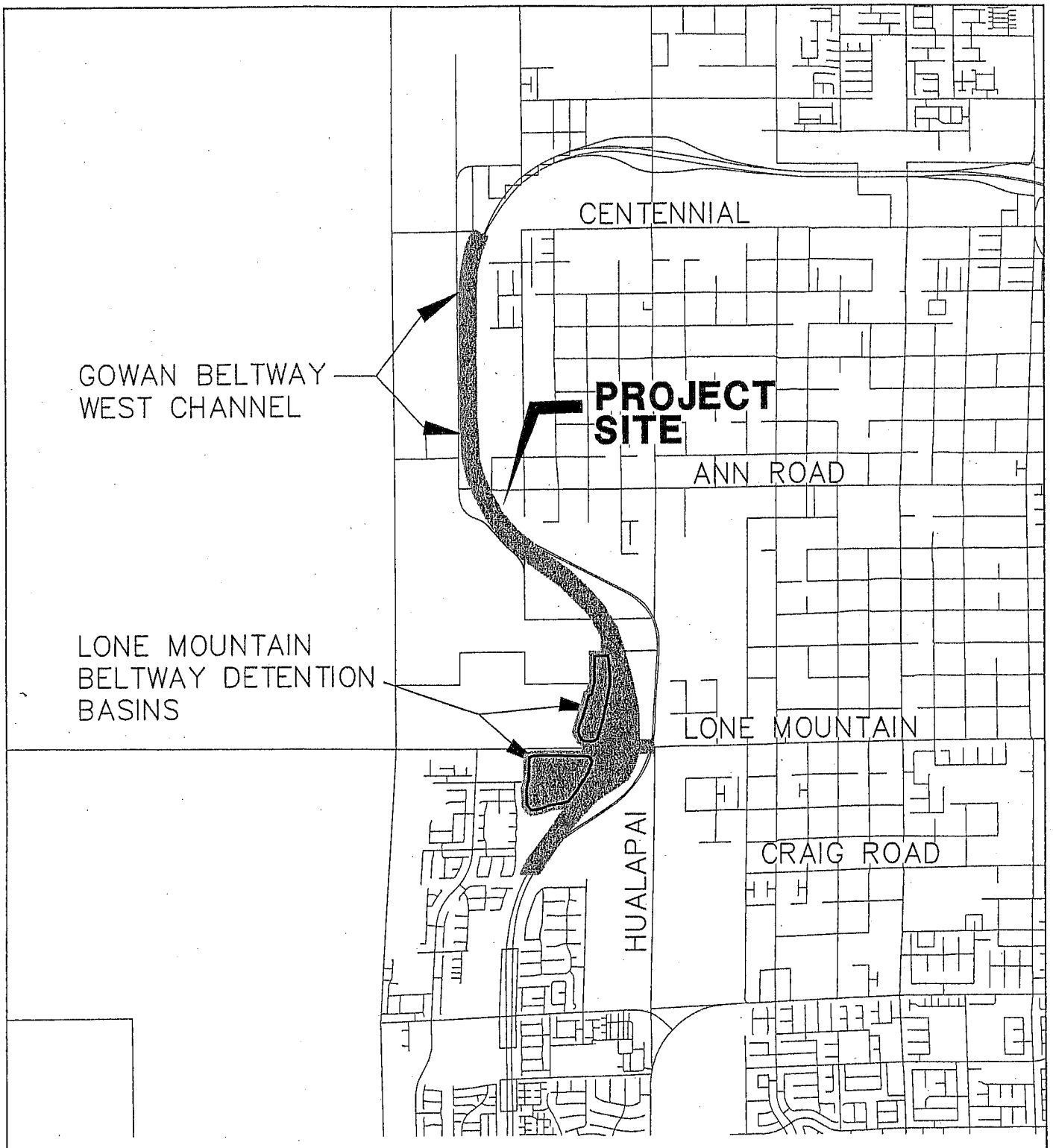
SCALE 1" = 10,000'

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

FIGURE E-1

VICINITY MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NV 89146



GRAPHIC SCALE

3000 0 1500 3000

(IN FEET)

1 inch = 3000 ft.

NORTH

SCALE 1" = 3,000'

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

FIGURE E-2

LOCATION MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NV 89146

CONCLUSIONS AND RECOMMENDATIONS

1. The project facilities are not located in a FEMA-designated Special Flood Hazard Area.

2. The Gowan Beltway West Channel system will have design flows ranging from approximately 520 cfs at the north end to 2,180 cfs at the south end.

3. The detention basin facilities will include two basins located on the northwest and southwest quadrants of the Lone Mountain Road interchange. The peak storage volume for the detention basin on the northwest quadrant will be approximately 298 acre-feet. The peak storage volume for the detention basin on the southwest quadrant will be approximately 288 acre-feet. The peak flow into the north detention basin is approximately 2,240 cfs and the peak flow into the south detention basin is approximately 1,670 with a combined peak inflow of approximately 3,670 cfs.

4. A dual level outfall is planned for the Lone Mountain - Beltway Detention Basins to minimize adverse impacts to downstream facilities. The lower level outfall will restrict peak discharge for the combined detention basins to approximately 45 cfs for the level of storage that will collect to the basins for the design storm that encompasses the watershed for the Gowan Detention Basins. The second level outfall will increase the discharge to approximately 157 cfs maximum as the storage volume increases from a volume of 355 acre-feet to 587 acre-feet. This will provide for a storm centered over tributary watershed for the Lone Mountain - Beltway Detention Basins to discharge from the basins in approximately seven days while minimizing adverse impacts on the Gowan North system. The outfall system extends from the south detention basin across the beltway to the intersection of Lone Mountain Road and Hualapai Way where is connects to the Gowan North Channel – Phase IV system.

5. The Gowan Beltway West Channel system extends along the upstream side of the Las Vegas Beltway from the north detention basin to Centennial Parkway. A 14-feet wide, open channel extends from the upstream side of the north detention basin approximately 2,500 linear feet to the vicinity of the Hammer/Barden intersection. From the intersection of Hammer/Barden alignments a 14' X 7' RCB extends approximately 1,900 linear feet to Ann Road.

A 10' X 8' RCB extends approximately 800 linear feet to the north. Two alternatives are presented for the conveyance system from the segment from 800 feet north of Ann Road to Centennial Parkway. Alternative #1 is a rectangular open channel system ranging in size from 12' X 8' to 10' X 5'. The horizontal alignment for Alternative #1 utilizes 12-feet from the east side of the future Landsford Street right-of-way. Alternative #1 requires retaining walls from the vicinity of Ann Road to Centennial Parkway at the bottom of the back slope for the beltway ranging from 1 to 12 feet in height. Alternative #2 is a reinforced box culvert system ranging in size from 12' X 8' to 8' X 5'. The horizontal alignment of Alternative #2 lies within the east side of the future, 60-feet-wide Landsford Street right-of-way.

6. Additional right-of-way will be required for the channel in three locations. Minor amounts of additional right-of-way will be required to provide for approximately 400 linear feet of the proposed channel alignment at the north end of the north detention basin, at Ann Road where the RCB curves around the proposed bridge abutment at the west side of the Ann Road grade separation, and to accommodate the channel access ramp located between the Washburn and Hammer alignments. Additional right-of-way will also be needed for the conveyance system between Ann Road and Centennial Parkway as described in item 5 above.

7. The North Detention Basin extends to the limits of the County right-of-way adjacent to the beltway on the northwest quadrant of the Lone Mountain interchange to provide for an open channel inlet/energy dissipator layout for the Beltway Channel. The extension of the detention basin also provides additional storage for the northern cell of the combined detention basin system; reduces the total length of the Beltway Channel; and provides for the open channel inlet to be outside the envelope of the spillway for the North Detention Basin. The energy dissipater at the inlet to the north detention basin has access ramps and space to provide for ease of maintenance.

8. Storm drain laterals are proposed to convey flow to the Beltway Channel. The proposed lateral sizes are prorated based on the ultimate conditions drainage subbasins that contribute flow to those storm drain locations. For Alternative #2 it is anticipated that the flow collected in future local storm drain systems in the grid streets and other locations will be discharge to the RCB and that surface

flows collecting in the Landsford roadway will be collected and discharged into the RCB principally at the grid street intersections. A berm is proposed within the beltway right-of-way along the east side of Landsford to prevent flows collecting to Landsford between the intersections from discharging into the beltway right-of-way. For Alternative #1 lateral stubs are proposed at the major grid-street inflow locations.

9. Both detention basins will spill over the beltway ramps adjacent to the downstream sides of the detention basins. The ramps form substantial embankments with greater than 50-feet top widths and the back slopes of the ramps will have concrete slope lining to help prevent erosion in the event that spillage occurs from the detention basin. For the South Detention Basin, a 610 linear feet, 10-feet wide concrete spillway weir is proposed along the top of slope of the detention basin adjacent to the ramp (with 3-feet deep cutoff wall at each side of the weir apron). The spillway weir will be essentially centered about the low point on the beltway ramp and conforms to the grading along the shoulder of the ramp. For the North Detention Basin, an 855 linear feet, 10-feet wide concrete spillway weir is proposed along the top of slope of the detention basin (with 3-feet deep cutoff wall at each side of the weir apron). The spillway weir will extend from the low point on the beltway ramp south conforming to the grading along the shoulder of the ramp. On the north side of the low point the weir will extend along the top of slope of the detention basin and terminate at the channel embankment. The initial overflow for both detention basins will be at the north side of the north detention basin at the low point of the spillway weir since the balancing conduit will convey flow from the south basin to the north basin in the event that water ponds in the south basin above the 2738 maximum projected water surface elevation.

10. At the Peaceful Dawn cul-de-sac, a 10-foot wide stepped chute structure is proposed that will dissipate the energy in the flow as it descends down the slope into the basin. At the access road the flow will discharge to an impact basin/drop structure. The flow is conveyed to an impact basin at the north side of the detention basin via a RCP where it combines with the runoff from Lone Mountain Road and the flow is conveyed via riprap lined channel and grouted riprap chute to the bottom of the basin.

11. A collection system is proposed in Lone Mountain Road to collect the majority of the flow at the upstream side of the South Basin with supplementary collection facilities approximately 800 linear feet downstream. Depressed curb and storm drain capture a majority of the flow at the upstream end of Lone Mountain Road and convey it to the 10-foot wide stepped chute structure at the northwest corner of the South Detention Basin. The stepped chute will dissipate a substantial amount of the energy in the flow as it descends the slope into the basin. At the end of the chute the flow will discharge to an impact basin/drop structure. An RCP storm drain conveys the flow to an impact basin at the north side of the basin where it combines with the runoff from Peaceful Dawn Avenue. The supplementary collection system consisting of depressed curb and channel system that collects and routes the bypass flows into the proposed detention basins. In addition, drop inlets are proposed at the curb returns for the ramps.

12. The inflow at the southeast corner of the South Detention Basin is conveyed into the basin via a dual 54-inch RCP system with a dual impact basin to dissipate energy as the flow discharges into the basin. The layout of the impact basin includes ramps at the downstream side to facilitate maintenance.

13. The analysis of the balancing conduit for the 100-year design storm conditions shows that the proposed 8-feet wide by 8-feet high RCB performs as intended with a maximum of 1.0-feet difference in water surface elevation (WSE) occurring when the basins are approximately half full. The difference decreases to less than 0.25-foot by the end of the 6-hour storm. The difference in WSE is negligible when the basins reach peak storage/stage. The balancing conduit maintains hydraulic connectivity between the basins which provides flexibility for the overall system to minimize outflow and maximize use of the combined storage volume.

14. Underground low flow conveyance systems are proposed in both detention basins to convey low/nuisance flows from the upstream inlets to the basins to the basin outlets.

I. INTRODUCTION

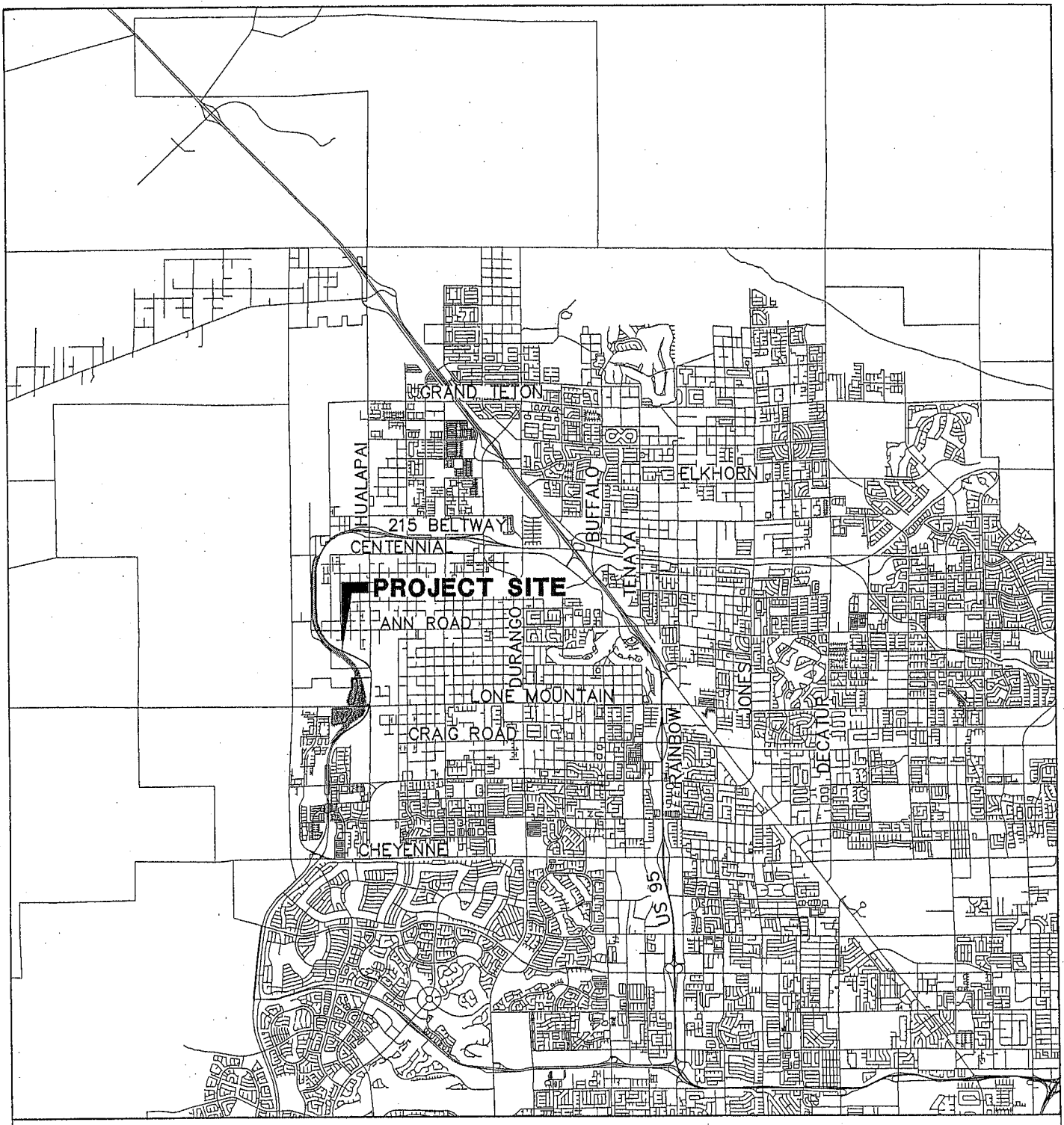
CH2M HILL, as the prime consultant for the design of the segment of the Las Vegas Beltway from Craig Road to Hualapai Way, has contracted with G. C. Wallace, Inc. (GCW) to provide engineering and design services for the Lone Mountain – Beltway Detention Basins (hereinafter referred to as the LMBW Detention Basins) and the Gowan Beltway West Channel from Centennial Parkway to the LMBW Detention Basins (hereinafter referred to as the Beltway Channel). A vicinity map and location map showing the exact location of the project are included as Figures 1 and 2.

II. FEMA FLOOD PLAIN INFORMATION

Figure 3 shows the project site in relation to designated Federal Emergency Management Agency (FEMA) flood zones. According to Flood Insurance Rate Map (FIRM) Panels 32003C 1750 E and 2150 E, dated September 27, 2002, the project site lies within FEMA-designated Zone X. Areas designated as Zone X are described as being outside of the 500-year floodplain.

III. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD) FACILITIES

Figure 4 is reproduced from Figure F-7 of the *2002 Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Master Plan Update* (Reference 1, hereinafter referred to as the 2002 MPU). This figure depicts the project site in relation to existing and proposed CCRFCD facilities. As shown on the figure, Facility GOBW 0277 is a 1,400 linear foot (LF) 10-foot wide by 4.5-foot deep concrete channel. Facility GOBW 0250 is a 1,400 LF 10-foot wide by 7.5-foot deep concrete channel. Facility GOBW 0248 is a 100 LF 10-foot wide by 8-foot high RCB. Facility GOBW 0220 is a 1,500 LF 15-foot wide by 7.5-foot deep concrete channel. Facility GOBW 0194 is a 1,400 LF 15-foot wide by 10-foot deep concrete channel. Facility GOBW 0124 is a 3,700 LF 14-foot wide by 7-foot deep concrete channel. Facility GOBW 0096 is a 1,500 LF 15-foot wide by 7.5-foot deep concrete channel. Facility GOBW 0050 is a 32,890 cfs PMF spillway. Facility GOBW 0051 is a 100 LF18-inch RCP outlet. Facility GOBW 0052 is the 555 acre-feet Lone Mountain-Beltway Detention Basin. Facility GOBW 0053 is a 300 LF 8-foot wide by 8-foot high RCB connector pipe under the Beltway. Facility GOBW 0054 is a 200 LF 8-foot wide by 8-foot high RCB connector pipe under Lone Mountain Road.



GRAPHIC SCALE

10000 0 5000 10000

(IN FEET)

1 inch =10000 ft.

NORTH

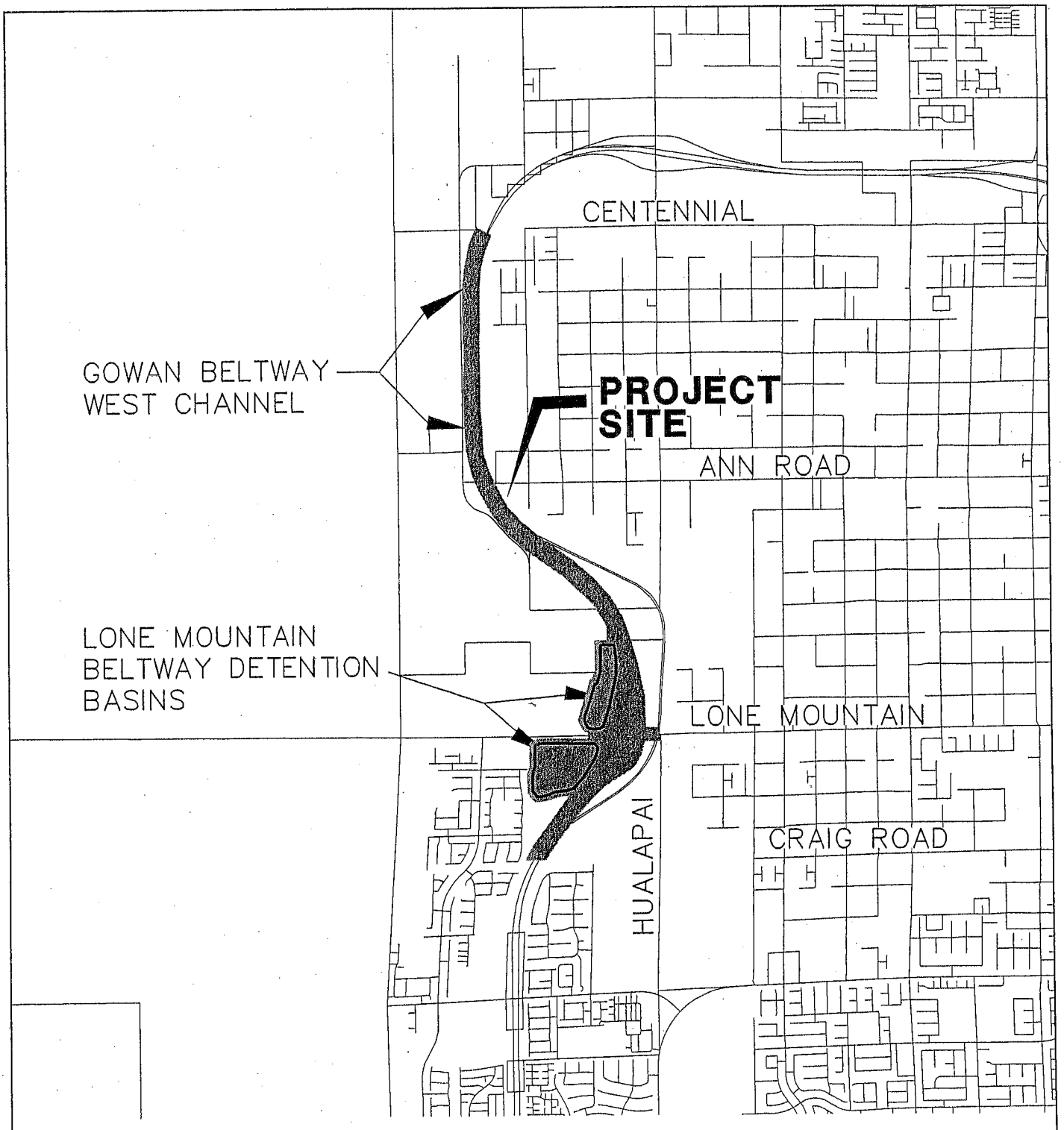
SCALE 1" = 10,000'

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

FIGURE 1

VICINITY MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NV 89146



GRAPHIC SCALE

3000 0 1500 3000

(IN FEET)

1 inch = 3000 ft.

NORTH

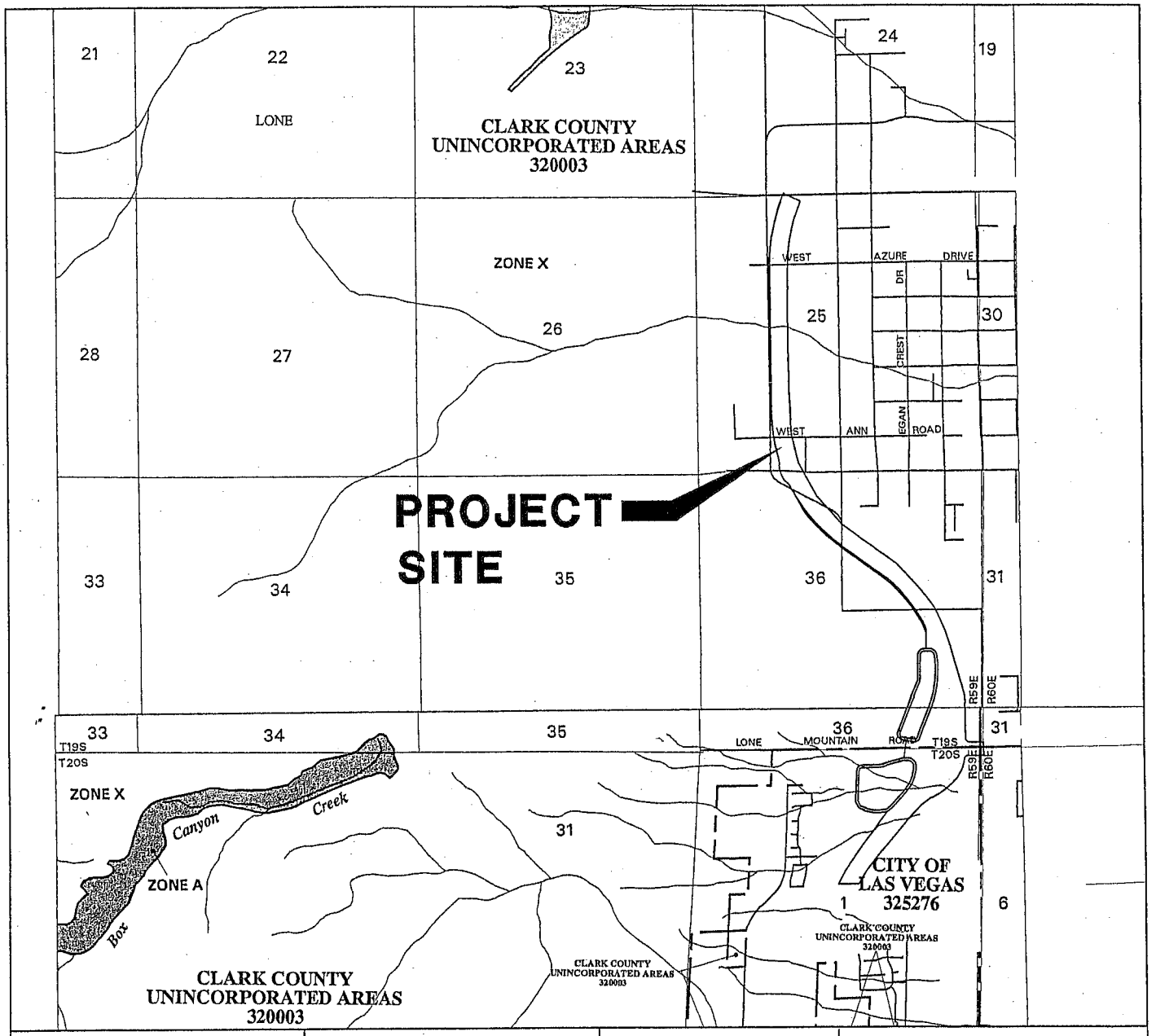
SCALE 1" = 3,000'

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

FIGURE 2

LOCATION MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NV 89146



NFIP

PANEL 1750 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 1750 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	1750	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	1750	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
32003C1750 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

NFIP

PANEL 2150 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2150 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	2150	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2150	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
32003C2150 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

NORTH

SCALE = 3000'

WESTERN SEGMENT OF THE
LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

FIGURE 3

F.I.R.M.

G.C. WALLACE, INC.
Engineers/Planners/Surveyors 1555 SOUTH RAINBOW BLVD./LAS VEGAS, NV 89146

F:\45\...52\Drainage\fig\FIG3.dwg 02-11-04 ...48:21 wfelkins

IV. PROJECT OBJECTIVES

The project has been divided into two phases. Phase 1, which addresses hydrologic analysis which provided estimated flows and their corresponding discharge locations to the Beltway Channel and the LMBW Detention Basins. Phase 2, which addresses hydraulic design of the future storm drain facilities. Previous memoranda have addressed the hydrologic and hydraulic analysis for the project. This is a compiled report detailing the results of the previous efforts.

The following tasks were performed to prepare and compile this design report:

- Obtain and review hydrologic information from previously approved drainage studies to obtain information pertaining to the Project.
- Identify the FEMA flood zone designation for the project site.
- Identify drainage basins impacting the project facilities and discharge locations for the inflows to the channel and detention basins.
- Analyze the flow routing through LMBW Detention Basin System utilitizing the refined hydrology from this study
- Analyze downstream impacts utilizing the updated hydrology for the study area and the 2002 MPU hydrologic models.
- Determine the sedimentation impacts to the detention basins.
- Performed a Probable Maximum Flood (PMF) Analysis for the detention basin sites.
- Provided design for the spillways for the detention basins.
- Provided design for the grading for the detention basins.
- Provided detailed analysis and design for the balancing conduit between the north and south detention basins.
- Provided open channel alignment and design from the north detention basin to the south side of Ann Road and two alternatives for conveyance from Ann Road to Centennial Road including an open channel option and an underground box culvert option.
- Identified inflow locations and magnitudes based on flows obtained from the hydrologic analysis.

- Provided design for the energy dissipator/stilling basin in the North Detention Basin at the inlet from the Gowan Beltway Channel and address maintenance concerns for that facility.
- Provided design for the collection berms along the west side of the north detention basin and for a stepped chute to convey the flows down the slope.
- Provided design for a collection system in Lone Mountain Road at the northwest corner of the south detention basin and for a stepped chute and pipe system to convey the flows down the slope.
- Provided design for a stepped chute and pipe system to convey flows down the slope from the cul-de-sac at the east end of Peaceful Dawn.
- Provided design for an impact basin for the pipes from Peaceful Dawn and Lone Mountain Road and a riprap lined channel to convey flows to the basin of the south basin.
- Provided design for an impact basin with a dual pipe inlet system for the RCB at the southeast corner of the south detention basin.
- Designed low flow storm drain facilities for the detention basins.

V. HYDROLOGY

The 2002 MPU hydrology was used as the basic source for the formation of the hydrologic model for this study. The hydrologic modeling done for the design of the Ann Road Detention Basin (CAM10) was referenced from the Preliminary Hydraulic Design Report for Western Segment Las Vegas Beltway, Initial Improvements – Ann Road to El Capitan Way (Reference 2, hereinafter referred to as the Ann Road DB Study). The Master Study for Lone Mountain West (Reference 3, hereinafter referred to as the Lone Mountain West Study) and the Technical Drainage Study for Monument at Line Mountain West Units 1, 3, 4, and 5 (Reference 4, hereinafter referred to as the Monument Study) were used in determining flow patterns for the drainage areas between Craig Road and Lone Mountain Road.

The LMBW Detention Basins provide protection to the beltway, particularly to the Lone Mountain Road interchange, as well as to downstream properties and facilities. The LMBW Detention Basins have discharges from two upstream detention basins

(the Ann Road [CAM10] Detention Basin and the future Box Canyon Detention Basin) routed through them. It is critical for the LMBW Detention Basins to contain the flows that collect to them, therefore, a conservative approach was used to determine design capacity for the basins.

To provide flexibility for future development, storm drain laterals conveying flow to the Beltway Channel were designed based on portions of the ultimate conditions drainage map (see Figure 5 in Hydrology Report) subbasins that may contribute flow to those storm drain locations. However, the capacity at any particular location of the Beltway Channel was designed based on the flows from the Ultimate Condition HEC-1 nodes.

A conceptual layout of the detention basins facilities was presented for regional flood control master planning purposes in the 2002 MPU. The 2002 MPU presented a configuration that showed three potential sites for interconnected detention basins. The volume for the combined basins was estimated to be 550 acre-foot for a nominal peak outflow. The peak outflow was listed as 0 cfs; however, the *Hydrologic Criteria and Drainage Design Manual, CCRFCD, August 1999* (Reference 7, hereinafter referred to as the Manual) states that the maximum drainage time for a regional detention basin is seven days, therefore, a minimum average outflow of approximately 40 cfs would be required per the Manual.

Model Description – The watersheds were modeled using the SCS Unit Hydrograph method within the *U. S. Army Corps of Engineers HEC-1 Flood Hydrograph Package* (Reference 5).

Precipitation - The project site lies outside the McCarran Rainfall Area as delineated in the Manual. Point precipitation values for the 100-year return period storm were determined from the CCRFCD GIS coverage developed with the MPU. Rainfall values range between 3.17 and 3.55 inches.

Although the total drainage area collecting the LMBW Detention Basins is larger than 8 square miles, an SDN 3 design storm was selected for use in the HEC-1 computer model to provide a conservative approach for the design of the detention basins.

Curve Numbers (CN) – The soils information for the project watershed was referenced from the MPU GIS soils data coverage in the project area, is based on data from the Soil Conservation Service (SCS) Soil Survey of the Las Vegas Valley (Reference 6). A portion of the soils map containing the project is included in Appendix A. This exhibit delineates families of soil types and Hydrologic Soil Group of each family.

The modeled offsite and onsite tributary areas consist of soil types 502, 190, and 400 from the Las Vegas Valley soil survey. Hydrologic Soils Groups primarily consist of "D" and "B" type soils. For the given soils, weighted CN values for ultimate conditions were calculated as a weighted average by area determined by the 2002 MPU Land Use GIS coverages. Curve number calculations are included in Appendix A.

Drainage Areas and Flow Patterns - The onsite and offsite subbasins and flow patterns used in the hydrologic modeling are based on the 2002 MPU Ultimate Conditions Hydrologic Basin Map and the Clark County GIS Management Office (GISMO) 5-foot contour files. Some modifications were made to the 2002 MPU basins to provide for anticipated worst-case conditions that account for potential irregular development where historic flow patterns for storm runoff would not conform to a street grid system. The drainage areas for the Ann Road Detention Basin (CAM10) were referenced from the Ann Road DB Study. The CN values from the 2002 MPU were used in lieu of the values from the Ann Road DB Study where the 2002 MPU values were more conservative. The Ann Road DB Study routed a portion of 2002 MPU drainage area CDMNA3 to the north in order to be conservative in the design of the conveyance facilities along the northern beltway. Since development has not occurred in that area and future flow patterns are not absolutely predictable, the modified drainage area is added to the model for this study in order to have conservative design flows for the design of the regional facilities for this project.

Ultimate condition drainage subbasins and flow patterns are shown on Figure 5. The overall drainage pattern is generally from west to east with slopes of five to seven percent. An ultimate conditions HEC-1 model based on the 2002 MPU, which incorporated parts of other models impacting the project, is included in Appendix A.

Table 1 is a summary of ultimate condition peak 100-year design flows. Storm runoff from areas that currently convey runoff through the project site will be cut off by construction of the Beltway Channel and will be conveyed within the Beltway Channel and discharged to the Lone Mountain Detention Basins.

Offsite runoff impacting the project site from the north was addressed in the Ann Road DB Study (Reference 4). Pertinent portions of the Ann Road DB Study are included in Appendix C.

Storm runoff impacting the project site from the west was addressed in the Lone Mountain West Study and the Monument Study. Pertinent portions of the LMW Master Study and the Monument Study are included in Appendix C.

Table 1 contains a summary of the peak flows from the Ultimate Conditions Hydrologic HEC-1 model.

TABLE 1
SUMMARY OF PEAK FLOWS FOR ULTIMATE CONDITIONS

Subbasin/ Combination Point*	AREA (acres)	Q_{100} (cfs)
CAMDK1	54.4	126
CAMDK2	163.2	366
COMDK2	217.6	491
CAMDK3	233.6	485
COMDK3	454.4	934
CAM10D	27.52	88
CAM10a	1068.8	1710
CAM10b	19.84	60
CAM10c	832	1377
COMCAM	2399.99	3759
DETCAM10	2399.99	168
CDMNA3	89.6	167
EFPOA1	199.04	351
COM1A	288	518
EFPOA2	145.28	245
COM1B	435.2	729
EFPOB1	152.32	298
COM2	2982.39	1000
EFPOB2	166.4	396
COM3	3155.19	1294

TABLE 1
SUMMARY OF PEAK FLOWS FOR ULTIMATE CONDITIONS

Subbasin/ Combination Point *	AREA (acres)	Q_{100} (cfs)
WBCA	38.21	75
HLBW1-CA	251.71	502
COM4	3443.19	1785
HLBW1-CB	74.94	145
COM5	3519.99	1897
WBAW	36.48	81
WRBW1	156.42	309
COM6	3711.99	2182
LMDBN	15.17	34
CLMDBN	3724.79	2239
BOXCANYO	2184.95	2562
DBOXDET	2184.95	13
LWBW1A	205.63	399
UVB1-2A	156.99	365
EDIV2A	156.99	282
NDIV2A	156.99	83
COM7	2547.19	458
UVB1-2B	12.29	38
LWBW1B	48.32	135
COM8	2611.19	582
LWBW1C	36.48	98
COM9	2643.19	905
UVB1-2C	20.67	59
COM10	20.67	341
UVB1-1C	11.84	38
UVB1-1B	7.94	26
COM11	19.2	62
UVB1-1A	140.67	413
UVB1-1D	22.72	70
COM12	166.4	474
UVB1-1E	17.92	56
COM13	198.4	580
WBCL	19.97	60
LMBW1	53.82	112
COM14	275.2	753
LMDBS	37.7	92
CLMDBS	2975.99	1669
CLMBWCDB	6700.77	3671
LMBWCDB	6700.77	104
WBLM	51.52	129
COM15	6751.97	149

*See Figure 5

Downstream Impacts – As noted above, the 2002 MPU HEC-1 models used a negligible outflow from the LMBW Detention Basins and the future Box Canyon Detention Basin. However, in order to meet the criteria for maximum drain time in the Manual, an average discharge of approximately 40 cfs is required for each of those detention basin facilities. This additional flow has an effect on downstream conveyance facilities as well as downstream detention basins. In order to assess these impacts, the 2002 MPU HEC-1 models were modified to include the hydrology for this project that provides discharge from both of these detention basin facilities into the Gowan North Channel system.

The peak storage volume for the Gowan North Detention Basins occurs approximately 2 days after the storm event. Therefore, any flow released from the LMBW Detention Basins during that time will result in increased storage requirement for the Gowan North Detention Basins. Since detention basin outfall systems must be designed as passive systems, the release of the inflows must be dependent on depth of ponding. In order to produce a discharge relationship that will meet the maximum drain time requirement and minimize impacts on the Gowan North Detentions a dual level outfall is proposed. The lower level outfall will restrict peak discharge for the combined LMBW Detention Basins to approximately 45 cfs for the level of storage that will collect to the basins for the design storm that encompasses the watershed for the Gowan Detention Basins. This will result in an increase of the required storage at the Gowan North Detention Basins from approximately 767 acre-feet to 864 acre-feet (the freeboard will be approximately 1.4 feet to the ponding elevation for the peak storage of 960 acre-feet). The second level outfall will increase the discharge to approximately 157 cfs maximum as the storage volume increases from a volume of 355 acre-feet to 587 acre-feet. This will provide for a storm centered over tributary watershed for the LMBW Detention Basins to discharge from the basins in approximately seven days while minimizing adverse impacts on the Gowan North system.

The Box Canyon Detention Basin peak outflow was set to approximately 15 cfs in the modeling for this project. This allows for drainage of that detention basin, however, it will not provide for a seven day maximum drain time. The outfall for the LMBW Detention Basins will have sufficient conveyance capacity to provide for increased

discharge from Box Canyon Detention Basin to be routed through the system if that is determined to be desirable in the future design of those detention facilities. This could be done with minimal impact to the LMBW Detention Basins by simply replacing the orifice plate (the discharge from the LMBW Detention Basins will be restricted by an orifice plate that provides inlet control). However, routing of those flows downstream will result in increased storage in the Gowan North Detention Basins since the outfall for those basins operates under outlet control.

An additional impact on the downstream facilities is generated by the fact that the detention basin cell shown in the 2002 MPU on the east side of the beltway is proposed to be eliminated, therefore, a minor amount of drainage from the area adjacent to the Lone Mountain Road interchange will not be able to be routed through the LMBW Detention Basins. The peak flow magnitudes in the downstream conveyance systems are increased by approximately 50-60 cfs. This amounts to a relative increase of 5-10 percent and does not have a substantial impact on the conveyance systems.

Lag Time - The lag time (TLAG) is described as the time between the center of mass of rainfall and the time of peak discharge from a basin. Lag time can be related to time of concentration (Tc) by the following relationship: TLAG = 0.6 (Tc). The time of concentration (Tc) is defined as the time required for runoff to flow from the most hydraulically distant area of the basin to the outlet of the basin or to a design point. The procedure for calculating Tc is outlined in Section 602 of the Manual. Lag time calculations for the drainage subbasins are included in Appendix A on Standard Form 4.

VI. REGIONAL FLOOD CONTROL FACILITY DESIGN

The detention basin system and associated collection and conveyance systems are set up in coordination with the beltway and are laid out along the upstream side of the beltway alignment in order to facilitate the protection of that major infrastructure and the acquisition of right-of-way for those public facilities.

Detention Basins - A conceptual layout of the detention basins facilities was presented for regional flood control master planning purposes in the 2002 MPU. The

2002 MPU presented a configuration that showed three potential sites for interconnected detention basins. The volume for the combined basins was estimated to be 550 acre-feet for a nominal peak outflow. The peak outflow was listed as 0 cfs, however, the Hydrologic Criteria and Drainage Design Manual, CCRFCD, August 1999 (Reference 7, hereinafter referred to as the Manual) states that the maximum drainage time for a regional detention basin is seven days, therefore, a minimum average outflow of approximately 40 cfs would be required per the Manual.

Since the detention basins are associated with the beltway layout, the design of the segment of the beltway in the vicinity of the Lone Mountain Road interchange has direct bearing on the layout of the detention basins. Preliminary evaluations demonstrated that all three potential sites identified in the 2002 MPU are not needed to provide for the required storage volume for the detention basins. Three alternatives configurations were considered to provide the required storage volume utilizing the sites at the northwest and southwest quadrants of the interchange including 1) North Basin Concept, 2) South Basin Concept, and 3) Dual North and South Basin Concept. The planning level evaluation of the concepts demonstrated that the dual basin concept provided several advantages including decreased berm heights resulting in increased structural safety and lower spillway costs, maximized collection of beltway flows into the conveyance system upstream of the detention basins, and increased flexibility for future flood control planning and potential dual use of the facilities.

A dual detention basin design located adjacent to the northwest and southwest quadrants of the Lone Mountain interchange is proposed for this project (refer to Figure 6). Dual basins provide the advantages noted above, including decreased berm heights resulting in increased structural safety and lower spillway costs, maximized collection of beltway flows into the conveyance system upstream of the detention basins, and increased flexibility for future flood control planning and potential dual use of the facilities.

The north detention basin will have an elongated shape and will serve as a joint conveyance/detention facility. The initial flows up to a magnitude of approximately

800 cfs from the Beltway Channel system will pass through the north basin to a box culvert that will convey the flows under Lone Mountain Road to the south detention basin. The bottom of the north detention basin will be approximately 7-15 feet higher than the bottom of the south basin. When the WSE in the south basin reaches 2707 or if inflows in excess of 800 cfs discharge into the north detention basin then flows will be detained within the north detention basin. The stage/discharge and stage/volume relationships for the detention basins are included in Appendix B (also refer to the discussion on the balancing conduit below).

Sedimentation Analysis – The total projected sediment deposition for this detention basin was consists of suspended sediment (wash load) and bed load sediment conveyed to the basin by the various inflows. The suspended sediment was analyzed using the Universal Soil Loss Equation (USLE) as outlined in the Manual. The bed load was analyzed using the Meyer-Peter formula as outlined in Section 3 of the National Engineering Handbook, SCS. The total sediment load for the North Detention Basin was determined to be 7.4 acre-feet. The total sediment load for the South Detention Basin was determined to be 4.4 acre-feet. The total magnitude is smaller than typical magnitudes because a substantial amount of the upstream watershed is routed through upstream detention basins that will entrap sediment from the upper watershed area. In order to be conservative in determining required detention basin volumes the calculated magnitudes of total sediment load will be multiplied by a factor of safety of three to verify the adequacy of the respective detention basin volumes.

PMF Analysis - The intent of spillways for a detention basin is to provide for the passage of flows through the detention basin that exceed the peak design inflows without causing failure of the downstream embankments resulting in a sudden large release of the detained water that could worsen the downstream damage from these catastrophic events. The spillway facilities are required to provide for the passage of the PMF flows. The Probable Maximum Precipitation (PMP) was determined following the procedures outlined in the National Oceanic and Atmospheric Administration (NOAA) Hydrometerological Report No. 49 (Reference 8). Two separate distributions were modeled, HMR No. 5 and EM1110-2-1411. The basic difference between the methods is the placement of the maximum precipitation hour.

The HMR No. 5 method places the maximum hour in the second hour while EM1110-2-1411 places it in the third hour. Separate PMPs were modeled for the South Detention Basin and the North Detention Basin. The South Detention Basin tributary watershed covers 0.65 square miles. The North Detention Basin tributary watershed covers 3.85 square miles. These drainage areas were determined from 20-feet contour interval mapping that predates much of the gravel mining excavation in the area. This mapping was used to generate conservative/worst case estimates of PMF impacts to the basins. Calculations for precipitation are included in Appendix A. The HEC-1 model for EM1110-2-1411 procedure yielded the highest PMF flows. The South Detention Basin yielded a Probable Maximum Flood (PMF) magnitude of 8,205 cfs. The North Detention Basin yielded a PMF magnitude of 19,620 cfs.

A two-dimensional flow analysis was done to evaluate the probable flow paths for the PMF flows. Two analyses were done using the FLO-2D two-dimensional flow analysis computer program. The first analysis was done using the historic USGS 20-foot contour mapping for the area. This mapping predates the major gravel mining operations in the vicinity of Lone Mountain. The second analysis was done using the 5-foot contour mapping from Clark County that reflects modifications by the gravel mining operations and more closely represents current topography. Both of the analyses showed much of the PMF flows from the Box Canyon drainage area bypassing the detention basins and flowing north of the Washburn Road alignment. The results of these analyses are contained in Appendix B. Based on the results of the FLO-2D analyses, the maximum flow that impacts the north detention basin from a PMP storm over the North Detention Basin PMF Drainage Area is 4,400 cfs. Since the smaller localized PMF drainage area for the south detention basin generated a flow of approximately 8,300 cfs, it was determined that both detention basins will be designed to discharge a PMF flow of at least that magnitude.

Spillways – The initial overflow for both detention basins will be at the north side of the north detention basin at the low point of the spillway weir since the balancing conduit will convey flow from the south basin to the north basin in the event that water ponds in the south basin above the maximum projected water surface elevation of 2741 (overflow discharge from the south basin does not occur until the water surface in the south basin reaches the minimum ramp elevation of

approximately 2742). A peak flow of approximately 400 cfs could convey through the balancing the conduit from the south basin to the north basin and discharge from the north side of the north basin before the ponding elevation of 2742 was exceeded in the south basin. (In excess of 400 cfs will discharge over the spillway at the north end of the north basin for a ponding elevation of approximately 1-foot above the minimum elevation of the crest of the concrete spillway weir.)

The Nevada State Dam Safety has indicated two main criteria for a detention basin to be categorized as a "below grade" basin that with reduced risk of failure and a lower probability of creating an adverse impact on downstream properties. The first requirement is that the detention volume be located below the natural grade so that potential energy is not added into the system that would substantially exceed the energy for natural conditions. The planned storage volumes for both of the detention basins are substantially below the natural grade, and therefore, both basins comply with the first requirement. The second requirement is that the grading of the embankments, downstream from where overflow will discharge from the detention basins in the event of a PMF flow, represents a minimal risk of failure. The typical measure of reduced risk is having a slope that is sufficiently flat (typically in the order of 10:1 or less) and/or sufficiently massive and erosion resistant such that minimal erosion protection is required. The discharge from the south basin will occur over the southbound beltway ramp for the Lone Mountain interchange. The top width of the ramp in the location of the overflow is greater than 40 feet and the paving for the ramp will have a relatively high resistance to erosion. In order to further ensure the integrity of the embankment in location where overflow will occur, a 10-feet concrete weir is proposed with 3-feet deep cutoff wall at each side of the weir apron. A similar concrete spillway weir is proposed at the north side of the north detention basin where overflow will discharge from that basin. The initial overflow will occur to the north and as the depth of the overflow increases, overflow will begin to spill over the beltway ramp at that location. The FlowMaster analyses of the spillways for the detention basins are contained in Appendix B.

Concrete slope paving is shown in the locations of the potential overflow from the detention basins on the downstream side of the beltway ramps to provide additional erosion resistance. As noted above, the detention basins are located on the

upstream side of the Lone Mountain Road interchange for the beltway. It is anticipated that the construction of the beltway embankments for the interchange will create effective downstream slopes for the detention basins in the order of 10-12 percent that will effectively produce a below grade configuration for the detention basins. Therefore, the detention basins are anticipated to meet the requirements to be classified as below grade facilities (the final determination will be made as a part of the State of Nevada Dam Safety review process for the approved construction plans).

Balancing Conduit - The balancing conduit maintains hydraulic connectivity between the basins which provides flexibility for the overall system to minimize outflow and maximize use of the combined storage volume. The flow through the balancing conduit was analyzed using the 100-year design storm hydrographs for inflow into the North and South Detention Basins. The purpose of the balancing conduit calculation spreadsheet is to provide a more accurate view of the interaction of the two detention basins through the balancing conduit using standard reservoir routing methodology.

The spreadsheet analyzes each time interval established in the HEC-1 model (5 minutes) and performs the following calculation for each time interval:

1. Convert North Basin inflow (from HEC-1) to volume
2. Determine North Basin stage based on new total volume
3. Convert South Basin inflow (from HEC-1) to volume
4. Determine South Basin stage based on new total volume
5. Calculate difference between WSE of two basins
6. Calculate flow through balancing conduit based on difference in WSE
7. Calculate change in North Basin volume and stage due to flow through balancing conduit
8. Calculate change in South Basin volume and stage due to flow through balancing conduit
9. Using South Basin water surface elevation as head, calculate discharge from outfall
10. Calculate change in South Basin volume and stage based on outfall facility flow.

8' to 8' X 5'. The horizontal alignment of Alternative #1 lies within the east side of the future, 60-feet-wide Landsford Street right-of-way. Alternative #2 is a rectangular open channel system ranging in size from 12' X 8' to 10' X 5'. The horizontal alignment for Alternative #2 utilizes 12-feet from the east side of the future Landsford Street right-of-way. Alternative #2 requires retaining walls from the vicinity of Ann Road to Centennial Parkway at the bottom of the back slope for the beltway ranging from 1 to 12 feet in height.

Storm drain laterals are proposed to convey flow to the Beltway Channel. The proposed lateral sizes are prorated based on the ultimate conditions drainage subbasins that contribute flow to those storm drain locations. For Alternative #1 it is anticipated that the flow collected in future local storm drain systems in the grid streets and other locations will be discharge to the RCB and that surface flows collecting in the Landsford roadway will be collected and discharged into the RCB principally at the grid street intersections. A berm is proposed within the beltway right-of-way along the east side of Landsford to prevent flows collecting to Landsford between the intersections from discharging into the beltway right-of-way. For Alternative #2 lateral stubs are located at the major grid-street inflow locations. The seven principal grid-street inflow locations are located at the Centennial, Azure, Tropical, El Campo, Ann, Hammer and Washburn alignments.

Energy Dissipator/Stilling Basin for the Gowan Beltway West Channel – The layout and hydraulic characteristics of the energy dissipator are 1) the open channel system widens upstream of the grade break at the top of the side slope into the detention basin and the channel invert at the grade break is approximately at the proposed 100-year water surface elevation for the detention basin; 2) the flow in the channel reaches a high velocity at the toe of the slope at the bottom of the detention basin and the flow enters a stilling basin where a hydraulic jump forms to dissipate a substantial amount of the energy of the flow; and 3) the flow discharges over a grouted riprap blanket to the detention basin floor. The baffle blocks in front of the sloped channel section and the abrupt widening at the entrance to the stilling basin induce a hydraulic jump to dissipate the excess energy and to decrease the flow velocity as the flow enters the detention basin. The 3-foot high raised sill at the end of the stilling basin helps to ensure that a hydraulic jump will occur within the stilling basin.

Two analyses were done in the Alternatives Memorandum to determine the hydraulic characteristics of the flow as it enters the detention basin via the widened channel at the top of slope and proceeds through the stilling basin into the detention basin. The first is a HEC-RAS model and the second was done using the USBR methodology for a similar configuration of energy dissipator. The results from the analyses was similar, therefore, only the HECRAS analysis is included herein. The HEC-RAS model shows the increase in velocity from approximately 36 fps at the top of slope to approximately 49 fps at the toe of slope as the flow enters the stilling basin. A hydraulic jump is formed in the stilling basin and the flow exits the stilling basin across the grouted riprap blanket at a velocity of approximately 6 fps at the downstream side of the grouted riprap blanket. The second analysis was done as a comparison to validate the results of the HEC-RAS model using the USBR Type III Energy Dissipator methodology. It showed similar flow characteristics for the flow through the energy dissipator. Access ramps are provided at the downstream end of the stilling basin to provide for easy access for maintenance of the facilities. The layout of the energy dissipator is shown in the drawings in Appendix E.

Collection Berms at the West Side of the North Detention Basin - Collection berms/channels are proposed along the west side of the north detention basin to collect surface flows approaching the upstream side of the basin. These flows will be conveyed to a stepped chute (see below) at the middle of the north detention where the flows will be conveyed to the basin bottom. For major storm events the south berm/channel will also receive flows from the north side of Lone Mountain Road (see below).

Conveyance System From Peaceful Dawn Cul-de-sac - The flow in Peaceful Dawn will flow over the back of the cul-de-sac into a cast-in-place transition structure to a 10-foot wide stepped chute structure. The stepped chute will consist of precast concrete blocks with 2-foot step lengths and 1-foot step heights. As the flow is conveyed down the 2:1 stepped spillway energy is dissipated in the stepped chute structure and the resultant velocity at the bottom of the stepped spillway is approximately 20-25 fps. The flow will enter an impact basin/drop structure, which will dissipate the energy before the flow will enter a RCP that will convey the flow to

an impact basin on the north side of the detention basin. Calculations for the stepped chute and pipe system are included in Appendix B.

The flow will combine with the previously mentioned Lone Mountain Road runoff in the impact basin (Q_{100} = 905 cfs from Model #2 COM9) and will be conveyed in a riprap lined channel approximately 400 feet to a concrete transition to a grouted riprap chute that conveys the flow to the bottom of the basin.

Lone Mountain Collection System - The total 100-year flow in Lone Mountain Road at the west end of the South Detention Basin is 582 cfs as depicted at HEC-1 Model #2 combination point COM8. Approximately 134 cfs is conveyed within an existing 42-inch storm drain leaving approximately 448 cfs as surface flow in the street. The proposed design for the collection facilities has 374 cfs of the 448 cfs surface flow being collected at the inlets at the west end of the South Detention Basin and 74 cfs bypassing and being collected at the downstream end of the detention basins immediately upstream from the Lone Mountain Road interchange. The upstream collection system will consist of 110-feet of depressed curb on the north and south sides of Lone Mountain to produce side weirs designed to collect the 374 cfs as shown in Figure D1-A (the depth of flow for 74 cfs bypass flow is 0.60 feet; therefore, the bypass flow is contained below the back of walk in as it conveys down Lone Mountain Road). An open channel collector facility behind the sidewalk collects approximately 187 cfs on either side of Lone Mountain Road into 6-foot wide by 4-foot high RCB culverts. The 187 cfs collected in the north half of Lone Mountain is conveyed under Lone Mountain Road in a 6-foot wide by 4-foot high RCB. An existing 42-inch RCP storm drain connects into the box culvert, adding 134 cfs into the 6-foot wide by 4-foot high box for a total of 321 cfs. At the south side of Lone Mountain Road a 6-foot wide by 4-foot high open channel discharges an additional 187 cfs for a total of 508 cfs in the system at the upstream end of the stepped chute structure). The stepped chute structure conveys the 508 cfs down the side slope of the detention basin to an impact/drop structure that discharges into an 84-inch RCP that reduces to a 66-inch RCP. The 66-inch RCP is run at a 10 percent maximum slope to another impact/drop structure and from there to a dual impact basin where it combines with the flow from Peaceful Dawn.

The facilities at the downstream side of the detention basin are designed to collect and route the bypass flow into the proposed detention basins. The downstream facilities consist of 60-feet of depressed curb on the north and south sides of Lone Mountain to collect approximately half of the flow from each half-street. On the north side of Lone Mountain the flow are conveyed in a berm/channel described above and on the south side of Lone Mountain the flows are conveyed to the basin bottom via a 5-feet wide grouted riprap chute. Inlets approximately 20-feet in length collect approximately 16 cfs each allowing minimal bypass flow. Flows collected in the inlets are conveyed down the slope via storm drain pipe to the low flow system for the north detention basin.

Impact Basin at the Southeast Corner of the South Detention Basin - The flow in Stange Avenue will be conveyed to the South Detention Basin via a local box culvert conveyance facility. Flows from drainage areas adjoining the RCB will be collected into the facility and the total flow will discharge into the South Detention Basin at the southeast corner of the basin. The flows will be conveyed down the slope into the basin via dual 54-inch RCP's and a USBR Type VI Impact Stilling Basin will be used as an energy dissipator at the discharge point. The calculations and reference materials for the impact basin are contained in Appendix B. A WSPG model was done to determine the flow characteristics for the 100-year peak flow. The RCP's will be specified as Type V to provide additional strength for the impacts of the hydraulic jump (the 5,000 psi concrete used in the Type V pipe will also help mitigate potential abrasion due to potentially high velocities of flow). The slope of the 54-inch RCP's will be kept to a maximum of 10% to help minimize the flow velocity. Access ramps are formed into the downstream end of the impact basin for ease of maintenance and a low flow pipe will convey nuisance flows to the outfall for the detention basins.

VII. CONCLUSIONS AND RECOMMENDATIONS

1. The project facilities are not located in a FEMA-designated Special Flood Hazard Area.

2. The Gowan Beltway West Channel system will have design flows ranging from approximately 520 cfs at the north end to 2,180 cfs at the south end.

3. The detention basin facilities will include two basins located on the northwest and southwest quadrants of the Lone Mountain Road interchange. The peak storage volume for the detention basin on the northwest quadrant will be approximately 298 acre-feet. The peak storage volume for the detention basin on the southwest quadrant will be approximately 288 acre-feet. The peak flow into the north detention basin is approximately 2,240 cfs and the peak flow into the south detention basin is approximately 1,670 with a combined peak inflow of approximately 3,670 cfs.

4. A dual level outfall is planned for the Lone Mountain - Beltway Detention Basins to minimize adverse impacts to downstream facilities. The lower level outfall will restrict peak discharge for the combined detention basins to approximately 45 cfs for the level of storage that will collect to the basins for the design storm that encompasses the watershed for the Gowan Detention Basins. The second level outfall will increase the discharge to approximately 157 cfs maximum as the storage volume increases from a volume of 355 acre-feet to 587 acre-feet. This will provide for a storm centered over tributary watershed for the Lone Mountain - Beltway Detention Basins to discharge from the basins in approximately seven days while minimizing adverse impacts on the Gowan North system. The outfall system extends from the south detention basin across the beltway to the intersection of Lone Mountain Road and Hualapai Way where is connects to the Gowan North Channel – Phase IV system.

5. The Gowan Beltway West Channel system extends along the upstream side of the Las Vegas Beltway from the north detention basin to Centennial Parkway. A 14-feet wide, open channel extends from the upstream side of the north detention basin approximately 2,500 linear feet to the vicinity of the Hammer/Barden intersection. From the intersection of Hammer/Barden

alignments a 14' X 7' RCB extends approximately 1,900 linear feet to Ann Road. A 10' X 8' RCB extends approximately 800 linear feet to the north. Two alternatives are presented for the conveyance system from the segment from 800 feet north of Ann Road to Centennial Parkway. Alternative #1 is a rectangular open channel system ranging in size from 12' X 8' to 10' X 5'. The horizontal alignment for Alternative #1 utilizes 12-feet from the east side of the future Landsford Street right-of-way. Alternative #1 requires retaining walls from the vicinity of Ann Road to Centennial Parkway at the bottom of the back slope for the beltway ranging from 1 to 12 feet in height. Alternative #2 is a reinforced box culvert system ranging in size from 12' X 8' to 8' X 5'. The horizontal alignment of Alternative #2 lies within the east side of the future, 60-feet-wide Landsford Street right-of-way.

6. Additional right-of-way will be required for the channel in three locations. Minor amounts of additional right-of-way will be required to provide for approximately 400 linear feet of the proposed channel alignment at the north end of the north detention basin, at Ann Road where the RCB curves around the proposed bridge abutment at the west side of the Ann Road grade separation, and to accommodate the channel access ramp located between the Washburn and Hammer alignments. Additional right-of-way will also be needed for the conveyance system between Ann Road and Centennial Parkway as described in item 5 above.

7. The North Detention Basin extends to the limits of the County right-of-way adjacent to the beltway on the northwest quadrant of the Lone Mountain interchange to provide for an open channel inlet/energy dissipator layout for the Beltway Channel. The extension of the detention basin also provides additional storage for the northern cell of the combined detention basin system; reduces the total length of the Beltway Channel; and provides for the open channel inlet to be outside the envelope of the spillway for the North Detention Basin. The energy dissipater at the inlet to the north detention basin has access ramps and space to provide for ease of maintenance.

8. Storm drain laterals are proposed to convey flow to the Beltway Channel. The proposed lateral sizes are prorated based on the ultimate conditions drainage subbasins that contribute flow to those storm drain locations. For Alternative #2 it is anticipated that the flow collected in future local storm drain systems in the

grid streets and other locations will be discharge to the RCB and that surface flows collecting in the Landsford roadway will be collected and discharged into the RCB principally at the grid street intersections. A berm is proposed within the beltway right-of-way along the east side of Landsford to prevent flows collecting to Landsford between the intersections from discharging into the beltway right-of-way. For Alternative #1 lateral stubs are proposed at the major grid-street inflow locations.

9. Both detention basins will spill over the beltway ramps adjacent to the downstream sides of the detention basins. The ramps form substantial embankments with greater than 50-feet top widths and the back slopes of the ramps will have concrete slope lining to help prevent erosion in the event that spillage occurs from the detention basin. For the South Detention Basin, a 610 linear feet, 10-feet wide concrete spillway weir is proposed along the top of slope of the detention basin adjacent to the ramp (with 3-feet deep cutoff wall at each side of the weir apron). The spillway weir will be essentially centered about the low point on the beltway ramp and conforms to the grading along the shoulder of the ramp. For the North Detention Basin, an 855 linear feet, 10-feet wide concrete spillway weir is proposed along the top of slope of the detention basin (with 3-feet deep cutoff wall at each side of the weir apron). The spillway weir will extend from the low point on the beltway ramp south conforming to the grading along the shoulder of the ramp. On the north side of the low point the weir will extend along the top of slope of the detention basin and terminate at the channel embankment. The initial overflow for both detention basins will be at the north side of the north detention basin at the low point of the spillway weir since the balancing conduit will convey flow from the south basin to the north basin in the event that water ponds in the south basin above the 2738 maximum projected water surface elevation.

10. At the Peaceful Dawn cul-de-sac, a 10-foot wide stepped chute structure is proposed that will dissipate the energy in the flow as it descends down the slope into the basin. At the access road the flow will discharge to an impact basin/drop structure. The flow is conveyed to an impact basin at the north side of the detention basin via a RCP where it combines with the runoff from Lone Mountain Road and the flow is conveyed via riprap lined channel and grouted riprap chute to the bottom of the basin.

11. A collection system is proposed in Lone Mountain Road to collect the majority of the flow at the upstream side of the South Basin with supplementary collection facilities approximately 800 linear feet downstream. Depressed curb and storm drain capture a majority of the flow at the upstream end of Lone Mountain Road and convey it to the 10-foot wide stepped chute structure at the northwest corner of the South Detention Basin. The stepped chute will dissipate a substantial amount of the energy in the flow as it descends the slope into the basin. At the end of the chute the flow will discharge to an impact basin/drop structure. An RCP storm drain conveys the flow to an impact basin at the north side of the basin where it combines with the runoff from Peaceful Dawn Avenue. The supplementary collection system consisting of depressed curb and channel system that collects and routes the bypass flows into the proposed detention basins. In addition, drop inlets are proposed at the curb returns for the ramps.

12. The inflow at the southeast corner of the South Detention Basin is conveyed into the basin via a dual 54-inch RCP system with a dual impact basin to dissipate energy as the flow discharges into the basin. The layout of the impact basin includes ramps at the downstream side to facilitate maintenance.

13. The analysis of the balancing conduit for the 100-year design storm conditions shows that the proposed 8-feet wide by 8-feet high RCB performs as intended with a maximum of 1.0-feet difference in water surface elevation (WSE) occurring when the basins are approximately half full. The difference decreases to less than 0.25-foot by the end of the 6-hour storm. The difference in WSE is negligible when the basins reach peak storage/stage. The balancing conduit maintains hydraulic connectivity between the basins which provides flexibility for the overall system to minimize outflow and maximize use of the combined storage volume.

14. Underground low flow conveyance systems are proposed in both detention basins to convey low/nuisance flows from the upstream inlets to the basins to the basin outlets.

VIII. REFERENCES

1. PBS&J, Inc., G. C. Wallace, Inc., and Louis Berger Group, Inc. Clark County Regional Flood Control District, The 2002 Master Plan Update of the Las Vegas Valley. September 2002.

2. G. C. Wallace, Inc. *Technical Memorandum – Hydrologic Analysis Western Segment of the Las Vegas Beltway – Craig road to Hualapai Way.* March 2004.

3. Clark County Regional Flood Control District (CCRFCD) *Hydrologic Criteria and Drainage Design Manual.* August 1999.

4. VTN, Nevada, *Master Study for Lone Mountain West.* April 1999.

5. VTN, Nevada, *Monument at Lone Mountain West Units 1,3, 4, and 5.* August 2000.

6. L. R. Nelson, Inc. *Technical Drainage Study for Cliff Shadows Four-Plex.* December 2003.

7. FLO-2D Software, Inc. FLO-2D, Version 2003.06. Revised July 2003.

APPENDIX LAYOUT

Appendix A: Hydrology

1. Precipitation Exhibit
2. Soils Map Exhibit
3. Standard Form 4
4. HEC-1 Model #1 (Includes CAM10 and BOX CANYON Detention Basins)
5. HEC-1 Model #2
6. Flow Split Calculation (Peaceful Dawn and Cliff Shadows)
7. Detention Basin Stage/Volume/Discharge Charts
8. Detention Basin Sedimentation Calculations
9. PMF Analysis

Appendix B: Hydraulics

1. HEC-RAS Model -- OPEN CHANNEL STA 833+73 to STA 762+00
2. HEC-RAS Model -- BOX STA 835+38 to STA 762+00
3. HEC-RAS Model -- OPEN CHANNEL STA 762+00 to STA 734+60
4. North Detention Basin Facilities
    A. Stepped Spillway/Berm and Channel
    B. Low Flow System
    C. Spillway
5. Lone Mountain Road Facilities
    A. Upstream Collection System
    B. Downstream Collection System
    C. Nuisance Storm Drain
6. South Detention Basin Facilities
    A. Peaceful Dawn Stepped Spillway
    B. Lone Mountain Stepped Spillway
    C. Impact Basin/Open Channel System
    D. South Channel/Impact Basin System
    E. Balancing Conduit
    F. Outfall Pipe
    G. Low Flow System
    H. Spillway

Appendix C: Reference Material
Appendix D: Cost Estimate
Appendix E: Improvement Plans

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

WESTERN SEGMENT OF THE LAS VEGAS BELTWAY
CRAIG ROAD TO HUALAPAI WAY

Project No: 451.002
Date: 10-Mar-04
Calculated by: JTL

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN (16)	K (2)	AREA Ac (3)	AREA Sq Mi (4)	INITIAL LENGTH Feet (5)	SLOPE % (6)	Ti Min (7)	TRAVEL LENGTH Feet (8)	SLOPE % (9a)	V1 VELOCITY fps (9b)	V2 VELOCITY fps (10)	Tt Min (11)	TOTAL LENGTH Feet (12)	Tc = (L/180)+10 Min (13)	Min (14)	Tlag = 0.6Tc/60 Hours (15)	Remarks: RAINFALL
HLBW1-CA	D	86.6	0.7531	251.50	0.3930	100	1.0	6.2	9000	5.3	4.7	7.0	21.9	9100	60.6	28.1	0.281	3.30
HLBW1-CB	D	83.7	0.7148	74.95	0.1171	100	1.0	6.9	5700	5.0	4.5	6.8	14.5	5800	42.2	21.4	0.214	3.22
WRBW1	D	84.1	0.7201	156.42	0.2444	100	1.0	6.8	5800	5.4	4.7	7.1	14.2	5900	42.8	21.0	0.210	3.23
LWBW1A	D	83.0	0.7056	205.64	0.3213	100	1.0	7.1	6300	5.5	4.7	7.2	15.2	6400	45.6	22.3	0.223	3.31
LWBW1B	D	90.0	0.7980	48.34	0.0755	100	1.0	5.4	3600	4.7	4.4	6.6	9.7	3700	30.6	15.1	0.151	3.24
UVB1-2A	D	91.0	0.8112	157.00	0.2453	100	1.0	5.2	5900	6.9	5.3	8.0	12.8	6000	43.3	18.0	0.180	3.30
UVB1-2B	D	91.0	0.8112	12.28	0.0192	100	1.0	5.2	1400	3.6	3.8	5.8	4.8	1500	18.3	10.0	0.100	3.23
UVB1-1A	D	91.0	0.8112	140.66	0.2198	100	1.0	5.2	4300	6.5	5.2	7.8	9.7	4400	34.4	14.9	0.149	3.28
UVB1-1B	D	91.0	0.8112	7.92	0.0124	100	1.0	5.2	850	4.7	4.4	6.6	2.8	950	15.3	8.0	0.080	3.20
UVB1-2C	D	90.0	0.7980	20.65	0.0323	100	1.0	5.4	2000	3.0	3.5	5.3	7.1	2100	21.7	12.5	0.125	3.23
LMDBS	D	84.8	0.7294	37.69	0.0589	100	1.0	6.7	1300	5.8	4.9	7.4	3.5	1400	17.8	10.2	0.102	3.20
WBLM	D	90.0	0.7980	51.55	0.0805	100	1.0	5.4	2900	1.6	2.6	3.9	13.6	3000	26.7	19.0	0.190	3.17
WBCA	D	92.0	0.8244	38.18	0.0597	100	1.0	5.0	5200	0.5	1.4	2.2	42.0	5300	39.4	47.0	0.394	3.20
LWBW1C	D	88.3	0.7756	36.49	0.0570	100	1.0	5.8	2200	3.9	4.0	6.0	6.8	2300	22.8	12.6	0.126	3.20
LMDBN	D	84.8	0.7294	15.17	0.0237	100	1.0	6.7	1800	1.4	2.4	3.6	9.5	1900	20.6	16.1	0.161	3.18
WBAW	D	88.0	0.7716	36.46	0.0570	100	1.0	5.9	4400	2.4	3.1	4.7	16.4	4500	35.0	22.3	0.223	3.20
UVB1-1C	D	91.0	0.8112	11.86	0.0185	100	1.0	5.2	1200	4.2	4.1	6.3	3.9	1300	17.2	9.1	0.091	3.23
LMBW1	D	81.5	0.6858	53.84	0.0841	100	1.0	7.5	3000	15.7	8.0	12.1	4.5	3100	27.2	11.9	0.119	3.18
WBCL	D	92.0	0.8244	19.98	0.0312	100	1.0	5.0	2300	3.3	3.7	5.6	7.7	2400	23.3	12.6	0.126	3.21
UVB1-1D	D	91.0	0.8112	22.72	0.0355	100	1.0	5.2	1500	4.0	4.0	6.1	4.8	1600	18.9	10.0	0.100	3.23
UVB1-1E	D	91.0	0.8112	17.89	0.0280	100	1.0	5.2	1500	4.0	4.0	6.1	4.8	1600	18.9	10.0	0.100	3.24

$Tc = Ti + Tt$ $Tlag = 0.6\ Tc$

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

$K = 0.0132\ (CN) - 0.39$

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

Existing: $V1 = 14.8*(S/100)^{1/2}$ $V2 = 29.4*(S/100)^{1/2}$

Developed: $V1 = 20.2*(S/100)^{1/2}$ $V2 = 30.6*(S/100)^{1/2}$

REFERENCE:

STANDARD FORM 4

FLOW SPLIT CALCULATION
(AT PEACEFUL DAWN AND CLIFF SHADOWS)

FLOW SPLITS AT INTERSECTIONS

CITY OF TUCSON METHOD

Western Segment of the Las Vegas Beltway

Calculated by: WEH

NAME - MAIN STREET	W_M Feet	S_M Ft/Ft	Q_{TOT-M} CFS	Q_{REM-M} CFS	NAME - SIDE STREET	W_S Feet	Q_{LAT} CFS	Y_{OVBK} Feet	S_S Ft/Ft	$Q_{OVBK-TOT}$ CFS	Q_{TOT} CFS
Peaceful Dawn	50	0.06	365.0	282	Cliff Shadows	70.0	54.1	0.4	0.004	28.8	83

$$Q_{TOT} = Q_{LAT} + Q_{OVBK.\,DIV.} \qquad Q_{LAT} = (0.042)\frac{(Q_M^{0.93})\,(W_{SS}^{0.85})}{(S_M^{0.41})\,(W_M^{0.79})}$$

$$Q_{OVBK.\,DIV.} = (46.8)(Y_{OVBK})(W_{SS})(S_S^{0.5}) - Q_{LAT}$$

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PMF ANALYSIS

PMF Analysis

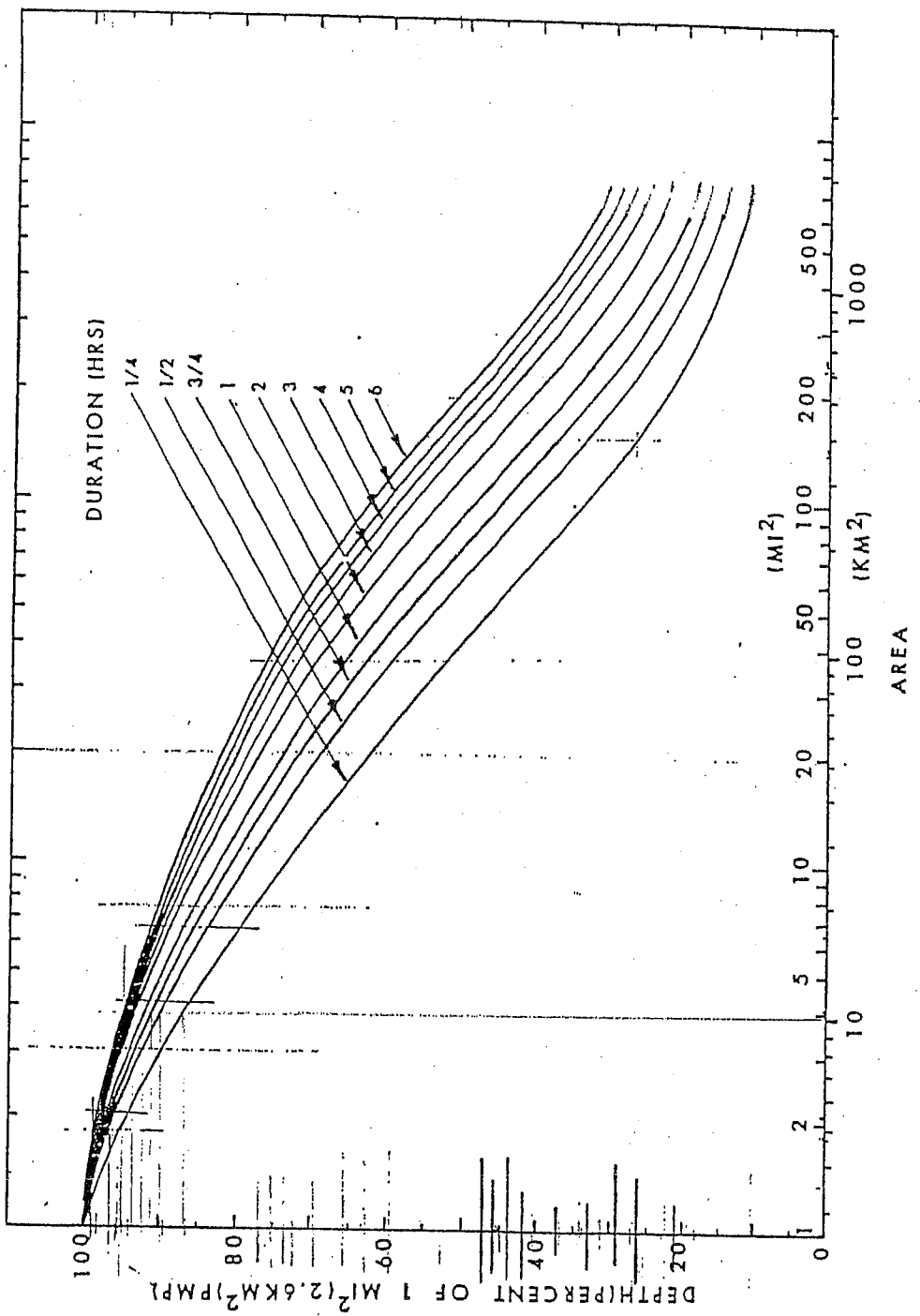


Figure 4.9.--Adopted depth-area relations for local-storm PMP.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J
File: FORM4.XLS

Lone Mountain/Beltway Detention Basin
PMF Analysis
South Basin

BY: SCA
DATE: 12/15/03

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA MI^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours	RAINFALL Q100/Q10 Inches
PMPAS	E	86.3	0.7492	415.8	0.650	500	7.9	7.1	6130	7.2	4.0	7.9	14.0	21.1	N/A	0.211	
PMPAN				2,464.7	3.851	See lag time calculation for area great 1 mi^2											

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39
Tc Check = L/180+10

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

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

REFERENCE :

STANDARD FORM 4

LoneMountain/Beltway Detention Basin

PMP Analysis - South Basin

A = 0.65 mi^2

Local-storm PMP computation

Determine cumulative prepitation from Table 6.3A.
Fifteen minute intervals are obtained by dividing the hourly increment by 4.
For peak hour, use the 15 minute increments.

	HMR No. 5 Time Sequence			EM1110-2-1411 Time Sequence		
Time(hr)	Incremental Precipitation (in)	Cumulative Precipitation (in)	Storm Distribution	Incremental Precipitation (in)	Cumulative Precipitation (in)	Storm Distribution
0.00	0.000	0.000	0.000	0.000	0.000	0.000
0.25	0.075	0.075	0.005	0.050	0.050	0.004
0.50	0.075	0.150	0.011	0.050	0.100	0.007
0.75	0.075	0.225	0.016	0.050	0.150	0.011
1.00	0.075	0.300	0.022	0.050	0.200	0.014
1.25	0.175	0.475	0.034	0.125	0.325	0.024
1.50	0.175	0.650	0.047	0.125	0.450	0.033
1.75	0.175	0.825	0.060	0.125	0.575	0.042
2.00	0.175	1.000	0.072	0.125	0.700	0.051
2.25	7.800	8.800	0.638	0.375	1.075	0.078
2.50	1.600	10.400	0.754	0.375	1.450	0.105
2.75	0.700	11.100	0.804	0.375	1.825	0.132
3.00	0.500	11.600	0.841	0.375	2.200	0.159
3.25	0.375	11.975	0.868	7.800	10.000	0.725
3.50	0.375	12.350	0.895	1.600	11.600	0.841
3.75	0.375	12.725	0.922	0.700	12.300	0.891
4.00	0.375	13.100	0.949	0.500	12.800	0.928
4.25	0.125	13.225	0.958	0.175	12.975	0.940
4.50	0.125	13.350	0.967	0.175	13.150	0.953
4.75	0.125	13.475	0.976	0.175	13.325	0.966
5.00	0.125	13.600	0.986	0.175	13.500	0.978
5.25	0.050	13.650	0.989	0.075	13.575	0.984
5.50	0.050	13.700	0.993	0.075	13.650	0.989
5.75	0.050	13.750	0.996	0.075	13.725	0.995
6.00	0.050	13.800	1.000	0.075	13.800	1.000

 South Basin

Table 6.3A.--Local-storm PMP computation, Colorado River, Great Basin and California drainages. For drainage average depth PMP. Go to table 6.3B if areal variation is required.

Drainage LAS VEGAS, NV Area 0.65 mi^2 (km^2)
Latitude 36°10' Longitude 115°09' Minimum Elevation ____ ft (m)

Steps correspond to those in sec. 6.3A.

1. Average 1-hr 1-mi^2 (2.6-km^2) PMP for drainage [fig. 4.5]. 10.6 in. (mm)

2. a. Reduction for elevation. [No adjustment for elevations up to 5,000 feet (1,524 m): 5% decrease per 1,000 feet (305 m) above 5,000 feet (1,524 m)]. 100 %

   b. Multiply step 1 by step 2a. 10.6 in. (mm)

3. Average 6/1-hr ratio for drainage [fig. 4.7]. 1.3

	Duration (hr)								
	1/4	1/2	3/4	1	2	3	4	5	6
4. Durational variation for 6/1-hr ratio of step 3 [table 4.4].	74	89	95	100	114	121	125	128	130 %
5. 1-mi^2 (2.6-km^2) PMP for indicated durations [step 2b X step 4].	7.8	9.4	10.1	10.6	12.1	12.8	13.3	13.6	13.8 in. (mm)
6. Areal reduction [fig. 4.9].	100	100	100	100	100	100	100	100	100 %
7. Areal reduced PMP [steps 5 X 6].	7.8	9.4	10.1	10.6	12.1	12.8	13.3	13.6	13.8 in. (mm)
8. Incremental PMP [successive subtraction in step 7].				10.6	1.5	0.7	0.5	0.3	0.2 in. (mm)
	7.8	1.6	0.7	0.5 } 15-min. increments					
9. Time sequence of incremental PMP according to: (EM1110-2-1411)				0.2	0.5	1.5	10.6	0.7	0.3
Hourly increments [table 4.7]. (HMR No.5)				0.3	0.7	10.6	1.5	0.5	0.2 in. (mm)
Four largest 15-min. increments [table 4.8].				7.8	1.6	0.7	0.5		in. (mm)

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1*****************************************
*                                       *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*                JUN  1998              *
*              VERSION 4.1              *
*                                       *
*  RUN DATE   15DEC03  TIME  16:09:54   *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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

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


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

          *DIAGRAM
    1     ID   ************************************************************
    2     ID   * ........................................................ *
    3     ID   * :                                                      : *
    4     ID   * :          LONE MOUNTAIN/BELTWAY DETENTION BASIN       : *
    5     ID   * :                     SOUTH BASIN                      : *
    6     ID   * :                   (PMF ANALYSIS)                     : *
    7     ID   * :......................................................: *
    8     ID   * :            TRIBUTARY AREA FOR PMF CALCULATION        : *
    9     ID   * :            IS 0.650 SQUARE MI                        : *
   10     ID   * :            PMF NALYSIS IS BASED ON NOAA HMR NO. 49   : *
   11     ID   * :            (TIME SEQUENCE HMR NO. 5)                 : *
   12     ID   * :                                                      : *
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   14     ID   * :            FILENAME_ _ _ _ _ _ PMPS-HMR.H1           : *
   15     ID   * :            DATE_ _ _ _ _ _ _ _ 12/15/03              : *
   16     ID   * :            BY_ _ _ _ _ _ _ _ HT                      : *
   17     ID   * :                                                      : *
   18     ID   * :......................................................: *
   19     ID   ************************************************************
          *
   20     IT       5       0       0     150
   21     IO       5       0       0
          * USE 15 MINUTE INPUT INTERVAL
   22     IN      15       0       0
   23     JR    PREC    1.00
          *

   24     KK  PMPA-S
   25     KM   TRIBUTARY AREA FOR SOUTH BASIN
   26     BA    .650
   27     PB   13.8
   28     PC    .000    .005    .011    .016    .022    .034    .047    .060    .072    .638
   29     PC    .754    .804    .841    .868    .895    .922    .949    .958    .967    .976
   30     PC    .986    .989    .993    .996   1.000
   31     LS       0   86.7
   32     UD    .211
          *
   33     ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
INE (V) ROUTING (---->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

24 PMPA-S

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN  1998              *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   15DEC03  TIME  16:09:54   *
*                                       *
*****************************************
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
```

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*****************************************************************
* ............................................................. *
* :                                                           : *
* :           LONE MOUNTAIN/BELTWAY DETENTION BASIN           : *
* :                       SOUTH BASIN                         : *
* :                    (PMF ANALYSIS)                         : *
* :...........................................................: *
* :              TRIBUTARY AREA FOR PMF CALCULATION           : *
* :              IS 0.650 SQUARE MI                           : *
* :              PMF NALYSIS IS BASED ON NOAA HMR NO. 49      : *
* :              (TIME SEQUENCE HMR NO. 5)                    : *
* :                                                           : *
* :              PROJECT NO_ _ _ _ _ 451.002                  : *
* :              FILENAME_ _ _ _ _ _ PMPS-HMR.H1              : *
* :              DATE_ _ _ _ _ _ _ _ 12/15/03                 : *
* :              BY_ _ _ _ _ _ _ _ _ HT                       : *
* :                                                           : *
* :...........................................................: *
*****************************************************************
```

21 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		150	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		1225	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 12.42 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

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
					1.00
HYDROGRAPH AT					
+	PMPA-S	.65	1	FLOW	7728.
				TIME	2.33

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

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  16:13:45   *
*                                       *
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*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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

          *DIAGRAM
    1     ID   ********************************************************************
    2     ID   * ..................................................................  *
    3     ID   * :                                                                :  *
    4     ID   * :           LONE MOUNTAIN/BELTWAY DETENTION BASIN                :  *
    5     ID   * :                       SOUTH BASIN                              :  *
    6     ID   * :                    (PMF ANALYSIS)                              :  *
    7     ID   * :.................................................................:  *
    8     ID   * :              TRIBUTARY AREA FOR PMF CALCULATION                :  *
    9     ID   * :              IS 0.650 SQUARE MI                                :  *
   10     ID   * :              PMF NALYSIS IS BASED ON NOAA HMR NO. 49           :  *
   11     ID   * :              (TIME SEQUENCE EM1110-2-1411 NO. 5)               :  *
   12     ID   * :                                                                :  *
   13     ID   * :              PROJECT NO_ _ _ _ _ 451.002                       :  *
   14     ID   * :              FILENAME_ _ _ _ _ _ PMPS-COE.H1                   :  *
   15     ID   * :              DATE_ _ _ _ _ _ _ _ 12/15/03                      :  *
   16     ID   * :              BY_ _ _ _ _ _ _ _ HT                              :  *
   17     ID   * :                                                                :  *
   18     ID   * :................................................................:  *
   19     ID   ********************************************************************
          *
   20     IT       5       0       0     150
   21     IO       5       0       0
          * USE 15 MINUTE INPUT INTERVAL
   22     IN      15       0       0
   23     JR    PREC    1.00
          *
   24      KK  PMPA-S
   25     KM   TRIBUTARY AREA FOR SOUTH BASIN
   26     BA    .650
   27     PB   13.8
   28     PC    .000    .004    .007    .011    .014    .024    .033    .042    .051    .078
   29     PC    .105    .132    .159    .725    .841    .891    .928    .940    .953    .966
   30     PC    .978    .984    .989    .995   1.000
   31     LS       0   86.7
   32     UD    .211
          *
   33     ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
INE (V) ROUTING (---->) DIVERSION OR PUMP FLOW

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

24 PMPA-S

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  16:13:45   *
*                                       *
*****************************************
```

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

```
*****************************************************************
* ............................................................. *
* :                                                           : *
* :           LONE MOUNTAIN/BELTWAY DETENTION BASIN           : *
* :                       SOUTH BASIN                         : *
* :                    (PMF ANALYSIS)                         : *
* :...........................................................: *
* :             TRIBUTARY AREA FOR PMF CALCULATION            : *
* :             IS 0.650 SQUARE MI                            : *
* :             PMF NALYSIS IS BASED ON NOAA HMR NO. 49       : *
* :             (TIME SEQUENCE EM1110-2-1411 NO. 5)           : *
* :                                                           : *
* :             PROJECT NO_ _ _ _ _ 451.002                   : *
* :             FILENAME_ _ _ _ _ _ PMPS-COE.H1               : *
* :             DATE_ _ _ _ _ _ _ _ 12/15/03                  : *
* :             BY_ _ _ _ _ _ _ _ _ HT                        : *
* :                                                           : *
* :...........................................................: *
*****************************************************************
```

21 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		150	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	1	0	ENDING DATE
NDTIME		1225	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 12.42 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

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
					1.00
HYDROGRAPH AT					
+	PMPA-S	.65	1	FLOW	8205.
				TIME	3.33

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

Lone Mountain/Beltway Detention Basin

LAG TIME FOR LARGE SUBBASINS (AREA > 1 mi^2)

$$T_{LAG} = 20 \times K_n \times \left[\frac{L \times L_c}{\sqrt{S}}\right]^{1/3}$$

Project No.: 451.002
By: HT
Date: 12/15/03

SUBBASIN	AREA (mi^2)	Kn	L (mi)	Lc (mi)	S (ft/mi)	t_{LAG} (hrs)
PMPAN	3.851	0.04	4.968	3.515	395	0.77

LoneMountain/Beltway Detention Basin

PMP Analysis - North Basin

A = 3.85 mi^2

Local-storm PMP computation

Determine cumulative prepitation from Table 6.3A.
Fifteen minute intervals are obtained by dividing the hourly increment by 4.
For peak hour, use the 15 minute increments.

	HMR No. 5 Time Sequence			EM1110-2-1411 Time Sequence		
Time(hr)	Incremental Precipitation (in)	Cumulative Precipitation (in)	Storm Distribution	Incremental Precipitation (in)	Cumulative Precipitation (in)	Storm Distribution
0.00	0.000	0.000	0.000	0.000	0.000	0.000
0.25	0.075	0.075	0.006	0.050	0.050	0.004
0.50	0.075	0.150	0.011	0.050	0.100	0.008
0.75	0.075	0.225	0.017	0.050	0.150	0.011
1.00	0.075	0.300	0.023	0.050	0.200	0.015
1.25	0.150	0.450	0.034	0.150	0.350	0.027
1.50	0.150	0.600	0.046	0.150	0.500	0.038
1.75	0.150	0.750	0.057	0.150	0.650	0.050
2.00	0.150	0.900	0.069	0.150	0.800	0.061
2.25	6.800	7.700	0.588	0.400	1.200	0.092
2.50	1.700	9.400	0.718	0.400	1.600	0.122
2.75	0.700	10.100	0.771	0.400	2.000	0.153
3.00	0.600	10.700	0.817	0.400	2.400	0.183
3.25	0.400	11.100	0.847	6.800	9.200	0.702
3.50	0.400	11.500	0.878	1.700	10.900	0.832
3.75	0.400	11.900	0.908	0.700	11.600	0.885
4.00	0.400	12.300	0.939	0.600	12.200	0.931
4.25	0.150	12.450	0.950	0.150	12.350	0.943
4.50	0.150	12.600	0.962	0.150	12.500	0.954
4.75	0.150	12.750	0.973	0.150	12.650	0.966
5.00	0.150	12.900	0.985	0.150	12.800	0.977
5.25	0.050	12.950	0.989	0.075	12.875	0.983
5.50	0.050	13.000	0.992	0.075	12.950	0.989
5.75	0.050	13.050	0.996	0.075	13.025	0.994
6.00	0.050	13.100	1.000	0.075	13.100	1.000

152 Lone Mountain/Beltway Detention Basin North Basin

Table 6.3A.--Local-storm PMP computation, Colorado River, Great Basin and California drainages. For drainage average depth PMP. Go to table 6.3B if areal variation is required.

Drainage LAS VEGAS, NV Area 3.85 mi^2 (km^2)
Latitude 36°10' Longitude 115°09' Minimum Elevation ____ ft (m)

Steps correspond to those in sec. 6.3A.

1. Average 1-hr 1-mi^2 (2.6-km^2) PMP for drainage [fig. 4.5]. 10.6 in. (mm)

2. a. Reduction for elevation. [No adjustment for elevations up to 5,000 feet (1,524 m): 5% decrease per 1,000 feet (305 m) above 5,000 feet (1,524 m)]. 100 %

   b. Multiply step 1 by step 2a. 10.6 in. (mm)

3. Average 6/1-hr ratio for drainage [fig. 4.7]. 1.3

	Duration (hr)									
	1/4	1/2	3/4	1	2	3	4	5	6	
4. Durational variation for 6/1-hr ratio of step 3 [table 4.4].	74	89	95	100	114	121	125	128	130	%
5. 1-mi^2 (2.6-km^2) PMP for indicated durations [step 2b X step 4].	7.8	9.4	10.1	10.6	12.1	12.8	13.3	13.6	13.8	in. (mm)
6. Areal reduction [fig. 4.9].	87	90	91	92	94	94	95	95	95	%
7. Areal reduced PMP [steps 5 X 6].	6.8	8.5	9.2	9.8	11.4	12.0	12.6	12.9	13.1	in. (mm)
8. Incremental PMP [successive subtraction in step 7].				9.8	1.6	0.6	0.6	0.3	0.2	in. (mm)
	6.8	1.7	0.7	0.6	} 15-min. increments					
9. Time sequence of incremental PMP according to:										
Hourly increments [table 4.7]. (EM1110-2-1411)				0.2	0.6	1.6	9.8	0.6	0.3	
(HMR No.5)				0.3	0.6	9.8	1.6	0.6	0.2	in. (mm)
Four largest 15-min. increments [table 4.8].				6.8	1.7	0.7	0.6			in. (mm)

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  15:41:55   *
*                                       *
*****************************************
```

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

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

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

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


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

                        *DIAGRAM
            1           ID   ************************************************************
            2           ID   * ..........................................................  *
            3           ID   * :                                                        :  *
            4           ID   * :          LONE MOUNTAIN/BELTWAY DETENTION BASIN         :  *
            5           ID   * :                    NORTH BASIN                         :  *
            6           ID   * :                 (PMF ANALYSIS)                         :  *
            7           ID   * :........................................................:  *
            8           ID   * :            TRIBUTARY AREA FOR PMF CALCULATION          :  *
            9           ID   * :            IS 3.851 SQUARE MI                          :  *
           10           ID   * :            PMF NALYSIS IS BASED ON NOAA HMR NO. 49     :  *
           11           ID   * :            (TIME SEQUENCE EM1110-2-1411)               :  *
           12           ID   * :                                                        :  *
           13           ID   * :            PROJECT NO_ _ _ _ _ 451.002                 :  *
           14           ID   * :            FILENAME_ _ _ _ _ _ PMPN-COE.H1             :  *
           15           ID   * :            DATE_ _ _ _ _ _ _ _ 12/15/03                :  *
           16           ID   * :            BY_ _ _ _ _ _ _ _ _ HT                      :  *
           17           ID   * :                                                        :  *
           18           ID   * :........................................................:  *
           19           ID   ************************************************************
                        *
           20           IT       5       0       0     150
           21           IO       5       0       0
                        * USE 15 MINUTE INPUT INTERVAL
           22           IN      15       0       0
           23           JR    PREC    1.00
                        *

           24           KK  PMPA-N
           25           KM   TRIBUTARY AREA FOR NORTH BASIN
           26           BA   3.851
           27           PB    13.1
           28           PC    .000    .004    .008    .011    .015    .027    .038    .050    .061    .092
           29           PC    .122    .153    .183    .702    .832    .885    .931    .943    .954    .966
           30           PC    .977    .983    .989    .994   1.000
           31           LS       0   86.7
           32           UD     .77
                        *
           33           ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

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

    24      PMPA-N

 (+++) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  15:41:55   *
*                                       *
*****************************************
```

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

```
                    LONE MOUNTAIN/BELTWAY DETENTION BASIN
                                NORTH BASIN
                             (PMF ANALYSIS)

                        TRIBUTARY AREA FOR PMF CALCULATION
                        IS 3.851 SQUARE MI
                        PMF NALYSIS IS BASED ON NOAA HMR NO. 49
                        (TIME SEQUENCE EM1110-2-1411)

                        PROJECT NO_ _ _ _ _ 451.002
                        FILENAME_ _ _ _ _ _ PMPN-COE.H1
                        DATE_ _ _ _ _ _ _ _ 12/15/03
                        BY_ _ _ _ _ _ _ _ _ HT
```

```
 21 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         150  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE       1    0  ENDING DATE
                     NDTIME        1225  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   12.42 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
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
                                                            1.00

 HYDROGRAPH AT
+                PMPA-N     3.85     1   FLOW            19620.
                                         TIME              4.00


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

Additional Area
New Area 3.97 sq. miles

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  15:37:09   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
            1       ID   ************************************************************
            2       ID   * ..........................................................  *
            3       ID   * :                                                        :  *
            4       ID   * :          LONE MOUNTAIN/BELTWAY DETENTION BASIN         :  *
            5       ID   * :                    NORTH BASIN                         :  *
            6       ID   * :                  (PMF ANALYSIS)                        :  *
            7       ID   * :........................................................:  *
            8       ID   * :             TRIBUTARY AREA FOR PMF CALCULATION         :  *
            9       ID   * :             IS 3.851 SQUARE MI                         :  *
           10       ID   * :             PMF NALYSIS IS BASED ON NOAA HMR NO. 49    :  *
           11       ID   * :             (TIME SEQUENCE HMR NO. 5)                  :  *
           12       ID   * :                                                        :  *
           13       ID   * :             PROJECT NO_ _ _ _ _ 451.002                :  *
           14       ID   * :             FILENAME_ _ _ _ _ _ PMPN-HMR.H1            :  *
           15       ID   * :             DATE_ _ _ _ _ _ _ _ 12/15/03               :  *
           16       ID   * :             BY_ _ _ _ _ _ _ _ _ HT                     :  *
           17       ID   * :                                                        :  *
           18       ID   * :........................................................:  *
           19       ID   ************************************************************
                    *
           20       IT       5       0       0     150
           21       IO       5       0       0
                    * USE 15 MINUTE INPUT INTERVAL
           22       IN      15       0       0
           23       JR    PREC    1.00
                    *

           24       KK  PMPA-N
           25       KM   TRIBUTARY AREA FOR NORTH BASIN
           26       BA   3.851
           27       PB    13.1
           28       PC    .000    .006    .011    .017    .023    .034    .046    .057    .069    .588
           29       PC    .718    .771    .817    .847    .878    .908    .939    .950    .962    .973
           30       PC    .985    .989    .992    .996   1.000
           31       LS       0   86.7
           32       UD     .77
                    *
           33       ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    24      PMPA-N

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15DEC03  TIME  15:37:09   *
*                                       *
*****************************************
```

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

```
                    LONE MOUNTAIN/BELTWAY DETENTION BASIN
                              NORTH BASIN
                            (PMF ANALYSIS)

                       TRIBUTARY AREA FOR PMF CALCULATION
                       IS 3.851 SQUARE MI
                       PMF NALYSIS IS BASED ON NOAA HMR NO. 49
                       (TIME SEQUENCE HMR NO. 5)

                       PROJECT NO_ _ _ _ _ 451.002
                       FILENAME_ _ _ _ _ _ PMPN-HMR.H1
                       DATE_ _ _ _ _ _ _ _ 12/15/03
                       BY_ _ _ _ _ _ _ _ _ HT
```

```
 21 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        150  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1225  ENDING TIME
                      ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE   12.42 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
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
                                                            1.00

 HYDROGRAPH AT
+                PMPA-N      3.85      1   FLOW          17815.
                                           TIME              3.00


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

CLIFF'S EDGE INFRASTRUCTURE PHASE 2

```
DIAGRAM
*FREE
ID  CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2008 MASTER PLAN UPDATE
ID  GOWAN WATERSHED (ALL)
    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
    INPUT FILE = ALLGOW4.PRN
    INPUT FILE DATE = FEBRUARY 13, 2008
ID  DESIGN STORM = 100-YEAR 6-HR STORM
ID  STORM DISTRIBUTION = SDN #4
ID  MODELED BY PBS&J (MICHELE L. D'ALESSANDRO, E.I., CFM)

ID  CHECKED BY PBS&J (HARSHAL B. DESAI, P.E., CFM)
ID  STORM CENTERING = FULL WATERSHED
ID
ID  REFERENCED HYDROLOGIC MODELS:
ID  CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
ID  NORTHWEST NEIGHBORHOOD STUDY PHASE 1 (PBS&J 1997)
ID  RESPONSE TO COMMENTS ON THE 2006 SUMMERLIN WEST PLANNING AREA FLOOD
ID  CONTROL MASTER PLAN UPDATE (G.C. WALLACE 2006)
ID  3RD RESPONSE TO COMMENTS ON THE 2006 SUMMERLIN WEST PLANNING AREA FLOOD
ID  CONTROL MASTER PLAN UPDATE (G.C. WALLACE 2006)
ID  SUPPLEMENT FOR THE 2006 SUMMERLIN WEST PLANNING AREA FLOOD CONTROL
ID  MASTER PLAN UPDATE (G.C. WALLACE 2006)
ID  GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
ID  (G.C. WALLACE 2007)
ID  LONE MOUNTAIN WESTERN BELTWAY DETENTION BASIN PARAMETERS (RECEIVED
ID  FROM G.C. WALLACE ON JANUARY 31, 2008)
ID  US 95/RANCHO FIS RESTUDY (PBS&J 1998)
ID  JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
ID
ID                          AREA    DARF
ID                          SQ. MI.
ID                          8-9     0.875
ID                          9-10    0.865
ID                          10-11   0.857
ID                          11-12   0.85
ID
ID
ID
ID
IDJR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
ID
ID100-YEAR,  6-HOUR STORM,  SDN4
ID
IT5             0       0     650
IO5             0       0
IN5             0       0
JRPREC    0.875   0.865   0.857   0.85
*
KKLV29-C
BA0.277
PB2.80
PC0       0.02    0.058   0.075   0.099   0.126   0.137   0.145   0.149   0.151
PC0.155   0.156   0.159   0.162   0.169   0.172   0.179   0.189   0.201   0.211
PC0.22    0.228   0.232   0.24    0.246   0.252   0.26    0.269   0.276   0.283
  0.286   0.292   0.302   0.312   0.321   0.332   0.352   0.376   0.415   0.462
  0.53    0.61    0.71    0.732   0.756   0.782   0.799   0.813   0.823   0.83
PC0.835   0.844   0.851   0.864   0.885   0.908   0.924   0.944   0.968   0.973
PC0.978   0.982   0.984   0.986   0.988   0.991   0.992   0.993   0.994   0.997
PC0.998   0.999   1
LS0           90.6
UD   0.409
*
KKRLV29-C
KMROUTE LV29-C TO CLV30-C
KMFACILITY = GOWAN - TENAYA BRANCH
KMFACILITY # = GOTE 0000
KMLINING = RCP
RD1350    0.013   0.013   0       CIRC    5
*
KKLV30-C
BA0.417
PB2.80
LS0       87.0
UD 0.58628
*
KKCLV30-C
KMCOMBINE RLV29-C AND LV30-C
HC2
*
KKBWHW1-C
BA0.291
PB3.09
LS0       82.8
UD 0.20132
*
KKRBWHW-C
KMROUTE BWHW-C TO CPHW-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0511
KMLINING = RCB
RD1320    0.0114  0.015   0       TRAP    7       0
*
KKCPHW-C
BA0.304
PB3.11
LS0       79.6
UD0.306454
*
KKCCPHW-C
KMCOMBINE RBWHW-C AND CPHW-C
KMGOWAN NORTH-JENSEN @ RANCH HOUSE ROAD
HC2
*
KKRCCPHW-C
KMROUTE CCPHW-C TO ADHW-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0486
KMLINING = RCB
RD1320    0.0076  0.015   0       TRAP    8       0
*
KKADHW-C
BA0.306
PB3.13
```

```
LS0       78.2
UD0.338623
*
KKCADHW-C
KMCOMBINE RCCPHW-C AND ADHW-C
KMGOWAN NORTH-JENSEN @ TROPICAL PARKWAY
HC2
*
KKRCADHW-C
KMROUTE CADHW-C TO TRHW-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0461
KMLINING = RCB
RD1320    0.0038  0.015   0       TRAP    10      0
*
KKTRHW-C
BA0.322
PB3.14
LS0       80.1
UD0.331415
*
KKCTRHW-C
KMCOMBINE RCADHW-C AND TRHW-C
KMGOWAN NORTH-JENSEN @ EL CAMPO GRANDE
HC2
*
KKRCTRHW-C
KMROUTE CTRHW-C TO CEAHW-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0436
KMLINING = RCB
RD1320    0.0114  0.015   0       TRAP    10      0
*
KKEAHW-C
BA0.302
PB3.15
LS0       79.0
UD0.331285
*
KKCEAHW-C
KMCOMBINE RCTRHW-C, AND EAHW-C
KMGRAND CANYON & ANN
HC2
*
KKRCEAHW-C
KMROUTE CEAHW-C TO RRCEAHWC
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0411
KMLINING = RCB
RD1320    0.0076  0.015   0       TRAP    10      0
*
KKARHW-C
BA0.368
PB3.15
LS0       76.7
UD0.322136

KKCARHW-C
KMCOMBINE RCEAHW-C AND ARHW-C
HC2
*
KKRCARHW-C
KMROUTE CARHW-C TO CWRHW-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0335, 0350
KMLINING = RCB
RD4000    0.0097  0.015   0       TRAP    10      0
*
KKWRHW-C
BA0.447
PB3.11
LS0       75.0
UD 0.51324
*
KKCWRHW-C
KMCOMBINE RCARHW-C AND WRHW-C
HC2
*
KKCDMNA3
BA0.353
PB3.21
LS0       95.3
UD0.254836
*
KKRMNA3
KMROUTE CDMNA3 TO CMNA2
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY ID-MILE = GOBW 0322, 0326
KMLINING = RCB
RD1615    0.01    0.015   0       TRAP    10      0
*
KKCDMNA2
BA0.135
PB3.19
LS0       92.8
UD0.262275
*
KKCMNA2
KMCOMBINE RMNA3 AND CDMNA2
KMRANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
HC2
*
KKRMNA2
KMROUTE CMNA2 TO CEFPOA1
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY ID-MILE = GOBW 0299,0268
KMLINING = CONCRETE
RD2640    0.01    0.015   0       TRAP    10      0
*
KKEFPOA1
BA0.235
PB3.22
LS0       91.2
UD0.211426
```

```
*
KKCEFPOA1
KMCOMBINE EFPOA1 AND RMNA2
KMGOWAN BELTWAY WEST @ TROPICAL


.CAMDK2
BA0.337
PB3.28
LS0       92.1
UD0.213342
*
KKRCAMDK2
KMROUTE RCAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
KMFACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
KMFACILITY # = GOAN 0065, 0067, 0068, 0070
KMLINING = SOIL CEMENT
RD1400    0.0321  0.025   0       TRAP    10      4
*
KKCAMDK3
BA0.316
PB3.32
LS0       90.3
UD0.193556
*
KKCCAMDK3
KMCOMBINE RCAMDK2 AND CAMDK3
HC2
*
KKCAM-10A
BA1.266
PB3.41
LS0       94.8
UD0.209967
*
KKCAM-10B
BA1.809
PB3.39
LS0       91.8
UD0.211495
*
KKDETCAM10
BA0.046
PB3.294
LS0       86.9
UD0.137401
*
KKCAM10IN
KMCOMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
KMTOTAL INFLOW TO CAM10 DETENTION BASIN
KO1
HC4
*
KKCAM10DB
KMFACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
  FACILITY # = GOAN 0058
  LEAR WATER STORAGE REQUIRED = 436.8 AC-FT
KMSEDIMENTATION VOLUME REQUIRED = 41.9 AC-FT
KMTOTAL VOLUME = 478.7 AC-FT
KMVOLUME TO BE INCREASE BY 114.7 AC-FT (24%)
KMOUTLET = 33" ORIFICE WITH 54" RCP
KM100-YEAR DISCHARGE = 156 CFS
KMSPILLWAY LENGTH = 1360 FT
KMSPILLWAY HEIGHT = 27.7 FT
KMSPILLWAY CREST ELEVATION = 3000'
KMSPILLWAY TYPE =
KMPMF DISCHARGE = 24,614 CFS
KMTOP OF EMBANKMENT ELEVATION = 3004.5'
KMINFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
KMBY THE LOUIS BERGER GROUP (5-05)
KO        1
RS        1   STOR        -1
*         0         0         0    0.67    3.33    8.33   26.67   43.33     110     200
*       280   347.2     364       396
SV0       0         0         0.81    4.03    10.08   32.27   52.43   133.10  242
SV338.80  420.11  436.80  475.20
SE2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
SE2995.0  2999.0  3000.0  3003.4
SQ0.00    6.67    17.78   27.78   45.56   54.44   64.44   82.22   93.33   117.78
SQ138.39  156.00  160.40  24614
*
KKCAM10OT
KMROUTE CAM10DB TO CEFPOA1
KMFACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
KMFACILITY # = GOAN 0000, 0044
KMLINING = RCP
RD3442    0.0258  0.015   0       CIRC    4.5     0
*
KKCCEFPOA1
KMCOMBINE CAM10OT AND CEFPOA1
HC2
*
KKRCCEFPOA1
KMROUTE CCEFPOA1 TO CEFPOA2
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY # = GOBW 0244, 0249
KMLINING = CONCRETE
RD1229    0.01    0.015   0       TRAP    11      0
*
KKEFPOA2
BA0.303
PB3.25
LS0       91.7
UD0.230268
*
KKCEFPOA2
  COMBINE RCEFPOA1 AND EFPOA2
  LAS VEGAS BELTWAY @ EL CAMPO GRANDE
HC2
*
KKRCEFPOA2
KMROUTE CEFPOA2 TO CEFPOB1
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY # = GOBW 0216, 0218, 0226, 0228, 0230
```

```
KMLINING = CONCRETE
RD1400    0.0086  0.015   0       TRAP    10      0
*
KKEFPOB1
   .391
   .28
LS0       95.8
UD0.143236
*
KKCEFPOB
KMCOMBINE RCEFPOA2 AND EFPOB1
HC2
*
KKRCEFPOB
KMROUTE TO CEFPOB TO CHLBW1-C
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY # = GOBW 0132, 0180
KMLINING = CONCRETE
RD3700    0.0184  0.015   0       TRAP    14      0
*
KKHLBW1-C
BA0.414
PB3.26
LS0       95.4
UD0.217858
*
KKCHLBW1-C
KMCOMBINE RCCEFPOB AND HLBW1-C
KMLAS VEGAS BELTWAY @ ANN ROAD
HC2
*
* KK      RCHLBW1C
* KM      CHANNEL ROUTING REMOVED FOR MODEL STABILITY
* KM      ROUTE CHLBW1-C TO CWRBW1
* KM      FACILITY = GOWAN BELTWAY WEST
* KM      FACILITY # = GOBW 0128, 0132
* KM      LINING = CONCRETE
* RD      1500    0.034   0.015   0       TRAP    14      0
*
KKWRBW1
BA0.452
PB3.27
LS0       94.8
UD0.280426
*
KKCWRBW1
KMCOMBINE WRBW1 AND RCHLBW1C
HC2
*
KKBOXCANYON
BA3.410
PB3.55
LS0       88.7
UD0.326658

KKBOXDET
KMBOX CANYON DETENTION BASIN
KMFACILITY = GOWAN BOX CANYON
KMFACILITY # = GOBX 0118
KMCLEAR WATER STORAGE REQUIRED = 393 AC-FT
KMSEDIMENTATION VOLUME REQUIRED = 37.2 AC-FT
KMTOTAL VOLUME = 430.2 AC-FT
KMOUTLET = GOBX 0016: 18" RCP
KM100-YEAR DISCHARGE = 40 CFS
KMSPILLWAY LENGTH =
KMSPILLWAY HEIGHT = 20.25 FT
KMSPILLWAY CREST ELEVATION =
KMSPILLWAY TYPE =
KMPMF DISCHARGE =
KMTOP OF EMBANKMENT ELEVATION =
KO1
RS1       STOR    -1
SV0.0     35.4    71.5    108.4   146.0   184.3   223.4
SV263.3   304.0   345.4   387.6   393.0
SE0       2       4       6       8       10      12
SE14      16      18      20      20.25
SQ0.0     10.3    16.6    21.1    24.8    28.0    30.9
SQ33.6    36.0    38.3    40.4    40.7
*
KKRBOXDET
KMROUTE THRU LWBW1
KMFACILITY = GOWAN BOX CANYON
KMFACILITY # = GOBX 0015,0016
KMLONE MOUNTAIN
RD6700    0.0655  0.013   0       CIRC    5.5     0
*
KKLWBW1
BA0.482
PB3.28
LS0       93.5
UD 0.28184
*
KKCLWBW1
KMCOMBINE RBOXDET, LWBW1, AND CWRBW1
HC3
*
KKUVB1-1
BA0.260
PB3.26
LS0       92.0
UD0.239196
*
KKUVB1-2
BA0.335
PB3.28
LS0       93.3
UD0.278269

KKCUVB
KMCOMBINE CLWBW1, UVB1-1, UVB1-2,
KMLAS VEGAS BELTWAY @ LONE MOUNTAIN
HC3
*
KKLMBW1
```

```
BA0.139
PB3.18
LS0       88.6
UD0.188391

   LMBW1
...COMBINE CUVB AND LMBW1
KMCOMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
KO1
HC2
*
KKLMBWDB
KMLONE MOUNTAIN BELTWAY DETENTION BASIN
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY # = GOBW 0085
KMSTORAGE VOLUME = 589 AC-FT (SOUTH BASIN 289 AC-FT & NORTH BASIN 300 AC-FT)
KMOUTLET = 72" RCP
KM100-YEAR DISCHARGE =
KMSPILLWAY LENGTH = 1010' TOTAL (SOUTH BASIN 600' & NORTH BASIN 410')
KMSPILLWAY HEIGHT =
KMSPILLWAY CREST ELEVATION = 2738.27'
KMSPILLWAY TYPE = CONCRETE BROAD CRESTED WEIR
KMPMF DISCHARGE =
KMTOP OF EMBANKMENT ELEVATION =
KMINFORMATION TAKEN FROM "2005 IMPROVEMENT PLANS FOR WESTERN SEGMENT OF THE
KMLAS VEGAS BELTWAY: CRAIG ROAD TO HUALAPAI WAY" BY CH2MHILL & G.C. WALLACE
KMPLANS DATED JUNE 23, 2005 AND THE LONE MOUNTAIN WESTERN BELTWAY DETENTION BASIN
KMPARAMETERS (RECEIVED FROM G.C. WALLACE ON JANUARY 31, 2008)
KO1
RS1       STOR    -1
SV0       7.4     29.8    81      150.8   233.1   352.9   493.7   585.4   617.3
SV755
SE2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
SE2744
SQ0       26.9    37.8    46.1    53.2    59.4    65      114     118.8   120.3
SQ8300
*
KKRLMBWDB
KMROUTE LMBWDB TO CCWRHW-C
KMFACILITY = GOWAN BELTWAY WEST
KMFACILITY # = GOBW 0000, 0048, 0051
KMLINING = RCP
RD4165    0.029   0.013   0       CIRC    4       0
*
KKCCWRHW-C
KMCOMBINE RLMBWDB AND CWRHW-C
HC2
*
KKRCCWRHWC
KMROUTE CCWRHW-C TO CCLWFR-C
KMFACILITY = GOWAN NORTH SYSTEM
KMFACILITY # = GONO 0230, 0234, 0272, 0325
KMLINING = RCB
RD5352    0.0275  0.015   0       TRAP    10      0

   BSFR-C
  0.207
PB2.94
LS0       84.8
UD0.285554
*
KKRBSFR-C
KMROUTE BSFR-C TO CCPFR-C
KMFACILITY = GOWAN - EL CAPITAN BRANCH
KMFACILITY # = GOEC 0176
KMLINING = RCP
RD1320    0.0115  0.013   0       CIRC    6.5
*
KKCPFR-C
BA0.251
PB2.95
LS0       77.5
UD0.331788
*
KKCCPFR-C
KMCOMBINE RBSFR-C AND CPFR-C
KMGOWAN-EL CAPITAN BRANCH @ RANCH HOUSE ROAD
HC2
*
KKRCCPFR-C
KMROUTE CCPFR-C TO CARFP-C
KMFACILITY = GOWAN - EL CAPITAN BRANCH
KMFACILITY # = GOEC 0152
KMLINING = RCB
RD1320    0.0076  0.015   0       TRAP    7       0
*
KKARFP-C
BA0.246
PB2.95
LS0       75.7
UD0.336165
*
KKCARFP-C
KMCOMBINE CARFP-C AND ARFP-C
KMGOWAN-EL CAPITAN BRANCH @ TROPICAL PARKWAY
HC2
*
KKRCARFP-C
KMROUTE RCARFP-C TO CTRFR-C
KMFACILITY = GOWAN - EL CAPITAN BRANCH
KMFACILITY # = GOEC 0126
KMLINING = RCB
RD1320    0.0038  0.015   0       TRAP    10      0
*
KKTRFR-C
  0.256
  2.96
  0       77.0
UD0.341601
*
KKCTRFR-C
KMCOMBINE RCARFP-C AND TRFR-C
KMGOWAN-EL CAPITAN BRANCH @ EL CAMPO GRANDE
HC2
```

REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 12
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subarea Boundary (ID)
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilites
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural (0.5 - 1 unit)
- 4 / 14* Low Density Residential (1 - 2 units)
- 5 / 15* Medium Density Residential (2 - 4 units)
- 6 / 16* High Density (4 - 8 units)
- 7 / 17* Public Facility, Residential (8 - 12 units)
- 8 / 18* Residential (12 or > units)
- 9 / 19* Commerical, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000
Feet

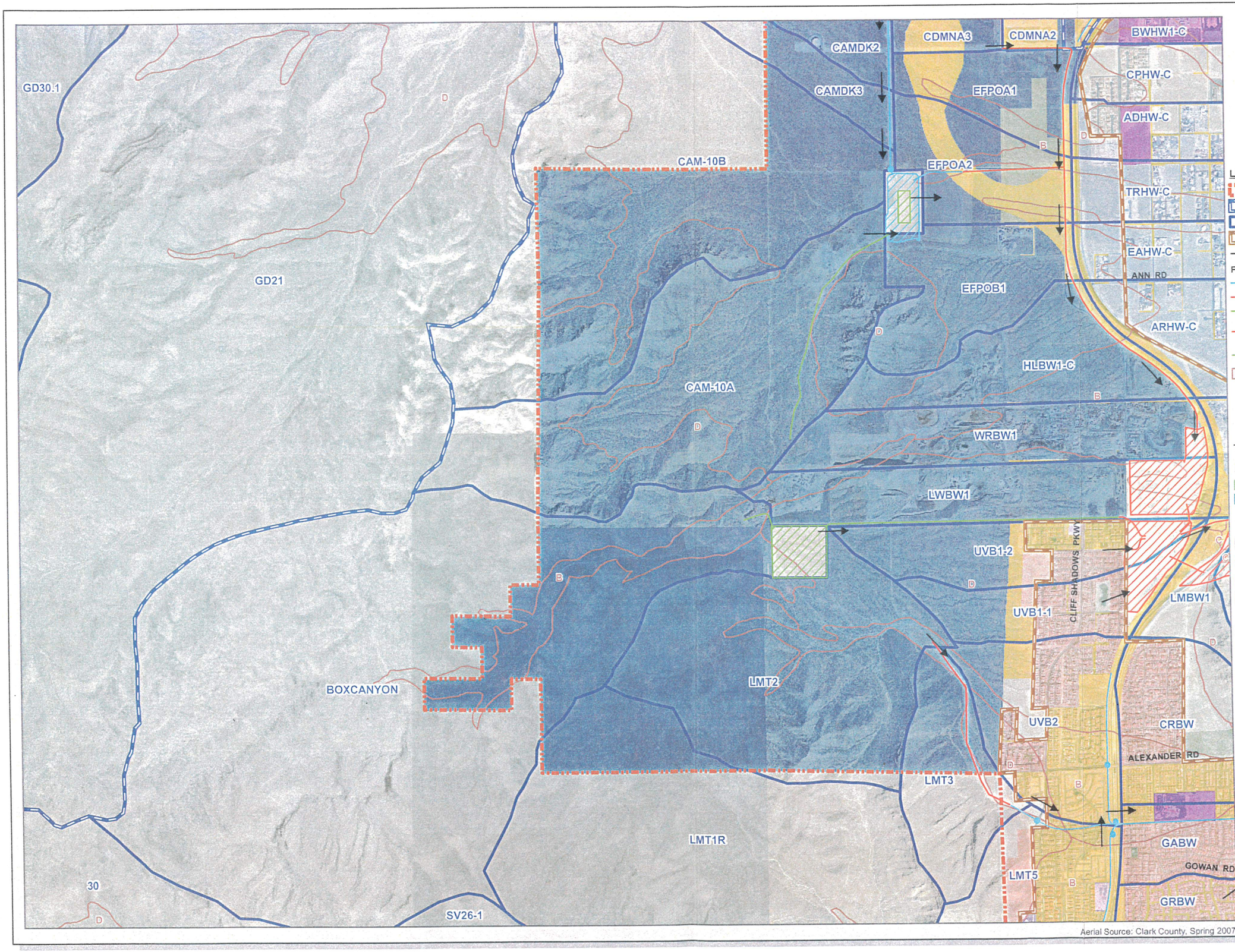
Scale: 1 inch = 2,000 feet

US95 I-15 I-215

1	2	3				
4	5	6				
	7	8	9	10		
11	12	13	14	15	16	17
18	19	20	21	22	23	
24	25	26	27	28		
29	30	31	32	33	34	
35	36	37	38	39	40	
41	42	43	44	45	46	
47	48	49	50	51	52	
53	54	55	56			
57	58	59				

PBS&J PB

Aerial Source: Clark County, Spring 2007



REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 18
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subarea Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilites
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

1	Undeveloped Land, Open Desert
2	Parks, Golf Courses
3	Rural (0.5 - 1 unit)
4 / 14*	Low Density Residential (1 - 2 units)
5 / 15*	Medium Density Residential (2 - 4 units)
6 / 16*	High Density (4 - 8 units)
7 / 17*	Public Facility, Residential (8 - 12 units)
8 / 18*	Residential (12 or > units)
9 / 19*	Commerical, Retail, Casino, High Rise Condominiums
10 / 20*	Light Industrial
11 / 21*	Heavy Industrial
12 / 22*	Schools
13	Lakes

* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

US95 I-15 I-215

1	2	3				
4	5	6				
	7	8	9	10		
11	12	13	14	15	16	17
18	19	20	21	22	23	
24	25	26	27	28		
29	30	31	32	33	34	
35	36	37	38	39	40	
41	42	43	44	45	46	
47	48	49	50	51	52	
53	54	55	56			
57	58	59				

PBS&J PB

Aerial Source: Clark County, Spring 2007

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

REGIONAL FLOOD CONTROL DISTRICT

2008 MPU HYDROLOGIC MAP - GOWAN WATERSHED

MARCH 2008

PBS&J

PB

1 inch equals 2,000 feet

APPENDIX D

Cost Estimate

WESTERN BELTWAY CRAIG ROAD TO HUALAPAI WAY
90% PRELIMINARY - OFFSITE DRAINAGE
CONSTRUCTION COST OPINION

Item No.	Description	Unit	Unit Price	Quantity	Cost
	SECTION 200				
200.01	CLEARING AND GRUBBING	ACRE	$600.00	8	$4,800.00
202.11	REMOVE STORM DRAIN STRUCTURES IN CENTENNIAL	LS	$1,500.00	1	$1,500.00
202.12	REMOVE STORM DRAIN STRUCTURES IN SHAUMBER	LS	$600.00	1	$600.00
202.13	ABANDON STORM DRAIN STRUCTURES AT PEACEFUL DAWN	LS	$1,000.00	1	$1,000.00
202.23	REMOVE RIP RAP	SY	$25.00	76	$1,900.00
202.27	REMOVE BITUMINOUS SURFACE	SY	$5.00	315	$1,575.00
202.29	REMOVE CONCRETE CURB/CURB & GUTTER	LF	$3.00	238	$714.00
203.02	CHANNEL EXCAVATION	CY	$2.50	20,000	$50,000.00
203.03	DETENTION BASIN EXCAVATION	CY	$2.50	1,032,000	$2,580,000.00
203.04	DETENTION BASIN EMBANKMENT (1-INCH MINUS SIZE)	CY	$3.50	11,000	$38,500.00
203.05	DETENTION BASIN EMBANKMENT (6-INCH MINUS SIZE)	CY	$4.00	420,000	$1,680,000.00
	SECTION 300				
302.03	TYPE 1 CLASS B AGGREGATE ACCESS ROAD	CY	$12.00	3,250	$39,000.00
302.04	TYPE 2 CLASS B AGGREGATE ACCESS ROAD	CY	$12.00	2,570	$30,840.00
	SECTION 400				
402.01	PLANT MIX BITUMINOUS SURFACE	TON	$32.00	7,880	$252,160.00
	SECTION 500				
502.04	6-FOOT BY 4-FOOT PRECAST RCB	LF	$450.00	218	$98,100.00
502.05	8-FOOT BY 6-FOOT PRECAST RCB	LF	$650.00	2050	$1,332,500.00
502.06	8-FOOT BY 8-FOOT PRECAST RCB	LF	$700.00	700	$490,000.00
502.07	9-FOOT BY 8-FOOT PRECAST RCB	LF	$800.00	1275	$1,020,000.00
502.08	10-FOOT BY 8-FOOT PRECAST RCB	LF	$900.00	1860	$1,674,000.00
502.09	14-FOOT BY 9-FOOT PRECAST RCB	LF	$1,300.00	4780	$6,214,000.00
502.13	10-FOOT WIDE STEPPED SPILLWAY	LF	$475.00	420	$199,500.00
502.14	STEPPED SPILLWAY ANCHOR	EA	$2,175.00	11	$23,925.00
502.15	SDB-54-1 AND SDB-54-2 STILLING BASIN STRUCTURE	LS	$93,400.00	1	$93,400.00
502.16	SDLM-1 6-FOOT WIDE CONCRETE STRUCTURE	LF	$570.00	113	$64,410.00
502.17	SDLM-1 20-FOOT WIDE CONCRETE STRUCTURE	LF	$705.00	42	$29,610.00
502.18	SDLM-1 CHANNEL TRANSITION STRUCTURE	LS	$15,750.00	1	$15,750.00
502.19	SDLM-1 IMPACT/DROP STRUCTURE	EA	$30,000.00	1	$30,000.00
502.20	SDLM-1 RCP REDUCER	EA	$2,400.00	2	$4,800.00
502.21	SDLM-1 DROP STRUCTURE	LS	$37,600.00	1	$37,600.00
502.22	SDLM-3 6-FOOT WIDE CONCRETE STRUCTURE	LF	$570.00	112	$63,840.00
502.23	SDLM-4 CONCRETE CHANNEL CHUTE	LS	$40,250.00	1	$40,250.00
502.24	SDLM-5 INLET/SDLF-NDB-1 OUTFALL STRUCTURE	LS	$33,900.00	1	$33,900.00
502.25	SDLM-6 SOUTH BASIN OUTFALL/INLET STRUCTURE	LS	$80,400.00	1	$80,400.00
502.26	SDLM-6 30-FOOT CONCRETE MANHOLE AND JUNCTION BOX AT STATION 10+97.55	LS	$14,250.00	1	$14,250.00
502.27	SDLM-6 JUNCTION BOX AT STATION 18+15.08	LS	$22,000.00	1	$22,000.00
502.28	SDLM-6 JUNCTION BOX AT STATION 25+21.95	LS	$20,500.00	1	$20,500.00
502.29	SDNDB-B2 5-FOOT WIDE TRAPEZOIDAL CHANNEL (NORTH)	LF	$425.00	670	$284,750.00
502.30	SDNDB-B3 NORTH BASIN TRANSITION/INLET STRUCTURE	LS	$19,620.00	1	$19,620.00
502.31	SDNDB-B3 NORTH BASIN STILLING BASIN STRUCTURE	LS	$35,500.00	1	$35,500.00
502.32	SDPD-1 PEACEFUL DAWN TRANSITION STRUCTURE	LS	$24,650.00	1	$24,650.00
502.33	SDPD-1 IMPACT/DROP STRUCTURE	EA	$27,030.00	1	$27,030.00
502.34	SDPD-1 RCP REDUCER	EA	$2,000.00	1	$2,000.00
502.35	SDPD-1 AND SDLM-1 DUAL IMPACT STILLING BASIN	LS	$93,400.00	1	$93,400.00
502.36	SDTR-1 CHANNEL DROP STRUCTURE	LS	$30,600.00	1	$30,600.00
502.37	GBWC INFLOW STRUCTURE AND ENERGY DISSIPATER	LS	$44,850.00	1	$44,850.00
502.38	GBWC 20-FOOT BY 10-FOOT CONCRETE RECTANGULAR CHANNEL	LF	$780.00	130	$101,400.00
502.39	GBWC 14-FOOT BY 10.5-FOOT CONCRETE RECTANGULAR CHANNEL	LF	$685.00	400	$274,000.00
502.40	GBWC 20-FOOT BY 10-FOOT TO 14-FOOT BY 10.5-FOOT TRANSITION STRUCTURE	LS	$14,630.00	1	$14,630.00
502.41	GBWC CONCRETE CHANNEL ACCESS RAMP	LS	$64,600.00	1	$64,600.00
502.42	GBWC CONFLUENCE STRUCTURE	LS	$130,000.00	1	$130,000.00
502.43	GBWC 14-FOOT BY 9-FOOT TO 10-FOOT BY 8-FOOT TRANSITION STRUCTURE	LS	$22,000.00	1	$22,000.00
502.44	GBWC 10-FOOT BY 8-FOOT TO 9-FOOT BY 8-FOOT TRANSITION STRUCTURE	LS	$17,000.00	1	$17,000.00
502.45	GBWC 9-FOOT BY 8-FOOT TO 8-FOOT BY 6-FOOT TRANSITION STRUCTURE	LS	$14,500.00	1	$14,500.00
502.46	RC-1 3-FOOT CONCRETE CHANNEL WITH LATERALS	LS	$290,000.00	1	$290,000.00
502.47	RC-2 8-FOOT BY 6-FOOT CONCRETE RECTANGULAR CHANNEL	LF	$410.00	510	$209,100.00
502.48	RC-2 8-FOOT BY 7.5-FOOT CONCRETE RECTANGULAR CHANNEL	LF	$460.00	600	$276,000.00
502.49	SOUTH DETENTION BASIN MONITORING STATION	LS	$30,000.00	1	$30,000.00
502.50	STAGE GAUGE	EA	$2,000.00	1	$2,000.00
502.51	SPILLWAY WEIR	LF	$280.00	1570	$439,600.00
502.52	MEDIAN POLE BARRIER	LS	$1,100.00	1	$1,100.00
511.01	SEDIMENT GAUGE	EA	$500.00	3	$1,500.00
	SECTION 600				
603.01	18" RCP CLASS III	LF	$100.00	89	$8,900.00
603.02	18" RCP CLASS IV	LF	$150.00	10	$1,500.00
603.03	24" RCP CLASS III	LF	$125.00	356	$44,500.00
603.04	24" RCP CLASS IV	LF	$150.00	210	$31,500.00
603.05	24" RCP CLASS V	LF	$175.00	102	$17,850.00
603.06	30" RCP CLASS III	LF	$150.00	205	$30,750.00
603.07	36" RCP CLASS III	LF	$175.00	3327	$582,225.00
603.08	36" RCP CLASS V	LF	$225.00	29	$6,525.00
603.09	42" RCP CLASS III	LF	$190.00	335	$63,650.00
603.10	48" RCP CLASS III	LF	$210.00	66	$13,860.00
603.11	48" RCP CLASS V	LF	$260.00	20	$5,200.00
603.12	54" RCP CLASS III	LF	$225.00	552	$124,200.00
603.13	54" RCP CLASS IV	LF	$260.00	339	$88,140.00
603.14	60" RCP CLASS III	LF	$240.00	209	$50,160.00
603.15	60" RCP CLASS IV	LF	$285.00	381	$108,585.00
603.17	66" RCP CLASS IV	LF	$290.00	133	$38,570.00
603.18	72" RCP CLASS III	LF	$315.00	101	$31,815.00

603.19	72" RCP CLASS V	LF	$340.00	1522	$517,480.00
603.20	78" RCP CLASS III	LF	$315.00	245	$77,175.00
603.21	78" RCP CLASS IV	LF	$330.00	122	$40,260.00
603.22	84" RCP CLASS III	LF	$315.00	37	$11,655.00
609.01	5' TYPE CM DI	EA	$5,000.00	8	$40,000.00
609.04	15' TYPE CM DI	EA	$15,000.00	10	$150,000.00
609.05	17.5' TYPE CM DI	EA	$17,500.00	2	$35,000.00
609.06	20' TYPE CM DI	EA	$20,000.00	5	$100,000.00
609.07	25' TYPE CM DI	EA	$25,000.00	8	$200,000.00
609.08	27.5' TYPE CM DI	EA	$27,500.00	2	$55,000.00
609.09	30' TYPE CM DI	EA	$30,000.00	3	$90,000.00
609.10	6.75' TRENCH DRAIN	EA	$6,750.00	2	$13,500.00
609.11	43' TRENCH DRAIN	EA	$43,000.00	2	$86,000.00
609.19	TYPE 1 MANHOLE	EA	$5,000.00	5	$25,000.00
609.20	TYPE 2 MANHOLE	EA	$6,500.00	6	$39,000.00
609.21	TYPE 3 MANHOLE	EA	$8,000.00	4	$32,000.00
609.24	NDOT TYPE 4 MANHOLE	EA	$8,500.00	5	$42,500.00
609.25	STORM DRAIN DEEP MANHOLE	EA	$6,500.00	3	$19,500.00
610.01	NDOT CLASS 150 RIPRAP	CY	$50.00	600	$30,000.00
610.02	NDOT CLASS 200 RIPRAP	CY	$50.00	75	$3,750.00
610.03	NDOT CLASS 300 RIPRAP	CY	$50.00	425	$21,250.00
610.04	SDLM-4 GROUTED RIPRAP CHUTE WITH CUTOFF WALLS	LS	$44,000.00	1	$44,000.00
610.05	SDB-54-1 AND SDB-54-2 GROUTED RIPRAP WITH CUTOFF WALLS	LS	$18,650.00	1	$18,650.00
610.06	SDNDB-B1 GROUTED RIPRAP WITH CUTOFF WALLS	LS	$44,000.00	1	$44,000.00
610.07	SDNDB-B3 GROUTED RIPRAP WITH CUTOFF WALLS	LS	$20,000.00	1	$20,000.00
610.08	SDTR-1 GROUTED RIPRAP WITH CUTOFF WALLS	LS	$90,000.00	1	$90,000.00
610.09	GBWC GROUTED RIPRAP WITH CUTOFF WALLS	LS	$37,800.00	1	$37,800.00
613.01	CLASS B CONCRETE CURB AND GUTTER (TYPE L)	LF	$8.00	5,478	$43,824.00
613.02	CLASS B CONCRETE CURB AND GUTTER (10")	LF	$9.00	5,176	$46,584.00
616.01	72-INCH CHAINLINK FENCE	LF	$15.00	2,700	$40,500.00
616.02	CONRETE BLOCK AND CHAIN FENCE	LF	$20.00	6,850	$137,000.00
616.03	METAL PICKET FENCE	LF	$30.00	510	$15,300.00
616.04	POST AND CABLE FENCE	LF	$10.00	5,520	$55,200.00
616.05	12-FOOT SWING GATE (DOUBLE)	EA	$150.00	1	$150.00
637.01	DUST PALLIATIVE (POLLUTION CONTROL)	ACRE	$1,000.00	60	$60,000.00
637.02	DUST CONTROL	LS	$10,000.00	1	$10,000.00
637.03	PRE-EMERGENT HERBICIDE	ACRE	$325.00	60	$19,500.00
				SUBTOTAL	$22,294,662.00
				10% CONTINGENCY	$2,229,466.20
				TOTAL CONSTRUCTION COST	**$24,524,128**

APPENDIX E

Improvement Plans