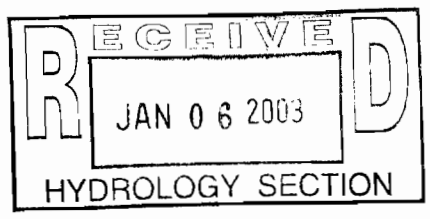
DRAINAGE REPORT

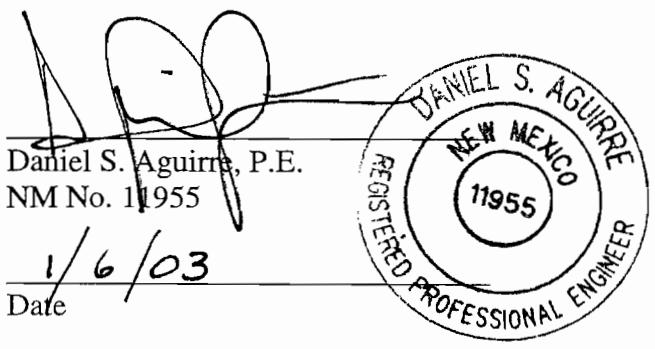
for

SEVILLE SUBDIVISION
UNIT 5 & 6
Albuquerque, New Mexico

January 2003



I, Daniel S. Aguirre, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.



Daniel S. Aguirre, P.E.
NM No. 11955

1/6/03
Date

Table of Contents

		Page
I.	Introduction	1
II.	Project Description	1
III.	Project Background & Documents	2
IV.	Existing Conditions	2
V.	Developed Conditions	3
VI.	Grading Plan	4
VII.	Conclusion	4
VIII.	Appendices	5

List of Exhibits

Exhibit A: Vicinity Map

Exhibit B: Zone Atlas Sheet A-10 with site

Exhibit C: FEMA Flood map with site

Exhibit D: Roll Curb Location Map

List of Plates

(Located in Pockets)

Plate 1: Existing Conditions

Plate 2: Developed Conditions (U5 & U6 only)

Plate 3: Future Developed Conditions

Plate 4: Grading plan

Plate 5: Erosion Control Plan

List of Appendices

Appendix A: AHYMO Input and Output for Existing Conditions

Appendix B: AHYMO Input and Output for Developed Conditions

Appendix C: Street Capacity Analysis

Appendix D: Storm Drain and Drainage Channel Analysis

Introduction

Wilson & Company prepared this drainage report under contract to Curb West, Inc. The document provides a basis for the design of storm water conveyance systems within Seville Units 5 & 6. The first objective of this report is to analyze the hydrologic characteristics associated with the existing and developed conditions. The second is to present the proposed storm drain design used to mitigate the storm runoff generated by Seville Units 5 & 6.

Seville Units 5 & 6 are located in Northwest Albuquerque and are part of the overall Seville Subdivision. Unit 5 currently drains in a Southeasterly direction with grades ranging from 1% to 5%. Flows generated by Unit 5 discharge into the West Branch Calabacillas Arroyo with a portion passing into the main branch. Unit 6 drains in a Northeasterly direction towards the main branch of the Calabacillas Arroyo. Both branches of the Calabacillas Arroyo discharge to the Swinburne Dam. Grades within Unit 6 range from 1% to 5%. Both Units are presently undeveloped and covered with typical West Mesa desert vegetation.

Developed flows from Unit 5 will pass into an existing storm drain within Unit 4. This existing storm drain discharges into the West Branch Calabacillas Arroyo. Developed flows from Unit 6 will pass into an existing storm drain within Rio Segura. The Rio Segura storm drain discharges into the main branch of the Calabacillas Arroyo. Both branches of the Calabacillas Arroyo discharge into the Swinburne Detention Facility. This facility has been designed to provide detention for all upstream lands assuming a fully developed condition.

Project Description

The proposed development is located within the city limits of Albuquerque, New Mexico. Seville Subdivision Units 5 & 6 are developments within the Seville Subdivision. Seville Subdivision is bounded on the south by Irving Blvd., on the east and north by the main branch of the Calabacillas Arroyo, and on the west by Universe Blvd. Seville is immediately west of the confluence of the west branch and the main stem of the Calabacillas Arroyo. Unit 5 is located on the western portion of the subdivision. Unit 5 is bounded on the west by Universe Blvd, the south by the West Branch Calabacillas Arroyo, the east by Unit 4, and the north by Unit 6 and vacant land. Unit 6 is located directly north of Units 4 & 5 and directly east of Unit 3. Unit 6 is bounded on the north by vacant land that currently drains to the south and east. See Exhibit A, Vicinity Map.

The current legal description of the proposed Unit 5 development is "Tract 1-B-2, being a replat of Tract 1-B, Seville, within the Alameda Grant in projected Section 3, Township 11 north, Range 2 east, New Mexico Principal Meridian, City of Albuquerque, Bernalillo County, New Mexico". The current legal description of the proposed Unit 6 development is "Tract B, Bulk Land Plat of Tracts A-1, B, C, D, E, and F, Paradise Heights, being a replat of vacated Paradise Heights Unit 6, Tract A, Paradise Heights

Unit 5, Unplatted Tract 3, Paradise Heights, and a vacated portion of Westside Boulevard N.W."

Exhibit C contains the September 20, 1996 FEMA Flood Insurance Rate Maps for the area which includes the proposed subdivision layout. The FEMA floodplain does not encroach on the subdivision in any location. Unit 5 will primarily discharge to the West Branch of the Calabacillas Arroyo and Unit 6 will discharge into the main branch of the Calabacillas Arroyo, both of which are identified as floodplains.

The site is located on Zone Atlas Sheet A-10-Z. See Exhibit C for site location on this Zone Atlas Sheet. Seville Subdivision Units 5 & 6 are currently zoned R-LT.

Project Background and Documents

Seville Subdivision currently includes Units 1, 2, 3, and 4. The infrastructure within Units 1 & 2 is in place and homes are currently under construction. Unit 3 and Unit 4 infrastructure is currently being constructed. Drainage design was approved for Units 1 & 2 in a report titled "Drainage Report for Seville Subdivision" (Easterling & Associates, Inc., June 2000). Drainage design approval for Units 3 & 4 was also obtained thru subsequent drainage reports performed by Wilson & Company dated April and February 2002, respectively. The reports for Units 3 and 4 addressed the area that includes Units 5 & 6 as future development that would discharge, in part, to the west branch and in part to the main stem of the Calabacillas Arroyo.

The TVI west campus is currently undergoing construction. The campus will be located north of the West Branch along the west side of Universe Blvd. TVI will construct the west half of Universe Blvd. The drainage from the west, which has historically entered Seville Subdivision across the Universe Blvd. right of way, will be diverted to the West Branch at Universe Blvd.

Existing Conditions

(Refer to Plate 1 – Existing Conditions)

The existing conditions hydrology used a bulking factor of 7%. The draft copy of the "Calabacillas Arroyo Prudent Line Study and Related Work Development of a Prudent Line for the West Branch" prepared by Mussetter Engineering, Inc., bulks the flow in the West Branch of the Calabacillas at an average of 7.75%. The bulking factor of 7.75% for the West Branch of the Calabacillas includes a bed load and a wash load. The existing conditions hydrology is bulked for a wash load, since it is not flowing in a defined channel. The bulking factor of 7% is a conservative wash load-bulking factor.

The existing site of Unit 5 typically slopes from northwest to southeast at grades of 3 to 5%. It is presently undeveloped and covered with typical west mesa desert vegetation. Historically, the site discharges via sheet flows and minor channelization into both the West and Main Branches of the Calabacillas Arroyo. The West Branch discharges directly into Swinburne detention facility. The Swinburne facility was designed to provide runoff detention of the 100-year event for the contributing area upstream of the

facility. A crossing structure at Kayenta Blvd. and the West Branch of the Calabacillas was designed and constructed with Unit 1 of Seville Subdivision. This structure was designed to safely pass 100-year developed flows. The development of Universe Blvd. with the TVI campus, as previously discussed, will divert flows entering the Seville Subdivision site from the west to the West Branch via street flow and storm drain located within the Universe Blvd. right of way.

The existing site of Unit 6 typically slopes from southwest to northeast at grades of 1% to 5%. It also is presently undeveloped and is covered by typical west mesa desert vegetation. Historically, this site discharges via sheet flow and channelization into the main branch of the Calabacillas Arroyo. The main branch of the Calabacillas Arroyo discharges directly to the Swinburne detention facility. Upstream from the detention facility within the Calabacillas Arroyo, a drop structure has been constructed. The Rio Segura storm drain outfall was constructed in conjunction with Unit 1 and discharges to said drop structure. The following table details the existing basins and the associated runoff.

Basin	Area, acres	Q_{100YR}, cfs	V_{100YR}, acft
EX-1	71.47	72.99	2.93
EX-2	67.23	61.96	2.75
EX-3	26.29	34.74	1.08
EX-4	16.95	63.24	2.21

Developed Conditions (U5 & U6 only)

(Refer to Plate 2 – Developed Conditions)

The developed site encompassed by Unit 5 will consist of 116 lots of single-family housing. The east half of Universe Blvd adjacent to Unit 5 will be constructed with this development. The Unit 6 site will consist of 76 lots of single-family housing. A portion of the western half of Kayenta Blvd. will be constructed with this development.

Unit 5 drainage, under developed conditions, will discharge as it has historically, to the West Branch of the Calabacillas Arroyo with a portion, Basin D-6, discharging to the main branch of the Calabacillas Arroyo. The flows generated by Basin D-6 will pass through the proposed storm drain serving Unit 6 to finally discharge to the Rio Segura Storm Drain. The peak flow generated by the developed on-site basins within Unit 5 is 74.5 cfs. Approximately 56.8 cfs of these flows enters the Unit 4 storm drain system. The remaining 17.7 cfs is conveyed to the Unit 6 storm drain.

Unit 6 will also discharge as it has historically. Unit 6 flows will be conveyed via the Rio Segura storm drain and discharged into the main branch of the Calabacillas Arroyo. The peak flows generated by the developed on-site basins within Unit 6 is 47.4 cfs.

The hydrologic analysis for the developed condition was completed using the Arid Lands Hydrologic Model (AHYMO) Version 1997.02. (See Appendices A & B for input and

output data). Methodology outlined in Section 22.2 of the City of Albuquerque Development Process Manual was also incorporated into this analysis. Street flows have been evaluated using Flow Master by Haested Methods. The street flow analysis was used to determine where roll type curb could be used within the subdivision. Inlets are located to prevent exceeding the street flow capacities per the DPM. See Appendix C and Exhibit D for street capacity analysis. See Appendix D for storm drain design output.

Offsite basins, Basins T-1, T-2, and T-3, were analyzed to determine the undeveloped flows generated upstream of the proposed subdivision. An earthen channel will be constructed along the northern boundary of Units 5 & 6 to collect and convey these undeveloped flows into a temporary desilting basin near the intersection of Rio Segura and Kayenta Blvd. Straw bale check dams will be used to reduce flow velocities within the earthen channel. The desilting basin will have a volume of 1.32 ACFT. The desilting basin will discharge into the downstream end of the Unit 6 storm drain system. In the event that Unit 5 is constructed first, a temporary retention pond will be constructed at the downstream end of Basin D-6. The proposed earthen channel will serve as an emergency spillway for this retention pond. The retention pond will have a volume of 0.97 ACFT.

The desilting basin will release its flows into the storm drain passing beneath Kayenta Blvd. and through Unit 3 (See Plate 2 for basin location and channel alignment.). The undeveloped off-site basins were found to generate flows of approximately 54 cfs. Basin D-6 will generate approximately 18 cfs.

The drainage associated with the proposed construction of the eastern half of Universe Blvd adjacent to the project site will be controlled in a manner consistent with the TVI Northwest Campus Drainage Report, 2002.

The following table details the developed onsite basins (D) as well as the undeveloped offsite basins (T) and the associated runoff.

Basin	Area, acres	Q_{100YR}, cfs	V_{100YR}, acft
D-1	3.65	13.47	0.27
D-2	2.20	8.12	0.16
D-3	2.90	10.71	0.22
D-4	2.62	9.67	0.19
D-5	4.02	14.86	0.30
D-6	4.79	17.67	0.36
D-7	3.22	11.88	0.24
D-8	4.23	15.61	0.31
D-9	1.75	6.47	0.13
D-10	1.76	6.50	0.13
D-11	1.89	6.98	0.14
T-1	34.46	37.17	1.32
T-2	5.50	7.49	0.21
T-3	7.02	9.56	0.27

Future Developed Conditions

(Refer to Plate 3 – Future Developed Conditions)

An analysis of upstream basins was performed assuming fully developed conditions. The basin boundaries were altered to include all areas south of the proposed McMahon alignment between Universe Blvd and Kayenta Blvd (See Plate 3). The peak flow determined with that analysis was used in sizing the storm drain system within Unit 6 and subsequent downstream systems. It was assumed that the developed flows generated by Basins F-1 and F-2 will be collected and discharged into the Unit 6 storm drain system at two locations. Flows from Basin F-1 will enter the system near the northernmost edge of the Unit 6 storm drain. Basin F-2 will enter the system near the proposed desilting basin. Flows generated by Basin F-3 will remain north of the proposed McMahon Blvd. alignment and discharge into the West Branch Calabacillas Arroyo further upstream. The runoff from Basins F-1 and F-2 was determined to be 125 cfs and 60 cfs, respectively.

Grading Plan

The Grading Plans for the Seville Units 5 & 6 are attached as Plate 4. These sheets illustrate the overall grading concept for the subdivision as well as the proposed storm drain.

Conclusion

The analysis indicates that the proposed system is adequate to handle the storm runoff generated by the site. Wilson & Company recommends that the proposed storm drain system undergo regular maintenance activities. This should include removing debris from grate inlets, as well as removing sediment buildup within the pipe system. The Future area contributing flows to the Unit 6 storm drainage system should be analyzed in greater detail at the time of development to ensure that the runoff is within the constraints of this design. The downstream condition of the West and Main Branches of the Calabacillas basin has been designed to accommodate developed discharge of the entire basin. Therefore, we are proposing no detention of runoff with this development.

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =08/02/2002

INPUT FILE = EXIST.TXT USER NO.=

AHYMO-C-9803c01UNMLIB-AH

HYDROGRAPH COMMAND	IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	PER ACRE	NOTATION
START										
TIME= .00										
RAINFALL TYPE= 1										
RAIN6= 2.200										
SEDIMENT BULK										
PK BF = 1.07										
COMPUTE NM HYD		1.10	-	1	.11167	72.99	2.925	.49106	1.600	
1.021 PER IMP= .00										
SEDIMENT BULK										
PK BF = 1.07										
COMPUTE NM HYD		1.20	-	2	.10505	61.96	2.751	.49106	1.633	
.922 PER IMP= .00										
SEDIMENT BULK										
PK BF = 1.07										
COMPUTE NM HYD		1.30	-	3	.04108	34.74	1.076	.49106	1.533	
1.321 PER IMP= .00										
ROUTE		1.40	1	4	.11167	56.89	2.925	.49107	1.700	
.796										
ADD HYD		301.00	2& 4	5	.21672	115.31	5.676	.49106	1.667	
.831										
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =06/12/2002

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RAINFALL TYPE= 1 RAIN6= 1.467									
COMPUTE NM HYD	3.10	-	1	.00570	8.21	.271	.88974	1.500	2.249 PER IMP= 60.00
COMPUTE NM HYD	3.20	-	2	.00344	4.95	.163	.88974	1.500	2.250 PER IMP= 60.00
COMPUTE NM HYD	3.30	-	3	.00453	6.52	.215	.88974	1.500	2.249 PER IMP= 60.00
COMPUTE NM HYD	3.40	-	4	.00409	5.89	.194	.88974	1.500	2.250 PER IMP= 60.00
COMPUTE NM HYD	3.50	-	5	.00628	9.04	.298	.88974	1.500	2.249 PER IMP= 60.00
COMPUTE NM HYD	3.60	-	6	.00748	10.77	.355	.88974	1.500	2.248 PER IMP= 60.00
COMPUTE NM HYD	3.70	-	7	.00503	7.24	.239	.88974	1.500	2.249 PER IMP= 60.00
COMPUTE NM HYD	3.80	-	8	.00661	9.51	.314	.88974	1.500	2.248 PER IMP= 60.00
COMPUTE NM HYD	3.90	-	9	.00273	3.94	.130	.88974	1.500	2.251 PER IMP= 60.00
COMPUTE NM HYD	3.10	-	10	.00275	3.96	.130	.88974	1.500	2.251 PER IMP= 60.00
COMPUTE NM HYD	3.11	-	11	.00295	4.25	.140	.88974	1.500	2.251 PER IMP= 60.00

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =06/12/2002

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COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	PER ACRE	NOTATION
START										
TIME= .00										
RAINFALL TYPE= 1										
RAIN6= 2.200										
COMPUTE NM HYD	3.10	-	1	.00570	13.47	.468	1.53936	1.500	3.690	PER IMP= 60.00
COMPUTE NM HYD	3.20	-	2	.00344	8.12	.282	1.53936	1.500	3.693	PER IMP= 60.00
COMPUTE NM HYD	3.30	-	3	.00453	10.71	.372	1.53936	1.500	3.692	PER IMP= 60.00
COMPUTE NM HYD	3.40	-	4	.00409	9.67	.336	1.53936	1.500	3.692	PER IMP= 60.00
COMPUTE NM HYD	3.50	-	5	.00628	14.83	.516	1.53936	1.500	3.690	PER IMP= 60.00
COMPUTE NM HYD	3.60	-	6	.00748	17.67	.614	1.53936	1.500	3.689	PER IMP= 60.00
COMPUTE NM HYD	3.70	-	7	.00503	11.88	.413	1.53936	1.500	3.691	PER IMP= 60.00
COMPUTE NM HYD	3.80	-	8	.00661	15.61	.543	1.53936	1.500	3.690	PER IMP= 60.00
COMPUTE NM HYD	3.90	-	9	.00273	6.47	.224	1.53936	1.500	3.695	PER IMP= 60.00
COMPUTE NM HYD	3.10	-	10	.00275	6.50	.226	1.53936	1.500	3.695	PER IMP= 60.00
COMPUTE NM HYD	3.11	-	11	.00295	6.98	.242	1.53936	1.500	3.694	PER IMP= 60.00
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =07/01/2002

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START										
TIME= .00										
RAINFALL TYPE= 1										
RAIN6= 1.460										
COMPUTE NM HYD	1.10	-	1	.05383	7.25	.263	.09158	1.567	.210	PER IMP= .00
COMPUTE NM HYD	1.20	-	2	.00859	1.52	.042	.09158	1.533	.276	PER IMP= .00
COMPUTE NM HYD	1.30	-	3	.01097	1.94	.054	.09158	1.533	.276	PER IMP= .00
FINISH										

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START										
TIME= .00										
RAINFALL TYPE= 1										
RAIN6= 2.200										
COMPUTE NM HYD	1.10	-	1	.05383	37.17	1.318	.45893	1.567		
1.079 PER IMP= .00										
COMPUTE NM HYD	1.20	-	2	.00859	7.49	.210	.45893	1.533		
1.362 PER IMP= .00										
COMPUTE NM HYD	1.30	-	3	.01097	9.56	.268	.45893	1.533		
1.362 PER IMP= .00										
FINISH										

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START TIME= .00										
RAINFALL TYPE= 1 RAIN6= 1.467										
COMPUTE NM HYD	1.10	-	1	.05319	76.47	2.524	.88974	1.500	2.246	PER IMP= 60.00
COMPUTE NM HYD	1.20	-	2	.02545	36.60	1.208	.88974	1.500	2.247	PER IMP= 60.00
COMPUTE NM HYD	1.30	-	3	.00795	11.44	.377	.88974	1.500	2.248	PER IMP= 60.00
FINISH										

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START TIME= .00								
RAINFALL TYPE= 1 RAIN6= 2.200								
COMPUTE NM HYD	1.10	-	1	.05319	125.48	4.367	1.53936	1.500
3.686 PER IMP= 60.00								
COMPUTE NM HYD	1.20	-	2	.02545	60.05	2.089	1.53936	1.500
3.687 PER IMP= 60.00								
COMPUTE NM HYD	1.30	-	3	.00795	18.78	.653	1.53936	1.500
3.689 PER IMP= 60.00								
FINISH								

CFS PAGE = 1

PER ACRE NOTATION

AP-1
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.005000	ft/ft
Discharge	8.00	cfs

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

Results		
Mannings Coefficient	0.017	
Water Surface Elevation	99.81	ft
Elevation Range	99.52 to 100.00	
Flow Area	4.5	ft²
Wetted Perimeter	29.21	ft
Top Width	29.13	ft
Actual Depth	0.29	ft
Critical Elevation	99.79	ft
Critical Slope	0.008206	ft/ft
Velocity	1.78	ft/s
Velocity Head	0.05	ft
Specific Energy	99.86	ft
Froude Number	0.80	
Flow Type	Subcritical	

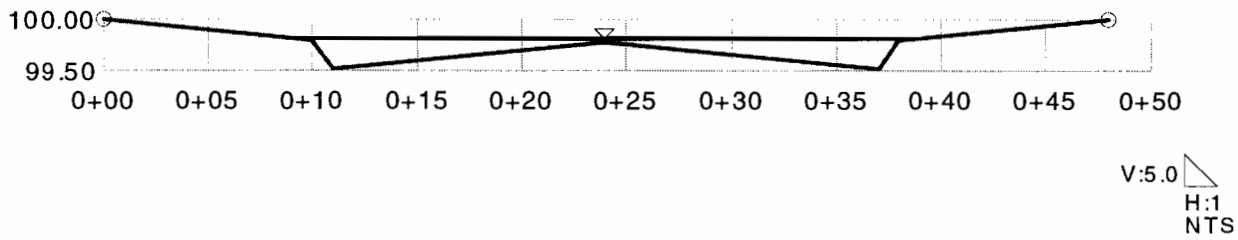
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+11	99.52
0+12	99.54
0+24	99.78
0+36	99.54
0+37	99.52
0+38	99.80
0+48	100.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.005000	ft/ft
Water Surface Elevation	99.81	ft
Elevation Range	99.52 to 100.00	
Discharge	8.00	cfs



AP-2
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-2
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	006600	ft/ft
Discharg	8.12	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.017	
Water Surface Elev	99.80	ft
Elevation Range	.52 to 100.00	
Flow Area	4.0	ft²
Wetted Perimeter	26.05	ft
Top Width	25.96	ft
Actual Depth	0.28	ft
Critical Elevation	99.79	ft
Critical Slope	0.008046	ft/ft
Velocity	2.03	ft/s
Velocity Head	0.06	ft
Specific Energy	99.86	ft
Froude Number	0.91	
Flow Type	Subcritical	

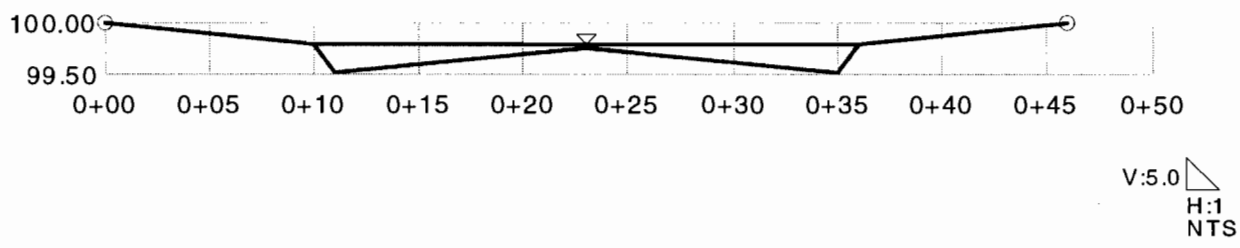
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+46	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+11	99.52
0+12	99.54
0+23	99.76
0+34	99.54
0+35	99.52
0+36	99.80
0+46	100.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.006600	ft/ft
Water Surface Elevation	99.80	ft
Elevation Range	99.52 to 100.00	
Discharge	8.12	cfs



AP-3
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-3
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	018500	ft/ft
Discharg	21.59	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.017	
Water Surface Elev	99.55	ft
Elevation Range	.13 to 100.00	
Flow Area	5.5	ft²
Wetted Perimeter	28.89	ft
Top Width	28.25	ft
Actual Depth	0.42	ft
Critical Elevation	99.62	ft
Critical Slope	0.006806	ft/ft
Velocity	3.93	ft/s
Velocity Head	0.24	ft
Specific Energy	99.79	ft
Froude Number	1.57	
Flow Type	Supercritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

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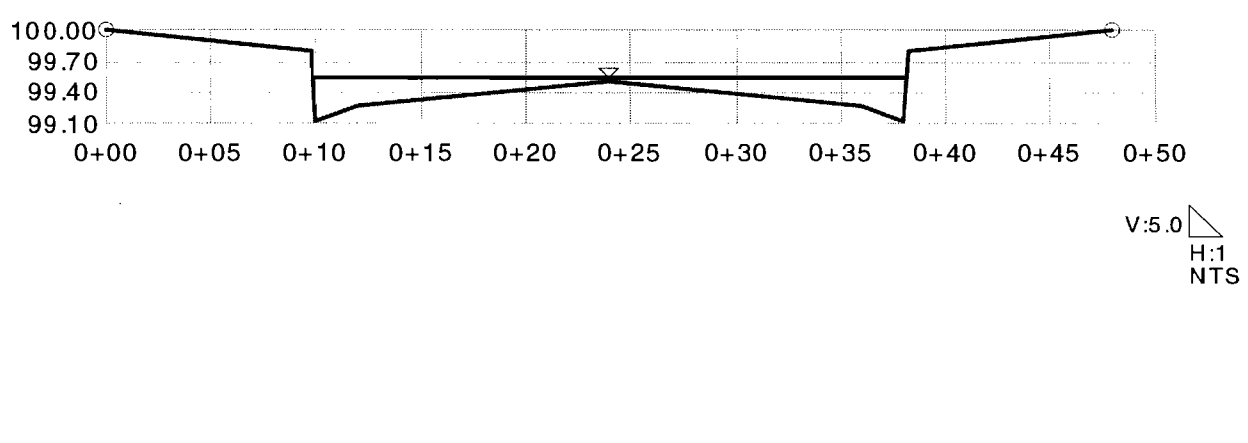
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-3
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.018500	ft/ft
Water Surface Elevation	99.55	ft
Elevation Range	99.13 to 100.00	
Discharge	21.59	cfs



AP-4
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-4
Flow Element	Irregular Chanı
Method	Manning's Forı
Solve For	Channel Depth

Input Data		
Slope	007600	ft/ft
Dischargı	9.00	cfs

Options	
Current Roughness Methc	›ved Lotter's Method
Open Channel Weighting	›ved Lotter's Method
Closed Channel Weightin(	Horton's Method

Results		
Mannings Coefficiei	0.017	
Water Surface Elev	99.80	ft
Elevation Range	.52 to 100.00	
Flow Area	4.1	ft²
Wetted Perimeter	26.07	ft
Top Width	25.99	ft
Actual Depth	0.28	ft
Critical Elevation	99.80	ft
Critical Slope	0.007871	ft/ft
Velocity	2.21	ft/s
Velocity Head	0.08	ft
Specific Energy	99.87	ft
Froude Number	0.98	
Flow Type	Subcritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+46	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+11	99.52
0+12	99.54
0+23	99.76
0+34	99.54
0+35	99.52
0+36	99.80
0+46	100.00

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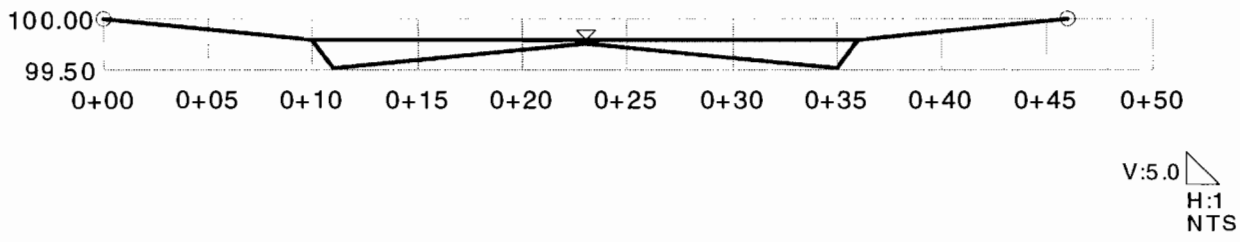
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.007600	ft/ft
Water Surface Elevation	99.80	ft
Elevation Range	99.52 to 100.00	
Discharge	9.00	cfs



AP-5
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-5
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	028100	ft/ft
Dischargi	28.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficiei	0.017	
Water Surface Elev	99.55	ft
Elevation Range	.13 to 100.00	
Flow Area	5.7	ft²
Wetted Perimeter	28.90	ft
Top Width	28.25	ft
Actual Depth	0.42	ft
Critical Elevation	99.67	ft
Critical Slope	0.006447	ft/ft
Velocity	4.94	ft/s
Velocity Head	0.38	ft
Specific Energy	99.93	ft
Froude Number	1.95	
Flow Type	Supercritical	

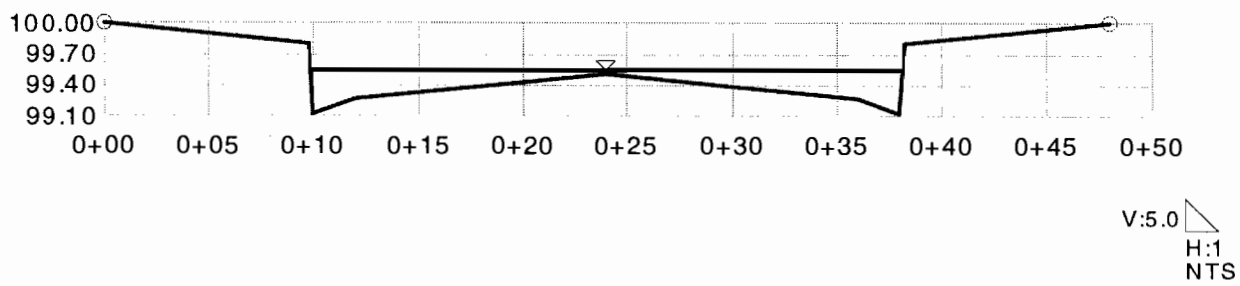
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.028100	ft/ft
Water Surface Elevation	99.55	ft
Elevation Range	99.13 to 100.00	
Discharge	28.00	cfs



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AP-6
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-6
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Dischargı	15.20	cfs

Options	
Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.017	
Water Surface Elev	99.54	ft
Elevation Range	.13 to 100.00	
Flow Area	5.4	ft²
Wetted Perimeter	28.87	ft
Top Width	28.25	ft
Actual Depth	0.41	ft
Critical Elevation	99.56	ft
Critical Slope	0.007329	ft/ft
Velocity	2.84	ft/s
Velocity Head	0.13	ft
Specific Energy	99.67	ft
Froude Number	1.15	
Flow Type	Supercritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

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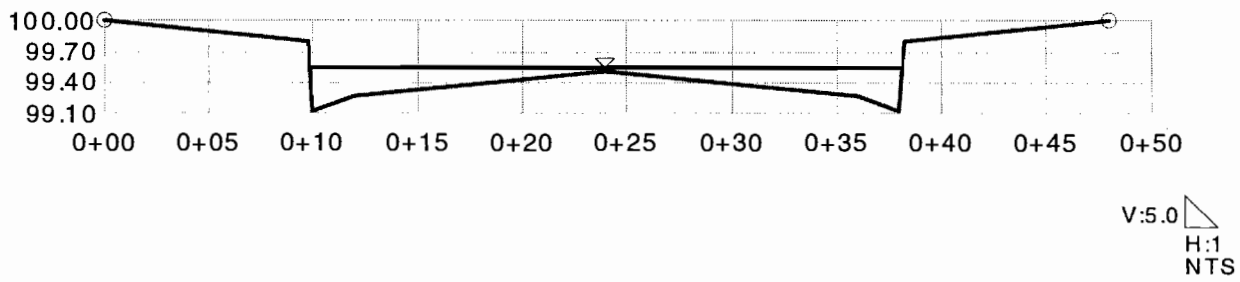
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-6
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.010000	ft/ft
Water Surface Elevation	99.54	ft
Elevation Range	99.13 to 100.00	
Discharge	15.20	cfs



AP-7
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-7
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010600	ft/ft
Dischargı	15.00	cfs

Options	
Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin(	Horton's Method

Results		
Mannings Coefficiei	0.017	
Water Surface Elev	99.54	ft
Elevation Range	.13 to 100.00	
Flow Area	5.2	ft²
Wetted Perimeter	28.86	ft
Top Width	28.24	ft
Actual Depth	0.41	ft
Critical Elevation	99.56	ft
Critical Slope	0.007350	ft/ft
Velocity	2.88	ft/s
Velocity Head	0.13	ft
Specific Energy	99.67	ft
Froude Number	1.18	
Flow Type	Supercritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

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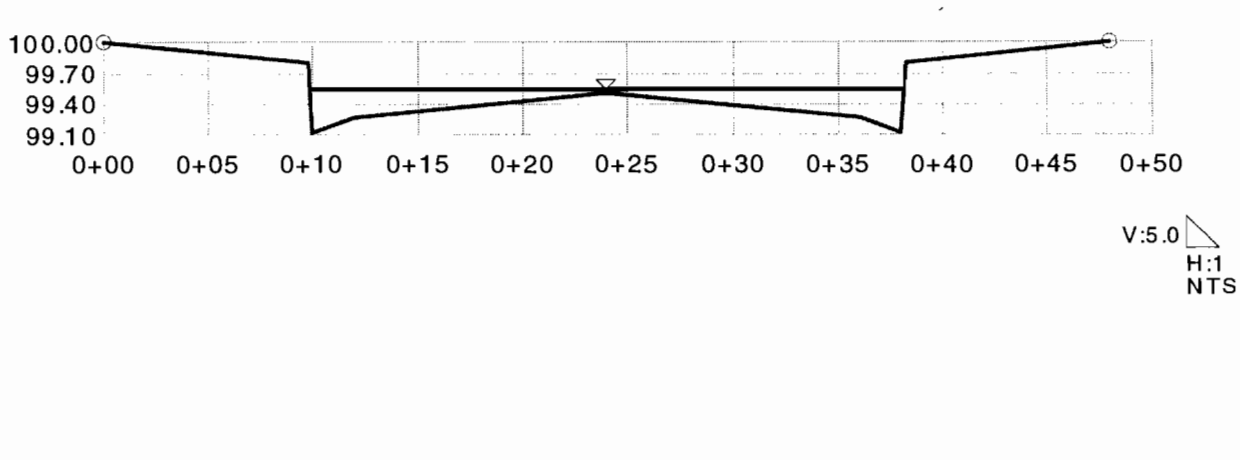
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-7
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.010600	ft/ft
Water Surface Elevation	99.54	ft
Elevation Range	99.13 to 100.00	
Discharge	15.00	cfs



AP-8
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	0.010000	ft/ft
Discharge	21.00	cfs

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

Results		
Mannings Coefficient	0.017	
Water Surface Elevation	99.58	ft
Elevation Range	99.13 to 100.00	
Flow Area	6.5	ft²
Wetted Perimeter	28.96	ft
Top Width	28.27	ft
Actual Depth	0.45	ft
Critical Elevation	99.61	ft
Critical Slope	0.006846	ft/ft
Velocity	3.23	ft/s
Velocity Head	0.16	ft
Specific Energy	99.75	ft
Froude Number	1.19	
Flow Type	Supercritical	

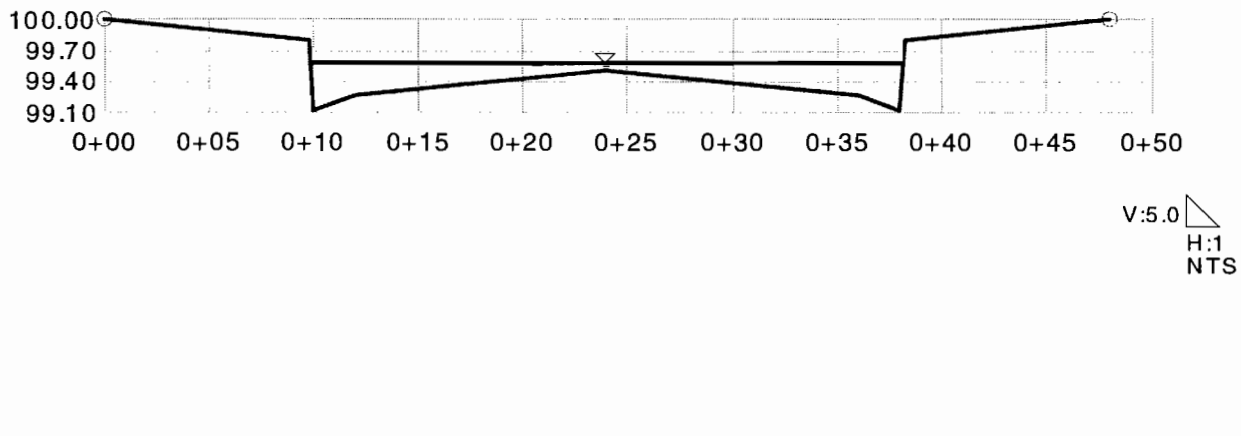
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-8
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.010000	ft/ft
Water Surface Elevation	99.58	ft
Elevation Range	99.13 to 100.00	
Discharge	21.00	cfs



AP-9
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-9
Flow Element	Irregular Chanı
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Dischargı	16.00	cfs

Options	
Current Roughness Methc	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficiei	0.017	
Water Surface Elev	99.55	ft
Elevation Range	.13 to 100.00	
Flow Area	5.5	ft²
Wetted Perimeter	28.89	ft
Top Width	28.25	ft
Actual Depth	0.42	ft
Critical Elevation	99.57	ft
Critical Slope	0.007250	ft/ft
Velocity	2.90	ft/s
Velocity Head	0.13	ft
Specific Energy	99.68	ft
Froude Number	1.16	
Flow Type	Supercritical	

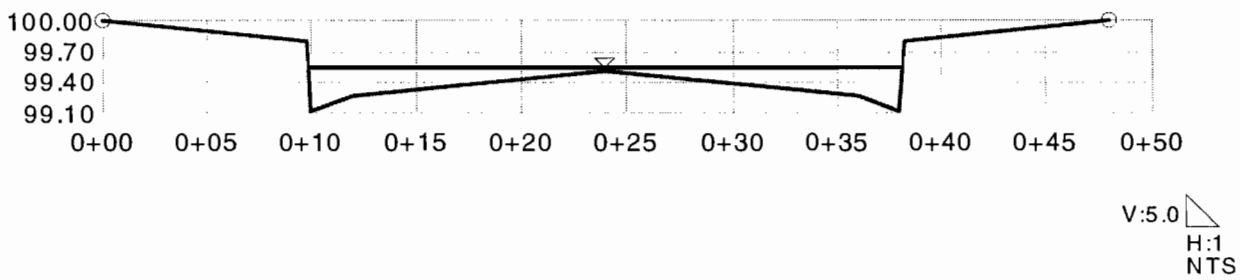
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-9
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.017	
Slope	0.010000	ft/ft
Water Surface Elev	99.55	ft
Elevation Range	.13 to 100.00	
Discharge	16.00	cfs



AP-10
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-10
Flow Element	Irregular Chan
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	026400	ft/ft
Dischargı	13.00	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.017	
Water Surface Elev	99.48	ft
Elevation Range	.13 to 100.00	
Flow Area	3.5	ft²
Wetted Perimeter	26.42	ft
Top Width	25.89	ft
Actual Depth	0.35	ft
Critical Elevation	99.54	ft
Critical Slope	0.007577	ft/ft
Velocity	3.70	ft/s
Velocity Head	0.21	ft
Specific Energy	99.69	ft
Froude Number	1.77	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

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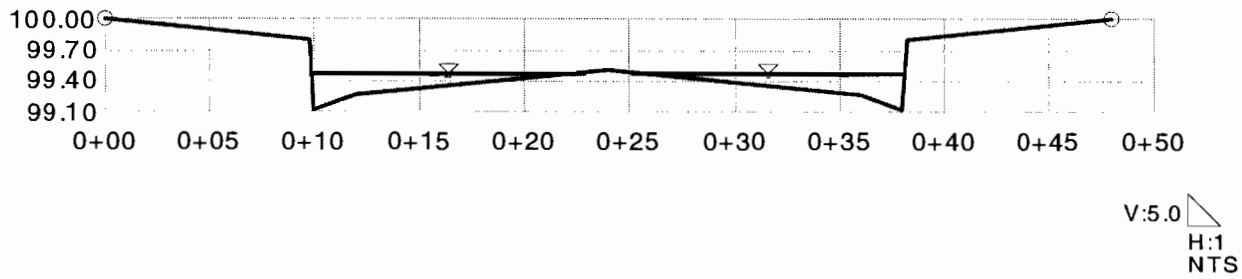
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-10
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.026400	ft/ft
Water Surface Elevation	99.48	ft
Elevation Range	99.13 to 100.00	
Discharge	13.00	cfs



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AP-11
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-11
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	010000	ft/ft
Discharg	21.50	cfs

Options	
Current Roughness Meth	oved Lotter's Method
Open Channel Weighting	oved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.017	
Water Surface Elev	99.59	ft
Elevation Range	.13 to 100.00	
Flow Area	6.6	ft²
Wetted Perimeter	28.97	ft
Top Width	28.27	ft
Actual Depth	0.46	ft
Critical Elevation	99.62	ft
Critical Slope	0.006812	ft/ft
Velocity	3.26	ft/s
Velocity Head	0.17	ft
Specific Energy	99.75	ft
Froude Number	1.19	
Flow Type	Supercritical	

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00	0+48	0.017

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+24	99.50
0+36	99.26
0+38	99.13
0+38	99.80
0+48	100.00

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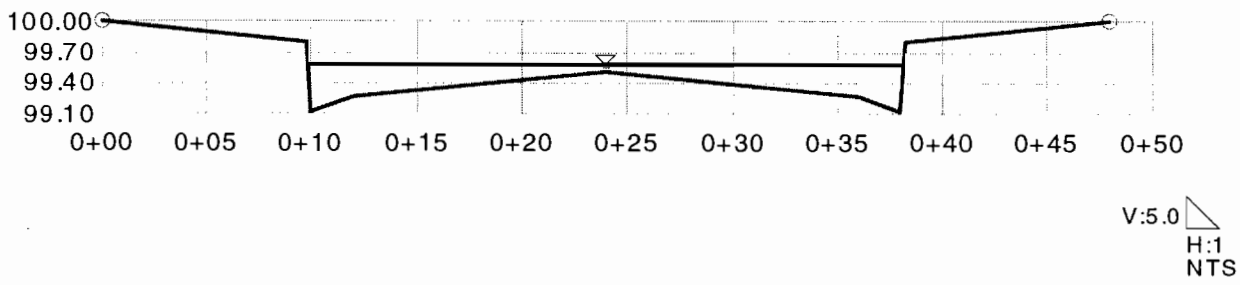
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-11
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Section Data		
Mannings Coefficie	0.017	
Slope	0.010000	ft/ft
Water Surface Elev	99.59	ft
Elevation Range	.13 to 100.00	
Discharge	21.50	cfs



AP-12
Worksheet for Irregular Channel

Project Description	
Worksheet	AP-12
Flow Element	Irregular Chani
Method	Manning's For
Solve For	Channel Depth

Input Data		
Slope	005000	ft/ft
Dischargi	11.31	cfs

Options	
Current Roughness Metho	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficiei	0.017	
Water Surface Elev	99.56	ft
Elevation Range	.13 to 100.00	
Flow Area	5.9	ft²
Wetted Perimeter	34.67	ft
Top Width	34.02	ft
Actual Depth	0.43	ft
Critical Elevation	99.53	ft
Critical Slope	0.007955	ft/ft
Velocity	1.91	ft/s
Velocity Head	0.06	ft
Specific Energy	99.61	ft
Froude Number	0.80	
Flow Type	Subcritical	

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+56	0.017

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	100.00
0+10	99.80
0+10	99.13
0+12	99.26
0+28	99.58
0+44	99.26
0+46	99.13
0+46	99.80
0+56	100.00

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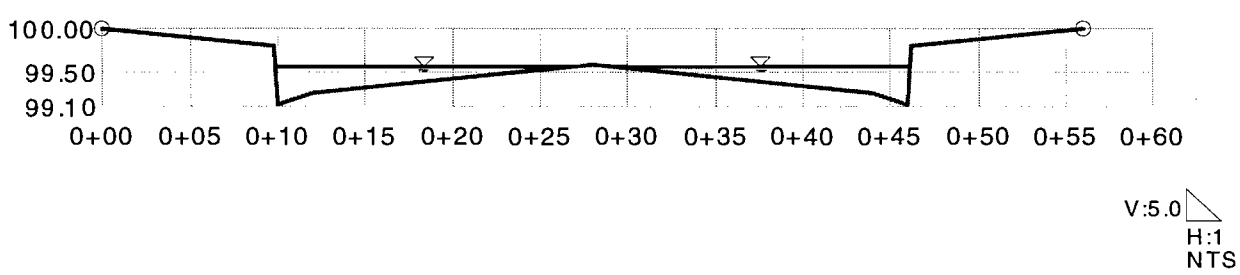
Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	AP-12
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.017	
Slope	0.005000	ft/ft
Water Surface Elevation	99.56	ft
Elevation Range	99.13 to 100.00	
Discharge	11.31	cfs



UNIT 5 - DI-1A & 1B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-1A/1B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	10.80	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.018500	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.67	
Intercepted Flow	7.28	cfs
Bypass Flow	3.52	cfs
Spread	15.60	ft
Depth	0.36	ft
Flow Area	1.9	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	3.95	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.07	
Grate Flow Ratio	0.50	
Equivalent Cross Slo	064957	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.18	
Total Interception Ler	29.28	ft

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UNIT 5 - DI-2A & 2B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-2A/2B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	14.00	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.028100	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	clude None

Results		
Efficiency	0.62	
Intercepted Flow	8.69	cfs
Bypass Flow	5.31	cfs
Spread	15.92	ft
Depth	0.37	ft
Flow Area	2.1	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	5.02	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.04	
Grate Flow Ratio	0.48	
Equivalent Cross Slo	064087	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.14	
Total Interception Ler	37.31	ft

UNIT 5 - DI-3A & 3B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-3A/3B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	7.60	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.010000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	) mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.76	
Intercepted Flow	5.77	cfs
Bypass Flow	1.83	cfs
Spread	15.33	ft
Depth	0.33	ft
Flow Area	1.6	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	2.77	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.12	
Grate Flow Ratio	0.54	
Equivalent Cross Slo	065724	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.25	
Total Interception Ler	20.85	ft

UNIT 6 - DI-4A & 4B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-4A/4B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	10.50	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.019200	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	) mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.68	
Intercepted Flow	7.15	cfs
Bypass Flow	3.35	cfs
Spread	15.32	ft
Depth	0.35	ft
Flow Area	1.8	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	3.98	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.06	
Grate Flow Ratio	0.51	
Equivalent Cross Slo	065776	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.18	
Total Interception Ler	29.04	ft

UNIT 6 - DI-5A & 5B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-5A/5B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	7.98	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.010000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Leng	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	ɔ mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.75	
Intercepted Flow	5.97	cfs
Bypass Flow	2.01	cfs
Spread	15.63	ft
Depth	0.34	ft
Flow Area	1.7	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	2.81	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.11	
Grate Flow Ratio	0.53	
Equivalent Cross Slo	064870	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.24	
Total Interception Ler	21.45	ft

UNIT 6 - DI 6A & 6B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-6A/6B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	6.50	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.026400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	ɔ mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.80	
Intercepted Flow	5.18	cfs
Bypass Flow	1.32	cfs
Spread	11.82	ft
Depth	0.28	ft
Flow Area	1.0	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	3.98	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.06	
Grate Flow Ratio	0.66	
Equivalent Cross Slo	078447	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.22	
Total Interception Ler	23.50	ft

GRATE INLET 7A
Worksheet for Grate Inlet In Sag

Project Description	
Worksheet	DI 7A
Type	Grate Inlet In Si
Solve For	Spread

Input Data		
Discharge	21.50	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Grate Width	2.00	ft
Grate Length	3.95	ft
Local Depression	2.7	in
Local Depression \	2.50	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	50.0	%

Results		
Spread	17.60	ft
Depth	1.04	ft
Gutter Depression	1.0	in
Total Depression	3.8	in
Open Grate Area	3.6	ft²
Active Grate Weir Le	5.95	ft

UNIT 6 - DI 8A & 8B
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	DI-8A/8B
Type	Combination Inlet On
Solve For	Efficiency

Input Data		
Discharge	6.74	cfs
Local Depression	2.7	in
Local Depression \	2.50	ft
Slope	0.005000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.017	
Curb Opening Len	7.45	ft
Grate Width	2.00	ft
Grate Length	2.95	ft
Grate Type	ɔ mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	clude None

Results		
Efficiency	0.81	
Intercepted Flow	5.44	cfs
Bypass Flow	1.30	cfs
Spread	16.77	ft
Depth	0.34	ft
Flow Area	1.7	ft²
Gutter Depression	1.0	in
Total Depression	3.8	in
Velocity	1.99	ft/s
Splash Over Velocity	8.56	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.19	
Grate Flow Ratio	0.53	
Equivalent Cross Slo	061887	ft/ft
Active Grate Length	2.21	ft
Length Factor	0.31	
Total Interception Ler	16.70	ft

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Seville Units 1, 3, 5, 6.
Junction Loss Coefficient Calculations
11/20/2002

Unit 3

Pipe	Minor Losses	Velocity Head	JLC
1	1.12	6.75	0.17
2	0.96	6.75	0.14
3	1.41	6.75	0.21
4	1.27	4.84	0.26
6	0.30	5.32	0.06
7	0.12	0.35	0.34
8/13	0.54	5.29	0.10
14	0.14	0.78	0.18
15	0.51	4.95	0.10
20	0.26	4.63	0.06
21	0.09	0.31	0.29
22/27	0.97	4.60	0.21
28	1.12	9.04	0.12
30	0.48	8.23	0.06
32/37	1.02	8.17	0.13
38	1.28	7.08	0.18
40	0.21	4.11	0.05
42	0.19	3.85	0.05
48	1.11	3.85	0.29
51	0.19	3.85	0.05

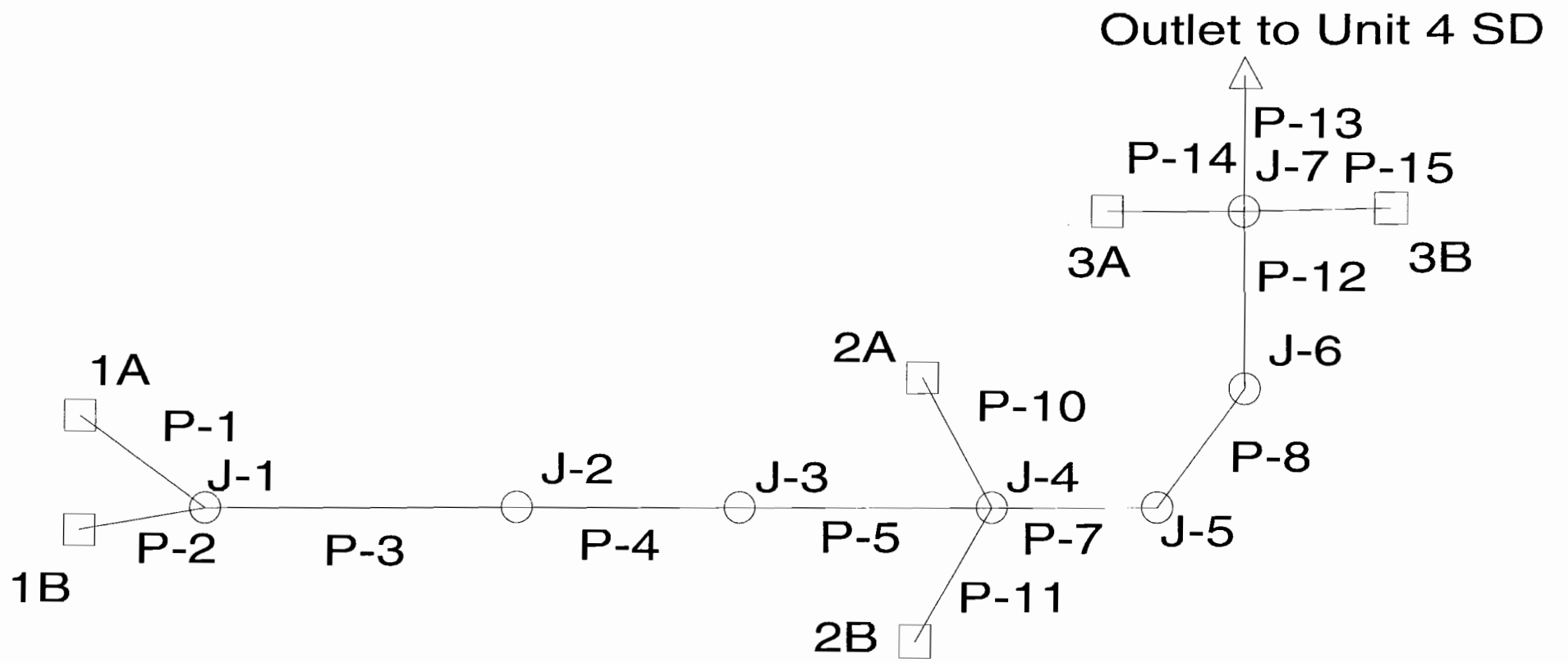
Unit 6

Pipe	Minor Losses	Velocity Head	JLC
55	1.65	2.23	0.74
58	0.16	0.71	0.22
62	0.03	0.56	0.05
65	0.43	0.56	0.77
67	0.11	0.56	0.19
69	0.11	0.56	0.19
70	0.13	0.56	0.23
73	0.09	0.69	0.13
74	0.73	0.69	1.05
76	0.03	0.55	0.05

Unit 6 - Offsite

Pipe	Minor Losses	Velocity Head	JLC
54	0.00	1.12	0.00
57	0.13	2.64	0.05
59	0.13	2.64	0.05
63	0.13	2.64	0.05

Note: Required for analyzing the storm drain within Hydraflow.



Project Title: Seville Unit 5 Storm Drain
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Project Engineer: Wilson & Company
StormCAD v1.0

Combined Pipe/Node Report

Pipe	Upstream Node	Downstream Node	Length (ft)	Inlet Area (acres)	Weighted Roughness Coefficient	Inlet CA (acres)	Total CA (acres)	Inlet Discharge (cfs)	Section Size	Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description
P-15	3B	J-7	4.00	0.00	0.00	0.00	0.00	0.00	18 inch	21.65	3.28	5,371.67	5,371.50	0.042500	
P-14	3A	J-7	22.50	0.00	0.00	0.00	0.00	0.00	18 inch	9.13	3.28	5,371.67	5,371.50	0.007556	
P-11	2B	J-4	7.00	0.00	0.00	0.00	0.00	0.00	18 inch	15.38	4.92	5,375.20	5,375.05	0.021429	
P-10	2A	J-4	24.00	0.00	0.00	0.00	0.00	0.00	18 inch	15.90	4.92	5,376.60	5,376.05	0.022917	
P-1	1A	J-1	23.00	0.00	0.00	0.00	0.00	0.00	18 inch	18.32	5.05	5,390.00	5,389.30	0.030435	
P-2	1B	J-1	6.00	0.00	0.00	0.00	0.00	0.00	18 inch	16.61	5.05	5,389.45	5,389.30	0.025000	
P-3	J-1	J-2	101.50	N/A	N/A	N/A	0.00	N/A	24 inch	30.54	7.93	5,389.20	5,387.35	0.018227	
P-4	J-2	J-3	241.00	N/A	N/A	N/A	0.00	N/A	24 inch	35.39	8.53	5,387.25	5,381.35	0.024481	
P-5	J-3	J-4	208.00	N/A	N/A	N/A	0.00	N/A	24 inch	35.18	5.49	5,381.25	5,376.22	0.024183	
P-7	J-4	J-5	33.00	N/A	N/A	N/A	0.00	N/A	24 inch	44.38	10.19	5,376.12	5,374.85	0.038485	
P-8	J-5	J-6	70.50	N/A	N/A	N/A	0.00	N/A	24 inch	34.61	10.19	5,374.75	5,373.10	0.023404	
P-12	J-6	J-7	158.00	N/A	N/A	N/A	0.00	N/A	36 inch	66.69	4.53	5,372.10	5,370.52	0.010000	
P-13	J-7	Outlet to Unit 4	10.00	N/A	N/A	N/A	0.00	N/A	36 inch	66.69	6.17	5,370.10	5,370.00	0.010000	

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Node Report

Node	Inlet Area (acres)	Weighted Roughness Coefficient	Inlet CA (acres)	Externa CA (acres)	Total CA (acres)	Inlet TC (min)	Externa TC (min)	Upstream Flow Time (min)	System Flow Time (min)	System Intensity (in/hr)	Total Watershed (CIA) (cfs)	Additiona Flow (cfs)	Carryover (cfs)	Known Flow (cfs)	Total Upstream Added (cfs)	Discharge (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	HGL In (ft)	HGL Out (ft)	Inlet Intensity (in/hr)
3B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	0.00	0.00	0.00	5.80	5,380.15	5,380.15	4,375.88	4,375.88	0.00
3A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	0.00	0.00	0.00	5.80	5,380.15	5,380.15	4,375.94	4,375.94	0.00
2B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	8.70	5,383.96	5,383.96	4,378.36	4,378.36	0.00
2A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	8.70	5,383.62	5,383.62	4,378.47	4,378.47	0.00
1A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.30	0.00	0.00	0.00	7.30	5,396.96	5,396.96	4,391.05	4,391.05	0.00
1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.30	0.00	0.00	0.00	7.30	5,396.96	5,396.96	4,390.50	4,390.50	0.00
J-1	N/A	N/A	N/A	N/A	0.00	N/A	0.00	0.08	0.08	0.00	0.00	N/A	N/A	N/A	14.60	14.60	5,397.27	5,397.27	4,390.58	4,390.58	N/A
J-2	N/A	N/A	N/A	N/A	0.00	N/A	0.00	0.29	0.29	0.00	0.00	N/A	N/A	N/A	14.60	14.60	5,395.39	5,395.39	4,388.63	4,388.63	N/A
J-3	N/A	N/A	N/A	N/A	0.00	N/A	0.00	0.76	0.76	0.00	0.00	N/A	N/A	N/A	14.60	14.60	5,389.37	5,389.37	4,382.63	4,382.63	N/A
J-4	N/A	N/A	N/A	N/A	0.00	N/A	0.00	1.39	1.39	0.00	0.00	N/A	N/A	N/A	32.00	32.00	5,384.12	5,384.12	4,378.31	4,378.31	N/A
J-5	N/A	N/A	N/A	N/A	0.00	N/A	0.00	1.45	1.45	0.00	0.00	N/A	N/A	N/A	32.00	32.00	5,382.76	5,382.76	4,377.65	4,377.65	N/A
J-6	N/A	N/A	N/A	N/A	0.00	N/A	0.00	1.56	1.56	0.00	0.00	N/A	N/A	N/A	32.00	32.00	5,381.87	5,381.87	4,376.24	4,376.24	N/A
J-7	N/A	N/A	N/A	N/A	0.00	N/A	0.00	2.14	2.14	0.00	0.00	N/A	N/A	N/A	43.60	43.60	5,380.49	5,380.49	4,375.87	4,375.87	N/A
Outlet to Unit 4	N/A	N/A	N/A	N/A	0.00	N/A	0.00	2.17	2.17	0.00	0.00	N/A	N/A	N/A	43.60	N/A	5,381.17	5,381.17	4,375.83	4,375.83	N/A

Pipe Report

Pipe	Upstream Node	Downstream Node	Inlet Area (acres)	Weighted Roughness Coefficient	Inlet CA (acres)	Total CA (acres)	System Intensity (in/hr)	Discharge (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Roughness	Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Upstream HGL (ft)
P-15	3B	J-7	0.00	0.00	0.00	0.00	0.00	5.80	4.00	0.042500	18 inch	0.013	21.65	5,371.67	5,371.50	5,380.15	5,380.49	6.98	7.49	5,375.88
P-14	3A	J-7	0.00	0.00	0.00	0.00	0.00	5.80	22.50	0.007556	18 inch	0.013	9.13	5,371.67	5,371.50	5,380.15	5,380.49	6.98	7.49	5,375.94
P-11	2B	J-4	0.00	0.00	0.00	0.00	0.00	8.70	7.00	0.021429	18 inch	0.013	15.38	5,375.20	5,375.05	5,383.96	5,384.12	7.26	7.57	5,378.36
P-10	2A	J-4	0.00	0.00	0.00	0.00	0.00	8.70	24.00	0.022917	18 inch	0.013	15.90	5,376.60	5,376.05	5,383.62	5,384.12	5.52	6.57	5,378.47
P-1	1A	J-1	0.00	0.00	0.00	0.00	0.00	7.30	23.00	0.030435	18 inch	0.013	18.32	5,390.00	5,389.30	5,396.96	5,397.27	5.46	6.47	5,391.05
P-2	1B	J-1	0.00	0.00	0.00	0.00	0.00	7.30	6.00	0.025000	18 inch	0.013	16.61	5,389.45	5,389.30	5,396.96	5,397.27	6.01	6.47	5,390.50
P-3	J-1	J-2	N/A	N/A	N/A	0.00	0.00	14.60	101.50	0.018227	24 inch	0.013	30.54	5,389.20	5,387.35	5,397.27	5,395.39	6.07	6.04	5,390.58
P-4	J-2	J-3	N/A	N/A	N/A	0.00	0.00	14.60	241.00	0.024481	24 inch	0.013	35.39	5,387.25	5,381.35	5,395.39	5,389.37	6.14	6.02	5,388.63
P-5	J-3	J-4	N/A	N/A	N/A	0.00	0.00	14.60	208.00	0.024183	24 inch	0.013	35.18	5,381.25	5,376.22	5,389.37	5,384.12	6.12	5.90	5,382.63
P-7	J-4	J-5	N/A	N/A	N/A	0.00	0.00	32.00	33.00	0.038485	24 inch	0.013	44.38	5,376.12	5,374.85	5,384.12	5,382.76	6.00	5.91	5,378.31
P-8	J-5	J-6	N/A	N/A	N/A	0.00	0.00	32.00	70.50	0.023404	24 inch	0.013	34.61	5,374.75	5,373.10	5,382.76	5,381.87	6.01	6.77	5,377.65
P-12	J-6	J-7	N/A	N/A	N/A	0.00	0.00	32.00	158.00	0.010000	36 inch	0.013	66.69	5,372.10	5,370.52	5,381.87	5,380.49	6.77	6.97	5,376.24
P-13	J-7	Outlet to Unit 4	N/A	N/A	N/A	0.00	0.00	43.60	10.00	0.010000	36 inch	0.013	66.69	5,370.10	5,370.00	5,380.49	5,381.17	7.39	8.17	5,375.87

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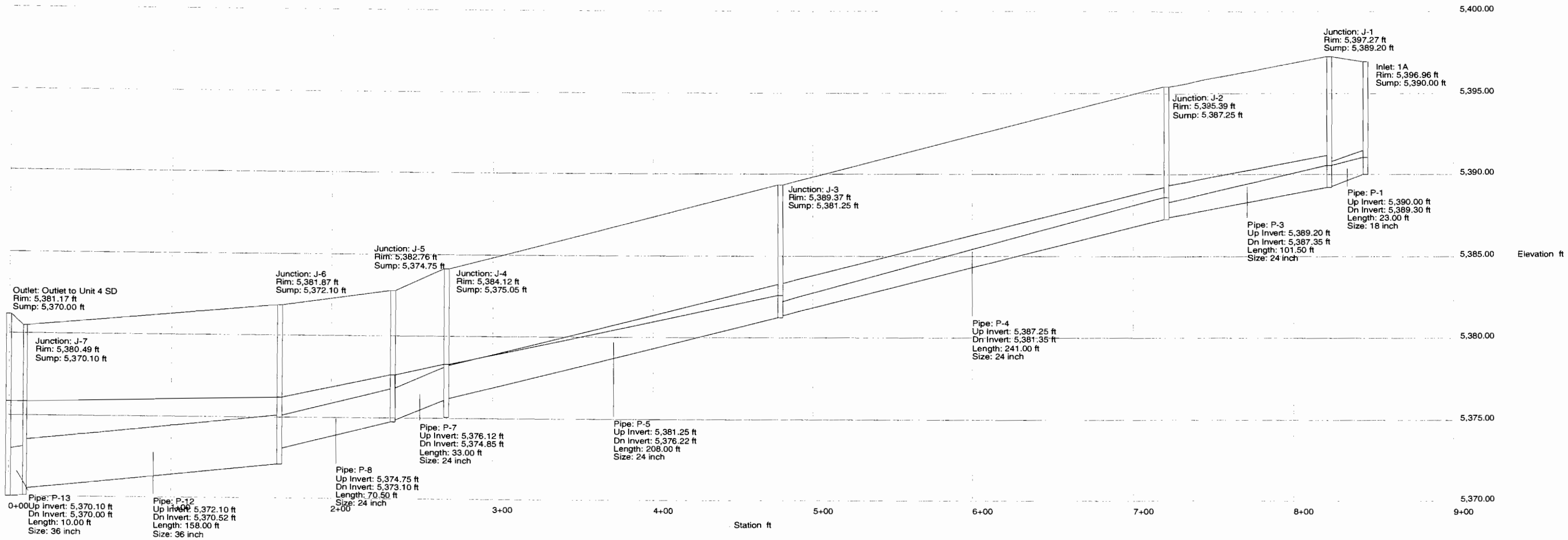
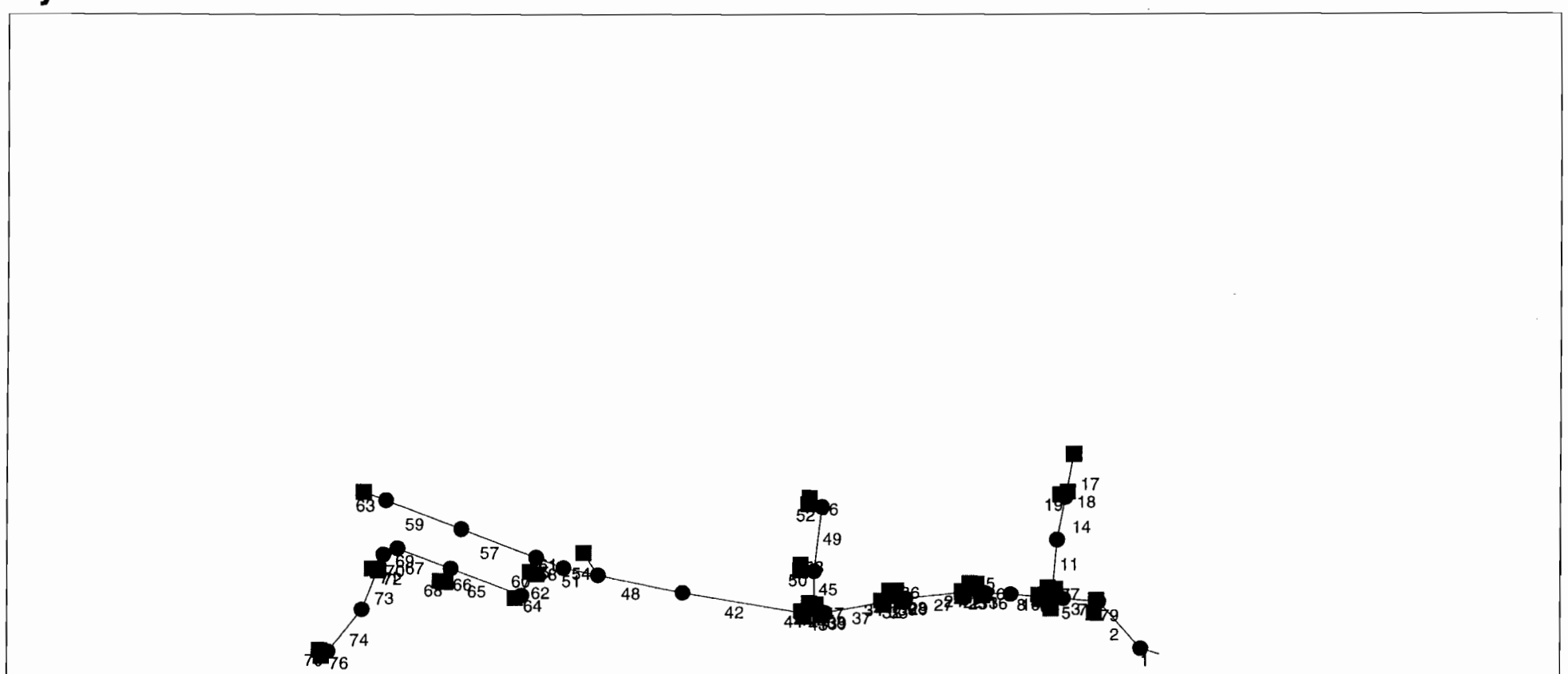


Hydraflow Plan View



Project file: UNIT6.stm	IDF file: sampleFHA.IDF	No. Lines: 79	01-02-2003

Hydraflow Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	72.0	-163.0	MH	0.00	0.00	0.00	0.0	5300.80	1.00	5301.52	72	Cir	0.013	0.17	5309.95	1
2	1	239.0	32.0	MH	0.00	0.00	0.00	0.0	5301.90	1.00	5304.29	72	Cir	0.013	0.14	5318.50	2
3	2	131.0	-44.0	MH	0.00	0.00	0.00	0.0	5304.29	0.99	5305.59	72	Cir	0.013	0.21	5320.89	3
4	3	24.0	0.0	MH	0.00	0.00	0.00	0.0	5305.59	1.04	5305.84	72	Cir	0.013	0.26	5321.00	4
5	3	61.0	-45.0	Genr	90.30	0.00	0.00	0.0	5306.59	1.00	5307.20	48	Cir	0.013	0.00	5321.70	5
6	4	56.0	0.0	MH	0.00	0.00	0.00	0.0	5305.84	2.23	5307.09	66	Cir	0.013	0.06	5322.30	6
7	4	36.0	60.0	MH	0.00	0.00	0.00	0.0	5306.84	0.95	5307.18	48	Cir	0.013	0.34	5322.05	7
8	6	116.0	0.0	MH	0.00	0.00	0.00	0.0	5307.09	3.76	5311.45	66	Cir	0.013	0.00	5325.50	8
9	6	13.0	-60.0	Comb	0.70	0.00	0.00	0.0	5311.28	2.46	5311.60	18	Cir	0.013	0.00	5322.06	9
10	6	15.0	31.0	Comb	0.70	0.00	0.00	0.0	5313.32	5.07	5314.08	18	Cir	0.013	0.00	5322.06	10
11	7	190.0	30.0	MH	0.00	0.00	0.00	0.0	5307.68	4.44	5316.11	36	Cir	0.013	0.05	5325.11	11
12	7	22.0	-37.0	Comb	4.56	0.00	0.00	0.0	5313.29	4.00	5314.17	18	Cir	0.013	0.00	5321.71	12
13	8	95.0	-2.0	MH	0.00	0.00	0.00	0.0	5311.45	3.76	5315.02	66	Cir	0.013	0.10	5327.62	13
14	11	164.0	6.0	MH	0.00	0.00	0.00	0.0	5316.21	2.01	5319.50	36	Cir	0.013	0.18	5328.40	14
15	13	15.0	-3.0	MH	0.00	0.00	0.00	0.0	5315.02	4.00	5315.62	66	Cir	0.013	0.10	5328.30	15
16	13	16.0	-48.0	Genr	14.20	0.00	0.00	0.0	5316.58	2.00	5316.90	24	Cir	0.013	0.00	5330.50	16
17	14	162.0	0.0	Genr	28.20	0.00	0.00	0.0	5319.60	2.00	5322.84	30	Cir	0.013	0.00	5331.65	17
18	14	21.0	13.0	Comb	11.00	0.00	0.00	0.0	5323.43	2.86	5324.03	18	Cir	0.013	0.00	5328.45	18
19	14	21.0	-75.0	Comb	11.00	0.00	0.00	0.0	5323.43	2.86	5324.03	18	Cir	0.013	0.00	5328.08	19
20	15	62.0	0.0	MH	0.00	0.00	0.00	0.0	5315.62	4.00	5318.10	66	Cir	0.013	0.06	5330.50	20
21	15	30.0	42.0	MH	0.00	0.00	0.00	0.0	5317.27	4.00	5318.47	24	Cir	0.013	0.28	5329.76	21

Hydraflow Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
22	20	43.0	-2.0	None	0.00	0.00	0.00	0.0	5318.10	4.00	5319.82	66	Cir	0.013	0.00	5332.00	22
23	20	13.0	-62.0	Comb	0.74	0.00	0.00	0.0	5319.94	2.00	5320.20	18	Cir	0.013	0.00	5330.50	23
24	20	13.0	35.0	Comb	0.74	0.00	0.00	0.0	5320.10	5.00	5320.75	18	Cir	0.013	0.00	5330.45	24
25	21	29.0	0.0	Comb	7.00	0.00	0.00	0.0	5318.57	1.83	5319.10	18	Cir	0.013	0.00	5329.50	25
26	21	16.0	61.0	Comb	7.00	0.00	0.00	0.0	5318.57	4.00	5319.21	18	Cir	0.013	0.00	5329.50	26
27	22	178.0	-4.0	MH	0.00	0.00	0.00	0.0	5319.82	3.99	5326.92	66	Cir	0.013	0.21	5339.34	27
28	27	16.0	-2.0	MH	0.00	0.00	0.00	0.0	5326.92	4.00	5327.56	66	Cir	0.013	0.12	5339.84	28
29	27	15.0	-50.0	Genr	25.00	0.00	0.00	0.0	5328.73	2.47	5329.10	24	Cir	0.013	0.00	5339.50	29
30	28	62.0	-2.0	MH	0.00	0.00	0.00	0.0	5327.56	4.03	5330.06	66	Cir	0.013	0.06	5342.42	30
31	28	25.0	43.0	MH	0.00	0.00	0.00	0.0	5329.31	5.00	5330.56	24	Cir	0.013	0.00	5341.51	31
32	30	56.0	-2.0	None	0.00	0.00	0.00	0.0	5331.06	4.00	5333.30	54	Cir	0.013	0.13	5345.00	32
33	30	13.0	-62.0	Comb	0.77	0.00	0.00	0.0	5332.28	2.46	5332.60	18	Cir	0.013	0.00	5342.42	33
34	30	15.0	30.0	Comb	0.77	0.00	0.00	0.0	5332.06	5.00	5332.81	18	Cir	0.013	0.00	5342.43	34
35	31	30.0	0.0	Comb	8.75	0.00	0.00	0.0	5330.66	3.00	5331.56	18	Cir	0.013	0.00	5341.31	35
36	31	18.0	57.0	Comb	8.75	0.00	0.00	0.0	5330.66	3.00	5331.20	18	Cir	0.013	0.00	5341.31	36
37	32	175.0	2.0	MH	0.00	0.00	0.00	0.0	5333.30	4.00	5340.30	54	Cir	0.013	0.13	5351.75	37
38	37	17.0	8.0	MH	0.00	0.00	0.00	0.0	5340.30	4.06	5340.99	54	Cir	0.013	0.18	5352.30	38
39	37	14.0	-37.0	Genr	25.00	0.00	0.00	0.0	5341.39	1.71	5341.63	24	Cir	0.013	0.00	5351.75	39
40	38	57.0	0.0	MH	0.00	0.00	0.00	0.0	5340.99	4.03	5343.29	54	Cir	0.013	0.05	5354.64	40
41	38	30.0	44.0	MH	0.00	0.00	0.00	0.0	5341.74	3.90	5342.91	36	Cir	0.013	0.00	5354.14	41
42	40	464.0	12.0	MH	0.00	0.00	0.00	0.0	5343.29	3.10	5357.67	54	Cir	0.013	0.05	5369.13	42

Hydraflow Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
43	40	13.0	-66.0	Comb	4.10	0.00	0.00	0.0	5344.63	2.00	5344.89	18	Cir	0.013	0.00	5354.87	43
44	40	16.0	33.0	Comb	4.10	0.00	0.00	0.0	5344.79	5.00	5345.59	18	Cir	0.013	0.00	5354.87	44
45	41	140.0	48.0	MH	0.00	0.00	0.00	0.0	5343.41	2.75	5347.26	30	Cir	0.013	0.00	5355.48	45
46	41	27.0	0.0	Comb	13.80	0.00	0.00	0.0	5346.12	1.00	5346.39	18	Cir	0.013	0.00	5353.90	46
47	41	16.0	68.0	Comb	13.80	0.00	0.00	0.0	5347.00	1.00	5347.16	18	Cir	0.013	0.00	5353.90	47
48	42	323.0	2.0	MH	0.00	0.00	0.00	0.0	5357.68	1.09	5361.19	54	Cir	0.013	0.20	5373.20	48
49	45	243.0	7.0	MH	0.00	0.00	0.00	0.0	5347.36	1.00	5349.79	30	Cir	0.013	0.00	5357.78	49
50	45	53.0	-87.0	Comb	8.92	0.00	0.00	0.0	5347.76	1.00	5348.29	24	Cir	0.013	0.00	5356.18	50
51	48	132.0	0.0	MH	2.34	0.00	0.00	0.0	5361.19	1.08	5362.62	54	Cir	0.013	0.05	5372.43	51
52	49	53.0	-85.0	Comb	17.78	0.00	0.00	0.0	5349.90	1.00	5350.43	24	Cir	0.013	0.00	5358.29	52
53	50	23.0	90.0	Comb	8.92	0.00	0.00	0.0	5348.39	1.00	5348.62	18	Cir	0.013	0.00	5356.18	53
54	48	100.0	45.0	Grate	60.05	0.00	0.00	0.0	5362.69	0.48	5363.17	36	Cir	0.013	0.00	5372.00	54
55	51	109.0	9.0	MH	0.00	0.00	0.00	0.0	5362.62	1.05	5363.76	54	Cir	0.013	0.74	5373.35	55
56	52	25.0	91.0	Comb	17.78	0.00	0.00	0.0	5350.53	1.00	5350.78	18	Cir	0.013	0.00	5358.29	56
57	55	300.0	0.0	MH	0.00	0.00	0.00	0.0	5364.26	1.00	5367.26	48	Cir	0.013	0.05	5378.59	57
58	55	58.0	-90.0	MH	0.00	0.00	0.00	0.0	5364.76	1.00	5365.34	42	Cir	0.013	0.22	5373.68	58
59	57	300.0	0.0	MH	0.00	0.00	0.00	0.0	5367.26	1.00	5370.26	48	Cir	0.013	0.05	5380.60	59
60	58	4.0	90.0	Comb	5.44	0.00	0.00	0.0	5366.09	5.25	5366.30	18	Cir	0.013	0.00	5373.24	8A
61	58	24.0	-89.0	Comb	5.44	0.00	0.00	0.0	5366.09	3.79	5367.00	18	Cir	0.013	0.00	5373.24	8B
62	58	95.0	0.0	MH	0.00	0.00	0.00	0.0	5365.44	0.66	5366.07	42	Cir	0.013	0.05	5374.13	62
63	59	90.0	0.0	Genr	125.48	0.00	0.00	0.0	5370.26	1.00	5371.16	48	Cir	0.013	0.05	5381.30	63

Hydraflow Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line type	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
64	62	27.0	45.0	Grate	15.00	0.00	0.00	0.0	5366.07	0.93	5366.32	18	Cir	0.013	0.00	5373.74	7A
65	62	284.0	90.0	MH	0.00	0.00	0.00	0.0	5366.57	0.60	5368.28	36	Cir	0.013	0.77	5376.73	65
66	65	54.0	-90.0	Comb	5.18	0.00	0.00	0.0	5369.27	1.07	5369.85	24	Cir	0.013	0.00	5377.22	6B
67	65	212.0	0.0	MH	0.00	0.00	0.00	0.0	5368.78	0.74	5370.34	30	Cir	0.013	0.19	5378.65	67
68	66	22.0	82.0	Comb	5.18	0.00	0.00	0.0	5369.95	1.14	5370.20	18	Cir	0.013	0.00	5377.29	6A
69	67	57.0	-45.0	MH	0.00	0.00	0.00	0.0	5370.34	1.39	5371.13	30	Cir	0.013	0.19	5379.45	69
70	69	55.0	-45.0	MH	0.00	0.00	0.00	0.0	5371.13	1.40	5371.90	30	Cir	0.013	0.23	5379.88	70
71	70	23.0	68.0	Comb	5.97	0.00	0.00	0.0	5372.40	2.61	5373.00	18	Cir	0.013	0.00	5379.58	5A
72	70	8.0	-19.0	Comb	5.97	0.00	0.00	0.0	5372.40	2.50	5372.60	18	Cir	0.013	0.00	5379.59	5B
73	70	169.0	0.0	MH	0.00	0.00	0.00	0.0	5372.40	1.63	5375.16	24	Cir	0.013	0.13	5383.62	73
74	73	203.0	17.0	MH	0.00	0.00	0.00	0.0	5375.16	2.89	5381.03	24	Cir	0.013	1.05	5389.03	74
75	74	33.0	61.0	Comb	7.30	0.00	0,00	0.0	5381.03	2.36	5381.81	18	Cir	0.013	0.00	5389.31	4A
76	74	31.0	16.0	Comb	7.30	0.00	0.00	0.0	5381.03	4.94	5382.56	18	Cir	0.013	0.00	5389.56	4B
77	7	9.0	91.0	Comb	4.56	0.00	0.00	0.0	5313.29	2.33	5313.50	18	Cir	0.013	0.00	5321.71	77
78	2	10.0	-2.0	Grate	0.01	0.00	0.00	0.0	5310.62	42.40	5314.86	24	Cir	0.013	0.00	5318.27	78
79	78	52.0	-127.0	Grate	0.01	0.00	0.00	0.0	5314.86	0.60	5315.17	24	Cir	0.013	0.00	5318.27	79

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
1	1	589.6	72 c	72.0	5300.80	5301.52	1.000	5306.80*	5308.20*	1.15	End
2	2	589.6	72 c	239.0	5301.90	5304.29	1.000	5309.35*	5313.98*	0.95	1
3	3	589.6	72 c	131.0	5304.29	5305.59	0.992	5314.93*	5317.47*	1.42	2
4	4	499.3	72 c	24.0	5305.59	5305.84	1.042	5318.89*	5319.22*	1.26	3
5	5	90.30	48 c	61.0	5306.59	5307.20	1.001	5318.89*	5319.13*	0.00	3
6	6	440.0	66 c	56.0	5305.84	5307.09	2.232	5320.49*	5321.45*	0.32	4
7	7	59.32	48 c	36.0	5306.84	5307.18	0.945	5320.49*	5320.55*	0.12	4
8	8	438.6	66 c	116.0	5307.09	5311.45	3.759	5321.77*	5323.75*	0.00	6
9	9	0.70	18 c	13.0	5311.28	5311.60	2.464	5321.77*	5321.77*	0.00	6
10	10	0.70	18 c	15.0	5313.32	5314.08	5.068	5321.77*	5321.77*	0.00	6
11	11	50.20	36 c	190.0	5307.68	5316.11	4.437	5320.66*	5321.74*	0.04	7
12	12	4.56	18 c	22.0	5313.29	5314.17	3.999	5320.66*	5320.71*	0.00	7
13	13	438.6	66 c	95.0	5311.45	5315.02	3.758	5323.75*	5325.37*	0.53	8
14	14	50.20	36 c	164.0	5316.21	5319.50	2.006	5321.78*	5322.71*	0.14	11
15	15	424.4	66 c	15.0	5315.02	5315.62	4.001	5325.90*	5326.14*	0.50	13
16	16	14.20	24 c	16.0	5316.58	5316.90	1.999	5325.90*	5325.96*	0.00	13
17	17	28.20	30 c	162.0	5319.60	5322.84	2.000	5322.85	5324.62	0.00	14
18	18	11.00	18 c	21.0	5323.43	5324.03	2.855	5324.93	5325.30	0.00	14
19	19	11.00	18 c	21.0	5323.43	5324.03	2.855	5324.93	5325.30	0.00	14
20	20	410.4	66 c	62.0	5315.62	5318.10	4.000	5326.64*	5327.57*	0.28	15
21	21	14.00	24 c	30.0	5317.27	5318.47	4.001	5326.64*	5326.75*	0.09	15
22	22	408.9	66 c	43.0	5318.10	5319.82	3.999	5327.84*	5328.48*	0.00	20
23	23	0.74	18 c	13.0	5319.94	5320.20	2.002	5327.84*	5327.85*	0.00	20
24	24	0.74	18 c	13.0	5320.10	5320.75	4.999	5327.84*	5327.85*	0.00	20
25	25	7.00	18 c	29.0	5318.57	5319.10	1.829	5326.84*	5326.97*	0.00	21
26	26	7.00	18 c	16.0	5318.57	5319.21	4.001	5326.84*	5326.91*	0.00	21
27	27	408.9	66 c	178.0	5319.82	5326.92	3.989	5328.48	5332.14	1.00	22
28	28	383.9	66 c	16.0	5326.92	5327.56	4.001	5333.15*	5333.36*	0.49	27
29	29	25.00	24 c	15.0	5328.73	5329.10	2.467	5333.15*	5333.33*	0.00	27
30	30	366.4	66 c	62.0	5327.56	5330.06	4.032	5333.85	5335.15	0.24	28
31	31	17.50	24 c	25.0	5329.31	5330.56	5.000	5333.85*	5334.00*	0.00	28
32	32	364.9	54 c	56.0	5331.06	5333.30	4.000	5335.56	5337.75	1.07	30

Project File: UNIT6.stm	IDF File: sampleFHA.IDF	Total No. Lines: 79	Run Date: 01-02-2003

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
33	33	0.77	18 c	13.0	5332.28	5332.60	2.464	5335.39*	5335.39*	0.00	30
34	34	0.77	18 c	15.0	5332.06	5332.81	5.000	5335.39*	5335.39*	0.00	30
35	35	8.75	18 c	30.0	5330.66	5331.56	3.000	5334.00*	5334.21*	0.00	31
36	36	8.75	18 c	18.0	5330.66	5331.20	3.000	5334.00*	5334.12*	0.00	31
37	37	364.9	54 c	175.0	5333.30	5340.30	4.000	5338.82	5344.80	1.06	32
38	38	339.9	54 c	17.0	5340.30	5340.99	4.061	5345.86*	5346.37*	1.28	37
39	39	25.00	24 c	14.0	5341.39	5341.63	1.712	5345.86*	5346.03*	0.00	37
40	40	258.9	54 c	57.0	5340.99	5343.29	4.035	5347.65*	5348.64*	0.21	38
41	41	81.00	36 c	30.0	5341.74	5342.91	3.900	5347.65*	5348.09*	0.00	38
42	42	250.7	54 c	464.0	5343.29	5357.67	3.099	5348.85	5361.95	0.20	40
43	43	4.10	18 c	13.0	5344.63	5344.89	2.002	5348.85*	5348.87*	0.00	40
44	44	4.10	18 c	16.0	5344.79	5345.59	4.999	5348.85*	5348.87*	0.00	40
45	45	53.40	30 c	140.0	5343.41	5347.26	2.750	5348.09*	5350.47*	0.00	41
46	46	13.80	18 c	27.0	5346.12	5346.39	1.000	5348.09*	5348.56*	0.00	41
47	47	13.80	18 c	16.0	5347.00	5347.16	1.001	5348.50*	5348.78*	0.00	41
48	48	250.7	54 c	323.0	5357.68	5361.19	1.087	5362.18*	5367.43*	0.77	42
49	49	35.56	30 c	243.0	5347.36	5349.79	1.000	5350.47	5352.29	0.00	45
50	50	17.84	24 c	53.0	5347.76	5348.29	1.001	5350.47*	5350.80*	0.00	45
51	51	190.6	54 c	132.0	5361.19	5362.62	1.083	5368.20*	5369.44*	0.11	48
52	52	35.56	24 c	53.0	5349.90	5350.43	1.001	5352.29*	5353.60*	0.00	49
53	53	8.92	18 c	23.0	5348.39	5348.62	1.000	5350.80*	5350.96*	0.00	50
54	54	60.05	36 c	100.0	5362.69	5363.17	0.480	5368.20*	5369.01*	0.00	48
55	55	188.3	54 c	109.0	5362.62	5363.76	1.046	5369.56*	5370.56*	1.61	51
56	56	17.78	18 c	25.0	5350.53	5350.78	1.000	5353.60*	5354.32*	0.00	52
57	57	125.5	48 c	300.0	5364.26	5367.26	1.000	5372.17*	5374.46*	0.08	55
58	58	62.78	42 c	58.0	5364.76	5365.34	1.000	5372.17*	5372.39*	0.15	55
59	59	125.5	48 c	300.0	5367.26	5370.26	1.000	5374.54*	5376.83*	0.08	57
60	8A	5.44	18 c	4.0	5366.09	5366.30	5.249	5372.54*	5372.55*	0.00	58
61	8B	5.44	18 c	24.0	5366.09	5367.00	3.792	5372.54*	5372.60*	0.00	58
62	62	51.90	42 c	95.0	5365.44	5366.07	0.663	5372.54*	5372.79*	0.02	58
63	63	125.5	48 c	90.0	5370.26	5371.16	1.000	5376.90*	5377.59*	0.08	59
64	7A	15.00	18 c	27.0	5366.07	5366.32	0.926	5372.81*	5373.37*	0.00	62

Project File: UNIT6.stm | IDF File: sampleFHA.IDF | Total No. Lines: 79 | Run Date: 01-02-2003

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	Dns line No.
65	65	36.90	36 c	284.0	5366.57	5368.28	0.602	5372.81*	5373.68*	0.33	62
66	6B	10.36	24 c	54.0	5369.27	5369.85	1.074	5374.01*	5374.12*	0.00	65
67	67	26.54	30 c	212.0	5368.78	5370.34	0.736	5374.01*	5374.90*	0.09	65
68	6A	5.18	18 c	22.0	5369.95	5370.20	1.136	5374.12*	5374.18*	0.00	66
69	69	26.54	30 c	57.0	5370.34	5371.13	1.386	5374.98*	5375.22*	0.09	67
70	70	26.54	30 c	55.0	5371.13	5371.90	1.400	5375.31*	5375.54*	0.10	69
71	5A	5.97	18 c	23.0	5372.40	5373.00	2.609	5375.65*	5375.72*	0.00	70
72	5B	5.97	18 c	8.0	5372.40	5372.60	2.502	5375.65*	5375.67*	0.00	70
73	73	14.60	24 c	169.0	5372.40	5375.16	1.633	5375.65	5376.51	0.08	70
74	74	14.60	24 c	203.0	5375.16	5381.03	2.891	5377.16	5382.38	0.68	73
75	4A	7.30	18 c	33.0	5381.03	5381.81	2.364	5383.06	5383.19	0.00	74
76	4B	7.30	18 c	31.0	5381.03	5382.56	4.936	5383.06	5383.59	0.00	74
77	77	4.56	18 c	9.0	5313.29	5313.50	2.333	5320.66*	5320.68*	0.00	7
78	78	0.02	24 c	10.0	5310.62	5314.86	42.397	5314.93	5314.93	0.00	2
79	79	0.01	24 c	52.0	5314.86	5315.17	0.596	5316.86	5316.86	0.00	78

Project File: UNIT6.stm	IDF File: sampleFHA.IDF	Total No. Lines: 79	Run Date: 01-02-2003

NOTES: c = circular; e = elliptical; b = box; Return period = 100 Yrs.; * Indicates surcharge condition.

Hydraflow Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	
1		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
2		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	1
3		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	2
4		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	3
5		90.30*	0.00	90.30	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	3
6		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	4
7		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	4
8		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	6
9		0.70*	0.00	0.70	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.020	2.00	0.063	0.020	0.013	0.16	3.70	0.21	1.56	2.75	6
10		0.70*	0.00	0.70	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.020	2.00	0.063	0.020	0.013	0.16	3.70	0.21	1.56	2.75	6
11		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	7
12		4.56*	2.91	7.47	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.008	2.00	0.063	0.020	0.013	0.38	14.70	0.50	13.34	2.75	79
13		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	8
14		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	11
15		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	13
16		14.20*	0.00	14.20	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	13
17		28.20*	0.00	28.20	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	19
18		11.00*	0.00	8.09	2.91	Comb	6.0	7.45	0.00	3.33	2.00	0.020	2.00	0.063	0.020	0.013	0.37	14.20	0.49	12.89	2.75	12
19		11.00*	0.00	8.09	2.91	Comb	6.0	7.45	0.00	3.33	2.00	0.020	2.00	0.063	0.020	0.013	0.37	14.20	0.49	12.89	2.75	78
20		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	15
21		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	15
22		0.00	2.42	0.00	2.42	None	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	20

NOTES: Inlet N-Values = 0.017 ; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added

Hydraflow Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	
23		0.74*	0.00	0.74	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.15	3.20	0.19	1.40	2.75	9
24		0.74*	0.00	0.74	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.15	3.20	0.19	1.40	2.75	10
25		7.00*	0.00	7.00	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.007	2.00	0.063	0.020	0.013	0.38	14.70	0.50	13.34	2.75	9
26		7.00*	0.00	7.00	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.007	2.00	0.063	0.020	0.013	0.38	14.70	0.50	13.34	2.75	10
27		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	22
28		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	27
29		25.00*	0.00	25.00	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	27
30		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	28
31		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	28
32		0.00	2.42	0.00	2.42	None	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	30
33		0.77*	8.95	9.72	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.32	11.70	0.43	10.19	2.75	23
34		0.77*	8.95	9.72	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.32	11.70	0.43	10.19	2.75	24
35		8.75*	0.00	8.75	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.010	2.00	0.063	0.020	0.013	0.38	14.70	0.50	13.59	2.75	23
36		8.75*	0.00	8.75	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.010	2.00	0.063	0.020	0.013	0.38	14.70	0.50	13.59	2.75	24
37		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	32
38		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	37
39		25.00*	0.00	25.00	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	37
40		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	38
41		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	38
42		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	40
43		4.10*	0.00	4.10	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.25	8.20	0.34	5.79	2.75	33
44		4.10*	0.00	4.10	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.040	2.00	0.063	0.020	0.013	0.25	8.20	0.34	5.79	2.75	34

Project File: UNIT6.stm | I-D-F File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Inlet N-Values = 0.017 ; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added

Hydraflow Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	
45		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	41
46		13.80*	6.86	11.71	8.95	Comb	6.0	7.45	0.00	3.33	2.00	0.010	2.00	0.063	0.020	0.013	0.50	20.70	0.62	19.79	2.75	33
47		13.80*	6.86	11.71	8.95	Comb	6.0	7.45	0.00	3.33	2.00	0.010	2.00	0.063	0.020	0.013	0.50	20.70	0.62	19.79	2.75	34
48		0.00	2.42	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	42
49		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	45
50		8.92*	0.00	8.92	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.33	12.20	0.44	10.69	2.75	46
51		2.34*	0.08	0.00	2.42	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	48
52		17.78*	0.00	10.92	6.86	Comb	6.0	7.45	0.00	3.33	2.00	0.022	2.00	0.063	0.020	0.013	0.42	16.70	0.54	15.69	2.75	47
53		8.92*	0.00	8.92	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.33	12.20	0.44	10.69	2.75	47
54		60.05*	0.00	60.05	0.00	Grate	0.0	0.00	20.74	33.14	2.00	Sag	2.00	0.063	0.020	0.000	0.52	21.65	0.66	21.65	2.75	51
55		0.00	0.08	0.00	0.08	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	51
56		17.78*	0.00	10.92	6.86	Comb	6.0	7.45	0.00	3.33	2.00	0.022	2.00	0.063	0.020	0.013	0.42	16.70	0.54	15.69	2.75	46
57		0.00	0.08	0.00	0.08	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	55
58		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	55
59		0.00	0.08	0.00	0.08	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	57
60		5.44*	0.00	5.44	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.005	2.00	0.063	0.020	0.013	0.37	14.20	0.48	12.79	2.75	51
61		5.44*	0.00	5.44	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.005	2.00	0.063	0.020	0.013	0.37	14.20	0.48	12.79	2.75	51
62		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	58
63		125.48*	0.00	125.40	0.08	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.063	0.020	0.000	0.29	10.20	0.29	10.20	0.0	59
64		15.00*	0.00	15.00	0.00	Grate	0.0	0.00	5.18	5.28	2.00	Sag	2.00	0.063	0.020	0.000	0.52	21.64	0.66	21.64	2.75	62
65		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	62
66		5.18*	0.00	5.18	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.026	2.00	0.063	0.020	0.013	0.28	9.70	0.39	8.04	2.75	60

Project File: UNIT6.stm | I-D-F File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Inlet N-Values = 0.017 ; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added

Hydraflow Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	depth (ft)	spread (ft)	depth (ft)	spread (ft)	Dep (in)	
67		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	65
68		5.18*	0.00	5.18	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.026	2.00	0.063	0.020	0.013	0.28	9.70	0.39	8.04	2.75	64
69		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	67
70		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	69
71		5.97*	0.00	5.97	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.29	10.20	0.40	8.54	2.75	64
72		5.97*	0.00	5.97	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.29	10.20	0.40	8.54	2.75	64
73		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	70
74		0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	73
75		7.30*	0.00	7.30	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.31	11.20	0.42	9.59	2.75	71
76		7.30*	0.00	7.30	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.028	2.00	0.063	0.020	0.013	0.31	11.20	0.42	9.59	2.75	72
77		4.56*	0.00	4.56	0.00	Comb	6.0	7.45	0.00	3.33	2.00	0.008	2.00	0.100	0.020	0.013	0.39	11.50	0.44	10.44	2.75	79
78		0.01*	2.91	2.92	0.00	Grate	0.0	0.00	13.29	10.00	2.00	Sag	2.00	0.063	0.020	0.000	0.03	0.41	0.17	1.25	2.75	2
79		0.01*	0.00	0.01	0.00	Grate	0.0	0.00	13.29	10.00	2.00	Sag	2.00	0.063	0.020	0.000	-0.14	-2.21	0.00	0.03	2.75	2

Project File: UNIT6.stm | I-D-F File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Inlet N-Values = 0.017 ; Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; * Indicates Known Q added

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	72	589.6	5300.80	5306.80	6.00	28.27	20.86	6.76	5313.56	1.938	72.0	5301.52	5308.20	6.00	28.27	20.85	6.76	5314.96	1.938	1.938	1.395	0.17	1.15
2	72	589.6	5301.90	5309.35	6.00	28.27	20.86	6.76	5316.11	1.938	239	5304.29	5313.98	6.00	28.27	20.85	6.76	5320.74	1.938	1.938	4.632	0.14	0.95
3	72	589.6	5304.29	5314.93	6.00	28.27	20.86	6.76	5321.69	1.938	131	5305.59	5317.47	6.00	28.27	20.85	6.76	5324.23	1.938	1.938	2.539	0.21	1.42
4	72	499.3	5305.59	5318.89	6.00	28.27	17.66	4.85	5323.74	1.390	24.0	5305.84	5319.22	6.00	28.27	17.66	4.85	5324.07	1.390	1.390	0.334	0.26	1.26
5	48	90.30	5306.59	5318.89	4.00	12.56	7.19	0.80	5319.69	0.395	61.0	5307.20	5319.13	4.00	12.57	7.19	0.80	5319.93	0.395	0.395	0.241	0.00	0.00
6	66	440.0	5305.84	5320.49	5.50	23.75	18.52	5.33	5325.82	1.717	56.0	5307.09	5321.45	5.50	23.76	18.52	5.33	5326.78	1.716	1.717	0.961	0.06	0.32
7	48	59.32	5306.84	5320.49	4.00	12.56	4.72	0.35	5320.83	0.171	36.0	5307.18	5320.55	4.00	12.57	4.72	0.35	5320.89	0.171	0.171	0.061	0.34	0.12
8	66	438.6	5307.09	5321.77	5.50	23.75	18.46	5.30	5327.07	1.706	116	5311.45	5323.75	5.50	23.76	18.46	5.30	5329.05	1.705	1.706	1.979	0.00	0.00
9	18	0.70	5311.28	5321.77	1.50	1.77	0.40	0.00	5321.77	0.004	13.0	5311.60	5321.77	1.50	1.77	0.40	0.00	5321.77	0.004	0.004	0.001	0.00	0.00
10	18	0.70	5313.32	5321.77	1.50	1.77	0.40	0.00	5321.77	0.004	15.0	5314.08	5321.77	1.50	1.77	0.40	0.00	5321.77	0.004	0.004	0.001	0.00	0.00
11	36	50.20	5307.68	5320.66	3.00	7.07	7.10	0.78	5321.45	0.567	190	5316.11	5321.74	3.00	7.07	7.10	0.78	5322.53	0.567	0.567	1.077	0.05	0.04
12	18	4.56	5313.29	5320.66	1.50	1.77	2.58	0.10	5320.77	0.189	22.0	5314.17	5320.71	1.50	1.77	2.58	0.10	5320.81	0.189	0.189	0.041	0.00	0.00
13	66	438.6	5311.45	5323.75	5.50	23.75	18.46	5.30	5329.05	1.706	95.0	5315.02	5325.37	5.50	23.76	18.46	5.30	5330.67	1.705	1.706	1.620	0.10	0.53
14	36	50.20	5316.21	5321.78	3.00	7.07	7.10	0.78	5322.57	0.567	164	5319.50	5322.71	3.00	7.07	7.10	0.78	5323.49	0.567	0.567	0.929	0.18	0.14
15	66	424.4	5315.02	5325.90	5.50	23.75	17.87	4.96	5330.86	1.597	15.0	5315.62	5326.14	5.50	23.76	17.86	4.96	5331.10	1.597	1.597	0.240	0.10	0.50
16	24	14.20	5316.58	5325.90	2.00	3.14	4.52	0.32	5326.22	0.394	16.0	5316.90	5325.96	2.00	3.14	4.52	0.32	5326.28	0.394	0.394	0.063	0.00	0.00
17	30	28.20	5319.60	5322.85	2.50	4.91	5.75	0.51	5323.36	0.473	162	5322.84	5324.62	1.77**	3.73	7.57	0.89	5325.51	0.650	0.562	N/A	0.00	0.00
18	18	11.00	5323.43	5324.93	1.50*	1.77	6.23	0.60	5325.53	1.098	21.0	5324.03	5325.30	1.27**	1.59	6.91	0.74	5326.04	1.045	1.071	N/A	0.00	0.00
19	18	11.00	5323.43	5324.93	1.50*	1.77	6.23	0.60	5325.53	1.098	21.0	5324.03	5325.30	1.27**	1.59	6.91	0.74	5326.04	1.045	1.071	N/A	0.00	0.00
20	66	410.4	5315.62	5326.64	5.50	23.75	17.28	4.64	5331.28	1.494	62.0	5318.10	5327.57	5.50	23.76	17.27	4.64	5332.21	1.493	1.493	0.926	0.06	0.28
21	24	14.00	5317.27	5326.64	2.00	3.14	4.46	0.31	5326.95	0.383	30.0	5318.47	5326.75	2.00	3.14	4.46	0.31	5327.06	0.383	0.383	0.115	0.28	0.09

Project File: UNIT6.stm | IDF File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Initial tailwater elevation = 5306.8 (ft) , * Crown depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
22	66	408.9	5318.10	5327.84	5.50	23.75	17.21	4.61	5332.45	1.483	43.0	5319.82	5328.48	5.50	23.76	17.21	4.61	5333.09	1.482	1.483	0.638	0.00	0.00
23	18	0.74	5319.94	5327.84	1.50	1.77	0.42	0.00	5327.85	0.005	13.0	5320.20	5327.85	1.50	1.77	0.42	0.00	5327.85	0.005	0.005	0.001	0.00	0.00
24	18	0.74	5320.10	5327.84	1.50	1.77	0.42	0.00	5327.85	0.005	13.0	5320.75	5327.85	1.50	1.77	0.42	0.00	5327.85	0.005	0.005	0.001	0.00	0.00
25	18	7.00	5318.57	5326.84	1.50	1.77	3.96	0.24	5327.08	0.445	29.0	5319.10	5326.97	1.50	1.77	3.96	0.24	5327.21	0.444	0.444	0.129	0.00	0.00
26	18	7.00	5318.57	5326.84	1.50	1.77	3.96	0.24	5327.08	0.445	16.0	5319.21	5326.91	1.50	1.77	3.96	0.24	5327.16	0.444	0.444	0.071	0.00	0.00
27	66	408.9	5319.82	5328.48	5.50	23.75	17.21	4.61	5333.09	1.483	178	5326.92	5332.14	5.22**	23.31	17.54	4.78	5336.93	1.284	1.383	N/A	0.21	1.00
28	66	383.9	5326.92	5333.15	5.50	23.75	16.16	4.06	5337.21	1.307	16.0	5327.56	5333.36	5.50	23.76	16.16	4.06	5337.42	1.307	1.307	0.209	0.12	0.49
29	24	25.00	5328.73	5333.15	2.00	3.14	7.96	0.98	5334.13	1.222	15.0	5329.10	5333.33	2.00	3.14	7.96	0.98	5334.32	1.222	1.222	0.183	0.00	0.00
30	66	366.4	5327.56	5333.85	5.50	23.75	15.42	3.70	5337.55	1.191	62.0	5330.06	5335.15	5.09**	22.96	15.96	3.96	5339.11	1.031	1.111	N/A	0.06	0.24
31	24	17.50	5329.31	5333.85	2.00	3.14	5.57	0.48	5334.33	0.599	25.0	5330.56	5334.00	2.00	3.14	5.57	0.48	5334.48	0.599	0.599	0.150	0.00	0.00
32	54	364.9	5331.06	5335.56	4.50*	15.90	22.94	8.18	5343.75	3.443	56.0	5333.30	5337.75	4.45**	15.87	22.99	8.21	5345.96	3.157	3.300	N/A	0.13	1.07
33	18	0.77	5332.28	5335.39	1.50	1.77	0.44	0.00	5335.39	0.005	13.0	5332.60	5335.39	1.50	1.77	0.44	0.00	5335.39	0.005	0.005	0.001	0.00	0.00
34	18	0.77	5332.06	5335.39	1.50	1.77	0.44	0.00	5335.39	0.005	15.0	5332.81	5335.39	1.50	1.77	0.44	0.00	5335.39	0.005	0.005	0.001	0.00	0.00
35	18	8.75	5330.66	5334.00	1.50	1.77	4.95	0.38	5334.38	0.695	30.0	5331.56	5334.21	1.50	1.77	4.95	0.38	5334.59	0.694	0.694	0.208	0.00	0.00
36	18	8.75	5330.66	5334.00	1.50	1.77	4.95	0.38	5334.38	0.695	18.0	5331.20	5334.12	1.50	1.77	4.95	0.38	5334.50	0.694	0.694	0.125	0.00	0.00
37	54	364.9	5333.30	5338.82	4.50	15.90	22.94	8.18	5347.00	3.443	175	5340.30	5344.80	4.50	15.90	22.94	8.18	5352.98	3.389	3.416	5.978	0.13	1.06
38	54	339.9	5340.30	5345.86	4.50	15.90	21.37	7.10	5352.96	2.988	17.0	5340.99	5346.37	4.50	15.90	21.37	7.10	5353.47	2.986	2.987	0.508	0.18	1.28
39	24	25.00	5341.39	5345.86	2.00	3.14	7.96	0.98	5346.85	1.222	14.0	5341.63	5346.03	2.00	3.14	7.96	0.98	5347.02	1.222	1.222	0.171	0.00	0.00
40	54	258.9	5340.99	5347.65	4.50	15.90	16.28	4.12	5351.77	1.733	57.0	5343.29	5348.64	4.50	15.90	16.28	4.12	5352.76	1.733	1.733	0.988	0.05	0.21
41	36	81.00	5341.74	5347.65	3.00	7.07	11.46	2.04	5349.69	1.476	30.0	5342.91	5348.09	3.00	7.07	11.46	2.04	5350.14	1.475	1.475	0.443	0.00	0.00
42	54	250.7	5343.29	5348.85	4.50	15.90	15.76	3.86	5352.71	1.625	464	5357.67	5361.95	4.28**	15.62	16.04	4.00	5365.96	1.408	1.517	N/A	0.05	0.20

Project File: UNIT6.stm | IDF File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Initial tailwater elevation = 5306.8 (ft) , * Crown depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
43	18	4.10	5344.63	5348.85	1.50	1.77	2.32	0.08	5348.93	0.153	13.0	5344.89	5348.87	1.50	1.77	2.32	0.08	5348.95	0.152	0.152	0.020	0.00	0.00
44	18	4.10	5344.79	5348.85	1.50	1.77	2.32	0.08	5348.93	0.153	16.0	5345.59	5348.87	1.50	1.77	2.32	0.08	5348.95	0.152	0.152	0.024	0.00	0.00
45	30	53.40	5343.41	5348.09	2.50	4.91	10.88	1.84	5349.93	1.696	140	5347.26	5350.47	2.50	4.91	10.88	1.84	5352.31	1.695	1.696	2.374	0.00	0.00
46	18	13.80	5346.12	5348.09	1.50	1.77	7.81	0.95	5349.04	1.728	27.0	5346.39	5348.56	1.50	1.77	7.81	0.95	5349.51	1.727	1.727	0.466	0.00	0.00
47	18	13.80	5347.00	5348.50	1.50*	1.77	7.81	0.95	5349.45	1.728	16.0	5347.16	5348.78	1.50	1.77	7.81	0.95	5349.73	1.727	1.727	0.276	0.00	0.00
48	54	250.7	5357.68	5362.18	4.50*	15.90	15.76	3.86	5366.04	1.625	323	5361.19	5367.43	4.50	15.90	15.76	3.86	5371.29	1.624	1.625	5.248	0.20	0.77
49	30	35.56	5347.36	5350.47	2.50	4.91	7.25	0.82	5351.29	0.752	243	5349.79	5352.29	2.50	4.91	7.24	0.82	5353.11	0.747	0.750	1.822	0.00	0.00
50	24	17.84	5347.76	5350.47	2.00	3.14	5.68	0.50	5350.97	0.622	53.0	5348.29	5350.80	2.00	3.14	5.68	0.50	5351.30	0.622	0.622	0.330	0.00	0.00
51	54	190.6	5361.19	5368.20	4.50	15.90	11.99	2.23	5370.44	0.940	132	5362.62	5369.44	4.50	15.90	11.98	2.23	5371.68	0.939	0.940	1.240	0.05	0.11
52	24	35.56	5349.90	5352.29	2.00	3.14	11.32	1.99	5354.28	2.473	53.0	5350.43	5353.60	2.00	3.14	11.32	1.99	5355.59	2.472	2.472	1.310	0.00	0.00
53	18	8.92	5348.39	5350.80	1.50	1.77	5.05	0.40	5351.20	0.722	23.0	5348.62	5350.96	1.50	1.77	5.05	0.40	5351.36	0.722	0.722	0.166	0.00	0.00
54	36	60.05	5362.69	5368.20	3.00	7.07	8.50	1.12	5369.33	0.811	100	5363.17	5369.01	3.00	7.07	8.50	1.12	5370.14	0.811	0.811	0.811	0.00	0.00
55	54	188.3	5362.62	5369.56	4.50	15.90	11.84	2.18	5371.73	0.917	109	5363.76	5370.56	4.50	15.90	11.84	2.18	5372.73	0.916	0.917	0.999	0.74	1.61
56	18	17.78	5350.53	5353.60	1.50	1.77	10.06	1.57	5355.18	2.868	25.0	5350.78	5354.32	1.50	1.77	10.06	1.57	5355.89	2.867	2.867	0.717	0.00	0.00
57	48	125.5	5364.26	5372.17	4.00	12.56	9.99	1.55	5373.72	0.763	300	5367.26	5374.46	4.00	12.57	9.99	1.55	5376.01	0.763	0.763	2.290	0.05	0.08
58	42	62.78	5364.76	5372.17	3.50	9.62	6.53	0.66	5372.83	0.390	58.0	5365.34	5372.39	3.50	9.62	6.53	0.66	5373.06	0.389	0.389	0.226	0.22	0.15
59	48	125.5	5367.26	5374.54	4.00	12.56	9.99	1.55	5376.09	0.763	300	5370.26	5376.83	4.00	12.57	9.99	1.55	5378.38	0.763	0.763	2.290	0.05	0.08
60	18	5.44	5366.09	5372.54	1.50	1.77	3.08	0.15	5372.69	0.268	4.0	5366.30	5372.55	1.50	1.77	3.08	0.15	5372.70	0.268	0.268	0.011	0.00	0.00
61	18	5.44	5366.09	5372.54	1.50	1.77	3.08	0.15	5372.69	0.268	24.0	5367.00	5372.60	1.50	1.77	3.08	0.15	5372.75	0.268	0.268	0.064	0.00	0.00
62	42	51.90	5365.44	5372.54	3.50	9.62	5.40	0.45	5372.99	0.266	95.0	5366.07	5372.79	3.50	9.62	5.39	0.45	5373.24	0.266	0.266	0.253	0.05	0.02
63	48	125.5	5370.26	5376.90	4.00	12.56	9.99	1.55	5378.45	0.763	90.0	5371.16	5377.59	4.00	12.57	9.99	1.55	5379.14	0.763	0.763	0.687	0.05	0.08

Project File: UNIT6.stm | IDF File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Initial tailwater elevation = 5306.8 (ft) , * Crown depth assumed., ** Critical depth assumed.

Hydraflow Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
	(in)	(cfs)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	(ft)	Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)	(K)	(ft)
64	18	15.00	5366.07	5372.81	1.50	1.77	8.49	1.12	5373.94	2.041	27.0	5366.32	5373.37	1.50	1.77	8.49	1.12	5374.49	2.040	2.041	0.551	0.00	0.00
65	36	36.90	5366.57	5372.81	3.00	7.07	5.22	0.42	5373.24	0.306	284	5368.28	5373.68	3.00	7.07	5.22	0.42	5374.11	0.306	0.306	0.870	0.77	0.33
66	24	10.36	5369.27	5374.01	2.00	3.14	3.30	0.17	5374.18	0.210	54.0	5369.85	5374.12	2.00	3.14	3.30	0.17	5374.29	0.210	0.210	0.113	0.00	0.00
67	30	26.54	5368.78	5374.01	2.50	4.91	5.41	0.45	5374.46	0.419	212	5370.34	5374.90	2.50	4.91	5.41	0.45	5375.35	0.419	0.419	0.888	0.19	0.09
68	18	5.18	5369.95	5374.12	1.50	1.77	2.93	0.13	5374.26	0.243	22.0	5370.20	5374.18	1.50	1.77	2.93	0.13	5374.31	0.243	0.243	0.054	0.00	0.00
69	30	26.54	5370.34	5374.98	2.50	4.91	5.41	0.45	5375.44	0.419	57.0	5371.13	5375.22	2.50	4.91	5.41	0.45	5375.68	0.419	0.419	0.239	0.19	0.09
70	30	26.54	5371.13	5375.31	2.50	4.91	5.41	0.45	5375.76	0.419	55.0	5371.90	5375.54	2.50	4.91	5.41	0.45	5376.00	0.419	0.419	0.230	0.23	0.10
71	18	5.97	5372.40	5375.65	1.50	1.77	3.38	0.18	5375.82	0.323	23.0	5373.00	5375.72	1.50	1.77	3.38	0.18	5375.90	0.323	0.323	0.074	0.00	0.00
72	18	5.97	5372.40	5375.65	1.50	1.77	3.38	0.18	5375.82	0.323	8.0	5372.60	5375.67	1.50	1.77	3.38	0.18	5375.85	0.323	0.323	0.026	0.00	0.00
73	24	14.60	5372.40	5375.65	2.00	3.14	4.65	0.34	5375.98	0.417	169	5375.16	5376.51	1.35**	2.26	6.45	0.65	5377.16	0.651	0.534	N/A	0.13	0.08
74	24	14.60	5375.16	5377.16	2.00*	3.14	4.65	0.34	5377.50	0.417	203	5381.03	5382.38	1.35**	2.26	6.45	0.65	5383.03	0.651	0.534	N/A	1.05	0.68
75	18	7.30	5381.03	5383.06	1.50	1.77	4.13	0.27	5383.33	0.483	33.0	5381.81	5383.19	1.38	1.70	4.29	0.29	5383.48	0.419	0.451	0.149	0.00	0.00
76	18	7.30	5381.03	5383.06	1.50	1.77	4.13	0.27	5383.33	0.483	31.0	5382.56	5383.59	1.03**	1.30	5.64	0.49	5384.09	0.723	0.603	N/A	0.00	0.00
77	18	4.56	5313.29	5320.66	1.50	1.77	2.58	0.10	5320.77	0.189	9.0	5313.50	5320.68	1.50	1.77	2.58	0.10	5320.79	0.189	0.189	0.017	0.00	0.00
78	24	0.02	5310.62	5314.93	2.00	3.14	0.01	0.00	5314.93	0.000	10.0	5314.86	5314.93	0.07	0.03	0.57	0.01	5314.94	0.151	0.076	0.008	0.00	0.00
79	24	0.01	5314.86	5316.86	2.00*	3.14	0.00	0.00	5316.86	0.000	52.0	5315.17	5316.86	1.69	2.83	0.00	0.00	5316.86	0.000	0.000	0.000	0.00	0.00

Project File: UNIT6.stm | IDF File: sampleFHA.IDF | Total number of lines: 79 | Run Date: 01-02-2003

NOTES: Initial tailwater elevation = 5306.8 (ft) , * Crown depth assumed., ** Critical depth assumed.