REVISED FEE SCHEDULE FOR LVMC TITLE 13 AND CHAPTER 11.50
(ADOPTED PURSUANT TO LVMC 13.40.050)
(Revised April 2004)

FEE DESCRIPTION	FEE AMOUNT
MAP, PLAN & PERMIT-RELATED FEES	**PER ITEM AS STATED**
Final map processing fee (basic)	$100 per map
Additional (per lot) final map processing fee	$10 per lot
Fee for application to deviate from standard (basic)	$250 per application
Additional fee for deviation from standard	$50 per deviation
Plan check fee for initial submittal	1.25% of approved bond estimate (with a $500 minimum for a commercial project or residential subdivision, and a $100 minimum for a single residence)
Plan check fee for any resubmittal to make required corrections if made later than one year following notification or if plans have been substantially redesigned	1.25% of approved bond estimate (with a $500 minimum for a commercial project or residential subdivision, and a $100 minimum for a single residence)
Express civil plan check application fee	$300 per application
Express civil plan check hourly fee	$600 per hour (1 hour minimum)
Plan revision fee	$100 per sheet affected by revisions
Plan replot fee	$200 per sheet (includes associated plan revision fee)
Minor excavation permit fee (for excavations affecting at most one traffic lane or 20 feet longitudinally)	$50 per request
Flood zone determination fee	$20 per determination
INSPECTION FEES	**PER ITEM AS STATED**
Inspection fee (fee for first $25,000 of approved estimate)	3% of approved estimate amount for first $25,000 (with a $150 minimum for a commercial project or residential subdivision, and a $50 minimum for a single residence
Inspection fee (additional fee for approved estimate amount in excess of $25,000, up to $100,000)	2.75% of approved estimate amount in excess of $25,000, up to $100,000)
Inspection fee (additional fee for approved estimate amount in excess of $100,000)	1.5% of approved estimate amount in excess
Reinspection fee	$100 per reinspection
Retest fee	$100 per retest

SPECIAL DOCUMENT FEES	PER ITEM AS STATED
Improvement agreement fee	$100 per agreement
Bond assumption fee	$250 per replacement bond
Bond reduction fee	$150 per reduction
Covenant running with land fee	$150 per application
Encroachment fee	$25 per encroachment
TECHNICAL, STUDIES FEES (INCLUDING WITHOUT LIMITATION DRAINAGE/FLOOD STUDIES, TRAFFIC IMPACT ANALYSIS)	**PER SUBMITTAL OR RESUBMITTAL**
Master technical study review fee	$1000 for master traffic impact analysis, $400 for other
Fee for update/revision/amendment to approved master technical study	$400
Individual technical study review fee	$400 for drainage/flood study; $300 for traffic impact analysis
Fee for update/revision/amendment to approved individual technical study	$100
TRAFFIC BARRICADE-RELATED FEES	**PER ITEM AS STATED**
Traffic barricade plan permit fee	$50 per plan or review
Traffic barricade plan renewal fee	$100 per renewal
Fee for noncompliance with traffic barricade plan (basic)	$100 per day per noncompliance
Fee for noncompliance with traffic barricade plan (additional fee, per unit of equipment)	$10 per unit per day
Fee for placement of traffic barricades by City	Cost as determined by City
RIGHT-OF-WAY CONSTRUCTION-RELATED FEES	**PER ITEM AS STATED**
Fee for failure to obtain permit for work in right-of-way	$100 per day per noncompliance, plus double the plan check fees and inspection fees described above
Fee for failure to comply with permit for work in right-of way	$100 per day per noncompliance
Roadway/sidewalk lane rental (arterial right-of-way)	$100 per lane per cumulative week (calculated using the formula identified by the asterisk below)
Roadway/sidewalk lane rental fee (collector right-of-way)	$75 per lane per cumulative week (calculated using the formula identified by the asterisk below)
Roadway/sidewalk lane rental fee (residential right-of-way)	$50 per lane per cumulative week (calculated using the formula identified by the asterisk below)

*(0.5n(n+1))ab, where n=Number of weeks, a=Land rental fee, b=Number of lanes

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February 22, 2023

Kleinfelder Project No.: 20232298.001A
CLV Project No.: DS05643

Mr. Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works
City of Las Vegas
333 N. Rancho Drive 7th Floor
Las Vegas, NV 89106

RE: Las Vegas Academy
Addendum No. 1 to the Technical Drainage Study

Dear Mr. Sung:

Enclosed are one copy and one CD containing a PDF version of the Las Vegas Academy Addendum 1 for your review. All items on the CD match the paper versions bound into the study. The proposed 17.45+/- acre site is located on the east corner of 7th Street and Clark Avenue.

If there are any questions or additional information that is necessary, please contact our office at 702.255.8100

Sincerely,

Adam Black, P.E.
Project Engineer
Kleinfelder

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ADDENDUM 1

to the

TECHNICAL DRAINAGE REPORT

for

LAS VEGAS ACADEMY

Prepared for:

Simpson Coulter Studio

151 E. Warm Springs

Las Vegas, NV 89119

Adam Black

Digitally signed by Adam Black
DN: C=US, E=ablack@kleinfelder.com, O=Poggemeyer Design Group, OU=Civil, CN=Adam Black
Reason: I am the author of this document
Date: 2023.02.22 17:36:49-08'00'

Prepared by:

Kleinfelder

6960 Smoke Ranch Road, Suite 110

Las Vegas, NV 89128

February 2023

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Las Vegas Academy Date: February 22, 2023

Location of Development: a) Descriptive (Cross Streets) North/South: 7th Street

East/West: Clark Avenue

b) Section: 34 Township: 20S Range: 61E

c) APN : 139-34-710-038, 139-34-710-039, 139-34-701-010, and 139-34-712-018

Name of Owner: Clark County School District

Telephone No.: Fax No.: E-Mail Address:

Address:

Contact Person-Name: Adam Black, P.E. **Telephone No.:** 702-255-8100

* **E-Mail Address:** ablack@kleinfelder.com **Fax No.:** (702) 255-8375

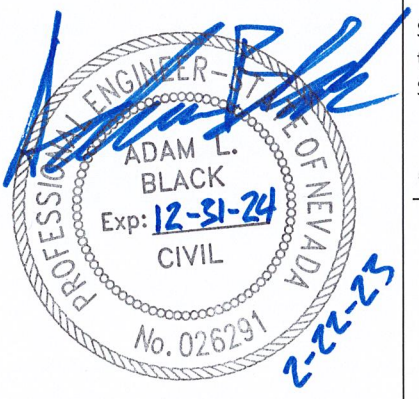
Firm: Kleinfelder

Address: 6960 Smoke Ranch Road, Suite 110, Las Vegas, NV 89128

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 17.45+/- Acres Being Developed/Disturbed: 11.5 +/- Acres
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): school facilities and buildings
5. Approximate upstream land area which drains to the subject site: 33.5 +/- Acres
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: Previously the site evaluated under Las Vegas Central Neighborhood Flood Control MPU
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: The site will drain via surface flows to Bridger Avenue, Clark Avenue, and towards the intersection of 10th Street and Lewis Avenue.
8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

February 22, 2023

Kleinfelder Project No.: 20232298.001A
CLV Project No.: DS05643

Mr. Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works
City of Las Vegas
333 N. Rancho Drive 7th Floor
Las Vegas, NV 89106

SUBJECT: **Las Vegas Academy**
Addendum No. 1 to the Technical Drainage Study

Dear Mr. Sung:

We have received and incorporated your comments on our technical drainage study submittal for the above-mentioned project. Below are the comments received and our responses thereto:

---

1) Provide a copy of the zoning/planning conditions associated with this site (**22-0593-SDR1** and **22-0593-VAC1**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

Response: **Noted. Zoning/planning conditions 22-0593-SDR1 and 22-0593-VAC1 is provided in the appendix.**

2) **FIGURE 7**, **FIGURE 8** and **FIGURE 9**: The drainage maps must show the entirety of the offsite basin(s), otherwise the labeled basin areas and flows cannot be verified. If the offsite basins and flows are referenced from other maps or studies, then provide a note for source referencing in the next submittal.

Response: **Figure 7, Figure 8, and Figure 9 revised to show the entirety of the offsite basin boundaries. Offsite basin boundaries were based upon local topography and referenced basin CH60A boundary from the *City of Las Vegas Central Neighborhood Flood Control Master Plan*, March 2005 prepared by PBS&J.**

3) In the report, **Section 4.1.1 *Offsite Watershed Condition*** it states sub-basins ST7N and BGR-1 flows combine at CP4 and they continue through sub-basin BGR-2 and combine at CP5. However,

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this statement is not representative of what's shown in **FIGURES 7**, **8** and **9**. Address and revise in the next submittal.

Response: **Sub-basins ST7N and BGR-1 flows combine at CP5. Combined flows continue southwest within Bridger Avenue through basin BGR-2 to combine with basin flows at CP6. Refer to Figure 7, Figure 8 and Figure 9 included in the appendix.**

4) In the report, Page 25, *Table 6.5 (Interim Condition 100-Year Culvert Normal Depth Summary)*: First column, there is no Section 12 and 18 anywhere on the basin drainage maps. Review and revise accordingly.

Response: **12 and 18 were referring to normal depth SD facility pipe diameters. FlowMaster calcs and table removed and replaced with WSPG model due to additional storm pipe facilities. WSPG exhibit and model provided in Appendix B.2. HGL elevations provided pipe profile included in civil plans.**

5) In the report, same page, same table: The values in the "D (FT)" column are seemingly incorrect. Perform a better quality control in the next submittal.

Response: **Table heading for flow depths was switched with velocity. Table headings and information corrected. See Table 1, "Interim Condition 100-Year Culvert Normal Depth Summary" included with response for comment 4. Refer to Figure 8 included in the appendix.**

6) **FIGURE 8:** Provide a hydraulic cross section for the proposed swale adjacent to the New Student Union and the Theater.

Response: **Cross section X17A/I, X17B/I, and X17C/I added to west of New Student Union Center for flow depth analysis. Refer to Figure 8 included in the appendix. Max flow depth is 0.34 feet. Water surface elevations at these locations will be above the New Student Union Finish Floor. Curb and gutter with curb face height greater than twice the depth of flow (0.7 feet) will be constructed for a raised planter area to divert flows away from the building. FlowMaster calculations are provided in the appendix.**

7) **FIGURE 9:** Onsite *Basin ON2-D* has several locations where flow is conveyed offsite. Break *ON2-D* up to calculate the various flow concentration points discharging offsite at such as the sidewalk underdrain east of the sports field, the driveway east of the parking garage and at *South 9th Street*.

Response: **Developed condition onsite basin ON2-D has been prorated into four sub-basins ON2A, ON2B, ON2C, and ON2D. Summary of sub-basin flows are listed in Table 4, "Developed Condition Drainage Basin 10- and 100-Year Flow Rates." Sub-basin flows were used for flow depth analysis at cross sections X18/D, X19/D, X20/D, and X21/D of onsite surface flows discharging to Clark Avenue. Cross section analysis and finish floor analysis summarized in tables included on Figure 9 in the appendix. FlowMaster calculations provided in the appendix.**

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8) General comment on the HEC-1 models for all drainage conditions – Provide HEC-1 routing for combination points.

Response: **Offsite basins have been added to the HEC-1 models to provide routing for the combination points. Onsite basins have also been revised per revision to New Gymnasium building layout. Updated curve number, standard form 4, and HEC-1 models are included in the appendix. Refer to Figure 7, Figure 8 and Figure 9 included in the appendix. Summary of HEC-1 model results provided below. FlowMaster calculations updated as needed and provided in the appendix.**

Table 1 Existing Condition Drainage Basin 10- and 100-Year Flow Rates

BASIN/CP ID	AREA (ACRE)	Q_{10} (CFS)	Q_{100} (CFS)	REMARKS
ST7S-1	4.21	5	11	Offsite area draining to intersection of Stanley W Cooper Pl & 7th St
ON1-E	0.46	1	2	Onsite basin draining towards 7th and Clark
CP1A	-	6	12	Total flow at 7th Street and Stanley W Cooper Pl
ST7S-2	2.06	3	5	Offsite area draining to 7th St and conveyed to Clark Ave
CP1B	-	8	17	Total flow entering Clark from 7th Street
CLK-1	7.29	9	19	Offsite area draining to Clark Ave and conveyed to 7th St
CP2	-	17	36	Total flow at Clark and 7th Street
CLK-2	6.86	9	18	Offsite area draining to Clark Ave and conveyed to 10th St
ON2-E	4.09	6	12	Onsite basin draining towards Clark and 10th
CP3	-	32	64	Total flow at Clark and 10th Street
ST7N	1.47	2	4	Offsite area draining to 7th Street and conveyed to Bridger Ave
ON3-E	0.50	1	1	Onsite basin draining towards 7th and Bridger
CP4	-	3	6	Total flow entering Bridger from 7th Street
BGR-1	4.69	6	12	Offsite area draining to Bridger Ave and conveyed to 7th St
CP5	-	8	17	Total flow at Bridger and 7th Street
BGR-2	3.19	4	8	Offsite area draining to Bridger Ave and conveyed to 9th St
ON4-E	2.59	4	8	Onsite basin draining towards Bridger and 9th
CP6	-	16	33	Total flow at Bridger and 9th Street
LWS	2.60	3	7	Offsite area draining to Lewis Ave and conveyed to 10th St
ON5-E	8.94	14	26	Onsite basin draining towards Lewis and 9th
CP7	-	17	33	Total flow entering 10th from Lewis
ST10	1.15	2	3	Offsite area draining to 10th St and conveyed to Lewis Ave
ON6-E	0.87	1	3	Onsite basin draining towards 10th and Lewis
CP8	-	3	6	Total flow entering Lewis from 10th

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Table 2 Interim Condition Drainage Basin 10- and 100-Year Flow Rates

BASIN/CP ID	AREA (ACRE)	Q_{10} (CFS)	Q_{100} (CFS)	REMARKS
ST7S-1	4.21	5	11	Offsite area draining to intersection of Stanley W Cooper Pl & 7th St
ON1-I	0.94	2	4	Onsite basin draining towards 7th and Clark
CP1A	-	6	13	Total flow at 7th Street and Stanley W Cooper Pl
ST7S-2	2.06	3	5	Offsite area draining to 7th St and conveyed to Clark Ave
CP1B	-	9	18	Total flow entering Clark from 7th Street
CLK-1	7.29	9	19	Offsite area draining to Clark Ave and conveyed to 7th St
CP2	-	18	37	Total flow at Clark and 7th Street
CLK-2	6.86	9	18	Offsite area draining to Clark Ave and conveyed to 10th St
ON2-I	4.55	6	12	Onsite basin draining towards Clark and 10th
CP3	-	33	67	Total flow at Clark and 10th Street
ST7N	1.47	2	4	Offsite area draining to 7th Street and conveyed to Bridger Ave
ON3-I	0.49	1	1	Onsite basin draining towards 7th and Bridger
CP4	-	3	6	Total flow entering Bridger from 7th Street
BGR-1	4.69	6	12	Offsite area draining to Bridger Ave and conveyed to 7th St
CP5	-	8	17	Total flow at Bridger and 7th Street
BGR-2	3.19	4	8	Offsite area draining to Bridger Ave and conveyed to 9th St
ON4-I	1.94	3	6	Onsite basin draining towards Bridger and 9th
ON4A	1.20	1.9	3.7	Prorated sub-basin flows of onsite basin ON4-I
ON4B	0.74	1.1	2.3	Prorated sub-basin flows of onsite basin ON4-I
CP6	-	15	31	Total flow at Bridger and 9th Street
LWS	2.60	3	7	Offsite area draining to Lewis Ave and conveyed to 10th St
ON5-I	8.54	14	26	Onsite basin draining towards Lewis and 9th
ON5A	0.47	0.8	1.4	Prorated sub-basin flows of onsite basin ON5-I
ON5B1	0.91	1.5	2.8	Prorated sub-basin flows of onsite basin ON5-I
ON5B2	0.40	0.7	1.2	Prorated sub-basin flows of onsite basin ON5-I
ON5B3	0.50	0.8	1.5	Prorated sub-basin flows of onsite basin ON5-I
ON5C	0.51	0.8	1.6	Prorated sub-basin flows of onsite basin ON5-I
ON5D	0.47	0.8	1.4	Prorated sub-basin flows of onsite basin ON5-I
ON5E	4.40	7.2	13.4	Prorated sub-basin flows of onsite basin ON5-I
ON5F	0.88	1.4	2.7	Prorated sub-basin flows of onsite basin ON5-I
CP7	-	17	33	Total flow entering 10th from Lewis
ST10	1.15	2	3	Offsite area draining to 10th St and conveyed to Lewis Ave
ON6-I	0.87	1	3	Onsite basin draining towards 10th and Lewis
CP8	-	3	6	Total flow entering Lewis from 10th

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Table 3 Developed Condition Drainage Basin 10- and 100-Year Flow Rates

BASIN/CP ID	AREA (ACRE)	Q_{10} (CFS)	Q_{100} (CFS)	REMARKS
ST7S-1	4.21	5	11	Offsite area draining to intersection of Stanley W Cooper Pl & 7th St
ON1-D	0.94	2	4	Onsite basin draining towards 7th and Clark
CP1A	-	6	13	Total flow at 7th Street and Stanley W Cooper Pl
ST7S-2	2.06	3	5	Offsite area draining to 7th St and conveyed to Clark Ave
CP1B	-	9	18	Total flow entering Clark from 7th Street
CLK-1	7.29	9	19	Offsite area draining to Clark Ave and conveyed to 7th St
CP2	-	18	37	Total flow at Clark and 7th Street
CLK-2	6.86	9	18	Offsite area draining to Clark Ave and conveyed to 10th St
ON2-D	5.35	8	15	Onsite basin draining towards Clark and 10th
ON2A	2.10	3.2	5.9	Onsite sub-basin of ON2-D draining to SW underdrain east of sports field.
ON2B	1.16	1.7	3.3	Onsite sub-basin of ON2-D draining to driveway east of parking garage.
ON2C	1.00	1.5	2.8	Onsite sub-basin of ON2-D draining to 9th Street.
ON2D	1.09	1.6	3.0	Onsite sub-basin of ON2-D draining to driveway east of performing arts center.
CP3	-	34	69	Total flow at Clark and 10th Street
ST7N	1.47	2	4	Offsite area draining to 7th Street and conveyed to Bridger Ave
ON3-D	0.49	1	1	Onsite basin draining towards 7th and Bridger
CP4	-	3	6	Total flow entering Bridger from 7th Street
BGR-1	4.69	6	12	Offsite area draining to Bridger Ave and conveyed to 7th St
CP5	-	8	17	Total flow at Bridger and 7th Street
BGR-2	3.19	4	8	Offsite area draining to Bridger Ave and conveyed to 9th St
ON4-D	1.94	3	6	Onsite basin draining towards Bridger and 9th
CP6	-	15	31	Total flow at Bridger and 9th Street
LWS	2.60	3	7	Offsite area draining to Lewis Ave and conveyed to 10th St
ON5-D	8.26	12	23	Onsite basin draining towards Lewis and 9th
CP7	-	15	29	Total flow entering 10th from Lewis
ST10	1.15	2	3	Offsite area draining to 10th St and conveyed to Lewis Ave
ON6-D	0.87	1	3	Onsite basin draining towards 10th and Lewis
CP8	-	3	6	Total flow entering Lewis from 10th

9) *Flow Masters Calculations*: No analysis is shown for existing condition. The flow master calculations for interim condition are duplicated and shown on both the Existing and Interim conditions sections.

Response: FlowMaster output calculations for the Existing, Interim, and Developed conditions have been included in the appendix for your review.

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10) The grading plans proposed a few feet of pavement cut and replacement along *7th Street* and *10th Street*. As both streets are currently fully improved, explain if it is because of bad condition of pavement or it needs to open up the street for installing utilities lines in the next submittal.

Consult with *City Land Development* for the required width of repaving or overpaving.

Response: Pavement cut and replacement along 7th Street and 10th Street are for the instillation of potable water pipe utilities. City Land Development will be consulted for the required width of repaving asphalt removed for waterline pipe trench.

11) **Sheet C3.01:** The high point in the proposed valley gutter (3.73 FG/HP) along the north side of the ***New Gymnasium*** is higher than the proposed finished floor at FF=2003.6 which is not acceptable. Raise the FF to be at least six inches above the adjacent high point.

Response: Flowline grades adjacent to the New Gymnasium adjusted so that building finish floor is at least six (6) inches above the flowline elevation.

12) **Sheet C3.02:** At the southeast corner of the ***New Student Courtyard & Amphitheater***, (5) 2.0' Type CM2 inlets are labeled on the plan. However, it is not understood where those Type CM2 inlets can fit in. Address and resolve in the next submittal.

Response: CM2 inlet labels have been revised to refer to 24"x24" NDOT type II area inlets.

13) **Sheet C3.02:** The area inlets had been called out with various type such as 24"x24" SDDI, 3.0'x3.0' NDOT Type II and even Type CM2 with the same ***Construction Note 31***. Explain why can't use the same type of inlet to be consistent?

Response: Area inlet labels have been revised to be consistent. 24"x24" NDOT type II area inlets to be installed.

14) In the grading plans, ***Construction Note 31*** refers to detail on *Sheet C6.02*. However, *Sheet C6.02* is not provided. It appears that *Sheet C4.XX* is mislabeled as *Sheet C6.XX*. Clarify and perform better quality control of plans in the next submittal.

Response: C4.XX sheets relabeled as C6.XX. Refer to plan sheets submitted with this study.

15) **Sheet C3.02:** At the southeast corner of the ***New Student Union***, a flow line elevation (96.14FL) is lower than the adjacent roadway elevation of 96.72TC/96.22FL. Review and revise accordingly.

Response: Flowline elevation raised to elevation 96.49 to drain through sidewalk drain at 2.0% slope.

16) Proposed ***Student Union and Theatre*** do not meet finished floor due to the swales adjacent the buildings. The report notes that "adjacent building wall will require flood proofing". The grading plans do not call out or detail any flood proofing.

Response: Labels provided in grading plans for building walls to be floodproofed.

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17) Provide a note on all grading plans: Post-Construction BMPs (PCBMPs) / Control Measures noted on the Grading Plans are mandatory permanent regulatory stormwater pollution controls. These PCBMPs must be installed per the approved plans and must be permanently maintained.

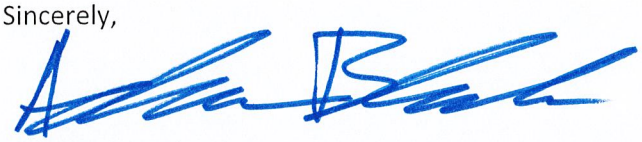
Response: Note provided on grading plan sheets.

18) Provide a note on all grading plans: All onsite storm drains and the associated facilities are privately owned and to be privately maintained by the *School District*.

Response: Note provided on grading plan sheets.

Included are revised plans for your review and approval; please feel free to contact us with any questions at (702) 255-8100.

Sincerely,



Adam Black, P.E.
Project Engineer
Kleinfelder

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APPENDIX A

ONSITE HYDROLOGIC DESIGN & ANALYSIS

A.1 FIGURES

- FIGURE 7: EXISTING ONSITE BASIN MAP
- FIGURE 8: INTERIM ONSITE BASIN MAP
- FIGURE 9: DEVELOPED ONSITE BASIN MAP

A.2 CURVE NUMBERS, SF4

A.3 HEC-1 MODELS

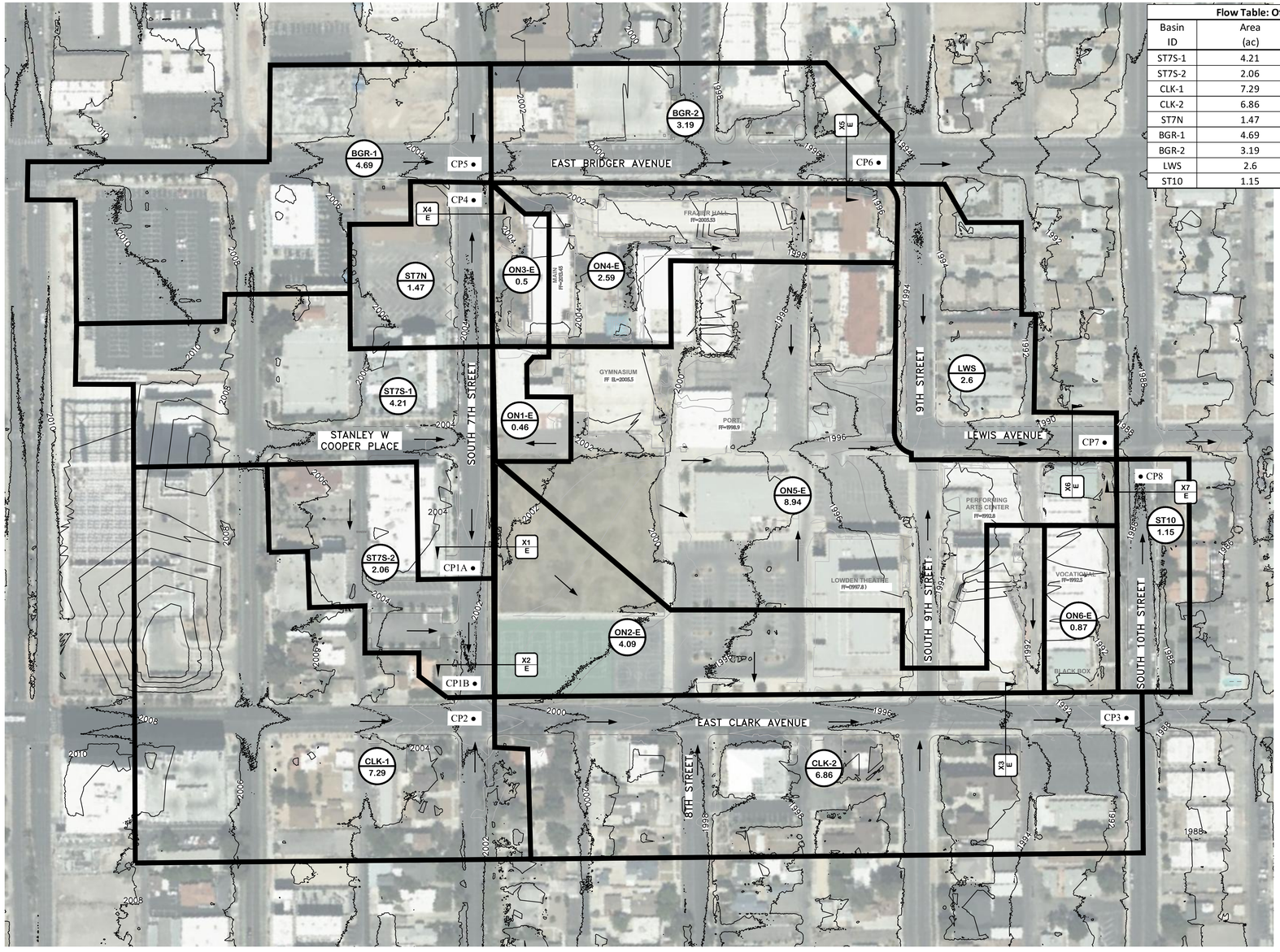
- ONSITE EXISTING CONDITION (LVA_EX.OUT)
- ONSITE INTERIM CONDITION (LVA_INT.OUT)
- ONSITE DEVELOPED CONDITION (LVA_DEV.OUT)

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A.1 FIGURES

- FIGURE 7: EXISTING ONSITE BASIN MAP
- FIGURE 8: INTERIM ONSITE BASIN MAP
- FIGURE 9: DEVELOPED ONSITE BASIN MAP

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Flow Table: Offsite Basins			
Basin ID	Area (ac)	Q10 (cfs)	Q100 (cfs)
ST7S-1	4.21	5	11
ST7S-2	2.06	3	5
CLK-1	7.29	9	19
CLK-2	6.86	9	18
ST7N	1.47	2	4
BGR-1	4.69	6	12
BGR-2	3.19	4	8
LWS	2.6	3	7
ST10	1.15	2	3

Flow Table: Existing Condition			
ID	Area/Description (ac)	Q10 (cfs)	Q100 (cfs)
ON1-E	0.46	1	2
ON2-E	4.09	6	12
ON3-E	0.5	1	1
ON4-E	2.59	4	8
ON5-E	8.94	14	26
ON6-E	0.87	1	3
CP1A	ST7S-1 and ON1-E	6	12
CP1B	CP1A and ST7-2	8	17
CP2	CP1B and CLK-1	17	36
CP3	CP2, CLK-2, and ON2-E	32	64
CP4	ST7N and ON3-E	3	6
CP5	CP4 and BGR-1	8	17
CP6	CP5, BGR-2, and ON4-E	16	33
CP7	LWS and ON5-E	17	33
CP8	ST10 and ON6-E	3	6

10-yr Street Capacity Existing Condition

Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{10} (CFS)	Depth D_{Q10} (FT)	Velocity V_{Q10} (FPS)	D x V	10-Year Dry Lane	COMMENTS
X1/E	80	0.70	6	0.55	2.66	1.46	15.13	Depth of flow not met along 7th.
X2/E	80	0.70	8	0.60	2.74	1.64	14.17	Depth of flow not met at Clark and 7th intersection.
X3/E	80	0.60	32	0.77	2.35	1.81	4.39	Depth of flow not met along Clark; Dry lane criteria not met.
X4/E	80	0.60	3	0.44	2.37	1.04	10.58	Dry lane criteria not met.
X5/E	80	0.90	16	0.57	2.45	1.40	2.58	Depth of flow not met along Bridger; Dry lane criteria not met.
X6/E	80	1.30	17	0.45	3.21	1.44	10.33	Dry lane criteria not met.
X7/E	80	0.50	3	0.33	1.49	0.49	16.33	

100-yr Street Capacity Existing Condition

Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{100} (CFS)	Depth D_{100} (FT)	Velocity V_{100} (FPS)	D x V	COMMENTS
X1/E	80	0.70	12	0.67	2.93	2.0	
X2/E	80	0.70	17	0.73	3.14	2.3	
X3/E	80	0.60	64	0.90	2.87	2.6	
X4/E	80	0.60	6	0.57	2.47	1.4	
X5/E	80	0.90	33	0.66	2.77	1.8	
X6/E	80	1.30	33	0.56	3.42	1.9	
X7/E	80	0.50	6	0.39	1.74	0.7	

LEGEND

XXX / X.XX	BASIN ID./AREA (AC)
•CPXX	CONCENTRATION POINT ID
→	FLOW PATH
———	BASIN BOUNDARY
XX / X	CROSS-SECTION ID CONDITION

100 0 50 100
1 inch = 100 ft.
(SCALE VALID AT 24"X36" ONLY)

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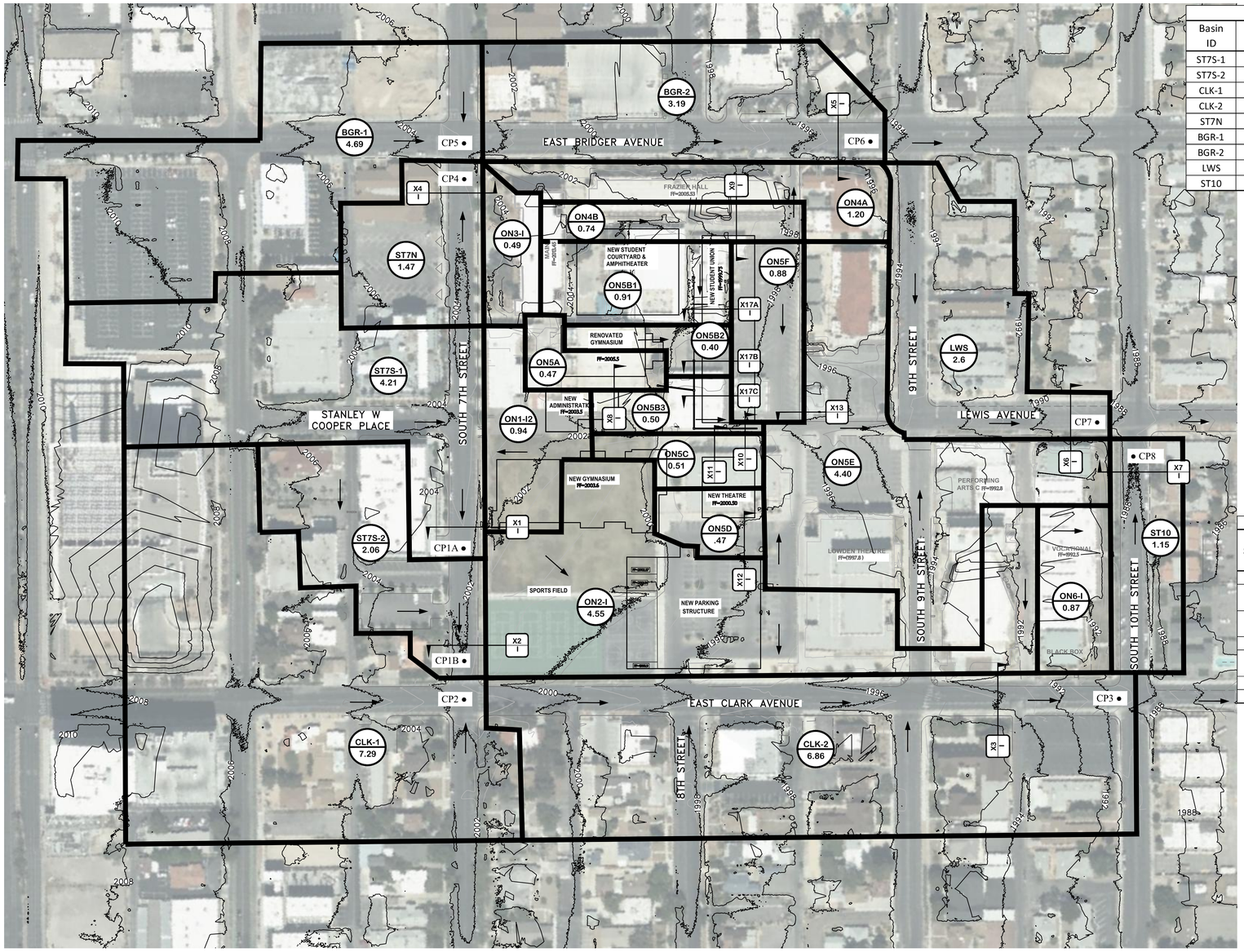
SCALE: 1"=100'
JOB#: 20232298
DATE: FEB 2022
DRAWING NO: **FIG-7**

LAS VEGAS ACADEMY

FIGURE 7

EXISTING ONSITE
BASIN MAP

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Flow Table: Offsite Basins

Basin ID	Area (ac)	Q10 (cfs)	Q100 (cfs)
ST7S-1	4.21	5	11
ST7S-2	2.06	3	5
CLK-1	7.29	9	19
CLK-2	6.86	9	18
ST7N	1.47	2	4
BGR-1	4.69	6	12
BGR-2	3.19	4	8
LWS	2.6	3	7
ST10	1.15	2	3

Flow Table: Interim Condition

ID	Area/Description (ac)	Q10 (cfs)	Q100 (cfs)
ON1-I	0.94	2	4
ON2-I	4.55	6	12
ON3-I	0.49	1	1
ON4-I	1.94	3	6
ON4A	1.20	1.9	3.7
ON4B	0.74	1.1	2.3
ON5-I	8.54	14	26
ON5A	0.47	0.8	1.4
ON5B1	0.91	1.5	2.8
ON5B2	0.40	0.7	1.2
ON5B3	0.50	0.8	1.5
ON5C	0.51	0.8	1.6
ON5D	0.47	0.8	1.4
ON5E	4.4	7.2	13.4
ON5F	0.88	1.4	2.7
ON6-I	0.87	1	3
CP1A	ST7S-1 and ON1-I	6	13
CP1B	CP1A and ST7-2	9	18
CP2	CP1B and CLK-1	18	37
CP3	CP2, CLK-2, and ON2-I	33	67
CP4	ST7N and ON3-I	3	6
CP5	CP4 and BGR-1	8	17
CP6	CP5, BGR-2, and ON4-I	15	31
CP7	LWS and ON5-I	17	33
CP8	ST10 and ON6-I	3	6

10-yr Street Capacity Interim Condition

Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{10} (CFS)	Depth D_{Q10} (FT)	Velocity V_{Q10} (FPS)	D x V	10-Year Dry Lane	COMMENTS
X1/I	80	0.70	6	0.55	2.66	1.46	15.13	Depth of flow not met along 7th.
X2/I	80	0.70	9	0.62	2.79	1.73	13.78	Depth of flow not met at Clark and 7th intersection;
X3/I	80	0.60	33	0.77	2.37	1.82	4.39	Depth of flow not met at Clark and 10st intersection; Dry lane criteria not met.
X4/I	80	0.60	3	0.44	2.37	1.04	10.58	Dry lane criteria not met.
X5/I	80	0.90	15	0.56	2.45	1.37	3.08	Depth of flow not met along Bridger; Dry lane criteria not met.
X6/I	80	1.30	17	0.45	3.21	1.44	10.33	Dry lane criteria not met.
X7/I	80	0.50	3	0.33	1.49	0.49	16.33	

100-yr Street Capacity Interim Condition

Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{100} (CFS)	Depth D_{100} (FT)	Velocity V_{100} (FPS)	D x V	COMMENTS
X1/I	80	0.70	13	0.68	2.98	2.0	
X2/I	80	0.70	18	0.74	3.18	2.4	
X3/I	80	0.60	67	0.91	2.91	2.6	
X4/I	80	0.60	6	0.57	2.47	1.4	
X5/I	80	0.90	31	0.65	2.71	1.8	
X6/I	80	1.30	33	0.56	3.42	1.9	
X7/I	80	0.50	6	0.39	1.74	0.7	

Interim Condition Finish Floor Analysis

Section ID	FF Elev.	FL Elev.	Depth, D (FT)	WSE	Freeboard (FT)	2*D	FF > 2*D + FL	COMMENTS
X1/I	2003.60	2002.04	0.68	2002.72	0.88	1.36	YES	
X3/I	2000.00	1998.16	0.91	1999.07	0.93	1.82	YES	
X8/I	2003.50	2002.54	0.23	2002.77	0.73	0.46	YES	
X9/I	1999.75	2001.47	0.31	2001.78	0	0.62	NO	Install curb & gutter. Minimum curb face hieght > 2*D (0.7 feet)
X10/I	1999.75	2000.35	0.22	2000.57	0	0.44	NO	Install curb & gutter. Minimum curb face hieght > 2*D (0.7 feet)
X11/I	2000.50	1998.93	0.69	1999.62	0.88	1.38	YES	
X12/I	2000.50	1998.92	0.35	1999.27	1.23	0.7	YES	
X13/I	1999.75	1998.18	0.35	1998.53	1.22	0.7	YES	
X17C/I	1999.75	1999.85	0.34	2000.19	0	0.68	NO	Install curb & gutter. Minimum curb face hieght > 2*D (0.7 feet)

Onsite Drainage Swale Analysis Interim Condition

Section ID	Channel Slope (%)	Flow Q_{100} (CFS)	Depth D (FT)	Velocity V (FPS)	COMMENTS
X8/I	0.50	1.4	0.23	0.99	Onsite Landscape Swale
X9/I	0.43	2.3	0.31	1.87	Onsite Landscape Swale
X10/I	2.00	8.5	0.22	3.65	Onsite Landscape Swale
X11/I	1.50	8.5	0.69	3.54	Onsite Landscape Swale
X12/I	1.80	1.4	0.35	2.47	Onsite Landscape Swale
X13/I	0.58	2.7	0.35	1.64	Adjacent drive isle/parking area
X17A/I	0.50	2.8	0.29	1.66	Onsite Landscape Swale
X17B/I	0.50	4.0	0.32	1.80	Onsite Landscape Swale
X17C/I	1.00	5.5	0.34	2.80	Onsite Landscape Swale

LEGEND

XXX / X.XX	BASIN ID./AREA (AC)
•CPXX	CONCENTRATION POINT ID
→	FLOW PATH
———	BASIN BOUNDARY
XX / X	CROSS-SECTION ID CONDITION

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DATE: FEB 2022
DRAWING NO: **FIG-8B**

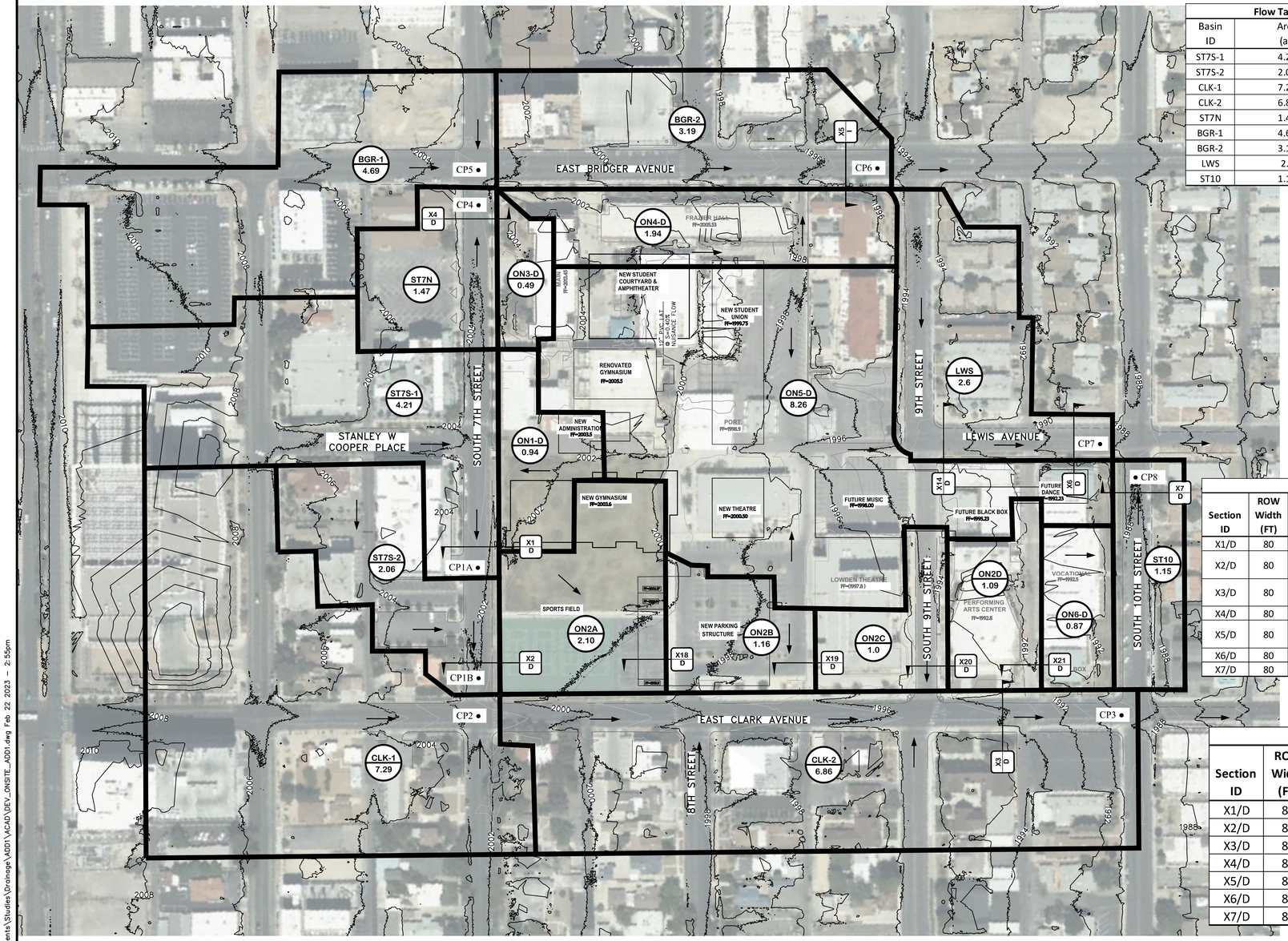
LAS VEGAS ACADEMY

FIGURE 8

INTERIM ONSITE BASIN MAP

100 0 50 100
1 inch = 100 ft.
(SCALE VALID AT 24"X36" ONLY)

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Flow Table: Offsite Basins			
Basin ID	Area (ac)	Q10 (cfs)	Q100 (cfs)
ST7S-1	4.21	5	11
ST7S-2	2.06	3	5
CLK-1	7.29	9	19
CLK-2	6.86	9	18
ST7N	1.47	2	4
BGR-1	4.69	6	12
BGR-2	3.19	4	8
LWS	2.6	3	7
ST10	1.15	2	3

Flow Table: Developed Condition			
ID	Area/Description (ac)	Q10 (cfs)	Q100 (cfs)
ON1-D	0.94	2	4
ON2-D	4.55	8	15
ON2A	2.1	3.2	5.9
ON2B	1.16	1.7	3.3
ON2C	1.00	1.5	2.8
ON2D	1.09	1.6	3
ON3-D	0.49	1	1
ON4-D	1.94	3	6
ON5-D	7.74	12	23
ON6-D	0.87	1	3
CP1A	ST7S-1 and ON1-D	6	13
CP1B	CP1A and ST7-2	9	18
CP2	CP1B and CLK-1	18	37
CP3	CP2, CLK-2, and ON2-D	34	69
CP4	ST7N and ON3-D	3	6
CP5	CP4 and BGR-1	8	17
CP6	CP5, BGR-2, and ON4-D	15	31
CP7	LWS and ON5-D	15	29
CP8	ST10 and ON6-D	3	6

10-yr Street Capacity Developed Condition								
Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{10} (CFS)	Depth D_{Q10} (FT)	Velocity V_{Q10} (FPS)	D x V	10-Year Dry Lane	COMMENTS
X1/D	80	0.70	6	0.55	2.66	1.46	15.13	Depth of flow not met along 7th.
X2/D	80	0.70	9	0.62	2.79	1.73	13.78	Depth of flow not met at Clark and 7th intersection;
X3/D	80	0.60	34	0.78	2.38	1.86	4.06	Depth of flow not met at Clark and 10st intersection; Dry lane criteria not met.
X4/D	80	0.60	3	0.44	2.37	1.04	10.58	Dry lane criteria not met.
X5/D	80	0.90	15	0.56	2.45	1.37	3.08	Depth of flow not met along Bridger; Dry lane criteria not met.
X6/D	80	1.30	15	0.44	3.12	1.37	10.83	Dry lane criteria not met.
X7/D	80	0.50	3	0.33	1.49	0.49	16.33	

100-yr Street Capacity Developed Condition							
Section ID	ROW Width (FT)	Street Slope (%)	Flow Q_{100} (CFS)	Depth D_{100} (FT)	Velocity V_{100} (FPS)	D x V	COMMENTS
X1/D	80	0.70	13	0.68	2.98	2.0	
X2/D	80	0.70	18	0.74	3.18	2.4	
X3/D	80	0.60	69	0.91	2.94	2.7	
X4/D	80	0.60	6	0.57	2.47	1.4	
X5/D	80	0.90	31	0.65	2.71	1.8	
X6/D	80	1.30	29	0.54	3.40	1.8	
X7/D	80	0.50	6	0.39	1.74	0.7	

Developed Condition Finish Floor Analysis								
Section ID	FF Elev.	FL Elev.	Depth, D (FT)	WSE	Freeboard (FT)	2*D	FF > 2*D + FL	COMMENTS
X1/D	2003.60	2002.04	0.68	2002.72	0.88	1.36	YES	
X3/D	2000.00	1998.16	0.91	1999.07	0.93	1.82	YES	
X14/D	1998.00	1994.95	0.83	1995.78	2.22	1.66	YES	
X6/D	1998.00	1993.05	0.54	1993.59	4.41	1.08	YES	
X6/D	1995.23	1991.96	0.54	1992.5	2.73	1.08	YES	
X6/D	1992.23	1989.58	0.54	1990.12	2.11	1.08	YES	
X18/D	2002.57	2001.76	0.30	2002.06	0.51	0.6	YES	
X18/D	2002.00	2001.37	0.30	2001.67	0.33	0.6	YES	
X18/D	2000.00	1999.18	0.30	1999.48	0.52	0.6	YES	

Onsite Drainage Swale Analysis Developed Condition					
Section ID	Channel Slope (%)	Flow Q_{100} (CFS)	Depth D (FT)	Velocity V (FPS)	COMMENTS
X14/D	1.00	23	0.83	4.85	Adjacent drive isle to Lewis Ave
X18/D	0.50	5.9	0.30	1.74	Onsite swale
X19/D	0.50	3.3	0.33	1.53	Onsite driveway
X20/D	0.40	2.8	0.33	1.35	9th Street (private)
X21/D	0.40	3	0.23	1.32	Onsite swale

LEGEND

XXX / X.XX	BASIN ID./AREA (AC)
•CPXX	CONCENTRATION POINT ID
→	FLOW PATH
———	BASIN BOUNDARY
XX / X	CROSS-SECTION ID CONDITION

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SCALE: 1"=100'
JOB#: 20232298
DATE: FEB 2022
DRAWING NO: **FIG-9**

LAS VEGAS ACADEMY

FIGURE 9

DEVELOPED ONSITE BASIN MAP

100 0 50 100
1 inch = 100 ft.
(SCALE VALID AT 24"X36" ONLY)

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A.2 CURVE NUMBERS, SF4

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Composite Curve Numbers - Existing Condition

BASIN ID	SOIL TYPE	COVER TYPE	HSG (%)				CN				SUB-AREA (ac)	CN
			A	B	C	D	A	B	C	D		
ON1-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.04	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.42	98.0
										TOTAL	**0.46**	**97.2**
ON2-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.33	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	2.76	98.0
										TOTAL	**4.09**	**95.1**
ON3-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.27	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.23	98.0
										TOTAL	**0.50**	**93.1**
ON4-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.54	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	2.05	98.0
										TOTAL	**2.59**	**96.1**
ON5-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.21	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	7.73	98.0
										TOTAL	**8.94**	**96.8**
ON6-E	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.26	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.61	98.0
										TOTAL	**0.87**	**95.3**

Composite Curve Numbers - Interim Condition

BASIN ID	SOIL TYPE	COVER TYPE	HSG (%)				CN				SUB-AREA (ac)	CN
			A	B	C	D	A	B	C	D		
ON1-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.20	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.85	98.0
										TOTAL	**1.05**	**96.3**
ON2-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.61	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	2.94	98.0
										TOTAL	**4.55**	**94.8**
ON3-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.27	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.22	98.0
										TOTAL	**0.49**	**93.0**
ON4-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.52	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	1.42	98.0
										TOTAL	**1.94**	**95.6**
ON5-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.44	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	7.10	98.0
										TOTAL	**8.54**	**96.5**
ON6-I	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.26	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.61	98.0
										TOTAL	**0.87**	**95.3**

Composite Curve Numbers - Developed Condition

BASIN ID	SOIL TYPE	COVER TYPE	HSG (%)				CN				SUB-AREA (ac)	CN
			A	B	C	D	A	B	C	D		
ON1-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.20	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.85	98.0
										TOTAL	**1.05**	**96.3**
ON2-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.61	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	3.74	98.0
										TOTAL	**5.35**	**95.3**
ON3-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.27	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.22	98.0
										TOTAL	**0.49**	**93.0**
ON4-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.52	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	1.42	98.0
										TOTAL	**1.94**	**95.6**
ON5-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	1.44	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	6.30	98.0
										TOTAL	**7.74**	**96.3**
ON6-D	615	Pervious	0.0	0.0	0.0	100.0	68	79	86	89	0.26	89.0
	615	Impervious	0.0	0.0	0.0	100.0	98	98	98	98	0.61	98.0
										TOTAL	**0.87**	**95.3**

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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

KLEINFELDER
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Project: LAS VEGAS ACADEMY

PROJECT NO.: 20232298
CALCULATED BY : ALB
DATE: 2/13/22

SUB-BASIN DATA			INITIAL / OVERLAND TIME (Ti)						TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIGN: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	TOTAL LENGTH Ft (11)	Tc = (L/180)+10 Min (12)	Min (13)	Tlag= 0.6Tc/60 Hours	P10/P100
ONSITE EXISTING CONDITION																		
ON1-E	**D**	**97.2**	0.893	0.46	**0.00072**	50	1.00	2.63	200	0.86	1.87	2.84	1.78	250	11.4	4.4	**0.050**	1.58/2.77
ON2-E	**D**	**95.1**	0.865	4.09	**0.00639**	150	1.00	5.17	860	1.12	2.14	3.24	5.75	1010	15.6	10.9	**0.109**	1.58/2.77
ON3-E	**D**	**93.1**	0.839	0.50	**0.00078**	100	1.00	4.70	280	0.50	1.43	2.16	3.27	380	12.1	8.0	**0.080**	1.58/2.77
ON4-E	**D**	**96.1**	0.879	2.59	**0.00405**	100	1.00	3.99	760	1.16	2.18	3.30	5.15	860	14.8	9.1	**0.091**	1.58/2.77
ON5-E	**D**	**96.8**	0.888	8.94	**0.01397**	380	1.50	6.51	525	0.85	1.86	2.82	4.62	905	15.0	11.1	**0.111**	1.58/2.77
ON6-E	**D**	**95.3**	0.868	0.87	**0.00136**	50	1.00	2.95	400	0.40	1.28	1.94	5.22	450	12.5	8.2	**0.082**	1.58/2.77
ONSITE INTERIM CONDITION																		
ON1-I	**D**	**96.3**	0.881	1.05	**0.00164**	75	1.20	3.21	200	0.86	1.87	2.84	1.78	275	11.5	5.0	**0.050**	1.58/2.77
ON2-I	**D**	**94.8**	0.861	4.55	**0.00711**	240	1.00	6.65	860	1.12	2.14	3.24	5.75	1100	16.1	12.4	**0.124**	1.58/2.77
ON3-I	**D**	**93.0**	0.838	0.49	**0.00077**	100	1.00	4.72	280	0.50	1.43	2.16	3.27	380	12.1	8.0	**0.080**	1.58/2.77
ON4-I	**D**	**95.6**	0.872	1.94	**0.00303**	100	1.00	4.11	760	1.16	2.18	3.30	5.15	860	14.8	9.3	**0.093**	1.58/2.77
ON5-I	**D**	**96.5**	0.884	8.54	**0.01334**	190	2.50	3.95	690	0.94	1.96	2.97	5.32	880	14.9	9.3	**0.093**	1.58/2.77
ON6-I	**D**	**95.3**	0.868	0.87	**0.00136**	50	1.00	2.95	400	0.40	1.28	1.94	5.22	450	12.5	8.2	**0.082**	1.58/2.77

Tc = Ti + Tt Tlag = 0.6 Tc MF = Multi-Family For the travel time (Tt) calculations, Existing § 602.1 V1 = 14.8*(S/100)^1/2 Developed § 602.1 V1 = 20.2*(S/100)^1/2

Ti = 1.8 (1.1 - K) L^1/2 / S^1/3 Pave = Pavement V1 applies to the first 500 feet of travel distance;

K = 0.0132 (CN) - 0.39 SF = Single-Family V2 applies to the remaining travel distance. Existing § 602.1 V2 = 29.4*(S/100)^1/2 Developed § 602.1 V2 = 30.6*(S/100)^1/2

REFERENCE :

STANDARD FORM 4

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

KLEINFELDER
Bright People. Right Solutions.

Project:
LAS VEGAS ACADEMY

PROJECT NO.: 20232298
CALCULATED BY : ALB
DATE: 2/13/22

SUB-BASIN DATA			INITIAL / OVERLAND TIME (Ti)						TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIGN: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	TOTAL LENGTH Ft (11)	Tc = (L/180)+10 Min (12)	Min (13)	Tlag= 0.6Tc/60 Hours	P10/P100
ONSITE DEVELOPED CONDITION																		
ON1-D	**D**	**96.3**	0.881	1.05	**0.00164**	75	1.20	3.21	200	0.86	1.87	2.84	1.78	275	11.5	5.0	**0.050**	1.58/2.77
ON2-D	**D**	**95.3**	0.868	5.35	**0.00836**	240	1.00	6.47	860	1.12	2.14	3.24	5.75	1100	16.1	12.2	**0.122**	1.58/2.77
ON3-D	**D**	**93.0**	0.838	0.49	**0.00077**	100	1.00	4.72	280	0.50	1.43	2.16	3.27	380	12.1	8.0	**0.080**	1.58/2.77
ON4-D	**D**	**95.6**	0.872	1.94	**0.00303**	100	1.00	4.11	760	1.16	2.18	3.30	5.15	860	14.8	9.3	**0.093**	1.58/2.77
ON5-D	**D**	**96.3**	0.881	7.74	**0.01209**	190	2.50	4.00	690	0.94	1.96	2.97	5.32	880	14.9	9.3	**0.093**	1.58/2.77
ON6-D	**D**	**95.3**	0.868	0.87	**0.00136**	50	1.00	2.95	400	0.40	1.28	1.94	5.22	450	12.5	8.2	**0.082**	1.58/2.77
OFFSITE CONDITION																		
ST7S-1	**D**	**92.8**	0.835	4.21	**0.00658**	150	1.00	5.84	815	0.40	1.28	1.94	9.24	965	15.4	15.1	**0.151**	1.58/2.77
ST7S-2	**D**	**92.8**	0.835	2.06	**0.00322**	100	1.00	4.77	580	0.40	1.28	1.94	7.21	680	13.8	12.0	**0.120**	1.58/2.77
CLK-1	**D**	**92.8**	0.835	7.29	**0.01139**	100	1.00	4.77	840	0.50	1.43	2.16	8.45	940	15.2	13.2	**0.132**	1.58/2.77
CLK-2	**D**	**92.8**	0.835	6.86	**0.01072**	50	1.00	3.37	1100	0.64	1.61	2.44	9.27	1150	16.4	12.6	**0.126**	1.58/2.77
ST7N	**D**	**92.8**	0.835	1.47	**0.00230**	100	1.50	4.17	310	0.40	1.28	1.94	4.04	410	12.3	8.2	**0.082**	1.58/2.77
BGR-1	**D**	**92.8**	0.835	4.69	**0.00733**	150	1.00	5.84	720	0.56	1.51	2.28	7.14	870	14.8	13.0	**0.130**	1.58/2.77
BGR-2	**D**	**92.8**	0.835	3.19	**0.00498**	100	1.00	4.77	680	0.60	1.56	2.37	6.59	780	14.3	11.4	**0.114**	1.58/2.78
LWS	**D**	**92.8**	0.835	2.60	**0.00406**	50	1.00	3.37	750	0.40	1.28	1.94	8.68	800	14.4	12.0	**0.120**	1.58/2.79
ST10	**D**	**92.8**	0.835	1.15	**0.00180**	50	1.00	3.37	420	0.40	1.28	1.94	5.48	470	12.6	8.9	**0.089**	1.58/2.80

Tc = Ti + Tt Tlag = 0.6 Tc MF = Multi-Family
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3 Pave = Pavement
K = 0.0132 (CN) - 0.39 SF = Single-Family

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

Existing § 602.1 V1 = 14.8*(S/100)^1/2
Existing § 602.1 V2 = 29.4*(S/100)^1/2
Developed § 602.1 V1 = 20.2*(S/100)^1/2
Developed § 602.1 V2 = 30.6*(S/100)^1/2

REFERENCE :

STANDARD FORM 4

A.2 HEC-1 MODELS

- ONSITE EXISTING CONDITION (LVA_EX.OUT)

- ONSITE INTERIM CONDITION (LVA_INT.OUT)

- ONSITE DEVELOPED CONDITION (LVA_DEV.OUT)

KLEINFELDER
Bright People. Right Solutions.

```
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   13FEB23  TIME  22:43:39  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************

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


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

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

1                                                HEC-1 INPUT                                                PAGE  1

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

                        *DIAGRAM
            1           ID  POGGEMEYER DESIGN GROUP
            2           ID  LAS VEGAS ACADEMY
            3           ID  EXISTING CONDITION ANALYSIS
            4           ID  10- & 100-YEAR STORM EVENTS
            5           ID  CITY OF LAS VEGAS, NV
            6           ID  INPUT FILE: LVA_EX.DAT
            7           ID  OUTPUT FILE: LVA_EX.OUT
            8           ID
            9           ID        ***********************************************************
           10           ID        *       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES    *
           11           ID        *       DEPTH-AREA REDUCTION VALUE = 0.00               *
           12           ID        *       STORM DISTRIBUTION #3                           *
           13           ID        *       ABSTRACTION METHOD: SCS CN                      *
           14           ID        *       HYDROLOGIC METHOD: SCS UH                       *
           15           ID        *       ROUTING METHOD: KINEMATIC WAVE                  *
           16           ID        *       RATIO 1 = 10 YEAR EVENT (1.58)   0.57           *
           17           ID        *       RATIO 2 - 100 YEAR EVENT (2.77)  1.00           *
           18           ID        ***********************************************************
           19           ID
           20           ID
           21           ID
           22           IT       5       0       0     300
           23           IO       5       0       0
           24           IN       5       0       0
           25           JR    PREC    0.57    1.00

           26           KK  ST7S-1
           27           KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
           28           PB    2.77
           29           PC     0.0     .02    .057     .07    .087    .108    .124     .13    .130    .130
           30           PC     .13    .130    .130    .133    .140    .142    .148    .158    .172    .181
           31           PC     .19    .197    .199     .20    .201    .204    .214    .229    .241    .249
           32           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
           33           PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
           34           PC     .86    .868    .876    .888    .910    .926    .937    .950    .970    .976
           35           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
           36           PC    .998    .999     1.0
           37           BA  .00658
           38           LS       0    92.8
           39           UD   0.151
                        *

           40           KK   ON1-E
           41           KM   ONSITE BASIN DRAINING TOWARDS 7TH AND CLARK
           42           BA  .00072
           43           LS       0    97.2
           44           UD   0.050
                        *
1                                                HEC-1 INPUT                                                PAGE  2

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

```
 45          KK    CP1A
 46          KM   COMBINE BASIN FLOWS ST7S-1 AND ON1-E
 47          KM   SURFACE FLOWS CONVEYED IN 7TH STREET THRU ST7S-2 TO CP1B
 48          HC       2
             *

 49          KK  ST7S-2
 50          KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
 51          BA  .00322
 52          LS       0    92.8
 53          UD   0.120
             *

 54          KK    CP1B
 55          KM   COMBINE FLOWS CP1A AND ST7S-2
 56          KM   SURFACE FLOWS CONVEYED TO CP2 AT INTERSECTION OF 7TH AND CLARK
 57          HC       2
             *

 58          KK   CLK-1
 59          KM   OFFSITE BASIN CLARK STREET
 60          BA  .01139
 61          LS       0    92.8
 62          UD   0.132
             *

 63          KK     CP2
 64          KM   COMBINED FLOWS CP1B AND CLK-1
 65          KM   SURFACE FLOWS CONVEYED THRU CLK-2 TO CP3
 66          HC       2
             *

 67          KK   CLK-2
 68          KM   OFFSITE BASIN CLARK STREET
 69          BA  .01072
 70          LS       0    92.8
 71          UD   0.126
             *

 72          KK   ON2-E
 73          KM   ONSITE BASIN DRAINING TOWARDS CLARK AND 10TH
 74          BA  .00639
 75          LS       0    95.1
 76          UD   0.109
             *

 77          KK     CP3
 78          KM   COMBINED FLOWS CP2, CLK-2, AND ON2-E
 79          KM   SURFACE FLOWS CONVEYED SOUTH EAST WITHIN CLARK AVENUE
 80          HC       3
             *
1                                    HEC-1 INPUT                                          PAGE  3

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

 81          KK    ST7N
 82          KM   OFFSITE BASIN 7TH STREET TOWARDS BRIDGER
 83          BA  .00230
 84          LS       0    92.8
 85          UD   0.082
             *

 86          KK   ON3-E
 87          KM   ONSITE BASIN DRAINING TOWARDS 7TH AND BRIDGER
 88          BA  .00078
 89          LS       0    93.1
 90          UD   0.080
             *

 91          KK     CP4
 92          KM   COMBINED BASIN FLOWS ST7N AND ON3-E
 93          KM   SURFACE FLOWS CONVEYED TO CP5 AT INTERSECTION OF 7TH AND BRIDGER
 94          HC       2
             *

 95          KK   BGR-1
 96          KM   OFFSITE BASIN BRIDGER AVE
 97          BA  .00733
 98          LS       0    92.8
 99          UD   0.130
             *

100          KK     CP5
101          KM   COMBINED FLOWS CP4 AND BGR-1
102          KM   SURFACE FLOWS CONVEYED WITHIN BRIDGER THRU BGR-2 TO CP6
103          HC       2
             *

104          KK   BGR-2
```

```
            105          KM   OFFSITE BASIN BRIDGER AVE
            106          BA  .00498
            107          LS       0    92.8
            108          UD   0.114
                         *

            109          KK   ON4-E
            110          KM   ONSITE BASIN DRAINING TOWARDS BRIDGER AND 9TH
            111          BA  .00405
            112          LS       0    96.1
            113          UD   0.091
                         *

            114          KK     CP6
            115          KM   COMBINED FLOWS CP5, BGR-2, AND ON4-E
            116          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN BRIDGER AVE
            117          HC       3
                         *
1                                                HEC-1 INPUT                                                PAGE  4

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


            118          KK     LWS
            119          KM   OFFSITE BASIN LEWIS AVE
            120          BA  .00406
            121          LS       0    92.8
            122          UD   0.120
                         *

            123          KK   ON5-E
            124          KM   ONSITE BASIN DRAINING TOWARDS LEWIS AND 9TH
            125          BA  .01397
            126          LS       0    96.8
            127          UD   0.111
                         *

            128          KK     CP7
            129          KM   COMBINED BASIN FLOWS LWS AND ON5-E
            130          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
            131          HC       2
                         *

            132          KK    ST10
            133          KM   OFFSITE BASIN 10Th STREET
            134          BA  .00180
            135          LS       0    92.8
            136          UD   0.089
                         *

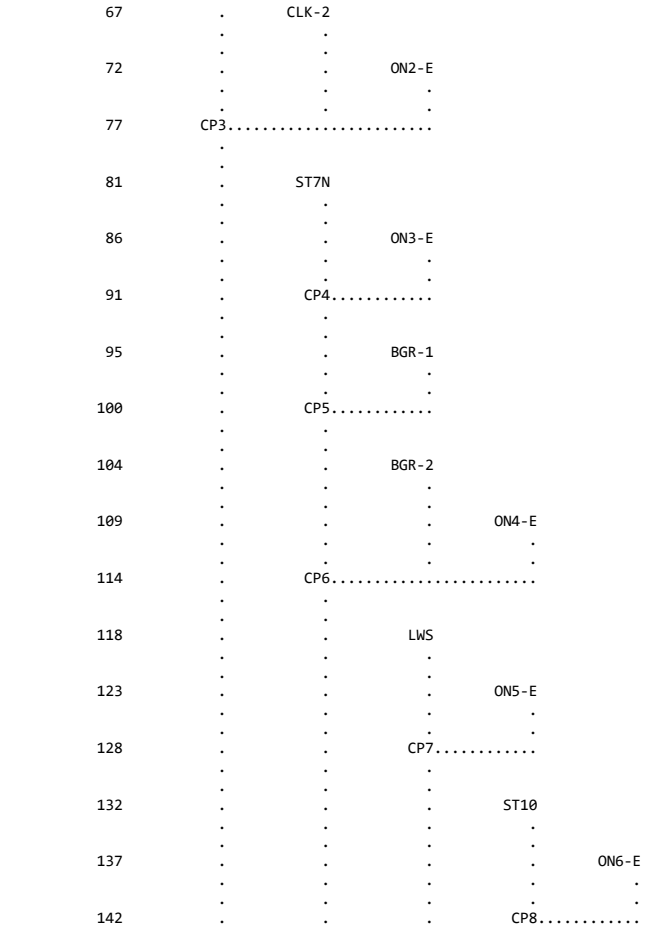
            137          KK   ON6-E
            138          KM   ONSITE BASIN DRAINING TOWARDS 10TH AND LEWIS
            139          BA  .00136
            140          LS       0    95.3
            141          UD   0.082
                         *

            142          KK     CP8
            143          KM   COMBINED BASIN FLOWS ST10 AND ON6-E
            144          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
            145          HC       2
                         *
            146          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    26      ST7S-1
                 .
                 .
    40           .       ON1-E
                 .           .
                 .           .
    45        CP1A............
                 .
                 .
    49           .      ST7S-2
                 .           .
                 .           .
    54        CP1B............
                 .
                 .
    58           .       CLK-1
                 .           .
                 .           .
    63         CP2............
                 .
                 .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *               JUN   1998             *
 *            VERSION 4.1               *
 *                                      *
 *  RUN DATE   13FEB23  TIME  22:43:39  *
 *                                      *
 ****************************************
```

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

POGGEMEYER DESIGN GROUP
LAS VEGAS ACADEMY
EXISTING CONDITION ANALYSIS
10- & 100-YEAR STORM EVENTS
CITY OF LAS VEGAS, NV
INPUT FILE: LVA_EX.DAT
OUTPUT FILE: LVA_EX.OUT

```
      ********************************************************
      *       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES   *
      *       DEPTH-AREA REDUCTION VALUE = 0.00              *
      *       STORM DISTRIBUTION #3                          *
      *       ABSTRACTION METHOD: SCS CN                     *
      *       HYDROLOGIC METHOD: SCS UH                      *
      *       ROUTING METHOD: KINEMATIC WAVE                 *
      *       RATIO 1 = 10 YEAR EVENT (1.58)   0.57          *
      *       RATIO 2 - 100 YEAR EVENT (2.77)  1.00          *
      ********************************************************
```

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                        NPLAN           1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                      .57      1.00
1

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


                                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                         .57     1.00

 HYDROGRAPH AT
+                ST7S-1       .01     1   FLOW           5.      11.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON1-E       .00     1   FLOW           1.       2.
                                          TIME         3.50     3.50

  2 COMBINED AT
+                  CP1A       .01     1   FLOW           6.      12.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                ST7S-2       .00     1   FLOW           3.       5.
                                          TIME         3.58     3.58

  2 COMBINED AT
+                  CP1B       .01     1   FLOW           8.      17.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 CLK-1       .01     1   FLOW           9.      19.
                                          TIME         3.58     3.58

  2 COMBINED AT
+                   CP2       .02     1   FLOW          17.      36.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 CLK-2       .01     1   FLOW           9.      18.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON2-E       .01     1   FLOW           6.      12.
                                          TIME         3.50     3.50

  3 COMBINED AT
+                   CP3       .04     1   FLOW          32.      64.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                  ST7N       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 ON3-E       .00     1   FLOW           1.       1.
                                          TIME         3.50     3.50

  2 COMBINED AT
+                   CP4       .00     1   FLOW           3.       6.
                                          TIME         3.50     3.50
```

```
 HYDROGRAPH AT
+                  BGR-1       .01     1   FLOW          6.      12.
                                           TIME        3.58     3.58

  2 COMBINED AT
+                    CP5       .01     1   FLOW          8.      17.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  BGR-2       .00     1   FLOW          4.       8.
                                           TIME        3.58     3.50

 HYDROGRAPH AT
+                  ON4-E       .00     1   FLOW          4.       8.
                                           TIME        3.50     3.50

  3 COMBINED AT
+                    CP6       .02     1   FLOW         16.      33.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                    LWS       .00     1   FLOW          3.       7.
                                           TIME        3.58     3.58

 HYDROGRAPH AT
+                  ON5-E       .01     1   FLOW         14.      26.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                    CP7       .02     1   FLOW         17.      33.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                   ST10       .00     1   FLOW          2.       3.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  ON6-E       .00     1   FLOW          1.       3.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                    CP8       .00     1   FLOW          3.       6.
                                           TIME        3.50     3.50


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

```
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   16FEB23  TIME  10:28:39  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************

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


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

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

1                                              HEC-1 INPUT                                                 PAGE  1

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

                         *DIAGRAM
             1           ID  POGGEMEYER DESIGN GROUP
             2           ID  LAS VEGAS ACADEMY
             3           ID  INTERIM CONDITION ANALYSIS
             4           ID  10- & 100-YEAR STORM EVENTS
             5           ID  CITY OF LAS VEGAS, NV
             6           ID  INPUT FILE: LVA_INT.DAT
             7           ID  OUTPUT FILE: LVA_INT.OUT
             8           ID
             9           ID        ***********************************************************
            10           ID        *       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES    *
            11           ID        *       DEPTH-AREA REDUCTION VALUE = 0.00               *
            12           ID        *       STORM DISTRIBUTION #3                           *
            13           ID        *       ABSTRACTION METHOD: SCS CN                      *
            14           ID        *       HYDROLOGIC METHOD: SCS UH                       *
            15           ID        *       ROUTING METHOD: KINEMATIC WAVE                  *
            16           ID        *       RATIO 1 = 10 YEAR EVENT (1.58)   0.57           *
            17           ID        *       RATIO 2 - 100 YEAR EVENT (2.77)  1.00           *
            18           ID        ***********************************************************
            19           ID
            20           ID
            21           ID
            22           IT       5       0       0     300
            23           IO       5       0       0
            24           IN       5       0       0
            25           JR    PREC    0.57    1.00

            26           KK  ST7S-1
            27           KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
            28           PB    2.77
            29           PC     0.0     .02    .057     .07    .087    .108    .124     .13    .130    .130
            30           PC     .13    .130    .130    .133    .140    .142    .148    .158    .172    .181
            31           PC     .19    .197    .199     .20    .201    .204    .214    .229    .241    .249
            32           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
            33           PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
            34           PC     .86    .868    .876    .888    .910    .926    .937    .950    .970    .976
            35           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
            36           PC    .998    .999     1.0
            37           BA  .00658
            38           LS       0    92.8
            39           UD   0.151
                         *

            40           KK   ON1-I
            41           KM   ONSITE BASIN DRAINING TOWARDS 7TH AND CLARK
            42           BA  .00164
            43           LS       0    96.3
            44           UD   0.050
                         *
1                                              HEC-1 INPUT                                                 PAGE  2

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

```
 45          KK    CP1A
 46          KM   COMBINE BASIN FLOWS ST7S-1 AND ON1-I
 47          KM   SURFACE FLOWS CONVEYED IN 7TH STREET THRU ST7S-2 TO CP1B
 48          HC       2
             *

 49          KK  ST7S-2
 50          KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
 51          BA  .00322
 52          LS       0    92.8
 53          UD   0.120
             *

 54          KK    CP1B
 55          KM   COMBINE FLOWS CP1A AND ST7S-2
 56          KM   SURFACE FLOWS CONVEYED TO CP2 AT INTERSECTION OF 7TH AND CLARK
 57          HC       2
             *

 58          KK   CLK-1
 59          KM   OFFSITE BASIN CLARK STREET
 60          BA  .01139
 61          LS       0    92.8
 62          UD   0.132
             *

 63          KK     CP2
 64          KM   COMBINED FLOWS CP1B AND CLK-1
 65          KM   SURFACE FLOWS CONVEYED THRU CLK-2 TO CP3
 66          HC       2
             *

 67          KK   CLK-2
 68          KM   OFFSITE BASIN CLARK STREET
 69          BA  .01072
 70          LS       0    92.8
 71          UD   0.126
             *

 72          KK   ON2-I
 73          KM   ONSITE BASIN DRAINING TOWARDS CLARK AND 10TH
 74          BA  .00711
 75          LS       0    94.8
 76          UD   0.124
             *

 77          KK     CP3
 78          KM   COMBINED FLOWS CP2, CLK-2, AND ON2-I
 79          KM   SURFACE FLOWS CONVEYED SOUTH EAST WITHIN CLARK AVENUE
 80          HC       3
             *
```



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

 81          KK    ST7N
 82          KM   OFFSITE BASIN 7TH STREET TOWARDS BRIDGER
 83          BA  .00230
 84          LS       0    92.8
 85          UD   0.082
             *

 86          KK   ON3-I
 87          KM   ONSITE BASIN DRAINING TOWARDS 7TH AND BRIDGER
 88          BA  .00077
 89          LS       0    93.0
 90          UD   0.080
             *

 91          KK     CP4
 92          KM   COMBINED BASIN FLOWS ST7N AND ON3-I
 93          KM   SURFACE FLOWS CONVEYED TO CP5 AT INTERSECTION OF 7TH AND BRIDGER
 94          HC       2
             *

 95          KK   BGR-1
 96          KM   OFFSITE BASIN BRIDGER AVE
 97          BA  .00733
 98          LS       0    92.8
 99          UD   0.130
             *

100          KK     CP5
101          KM   COMBINED FLOWS CP4 AND BGR-1
102          KM   SURFACE FLOWS CONVEYED WITHIN BRIDGER THRU BGR-2 TO CP6
103          HC       2
             *

104          KK   BGR-2
```

```
             105          KM   OFFSITE BASIN BRIDGER AVE
             106          BA  .00498
             107          LS       0    92.8
             108          UD   0.114
                          *

             109          KK   ON4-I
             110          KM   ONSITE BASIN DRAINING TOWARDS BRIDGER AND 9TH
             111          BA  .00303
             112          LS       0    95.6
             113          UD   0.093
                          *

             114          KK     CP6
             115          KM   COMBINED FLOWS CP5, BGR-2, AND ON4-I
             116          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN BRIDGER AVE
             117          HC       3
                          *
1                                                HEC-1 INPUT                                                PAGE  4

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


             118          KK     LWS
             119          KM   OFFSITE BASIN LEWIS AVE
             120          BA  .00406
             121          LS       0    92.8
             122          UD   0.120
                          *

             123          KK   ON5-I
             124          KM   ONSITE BASIN DRAINING TOWARDS LEWIS AND 9TH
             125          BA  .01334
             126          LS       0    96.5
             127          UD   0.093
                          *

             128          KK     CP7
             129          KM   COMBINED BASIN FLOWS LWS AND ON5-I
             130          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
             131          HC       2
                          *

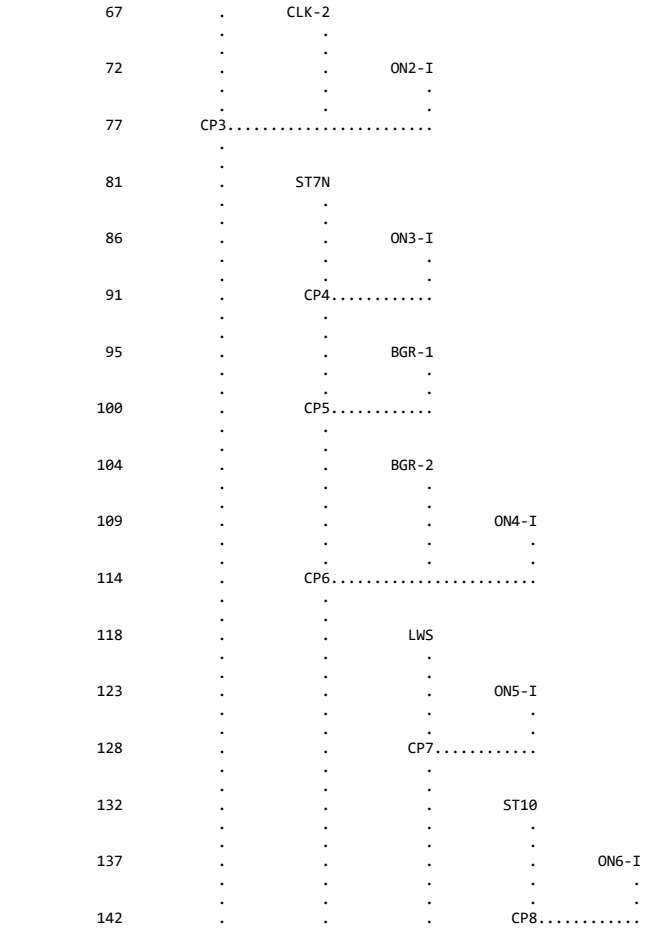
             132          KK    ST10
             133          KM   OFFSITE BASIN 10Th STREET
             134          BA  .00180
             135          LS       0    92.8
             136          UD   0.089
                          *

             137          KK   ON6-I
             138          KM   ONSITE BASIN DRAINING TOWARDS 10TH AND LEWIS
             139          BA  .00136
             140          LS       0    95.3
             141          UD   0.082
                          *

             142          KK     CP8
             143          KM   COMBINED BASIN FLOWS ST10 AND ON6-I
             144          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
             145          HC       2
                          *
             146          ZZ
1
                  SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    26      ST7S-1
                 .
                 .
    40           .       ON1-I
                 .           .
                 .           .
    45        CP1A............
                 .
                 .
    49           .      ST7S-2
                 .           .
                 .           .
    54        CP1B............
                 .
                 .
    58           .       CLK-1
                 .           .
                 .           .
    63         CP2............
                 .
                 .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   16FEB23  TIME  10:28:39   *
 *                                       *
 *****************************************
```

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

POGGEMEYER DESIGN GROUP
LAS VEGAS ACADEMY
INTERIM CONDITION ANALYSIS
10- & 100-YEAR STORM EVENTS
CITY OF LAS VEGAS, NV
INPUT FILE: LVA_INT.DAT
OUTPUT FILE: LVA_INT.OUT

```
*********************************************************
*       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES    *
*       DEPTH-AREA REDUCTION VALUE = 0.00               *
*       STORM DISTRIBUTION #3                           *
*       ABSTRACTION METHOD: SCS CN                      *
*       HYDROLOGIC METHOD: SCS UH                       *
*       ROUTING METHOD: KINEMATIC WAVE                  *
*       RATIO 1 = 10 YEAR EVENT (1.58)   0.57           *
*       RATIO 2 - 100 YEAR EVENT (2.77)  1.00           *
*********************************************************
```

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                        NPLAN           1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                      .57      1.00
1

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


                                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                         .57     1.00

 HYDROGRAPH AT
+                ST7S-1       .01     1   FLOW           5.      11.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON1-I       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

   2 COMBINED AT
+                  CP1A       .01     1   FLOW           6.      13.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                ST7S-2       .00     1   FLOW           3.       5.
                                          TIME         3.58     3.58

   2 COMBINED AT
+                  CP1B       .01     1   FLOW           9.      18.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 CLK-1       .01     1   FLOW           9.      19.
                                          TIME         3.58     3.58

   2 COMBINED AT
+                   CP2       .02     1   FLOW          18.      37.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 CLK-2       .01     1   FLOW           9.      18.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON2-I       .01     1   FLOW           6.      12.
                                          TIME         3.58     3.58

   3 COMBINED AT
+                   CP3       .04     1   FLOW          33.      67.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                  ST7N       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 ON3-I       .00     1   FLOW           1.       1.
                                          TIME         3.50     3.50

   2 COMBINED AT
+                   CP4       .00     1   FLOW           3.       6.
                                          TIME         3.50     3.50
```

```
 HYDROGRAPH AT
+                  BGR-1       .01     1   FLOW           6.      12.
                                           TIME         3.58     3.58

  2 COMBINED AT
+                    CP5       .01     1   FLOW           8.      17.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                  BGR-2       .00     1   FLOW           4.       8.
                                           TIME         3.58     3.50

 HYDROGRAPH AT
+                  ON4-I       .00     1   FLOW           3.       6.
                                           TIME         3.50     3.50

  3 COMBINED AT
+                    CP6       .02     1   FLOW          15.      31.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                    LWS       .00     1   FLOW           3.       7.
                                           TIME         3.58     3.58

 HYDROGRAPH AT
+                  ON5-I       .01     1   FLOW          14.      26.
                                           TIME         3.50     3.50

  2 COMBINED AT
+                    CP7       .02     1   FLOW          17.      33.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ST10       .00     1   FLOW           2.       3.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                  ON6-I       .00     1   FLOW           1.       3.
                                           TIME         3.50     3.50

  2 COMBINED AT
+                    CP8       .00     1   FLOW           3.       6.
                                           TIME         3.50     3.50


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

```
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   16FEB23  TIME  10:27:09  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************

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


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

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

1                                                HEC-1 INPUT                                                PAGE  1

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

                        *DIAGRAM
            1           ID  POGGEMEYER DESIGN GROUP
            2           ID  LAS VEGAS ACADEMY
            3           ID  DEVELOPED CONDITION ANALYSIS
            4           ID  10- & 100-YEAR STORM EVENTS
            5           ID  CITY OF LAS VEGAS, NV
            6           ID  INPUT FILE: LVA_DEV.DAT
            7           ID  OUTPUT FILE: LVA_DEV.OUT
            8           ID
            9           ID        ***********************************************************
           10           ID        *       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES    *
           11           ID        *       DEPTH-AREA REDUCTION VALUE = 0.00               *
           12           ID        *       STORM DISTRIBUTION #3                           *
           13           ID        *       ABSTRACTION METHOD: SCS CN                      *
           14           ID        *       HYDROLOGIC METHOD: SCS UH                       *
           15           ID        *       ROUTING METHOD: KINEMATIC WAVE                  *
           16           ID        *       RATIO 1 = 10 YEAR EVENT (1.58)   0.57           *
           17           ID        *       RATIO 2 - 100 YEAR EVENT (2.77)  1.00           *
           18           ID        ***********************************************************
           19           ID
           20           ID
           21           ID
           22           IT       5       0       0     300
           23           IO       5       0       0
           24           IN       5       0       0
           25           JR    PREC    0.57    1.00

           26           KK  ST7S-1
           27           KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
           28           PB    2.77
           29           PC     0.0     .02    .057     .07    .087    .108    .124     .13    .130    .130
           30           PC     .13    .130    .130    .133    .140    .142    .148    .158    .172    .181
           31           PC     .19    .197    .199     .20    .201    .204    .214    .229    .241    .249
           32           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
           33           PC    .499     .59     .71    .744    .781    .812    .819    .835    .851    .856
           34           PC     .86    .868    .876    .888    .910    .926    .937    .950    .970    .976
           35           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
           36           PC    .998    .999     1.0
           37           BA  .00658
           38           LS       0    92.8
           39           UD   0.151
                        *

           40           KK   ON1-D
           41           KM   ONSITE BASIN DRAINING TOWARDS 7TH AND CLARK
           42           BA  .00164
           43           LS       0    96.3
           44           UD   0.050
                        *
1                                                HEC-1 INPUT                                                PAGE  2

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

```
 45          KK    CP1A
 46          KM   COMBINE BASIN FLOWS ST7S-1 AND ON1-D
 47          KM   SURFACE FLOWS CONVEYED IN 7TH STREET THRU ST7S-2 TO CP1B
 48          HC       2
             *

 49          KK  ST7S-2
 50          KM   OFFSITE BASIN 7TH STREET TOWARDS CLARK
 51          BA  .00322
 52          LS       0    92.8
 53          UD   0.120
             *

 54          KK    CP1B
 55          KM   COMBINE FLOWS CP1A AND ST7S-2
 56          KM   SURFACE FLOWS CONVEYED TO CP2 AT INTERSECTION OF 7TH AND CLARK
 57          HC       2
             *

 58          KK   CLK-1
 59          KM   OFFSITE BASIN CLARK STREET
 60          BA  .01139
 61          LS       0    92.8
 62          UD   0.132
             *

 63          KK     CP2
 64          KM   COMBINED FLOWS CP1B AND CLK-1
 65          KM   SURFACE FLOWS CONVEYED THRU CLK-2 TO CP3
 66          HC       2
             *

 67          KK   CLK-2
 68          KM   OFFSITE BASIN CLARK STREET
 69          BA  .01072
 70          LS       0    92.8
 71          UD   0.126
             *

 72          KK   ON2-D
 73          KM   ONSITE BASIN DRAINING TOWARDS CLARK AND 10TH
 74          BA  .00836
 75          LS       0    95.3
 76          UD   0.122
             *

 77          KK     CP3
 78          KM   COMBINED FLOWS CP2, CLK-2, AND ON2-D
 79          KM   SURFACE FLOWS CONVEYED SOUTH EAST WITHIN CLARK AVENUE
 80          HC       3
             *
1                                    HEC-1 INPUT                                          PAGE  3

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

 81          KK    ST7N
 82          KM   OFFSITE BASIN 7TH STREET TOWARDS BRIDGER
 83          BA  .00230
 84          LS       0    92.8
 85          UD   0.082
             *

 86          KK   ON3-D
 87          KM   ONSITE BASIN DRAINING TOWARDS 7TH AND BRIDGER
 88          BA  .00077
 89          LS       0    93.0
 90          UD   0.080
             *

 91          KK     CP4
 92          KM   COMBINED BASIN FLOWS ST7N AND ON3-D
 93          KM   SURFACE FLOWS CONVEYED TO CP5 AT INTERSECTION OF 7TH AND BRIDGER
 94          HC       2
             *

 95          KK   BGR-1
 96          KM   OFFSITE BASIN BRIDGER AVE
 97          BA  .00733
 98          LS       0    92.8
 99          UD   0.130
             *

100          KK     CP5
101          KM   COMBINED FLOWS CP4 AND BGR-1
102          KM   SURFACE FLOWS CONVEYED WITHIN BRIDGER THRU BGR-2 TO CP6
103          HC       2
             *

104          KK   BGR-2
```

```
            105          KM   OFFSITE BASIN BRIDGER AVE
            106          BA  .00498
            107          LS       0    92.8
            108          UD   0.114
                         *

            109          KK   ON4-D
            110          KM   ONSITE BASIN DRAINING TOWARDS BRIDGER AND 9TH
            111          BA  .00303
            112          LS       0    95.6
            113          UD   0.093
                         *

            114          KK     CP6
            115          KM   COMBINED FLOWS CP5, BGR-2, AND ON4-D
            116          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN BRIDGER AVE
            117          HC       3
                         *
1                                                HEC-1 INPUT                                                PAGE  4

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


            118          KK     LWS
            119          KM   OFFSITE BASIN LEWIS AVE
            120          BA  .00406
            121          LS       0    92.8
            122          UD   0.120
                         *

            123          KK   ON5-D
            124          KM   ONSITE BASIN DRAINING TOWARDS LEWIS AND 9TH
            125          BA  .01148
            126          LS       0    96.5
            127          UD   0.093
                         *

            128          KK     CP7
            129          KM   COMBINED BASIN FLOWS LWS AND ON5-D
            130          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
            131          HC       2
                         *

            132          KK    ST10
            133          KM   OFFSITE BASIN 10Th STREET
            134          BA  .00180
            135          LS       0    92.8
            136          UD   0.089
                         *

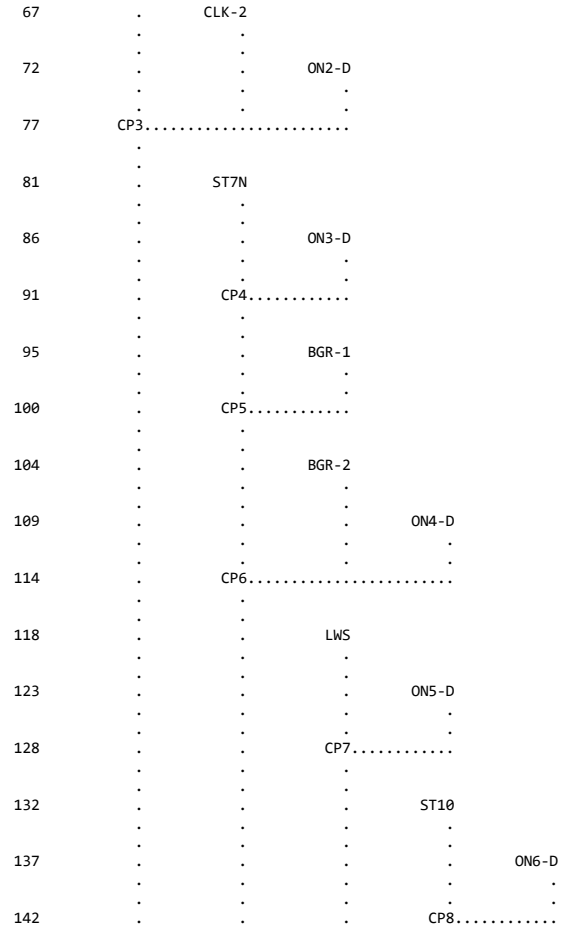
            137          KK   ON6-D
            138          KM   ONSITE BASIN DRAINING TOWARDS 10TH AND LEWIS
            139          BA  .00136
            140          LS       0    95.3
            141          UD   0.082
                         *

            142          KK     CP8
            143          KM   COMBINED BASIN FLOWS ST10 AND ON6-D
            144          KM   SURFACE FLOWS CONVEYED SOUTHEAST WITHIN LEWIS AVE
            145          HC       2
                         *
            146          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    26      ST7S-1
                 .
                 .
    40           .       ON1-D
                 .           .
                 .           .
    45        CP1A............
                 .
                 .
    49           .      ST7S-2
                 .           .
                 .           .
    54        CP1B............
                 .
                 .
    58           .       CLK-1
                 .           .
                 .           .
    63         CP2............
                 .
                 .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *               JUN   1998             *
 *            VERSION 4.1               *
 *                                      *
 *  RUN DATE   16FEB23  TIME  10:27:09  *
 *                                      *
 ****************************************
```

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

POGGEMEYER DESIGN GROUP
LAS VEGAS ACADEMY
DEVELOPED CONDITION ANALYSIS
10- & 100-YEAR STORM EVENTS
CITY OF LAS VEGAS, NV
INPUT FILE: LVA_DEV.DAT
OUTPUT FILE: LVA_DEV.OUT

```
      ************************************************************
      *       DEPTH-DURATION-FREQUENCY VALUE = 2.77 INCHES       *
      *       DEPTH-AREA REDUCTION VALUE = 0.00                  *
      *       STORM DISTRIBUTION #3                              *
      *       ABSTRACTION METHOD: SCS CN                         *
      *       HYDROLOGIC METHOD: SCS UH                          *
      *       ROUTING METHOD: KINEMATIC WAVE                     *
      *       RATIO 1 = 10 YEAR EVENT (1.58)   0.57              *
      *       RATIO 2 - 100 YEAR EVENT (2.77)  1.00              *
      ************************************************************
```

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                        NPLAN           1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                      .57      1.00
1

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


                                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                         .57     1.00

 HYDROGRAPH AT
+                ST7S-1       .01     1   FLOW           5.      11.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON1-D       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

   2 COMBINED AT
+                  CP1A       .01     1   FLOW           6.      13.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                ST7S-2       .00     1   FLOW           3.       5.
                                          TIME         3.58     3.58

   2 COMBINED AT
+                  CP1B       .01     1   FLOW           9.      18.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 CLK-1       .01     1   FLOW           9.      19.
                                          TIME         3.58     3.58

   2 COMBINED AT
+                   CP2       .02     1   FLOW          18.      37.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 CLK-2       .01     1   FLOW           9.      18.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                 ON2-D       .01     1   FLOW           8.      15.
                                          TIME         3.58     3.58

   3 COMBINED AT
+                   CP3       .04     1   FLOW          34.      69.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                  ST7N       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 ON3-D       .00     1   FLOW           1.       1.
                                          TIME         3.50     3.50

   2 COMBINED AT
+                   CP4       .00     1   FLOW           3.       6.
                                          TIME         3.50     3.50
```

```
 HYDROGRAPH AT
+                  BGR-1       .01     1   FLOW          6.      12.
                                           TIME        3.58     3.58

  2 COMBINED AT
+                    CP5       .01     1   FLOW          8.      17.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  BGR-2       .00     1   FLOW          4.       8.
                                           TIME        3.58     3.50

 HYDROGRAPH AT
+                  ON4-D       .00     1   FLOW          3.       6.
                                           TIME        3.50     3.50

  3 COMBINED AT
+                    CP6       .02     1   FLOW         15.      31.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                    LWS       .00     1   FLOW          3.       7.
                                           TIME        3.58     3.58

 HYDROGRAPH AT
+                  ON5-D       .01     1   FLOW         12.      23.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                    CP7       .02     1   FLOW         15.      29.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                   ST10       .00     1   FLOW          2.       3.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  ON6-D       .00     1   FLOW          1.       3.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                    CP8       .00     1   FLOW          3.       6.
                                           TIME        3.50     3.50


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

APPENDIX B

HYDRAULIC DESIGN & ANALYSIS

B.1 FLOWMASTER CALCULATIONS

- OFFSITE EXISTING CONDITION 10- AND 100-YEAR STREET CAPACITY CALCULATIONS
- OFFSITE INTERIM CONDITION 10- AND 100-YEAR STREET CAPACITY CALCULATIONS
- OFFSITE DEVELOPED CONDITION 10- AND 100-YEAR STREET CAPACITY CALCULATIONS
- ONSITE INTERIM CONDITION 100-YEAR DRAINAGE SWALE NORMAL DEPTH CALCULATIONS
- ONSITE DEVELOPED CONDITION 100-YEAR DRAINAGE SWALE NORMAL DEPTH CALCULATIONS

B.2 WSPG MODEL

- WSPG EXHIBIT
- ONSITE.WSW OUTPUT

KLEINFELDER
Bright People. Right Solutions.

B.1 FLOWMASTER CALCULATIONS

KLEINFELDER
Bright People. Right Solutions.

OFFSITE EXISTING CONDITION

STREET CAPACITY

Worksheet for X1/E - 7th Street 80 ROW @ CP1A (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	3.90 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X1/E - 7th Street 80 ROW @ CP1A (10yr)

Results	
Normal Depth	5.6 in
Roughness Coefficient	0.015
Elevation	0.47 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	1.5 ft²
Wetted Perimeter	7.7 ft
Hydraulic Radius	2.3 in
Top Width	7.27 ft
Normal Depth	5.6 in
Critical Depth	5.7 in
Critical Slope	0.006 ft/ft
Velocity	2.67 ft/s
Velocity Head	0.11 ft
Specific Energy	0.58 ft
Froude Number	1.052
Flow Type	Supercritical

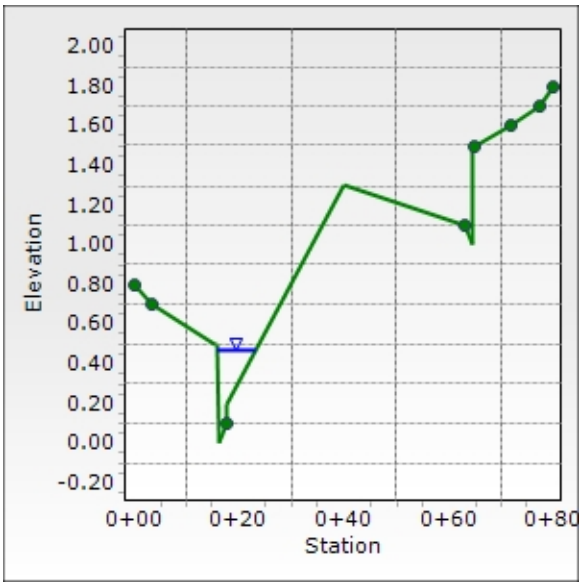
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.6 in
Critical Depth	5.7 in
Channel Slope	0.007 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X1/E - 7th Street 80 ROW @ CP1A (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	5.6 in
Discharge	3.90 cfs



Worksheet for X1/E - 7th Street 80 ROW @ CP1A (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	9.70 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X1/E - 7th Street 80 ROW @ CP1A (100yr)

Results	
Normal Depth	7.6 in
Roughness Coefficient	0.015
Elevation	0.63 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	3.4 ft²
Wetted Perimeter	18.1 ft
Hydraulic Radius	2.3 in
Top Width	17.63 ft
Normal Depth	7.6 in
Critical Depth	7.8 in
Critical Slope	0.005 ft/ft
Velocity	2.82 ft/s
Velocity Head	0.12 ft
Specific Energy	0.76 ft
Froude Number	1.125
Flow Type	Supercritical

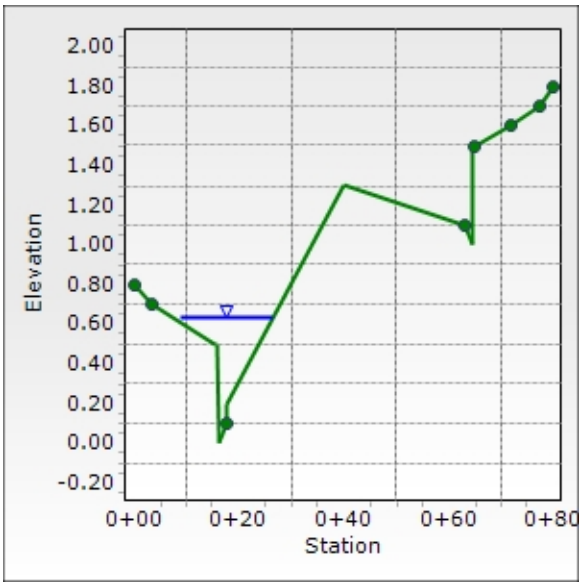
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.6 in
Critical Depth	7.8 in
Channel Slope	0.007 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for X1/E - 7th Street 80 ROW @ CP1A (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	7.6 in
Discharge	9.70 cfs



Worksheet for X2/E - 7th Street 80 ROW @ CP1B (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	5.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X2/E - 7th Street 80 ROW @ CP1B (10yr)

Results	
Normal Depth	6.4 in
Roughness Coefficient	0.015
Elevation	0.53 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	2.0 ft²
Wetted Perimeter	11.0 ft
Hydraulic Radius	2.2 in
Top Width	10.50 ft
Normal Depth	6.4 in
Critical Depth	6.5 in
Critical Slope	0.006 ft/ft
Velocity	2.66 ft/s
Velocity Head	0.11 ft
Specific Energy	0.64 ft
Froude Number	1.076
Flow Type	Supercritical

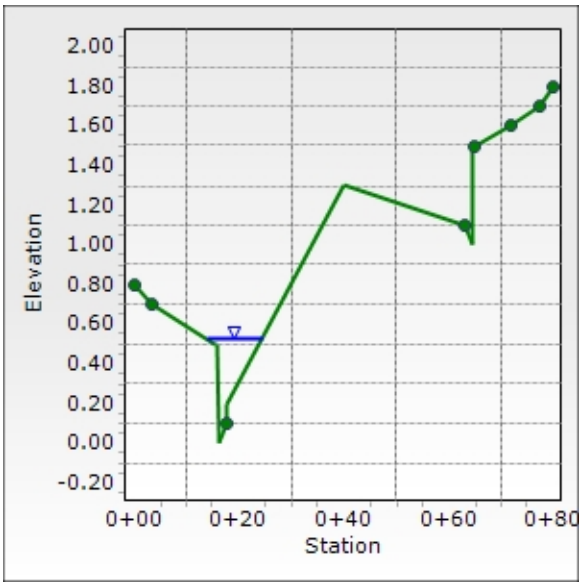
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.4 in
Critical Depth	6.5 in
Channel Slope	0.007 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X2/E - 7th Street 80 ROW @ CP1B (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	6.4 in
Discharge	5.30 cfs



Worksheet for X2/E - 7th Street 80 ROW @ CP1B (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	13.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X2/E - 7th Street 80 ROW @ CP1B (100yr)

Results	
Normal Depth	8.3 in
Roughness Coefficient	0.014
Elevation	0.69 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	4.5 ft²
Wetted Perimeter	21.9 ft
Hydraulic Radius	2.5 in
Top Width	21.40 ft
Normal Depth	8.3 in
Critical Depth	8.6 in
Critical Slope	0.005 ft/ft
Velocity	3.00 ft/s
Velocity Head	0.14 ft
Specific Energy	0.83 ft
Froude Number	1.152
Flow Type	Supercritical

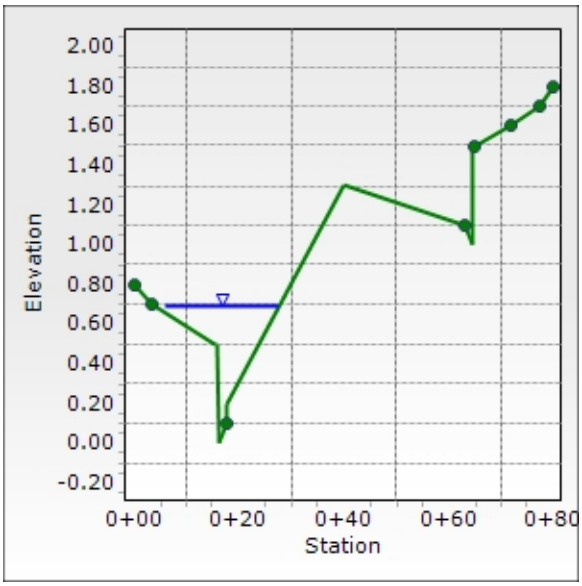
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.3 in
Critical Depth	8.6 in
Channel Slope	0.007 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for X2/E - 7th Street 80 ROW @ CP1B (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	8.3 in
Discharge	13.50 cfs



Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	21.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.91
0+08	0.75
0+15	0.61
0+16	0.61
0+16	0.11
0+17	0.23
0+17	0.27
0+40	0.99
0+64	0.17
0+64	0.13
0+65	0.00
0+65	0.50
0+66	0.50
0+73	0.65
0+78	0.75
0+80	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.91)	(0+08, 0.75)	0.013
(0+08, 0.75)	(0+15, 0.61)	0.025
(0+15, 0.61)	(0+17, 0.23)	0.013
(0+17, 0.23)	(0+64, 0.13)	0.016
(0+64, 0.13)	(0+66, 0.50)	0.013
(0+66, 0.50)	(0+73, 0.65)	0.025
(0+73, 0.65)	(0+78, 0.75)	0.013
(0+78, 0.75)	(0+80, 0.79)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (10yr)

Results	
Normal Depth	8.3 in
Roughness Coefficient	0.018
Elevation	0.69 ft
Elevation Range	0.000 to 0.987 ft
Flow Area	9.6 ft²
Wetted Perimeter	47.1 ft
Hydraulic Radius	2.5 in
Top Width	46.10 ft
Normal Depth	8.3 in
Critical Depth	7.9 in
Critical Slope	0.009 ft/ft
Velocity	2.18 ft/s
Velocity Head	0.07 ft
Specific Energy	0.76 ft
Froude Number	0.842
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.3 in
Critical Depth	7.9 in
Channel Slope	0.006 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (10yr)

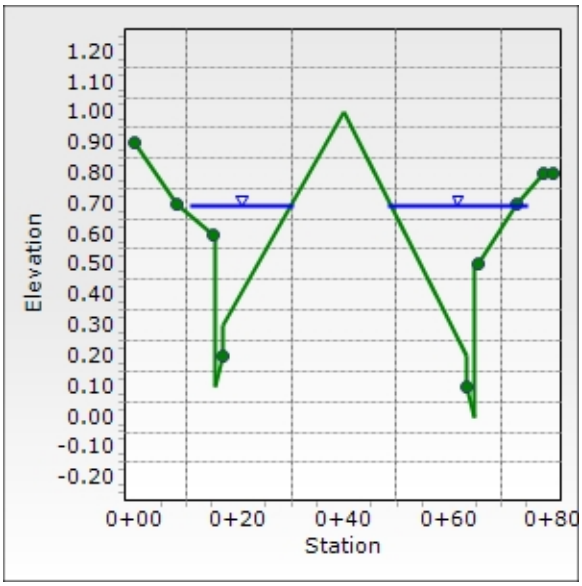
Messages:

Flow is divided.

Cross Section for X3/E - Clark Ave 80 ROW @ CP3 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	8.3 in
Discharge	21.00 cfs



Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	51.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.91
0+08	0.75
0+15	0.61
0+16	0.61
0+16	0.11
0+17	0.23
0+17	0.27
0+40	0.99
0+64	0.17
0+64	0.13
0+65	0.00
0+65	0.50
0+66	0.50
0+73	0.65
0+78	0.75
0+80	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.91)	(0+08, 0.75)	0.013
(0+08, 0.75)	(0+15, 0.61)	0.025
(0+15, 0.61)	(0+17, 0.23)	0.013
(0+17, 0.23)	(0+64, 0.13)	0.016
(0+64, 0.13)	(0+66, 0.50)	0.013
(0+66, 0.50)	(0+73, 0.65)	0.025
(0+73, 0.65)	(0+78, 0.75)	0.013
(0+78, 0.75)	(0+80, 0.79)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (100yr)

Results	
Normal Depth	10.2 in
Roughness Coefficient	0.018
Elevation	0.85 ft
Elevation Range	0.000 to 0.987 ft
Flow Area	19.1 ft²
Wetted Perimeter	70.1 ft
Hydraulic Radius	3.3 in
Top Width	69.03 ft
Normal Depth	10.2 in
Critical Depth	9.9 in
Critical Slope	0.008 ft/ft
Velocity	2.69 ft/s
Velocity Head	0.11 ft
Specific Energy	0.96 ft
Froude Number	0.901
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.2 in
Critical Depth	9.9 in
Channel Slope	0.006 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for X3/E - Clark Ave 80 ROW @ CP3 (100yr)

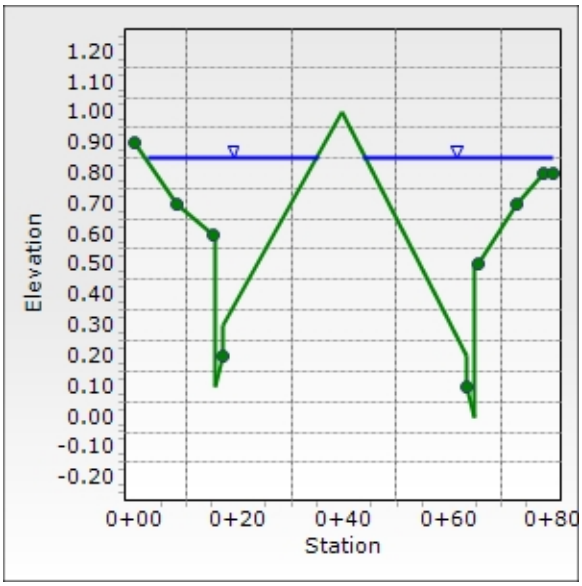
Messages:

Water Surface Elevation exceeds lowest end station by 0.0608858056509752ft. Flow is divided.

Cross Section for X3/E - Clark Ave 80 ROW @ CP3 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	10.2 in
Discharge	51.30 cfs



Worksheet for X4/E - 7th Street 80 ROW @ CP4 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.75
0+03	1.70
0+08	1.59
0+15	1.45
0+16	1.45
0+16	0.95
0+17	1.08
0+17	1.12
0+40	1.34
0+63	0.17
0+63	0.13
0+64	0.00
0+64	0.50
0+65	0.50
0+77	0.74
0+80	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.75)	(0+03, 1.70)	0.025
(0+03, 1.70)	(0+08, 1.59)	0.013
(0+08, 1.59)	(0+15, 1.45)	0.025
(0+15, 1.45)	(0+17, 1.08)	0.013
(0+17, 1.08)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.81)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X4/E - 7th Street 80 ROW @ CP4 (10yr)

Results	
Normal Depth	4.6 in
Roughness Coefficient	0.015
Elevation	0.38 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	0.9 ft²
Wetted Perimeter	6.0 ft
Hydraulic Radius	1.8 in
Top Width	5.66 ft
Normal Depth	4.6 in
Critical Depth	4.5 in
Critical Slope	0.007 ft/ft
Velocity	2.17 ft/s
Velocity Head	0.07 ft
Specific Energy	0.46 ft
Froude Number	0.947
Flow Type	Subcritical

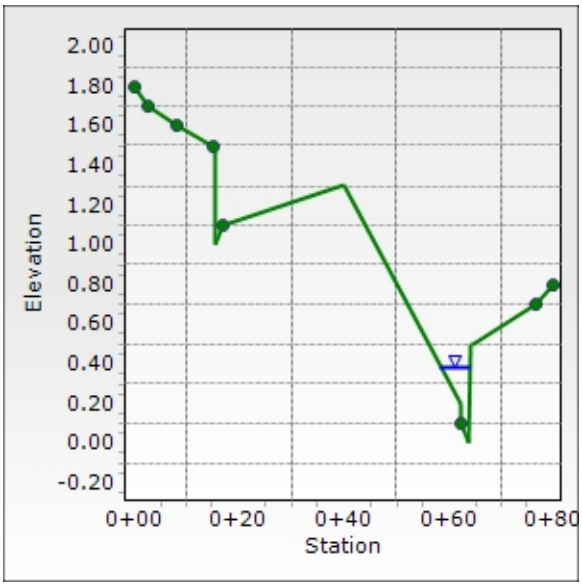
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.6 in
Critical Depth	4.5 in
Channel Slope	0.006 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X4/E - 7th Street 80 ROW @ CP4 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	4.6 in
Discharge	2.00 cfs



Worksheet for X4/E - 7th Street 80 ROW @ CP4 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	3.70 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.75
0+03	1.70
0+08	1.59
0+15	1.45
0+16	1.45
0+16	0.95
0+17	1.08
0+17	1.12
0+40	1.34
0+63	0.17
0+63	0.13
0+64	0.00
0+64	0.50
0+65	0.50
0+77	0.74
0+80	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.75)	(0+03, 1.70)	0.025
(0+03, 1.70)	(0+08, 1.59)	0.013
(0+08, 1.59)	(0+15, 1.45)	0.025
(0+15, 1.45)	(0+17, 1.08)	0.013
(0+17, 1.08)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.81)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X4/E - 7th Street 80 ROW @ CP4 (100yr)

Results	
Normal Depth	5.7 in
Roughness Coefficient	0.015
Elevation	0.47 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	1.5 ft²
Wetted Perimeter	7.8 ft
Hydraulic Radius	2.3 in
Top Width	7.34 ft
Normal Depth	5.7 in
Critical Depth	5.6 in
Critical Slope	0.006 ft/ft
Velocity	2.49 ft/s
Velocity Head	0.10 ft
Specific Energy	0.57 ft
Froude Number	0.975
Flow Type	Subcritical

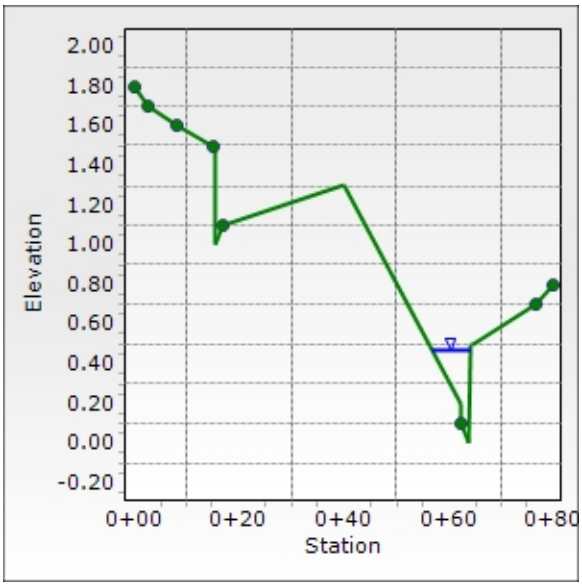
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.7 in
Critical Depth	5.6 in
Channel Slope	0.006 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X4/E - 7th Street 80 ROW @ CP4 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	5.7 in
Discharge	3.70 cfs



Worksheet for X5/E - Bridger Ave 80 ROW @ CP6 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Discharge	11.40 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.01
0+03	0.95
0+09	0.83
0+10	0.83
0+10	0.33
0+11	0.46
0+11	0.50
0+40	0.64
0+69	0.17
0+69	0.13
0+70	0.00
0+70	0.50
0+71	0.50
0+78	0.64
0+80	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.01)	(0+03, 0.95)	0.025
(0+03, 0.95)	(0+11, 0.46)	0.013
(0+11, 0.46)	(0+69, 0.13)	0.016
(0+69, 0.13)	(0+78, 0.64)	0.013
(0+78, 0.64)	(0+80, 0.69)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	5.9 in
Roughness Coefficient	0.016
Elevation	0.50 ft

Worksheet for X5/E - Bridger Ave 80 ROW @ CP6 (10yr)

Results	
Elevation Range	0.000 to 1.010 ft
Flow Area	4.1 ft²
Wetted Perimeter	23.5 ft
Hydraulic Radius	2.1 in
Top Width	22.88 ft
Normal Depth	5.9 in
Critical Depth	6.4 in
Critical Slope	0.007 ft/ft
Velocity	2.81 ft/s
Velocity Head	0.12 ft
Specific Energy	0.62 ft
Froude Number	1.174
Flow Type	Supercritical

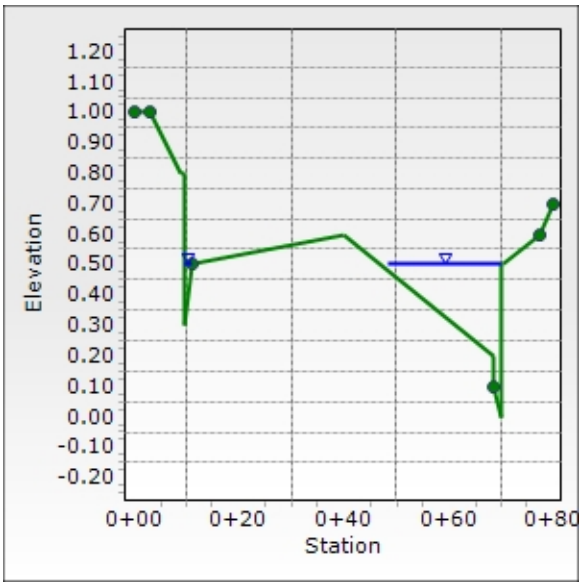
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Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.9 in
Critical Depth	6.4 in
Channel Slope	0.009 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X5/E - Bridger Ave 80 ROW @ CP6 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Normal Depth	5.9 in
Discharge	11.40 cfs



Worksheet for X5/E - Bridger Ave 80 ROW @ CP6 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Discharge	26.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.01
0+03	0.95
0+09	0.83
0+10	0.83
0+10	0.33
0+11	0.46
0+11	0.50
0+40	0.64
0+69	0.17
0+69	0.13
0+70	0.00
0+70	0.50
0+71	0.50
0+78	0.64
0+80	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.01)	(0+03, 0.95)	0.025
(0+03, 0.95)	(0+11, 0.46)	0.013
(0+11, 0.46)	(0+69, 0.13)	0.016
(0+69, 0.13)	(0+78, 0.64)	0.013
(0+78, 0.64)	(0+80, 0.69)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	7.6 in
Roughness Coefficient	0.016
Elevation	0.63 ft

Worksheet for X5/E - Bridger Ave 80 ROW @ CP6 (100yr)

Results	
Elevation Range	0.000 to 1.010 ft
Flow Area	10.1 ft²
Wetted Perimeter	67.1 ft
Hydraulic Radius	1.8 in
Top Width	66.30 ft
Normal Depth	7.6 in
Critical Depth	7.8 in
Critical Slope	0.007 ft/ft
Velocity	2.57 ft/s
Velocity Head	0.10 ft
Specific Energy	0.74 ft
Froude Number	1.159
Flow Type	Supercritical

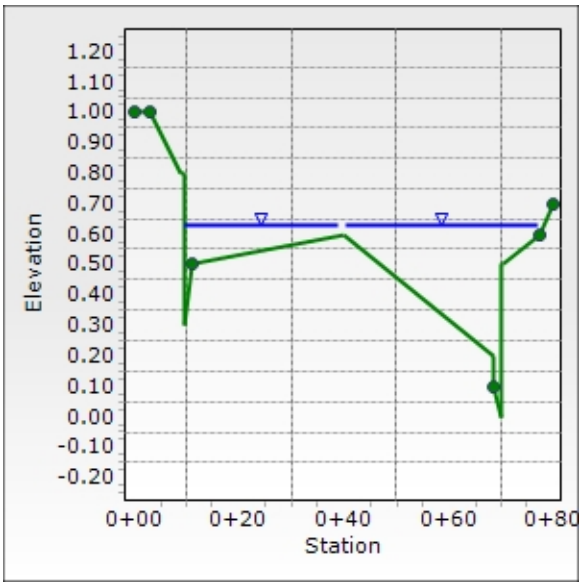
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Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.6 in
Critical Depth	7.8 in
Channel Slope	0.009 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X5/E - Bridger Ave 80 ROW @ CP6 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.009 ft/ft
Normal Depth	7.6 in
Discharge	26.10 cfs



Worksheet for X6/E - Lewis Ave 80 ROW @ CP7 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Discharge	15.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+10	0.60
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+72	0.64
0+77	0.74
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+10, 0.60)	0.025
(0+10, 0.60)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+65, 0.50)	0.013
(0+65, 0.50)	(0+72, 0.64)	0.025
(0+72, 0.64)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X6/E - Lewis Ave 80 ROW @ CP7 (10yr)

Results	
Normal Depth	5.3 in
Roughness Coefficient	0.016
Elevation	0.45 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	5.0 ft²
Wetted Perimeter	31.7 ft
Hydraulic Radius	1.9 in
Top Width	30.86 ft
Normal Depth	5.3 in
Critical Depth	5.9 in
Critical Slope	0.007 ft/ft
Velocity	3.16 ft/s
Velocity Head	0.15 ft
Specific Energy	0.60 ft
Froude Number	1.382
Flow Type	Supercritical

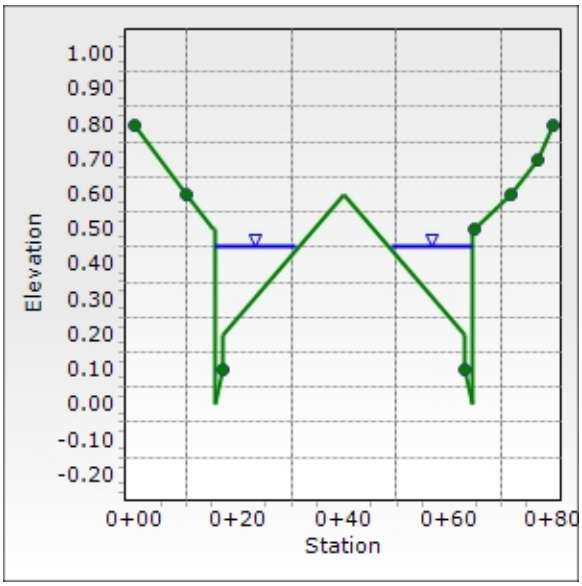
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.3 in
Critical Depth	5.9 in
Channel Slope	0.013 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X6/E - Lewis Ave 80 ROW @ CP7 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Normal Depth	5.3 in
Discharge	15.80 cfs



Worksheet for X6/E - Lewis Ave 80 ROW @ CP7 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Discharge	30.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+10	0.60
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+72	0.64
0+77	0.74
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+10, 0.60)	0.025
(0+10, 0.60)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+65, 0.50)	0.013
(0+65, 0.50)	(0+72, 0.64)	0.025
(0+72, 0.64)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X6/E - Lewis Ave 80 ROW @ CP7 (100yr)

Results	
Normal Depth	6.6 in
Roughness Coefficient	0.016
Elevation	0.55 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	9.0 ft²
Wetted Perimeter	48.7 ft
Hydraulic Radius	2.2 in
Top Width	47.74 ft
Normal Depth	6.6 in
Critical Depth	7.3 in
Critical Slope	0.007 ft/ft
Velocity	3.41 ft/s
Velocity Head	0.18 ft
Specific Energy	0.73 ft
Froude Number	1.379
Flow Type	Supercritical

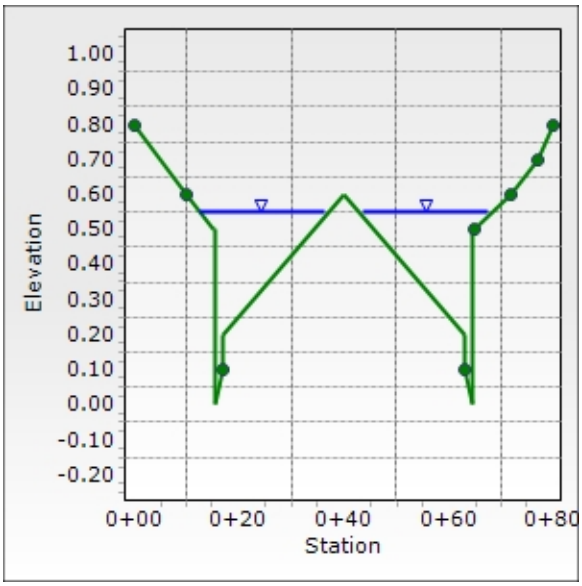
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.6 in
Critical Depth	7.3 in
Channel Slope	0.013 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X6/E - Lewis Ave 80 ROW @ CP7 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Normal Depth	6.6 in
Discharge	30.80 cfs



Worksheet for X7/E -10th Street 80 ROW @ CP8 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	1.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+03	0.74
0+08	0.64
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+03, 0.74)	0.025
(0+03, 0.74)	(0+08, 0.64)	0.013
(0+08, 0.64)	(0+15, 0.50)	0.025
(0+15, 0.50)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+70, 0.60)	0.013
(0+70, 0.60)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

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Worksheet for X7/E -10th Street 80 ROW @ CP8 (10yr)

Results		
Normal Depth	3.5	in
Roughness Coefficient	0.015	
Elevation	0.29	ft
Elevation Range	0.000 to 0.800	ft
Flow Area	1.3	ft²
Wetted Perimeter	15.4	ft
Hydraulic Radius	1.0	in
Top Width	14.88	ft
Normal Depth	3.5	in
Critical Depth	3.2	in
Critical Slope	0.008	ft/ft
Velocity	1.34	ft/s
Velocity Head	0.03	ft
Specific Energy	0.32	ft
Froude Number	0.787	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.5	in
Critical Depth	3.2	in
Channel Slope	0.005	ft/ft
Critical Slope	0.008	ft/ft

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Worksheet for X7/E -10th Street 80 ROW @ CP8 (10yr)

Messages:

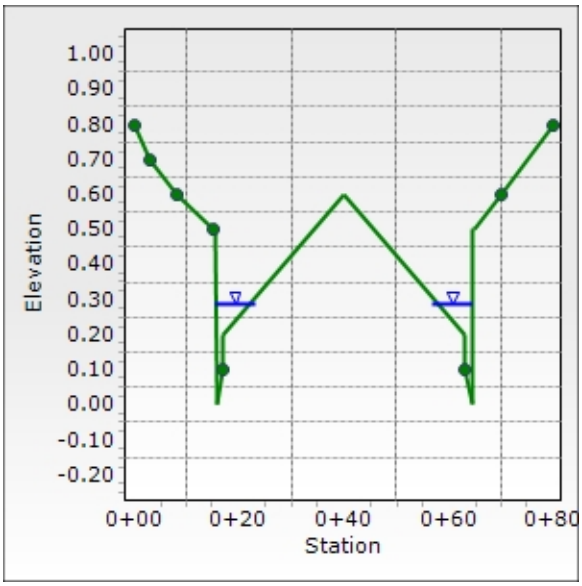
Flow is divided.

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Cross Section for X7/E -10th Street 80 ROW @ CP8 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	3.5 in
Discharge	1.80 cfs



Worksheet for X7/E -10th Street 80 ROW @ CP8 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	5.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+03	0.74
0+08	0.64
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+03, 0.74)	0.025
(0+03, 0.74)	(0+08, 0.64)	0.013
(0+08, 0.64)	(0+15, 0.50)	0.025
(0+15, 0.50)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+70, 0.60)	0.013
(0+70, 0.60)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X7/E -10th Street 80 ROW @ CP8 (100yr)

Results	
Normal Depth	4.5 in
Roughness Coefficient	0.016
Elevation	0.38 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	3.0 ft²
Wetted Perimeter	24.4 ft
Hydraulic Radius	1.5 in
Top Width	23.75 ft
Normal Depth	4.5 in
Critical Depth	4.3 in
Critical Slope	0.007 ft/ft
Velocity	1.68 ft/s
Velocity Head	0.04 ft
Specific Energy	0.42 ft
Froude Number	0.826
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.5 in
Critical Depth	4.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for X7/E -10th Street 80 ROW @ CP8 (100yr)

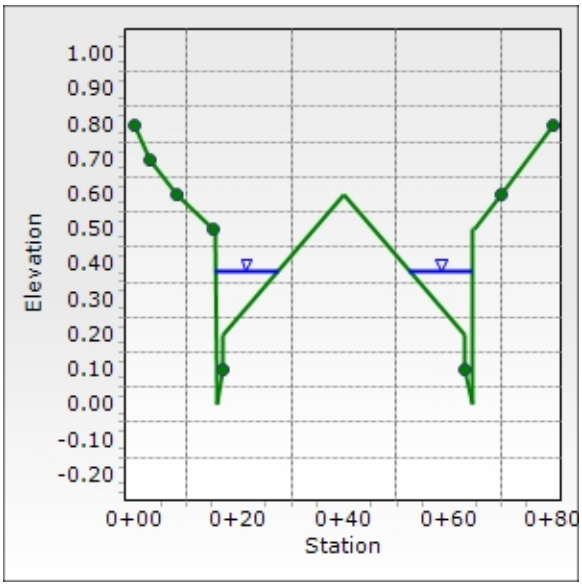
Messages:

Flow is divided.

Cross Section for X7/E -10th Street 80 ROW @ CP8 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.5 in
Discharge	5.10 cfs



OFFSITE INTERIM CONDITION

STREET CAPACITY

Worksheet for X1/I - 7th Street 80 ROW @ CP1A (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	3.90 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X1/I - 7th Street 80 ROW @ CP1A (10yr)

Results	
Normal Depth	5.6 in
Roughness Coefficient	0.015
Elevation	0.47 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	1.5 ft²
Wetted Perimeter	7.7 ft
Hydraulic Radius	2.3 in
Top Width	7.27 ft
Normal Depth	5.6 in
Critical Depth	5.7 in
Critical Slope	0.006 ft/ft
Velocity	2.67 ft/s
Velocity Head	0.11 ft
Specific Energy	0.58 ft
Froude Number	1.052
Flow Type	Supercritical

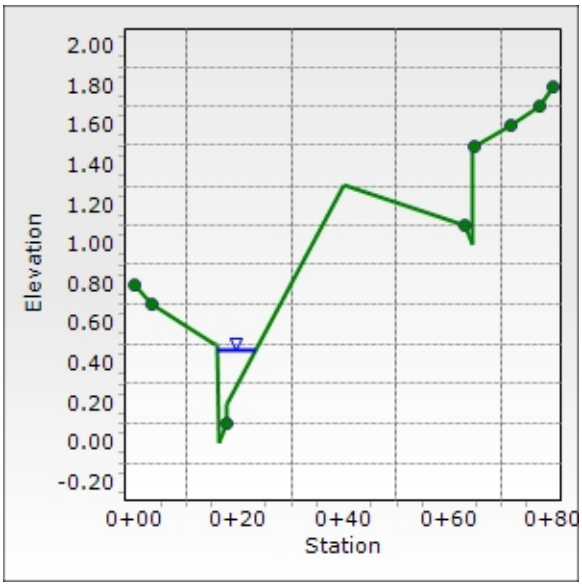
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.6 in
Critical Depth	5.7 in
Channel Slope	0.007 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X1/I - 7th Street 80 ROW @ CP1A (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	5.6 in
Discharge	3.90 cfs



Worksheet for X1/I - 7th Street 80 ROW @ CP1A (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	9.70 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X1/I - 7th Street 80 ROW @ CP1A (100yr)

Results	
Normal Depth	7.6 in
Roughness Coefficient	0.015
Elevation	0.63 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	3.4 ft²
Wetted Perimeter	18.1 ft
Hydraulic Radius	2.3 in
Top Width	17.63 ft
Normal Depth	7.6 in
Critical Depth	7.8 in
Critical Slope	0.005 ft/ft
Velocity	2.82 ft/s
Velocity Head	0.12 ft
Specific Energy	0.76 ft
Froude Number	1.125
Flow Type	Supercritical

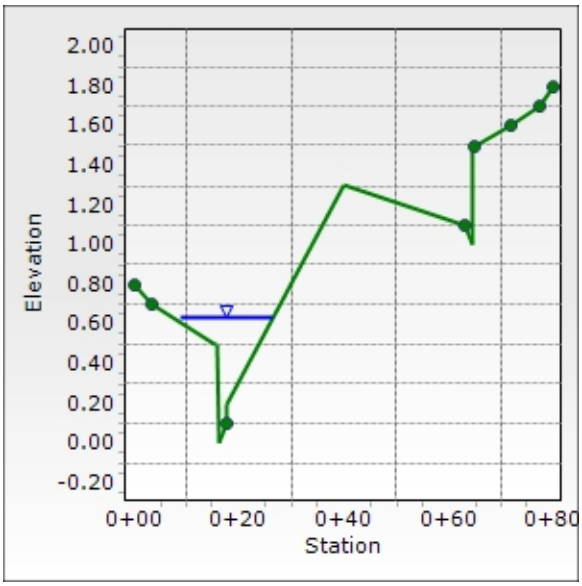
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.6 in
Critical Depth	7.8 in
Channel Slope	0.007 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for X1/I - 7th Street 80 ROW @ CP1A (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	7.6 in
Discharge	9.70 cfs



Worksheet for X2/I - 7th Street 80 ROW @ CP1B (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	5.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X2/I - 7th Street 80 ROW @ CP1B (10yr)

Results	
Normal Depth	6.4 in
Roughness Coefficient	0.015
Elevation	0.53 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	2.0 ft²
Wetted Perimeter	11.0 ft
Hydraulic Radius	2.2 in
Top Width	10.50 ft
Normal Depth	6.4 in
Critical Depth	6.5 in
Critical Slope	0.006 ft/ft
Velocity	2.66 ft/s
Velocity Head	0.11 ft
Specific Energy	0.64 ft
Froude Number	1.076
Flow Type	Supercritical

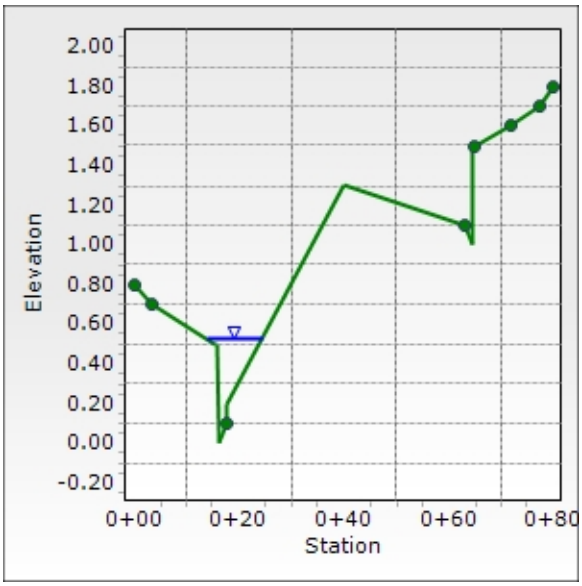
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.4 in
Critical Depth	6.5 in
Channel Slope	0.007 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X2/I - 7th Street 80 ROW @ CP1B (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	6.4 in
Discharge	5.30 cfs



Worksheet for X2/I - 7th Street 80 ROW @ CP1B (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Discharge	13.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.81
0+04	0.74
0+16	0.50
0+16	0.50
0+16	0.00
0+18	0.13
0+18	0.17
0+40	1.34
0+63	1.12
0+63	1.08
0+64	0.95
0+65	1.45
0+65	1.45
0+72	1.59
0+78	1.70
0+80	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.81)	(0+04, 0.74)	0.025
(0+04, 0.74)	(0+18, 0.13)	0.013
(0+18, 0.13)	(0+63, 1.08)	0.016
(0+63, 1.08)	(0+65, 1.45)	0.013
(0+65, 1.45)	(0+72, 1.59)	0.025
(0+72, 1.59)	(0+78, 1.70)	0.013
(0+78, 1.70)	(0+80, 1.75)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X2/I - 7th Street 80 ROW @ CP1B (100yr)

Results	
Normal Depth	8.3 in
Roughness Coefficient	0.014
Elevation	0.69 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	4.5 ft²
Wetted Perimeter	21.9 ft
Hydraulic Radius	2.5 in
Top Width	21.40 ft
Normal Depth	8.3 in
Critical Depth	8.6 in
Critical Slope	0.005 ft/ft
Velocity	3.00 ft/s
Velocity Head	0.14 ft
Specific Energy	0.83 ft
Froude Number	1.152
Flow Type	Supercritical

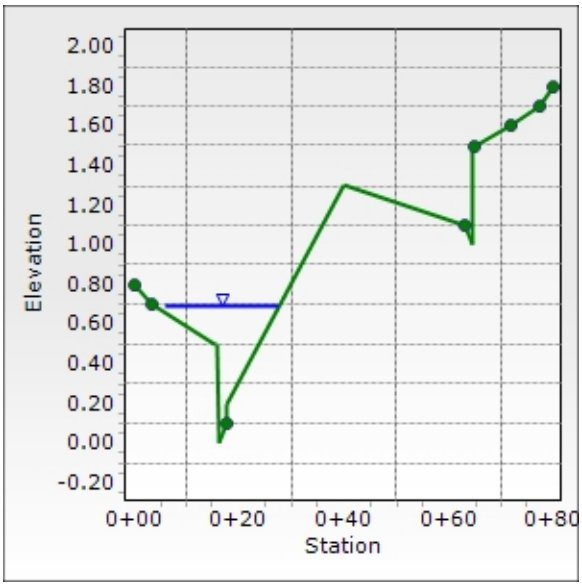
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.3 in
Critical Depth	8.6 in
Channel Slope	0.007 ft/ft
Critical Slope	0.005 ft/ft

Cross Section for X2/I - 7th Street 80 ROW @ CP1B (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.007 ft/ft
Normal Depth	8.3 in
Discharge	13.50 cfs



Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	22.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.91
0+08	0.75
0+15	0.61
0+16	0.61
0+16	0.11
0+17	0.23
0+17	0.27
0+40	0.99
0+64	0.17
0+64	0.13
0+65	0.00
0+65	0.50
0+66	0.50
0+73	0.65
0+78	0.75
0+80	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.91)	(0+08, 0.75)	0.013
(0+08, 0.75)	(0+15, 0.61)	0.025
(0+15, 0.61)	(0+17, 0.23)	0.013
(0+17, 0.23)	(0+64, 0.13)	0.016
(0+64, 0.13)	(0+66, 0.50)	0.013
(0+66, 0.50)	(0+73, 0.65)	0.025
(0+73, 0.65)	(0+78, 0.75)	0.013
(0+78, 0.75)	(0+80, 0.79)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (10yr)

Results	
Normal Depth	8.4 in
Roughness Coefficient	0.018
Elevation	0.70 ft
Elevation Range	0.000 to 0.987 ft
Flow Area	10.0 ft²
Wetted Perimeter	48.4 ft
Hydraulic Radius	2.5 in
Top Width	47.45 ft
Normal Depth	8.4 in
Critical Depth	8.0 in
Critical Slope	0.009 ft/ft
Velocity	2.20 ft/s
Velocity Head	0.08 ft
Specific Energy	0.77 ft
Froude Number	0.843
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	8.4 in
Critical Depth	8.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (10yr)

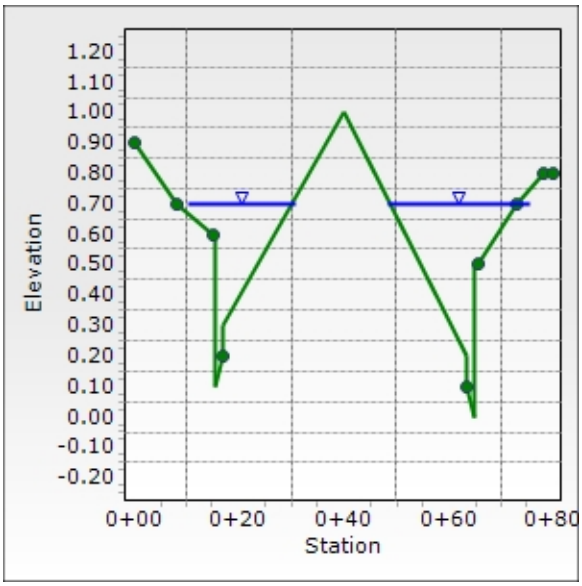
Messages:

Flow is divided.

Cross Section for X3/I - Clark Ave 80 ROW @ CP3 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	8.4 in
Discharge	22.00 cfs



Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	53.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.91
0+08	0.75
0+15	0.61
0+16	0.61
0+16	0.11
0+17	0.23
0+17	0.27
0+40	0.99
0+64	0.17
0+64	0.13
0+65	0.00
0+65	0.50
0+66	0.50
0+73	0.65
0+78	0.75
0+80	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.91)	(0+08, 0.75)	0.013
(0+08, 0.75)	(0+15, 0.61)	0.025
(0+15, 0.61)	(0+17, 0.23)	0.013
(0+17, 0.23)	(0+64, 0.13)	0.016
(0+64, 0.13)	(0+66, 0.50)	0.013
(0+66, 0.50)	(0+73, 0.65)	0.025
(0+73, 0.65)	(0+78, 0.75)	0.013
(0+78, 0.75)	(0+80, 0.79)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (100yr)

Results	
Normal Depth	10.3 in
Roughness Coefficient	0.018
Elevation	0.86 ft
Elevation Range	0.000 to 0.987 ft
Flow Area	19.6 ft²
Wetted Perimeter	70.9 ft
Hydraulic Radius	3.3 in
Top Width	69.87 ft
Normal Depth	10.3 in
Critical Depth	10.0 in
Critical Slope	0.007 ft/ft
Velocity	2.72 ft/s
Velocity Head	0.11 ft
Specific Energy	0.97 ft
Froude Number	0.904
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.3 in
Critical Depth	10.0 in
Channel Slope	0.006 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for X3/I - Clark Ave 80 ROW @ CP3 (100yr)

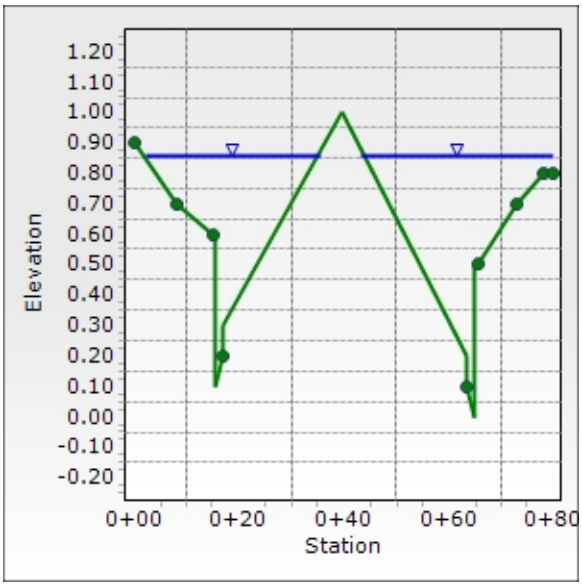
Messages:

Water Surface Elevation exceeds lowest end station by 0.0684683925645335ft. Flow is divided.

Cross Section for X3/I - Clark Ave 80 ROW @ CP3 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	10.3 in
Discharge	53.30 cfs



Worksheet for X4/I - 7th Street 80 ROW @ CP4 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.75
0+03	1.70
0+08	1.59
0+15	1.45
0+16	1.45
0+16	0.95
0+17	1.08
0+17	1.12
0+40	1.34
0+63	0.17
0+63	0.13
0+64	0.00
0+64	0.50
0+65	0.50
0+77	0.74
0+80	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.75)	(0+03, 1.70)	0.025
(0+03, 1.70)	(0+08, 1.59)	0.013
(0+08, 1.59)	(0+15, 1.45)	0.025
(0+15, 1.45)	(0+17, 1.08)	0.013
(0+17, 1.08)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.81)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X4/I - 7th Street 80 ROW @ CP4 (10yr)

Results	
Normal Depth	4.6 in
Roughness Coefficient	0.015
Elevation	0.38 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	0.9 ft²
Wetted Perimeter	6.0 ft
Hydraulic Radius	1.8 in
Top Width	5.66 ft
Normal Depth	4.6 in
Critical Depth	4.5 in
Critical Slope	0.007 ft/ft
Velocity	2.17 ft/s
Velocity Head	0.07 ft
Specific Energy	0.46 ft
Froude Number	0.947
Flow Type	Subcritical

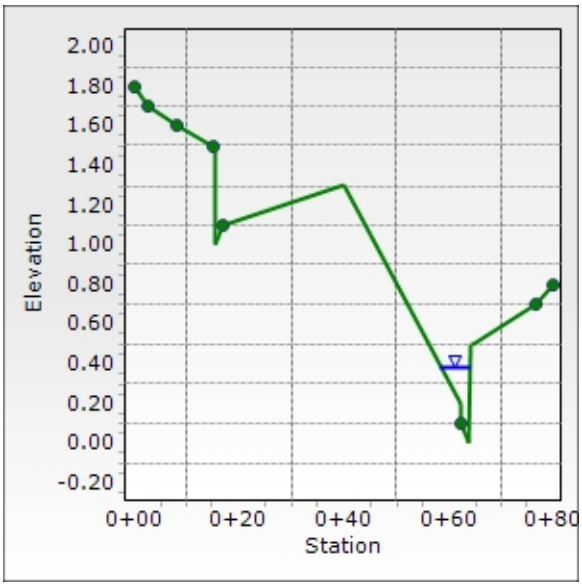
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.6 in
Critical Depth	4.5 in
Channel Slope	0.006 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X4/I - 7th Street 80 ROW @ CP4 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	4.6 in
Discharge	2.00 cfs



Worksheet for X4/I - 7th Street 80 ROW @ CP4 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Discharge	3.70 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.75
0+03	1.70
0+08	1.59
0+15	1.45
0+16	1.45
0+16	0.95
0+17	1.08
0+17	1.12
0+40	1.34
0+63	0.17
0+63	0.13
0+64	0.00
0+64	0.50
0+65	0.50
0+77	0.74
0+80	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.75)	(0+03, 1.70)	0.025
(0+03, 1.70)	(0+08, 1.59)	0.013
(0+08, 1.59)	(0+15, 1.45)	0.025
(0+15, 1.45)	(0+17, 1.08)	0.013
(0+17, 1.08)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.81)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X4/I - 7th Street 80 ROW @ CP4 (100yr)

Results	
Normal Depth	5.7 in
Roughness Coefficient	0.015
Elevation	0.47 ft
Elevation Range	0.000 to 1.750 ft
Flow Area	1.5 ft²
Wetted Perimeter	7.8 ft
Hydraulic Radius	2.3 in
Top Width	7.34 ft
Normal Depth	5.7 in
Critical Depth	5.6 in
Critical Slope	0.006 ft/ft
Velocity	2.49 ft/s
Velocity Head	0.10 ft
Specific Energy	0.57 ft
Froude Number	0.975
Flow Type	Subcritical

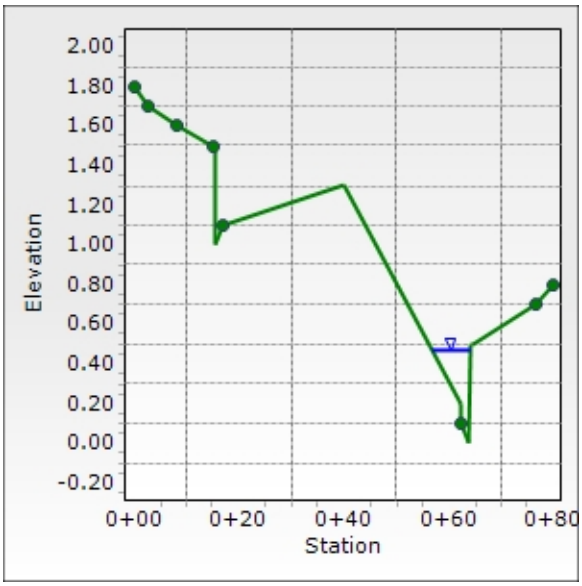
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.7 in
Critical Depth	5.6 in
Channel Slope	0.006 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for X4/I - 7th Street 80 ROW @ CP4 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 ft/ft
Normal Depth	5.7 in
Discharge	3.70 cfs



Worksheet for X5/I - Bridger Ave 80 ROW @ CP6 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Discharge	15.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.01
0+03.00	0.95
0+09.00	0.83
0+09.50	0.83
0+09.58	0.33
0+11.00	0.46
0+11.00	0.50
0+40.00	0.64
0+68.50	0.17
0+68.50	0.13
0+69.92	0.00
0+70.00	0.50
0+70.50	0.50
0+77.50	0.64
0+80.00	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.01)	(0+03.00, 0.95)	0.025
(0+03.00, 0.95)	(0+11.00, 0.46)	0.013
(0+11.00, 0.46)	(0+68.50, 0.13)	0.016
(0+68.50, 0.13)	(0+77.50, 0.64)	0.013
(0+77.50, 0.64)	(0+80.00, 0.69)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for X5/I - Bridger Ave 80 ROW @ CP6 (10yr)

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.56	ft
Elevation Range	0.000 to 1.010 ft		
Flow Area		6.13	ft²
Wetted Perimeter		43.620	ft
Hydraulic Radius		0.14	ft
Top Width		42.900	ft
Normal Depth		0.56	ft
Critical Depth		0.58	ft
Critical Slope		0.00688	ft/ft
Velocity		2.45	ft/s
Velocity Head		0.09	ft
Specific Energy		0.65	ft
Froude Number		1.14	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.58	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.00688	ft/ft

Cross Section for X5/I - Bridger Ave 80 ROW @ CP6 (10yr)

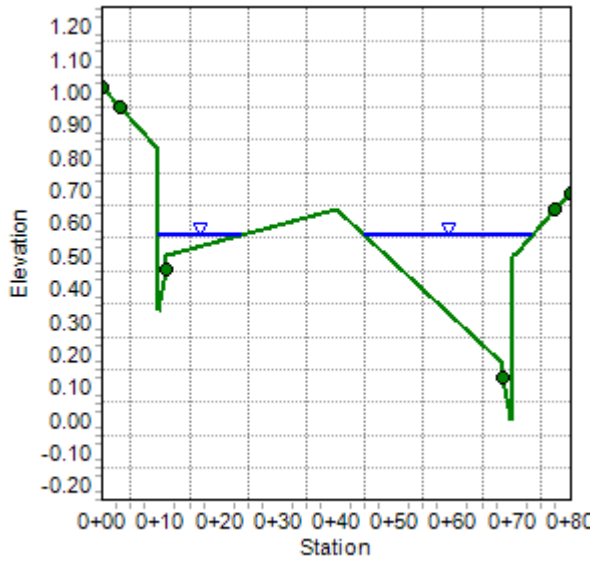
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Normal Depth	0.56	ft
Discharge	15.00	ft³/s

Cross Section Image



Worksheet for X5/I - Bridger Ave 80 ROW @ CP6 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Discharge	31.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.01
0+03.00	0.95
0+09.00	0.83
0+09.50	0.83
0+09.58	0.33
0+11.00	0.46
0+11.00	0.50
0+40.00	0.64
0+68.50	0.17
0+68.50	0.13
0+69.92	0.00
0+70.00	0.50
0+70.50	0.50
0+77.50	0.64
0+80.00	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.01)	(0+03.00, 0.95)	0.025
(0+03.00, 0.95)	(0+11.00, 0.46)	0.013
(0+11.00, 0.46)	(0+68.50, 0.13)	0.016
(0+68.50, 0.13)	(0+77.50, 0.64)	0.013
(0+77.50, 0.64)	(0+80.00, 0.69)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for X5/I - Bridger Ave 80 ROW @ CP6 (100yr)

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.65	ft
Elevation Range	0.000 to 1.010 ft		
Flow Area		11.44	ft²
Wetted Perimeter		69.331	ft
Hydraulic Radius		0.16	ft
Top Width		68.534	ft
Normal Depth		0.65	ft
Critical Depth		0.67	ft
Critical Slope		0.00638	ft/ft
Velocity		2.71	ft/s
Velocity Head		0.11	ft
Specific Energy		0.77	ft
Froude Number		1.17	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.65	ft
Critical Depth	0.67	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.00638	ft/ft

Cross Section for X5/I - Bridger Ave 80 ROW @ CP6 (100yr)

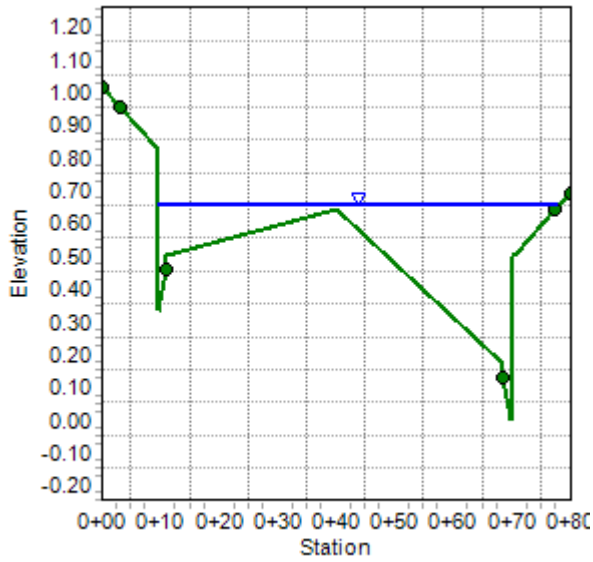
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Normal Depth	0.65	ft
Discharge	31.00	ft³/s

Cross Section Image



Worksheet for X6/I - Lewis Ave 80 ROW @ CP7 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Discharge	15.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+10	0.60
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+72	0.64
0+77	0.74
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+10, 0.60)	0.025
(0+10, 0.60)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+65, 0.50)	0.013
(0+65, 0.50)	(0+72, 0.64)	0.025
(0+72, 0.64)	(0+77, 0.74)	0.013
(0+77, 0.74)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X6/I - Lewis Ave 80 ROW @ CP7 (10yr)

Results	
Normal Depth	5.3 in
Roughness Coefficient	0.016
Elevation	0.45 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	5.0 ft²
Wetted Perimeter	31.7 ft
Hydraulic Radius	1.9 in
Top Width	30.86 ft
Normal Depth	5.3 in
Critical Depth	5.9 in
Critical Slope	0.007 ft/ft
Velocity	3.16 ft/s
Velocity Head	0.15 ft
Specific Energy	0.60 ft
Froude Number	1.382
Flow Type	Supercritical

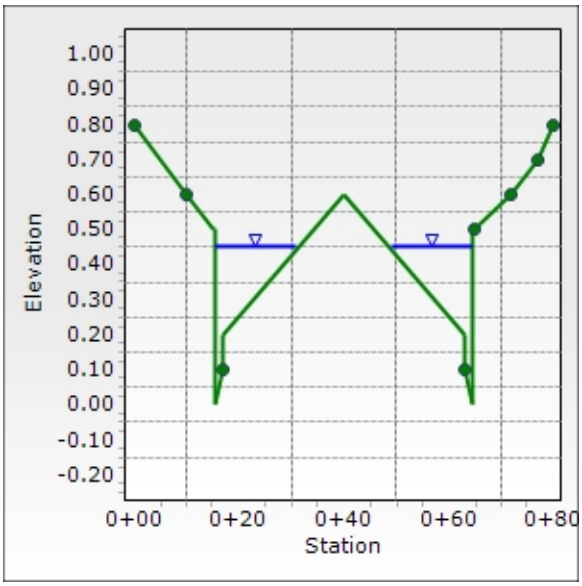
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.3 in
Critical Depth	5.9 in
Channel Slope	0.013 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for X6/I - Lewis Ave 80 ROW @ CP7 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.013 ft/ft
Normal Depth	5.3 in
Discharge	15.80 cfs



Worksheet for X6/I - Lewis Ave 80 ROW @ CP7 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Discharge	33.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.80
0+10.00	0.60
0+15.00	0.50
0+15.50	0.50
0+15.58	0.00
0+17.00	0.13
0+17.00	0.17
0+40.00	0.63
0+63.00	0.17
0+63.00	0.13
0+64.42	0.00
0+64.50	0.50
0+65.00	0.50
0+72.00	0.64
0+77.00	0.74
0+80.00	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.80)	(0+10.00, 0.60)	0.025
(0+10.00, 0.60)	(0+17.00, 0.13)	0.013
(0+17.00, 0.13)	(0+63.00, 0.13)	0.016
(0+63.00, 0.13)	(0+65.00, 0.50)	0.013
(0+65.00, 0.50)	(0+72.00, 0.64)	0.025
(0+72.00, 0.64)	(0+77.00, 0.74)	0.013
(0+77.00, 0.74)	(0+80.00, 0.80)	0.025

Worksheet for X6/I - Lewis Ave 80 ROW @ CP7 (100yr)

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.56	ft
Elevation Range	0.000 to 0.800 ft		
Flow Area		9.66	ft²
Wetted Perimeter		51.189	ft
Hydraulic Radius		0.19	ft
Top Width		50.237	ft
Normal Depth		0.56	ft
Critical Depth		0.62	ft
Critical Slope		0.00667	ft/ft
Velocity		3.42	ft/s
Velocity Head		0.18	ft
Specific Energy		0.75	ft
Froude Number		1.37	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.62	ft
Channel Slope	0.01300	ft/ft
Critical Slope	0.00667	ft/ft

Cross Section for X6/I - Lewis Ave 80 ROW @ CP7 (100yr)

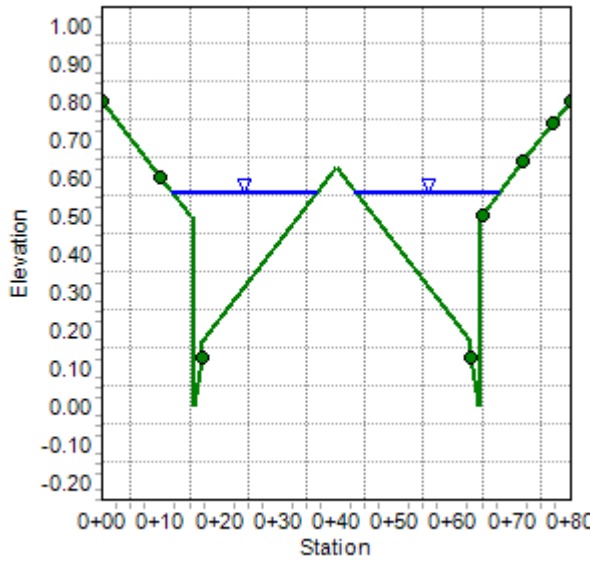
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Normal Depth	0.56	ft
Discharge	33.00	ft^3/s

Cross Section Image



Worksheet for X7/I -10th Street 80 ROW @ CP8 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	1.80 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+03	0.74
0+08	0.64
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+03, 0.74)	0.025
(0+03, 0.74)	(0+08, 0.64)	0.013
(0+08, 0.64)	(0+15, 0.50)	0.025
(0+15, 0.50)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+70, 0.60)	0.013
(0+70, 0.60)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X7/I -10th Street 80 ROW @ CP8 (10yr)

Results	
Normal Depth	3.5 in
Roughness Coefficient	0.015
Elevation	0.29 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	1.3 ft²
Wetted Perimeter	15.4 ft
Hydraulic Radius	1.0 in
Top Width	14.88 ft
Normal Depth	3.5 in
Critical Depth	3.2 in
Critical Slope	0.008 ft/ft
Velocity	1.34 ft/s
Velocity Head	0.03 ft
Specific Energy	0.32 ft
Froude Number	0.787
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.5 in
Critical Depth	3.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Worksheet for X7/I -10th Street 80 ROW @ CP8 (10yr)

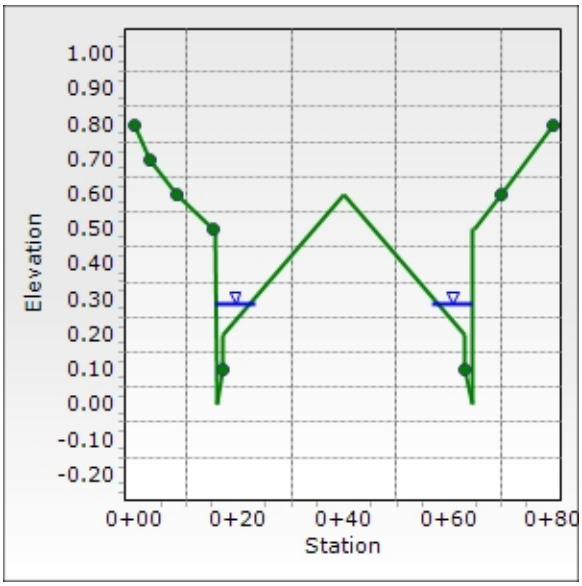
Messages:

Flow is divided.

Cross Section for X7/I -10th Street 80 ROW @ CP8 (10yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	3.5 in
Discharge	1.80 cfs



Worksheet for X7/I -10th Street 80 ROW @ CP8 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	5.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.80
0+03	0.74
0+08	0.64
0+15	0.50
0+16	0.50
0+16	0.00
0+17	0.13
0+17	0.17
0+40	0.63
0+63	0.17
0+63	0.13
0+64	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+80	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.80)	(0+03, 0.74)	0.025
(0+03, 0.74)	(0+08, 0.64)	0.013
(0+08, 0.64)	(0+15, 0.50)	0.025
(0+15, 0.50)	(0+17, 0.13)	0.013
(0+17, 0.13)	(0+63, 0.13)	0.016
(0+63, 0.13)	(0+70, 0.60)	0.013
(0+70, 0.60)	(0+80, 0.80)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Worksheet for X7/I -10th Street 80 ROW @ CP8 (100yr)

Results	
Normal Depth	4.5 in
Roughness Coefficient	0.016
Elevation	0.38 ft
Elevation Range	0.000 to 0.800 ft
Flow Area	3.0 ft²
Wetted Perimeter	24.4 ft
Hydraulic Radius	1.5 in
Top Width	23.75 ft
Normal Depth	4.5 in
Critical Depth	4.3 in
Critical Slope	0.007 ft/ft
Velocity	1.68 ft/s
Velocity Head	0.04 ft
Specific Energy	0.42 ft
Froude Number	0.826
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.5 in
Critical Depth	4.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for X7/I -10th Street 80 ROW @ CP8 (100yr)

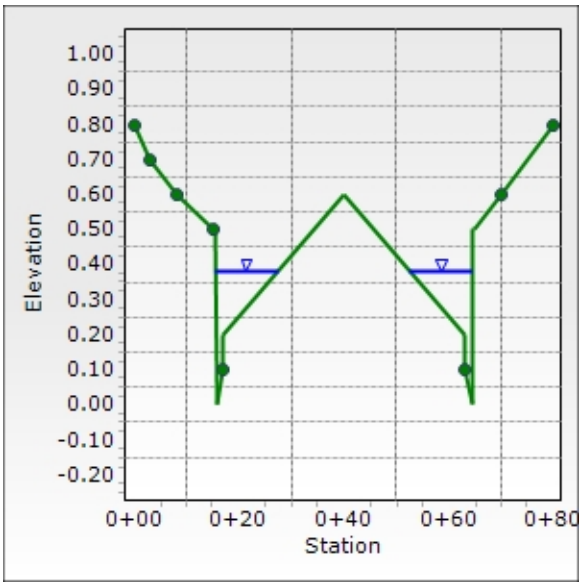
Messages:

Flow is divided.

Cross Section for X7/I -10th Street 80 ROW @ CP8 (100yr)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.5 in
Discharge	5.10 cfs



OFFSITE DEVELOPED CONDITION

STREET CAPACITY

KLEINFELDER
Bright People. Right Solutions.

Worksheet for X1/D - 7th Street 80 ROW @ CP1A (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.81
0+03.50	0.74
0+15.50	0.50
0+16.00	0.50
0+16.08	0.00
0+17.50	0.13
0+17.50	0.17
0+40.00	1.34
0+63.00	1.12
0+63.00	1.08
0+64.42	0.95
0+64.50	1.45
0+65.00	1.45
0+72.00	1.59
0+77.50	1.70
0+80.00	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.81)	(0+03.50, 0.74)	0.025
(0+03.50, 0.74)	(0+17.50, 0.13)	0.013
(0+17.50, 0.13)	(0+63.00, 1.08)	0.016
(0+63.00, 1.08)	(0+65.00, 1.45)	0.013
(0+65.00, 1.45)	(0+72.00, 1.59)	0.025

Worksheet for X1/D - 7th Street 80 ROW @ CP1A (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 1.59)	(0+77.50, 1.70)	0.013
(0+77.50, 1.70)	(0+80.00, 1.75)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.55	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		2.25	ft²
Wetted Perimeter		12.583	ft
Hydraulic Radius		0.18	ft
Top Width		12.101	ft
Normal Depth		0.55	ft
Critical Depth		0.57	ft
Critical Slope		0.00591	ft/ft
Velocity		2.66	ft/s
Velocity Head		0.11	ft
Specific Energy		0.66	ft
Froude Number		1.09	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft

Worksheet for X1/D - 7th Street 80 ROW @ CP1A (10yr)

GVF Output Data

Critical Depth	0.57	ft
Channel Slope	0.00700	ft/ft
Critical Slope	0.00591	ft/ft

Cross Section for X1/D - 7th Street 80 ROW @ CP1A (10yr)

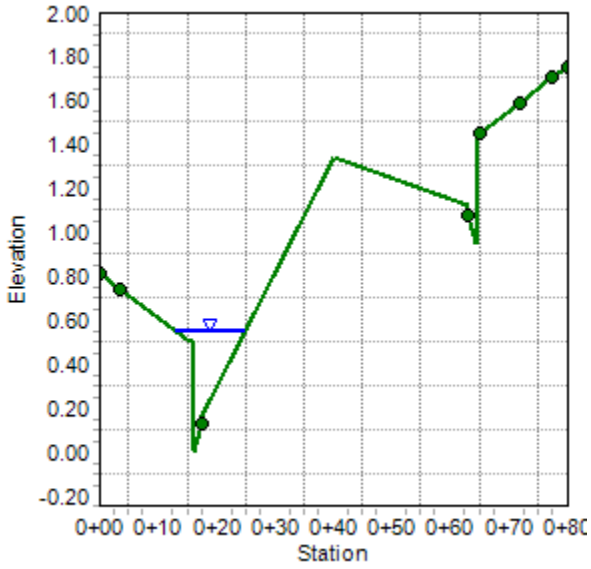
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Normal Depth	0.55	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for X1/D - 7th Street 80 ROW @ CP1A (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Discharge	13.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.81
0+03.50	0.74
0+15.50	0.50
0+16.00	0.50
0+16.08	0.00
0+17.50	0.13
0+17.50	0.17
0+40.00	1.34
0+63.00	1.12
0+63.00	1.08
0+64.42	0.95
0+64.50	1.45
0+65.00	1.45
0+72.00	1.59
0+77.50	1.70
0+80.00	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.81)	(0+03.50, 0.74)	0.025
(0+03.50, 0.74)	(0+17.50, 0.13)	0.013
(0+17.50, 0.13)	(0+63.00, 1.08)	0.016
(0+63.00, 1.08)	(0+65.00, 1.45)	0.013
(0+65.00, 1.45)	(0+72.00, 1.59)	0.025

Worksheet for X1/D - 7th Street 80 ROW @ CP1A (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 1.59)	(0+77.50, 1.70)	0.013
(0+77.50, 1.70)	(0+80.00, 1.75)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.68	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		4.37	ft²
Wetted Perimeter		21.442	ft
Hydraulic Radius		0.20	ft
Top Width		20.956	ft
Normal Depth		0.68	ft
Critical Depth		0.71	ft
Critical Slope		0.00522	ft/ft
Velocity		2.98	ft/s
Velocity Head		0.14	ft
Specific Energy		0.82	ft
Froude Number		1.15	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.68	ft

Worksheet for X1/D - 7th Street 80 ROW @ CP1A (100yr)

GVF Output Data

Critical Depth	0.71	ft
Channel Slope	0.00700	ft/ft
Critical Slope	0.00522	ft/ft

Cross Section for X1/D - 7th Street 80 ROW @ CP1A (100yr)

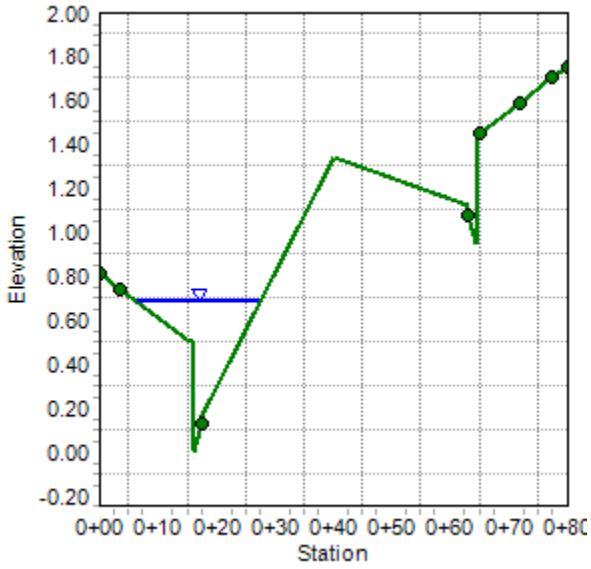
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Normal Depth	0.68	ft
Discharge	13.00	ft³/s

Cross Section Image



Worksheet for X2/D - 7th Street 80 ROW @ CP1B (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Discharge	9.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.81
0+03.50	0.74
0+15.50	0.50
0+16.00	0.50
0+16.08	0.00
0+17.50	0.13
0+17.50	0.17
0+40.00	1.34
0+63.00	1.12
0+63.00	1.08
0+64.42	0.95
0+64.50	1.45
0+65.00	1.45
0+72.00	1.59
0+77.50	1.70
0+80.00	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.81)	(0+03.50, 0.74)	0.025
(0+03.50, 0.74)	(0+17.50, 0.13)	0.013
(0+17.50, 0.13)	(0+63.00, 1.08)	0.016
(0+63.00, 1.08)	(0+65.00, 1.45)	0.013
(0+65.00, 1.45)	(0+72.00, 1.59)	0.025

Worksheet for X2/D - 7th Street 80 ROW @ CP1B (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 1.59)	(0+77.50, 1.70)	0.013
(0+77.50, 1.70)	(0+80.00, 1.75)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.62	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		3.23	ft²
Wetted Perimeter		17.269	ft
Hydraulic Radius		0.19	ft
Top Width		16.785	ft
Normal Depth		0.62	ft
Critical Depth		0.64	ft
Critical Slope		0.00553	ft/ft
Velocity		2.79	ft/s
Velocity Head		0.12	ft
Specific Energy		0.74	ft
Froude Number		1.12	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.62	ft

Worksheet for X2/D - 7th Street 80 ROW @ CP1B (10yr)

GVF Output Data

Critical Depth	0.64	ft
Channel Slope	0.00700	ft/ft
Critical Slope	0.00553	ft/ft

Cross Section for X2/D - 7th Street 80 ROW @ CP1B (10yr)

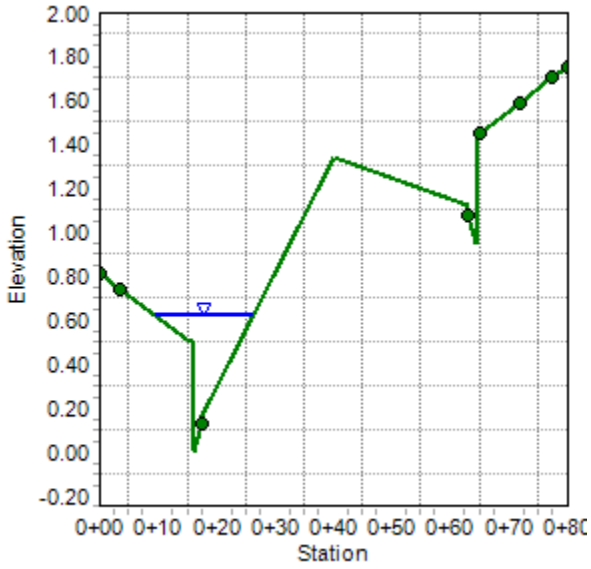
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Normal Depth	0.62	ft
Discharge	9.00	ft³/s

Cross Section Image



Worksheet for X2/D - 7th Street 80 ROW @ CP1B (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Discharge	18.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.81
0+03.50	0.74
0+15.50	0.50
0+16.00	0.50
0+16.08	0.00
0+17.50	0.13
0+17.50	0.17
0+40.00	1.34
0+63.00	1.12
0+63.00	1.08
0+64.42	0.95
0+64.50	1.45
0+65.00	1.45
0+72.00	1.59
0+77.50	1.70
0+80.00	1.75

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.81)	(0+03.50, 0.74)	0.025
(0+03.50, 0.74)	(0+17.50, 0.13)	0.013
(0+17.50, 0.13)	(0+63.00, 1.08)	0.016
(0+63.00, 1.08)	(0+65.00, 1.45)	0.013
(0+65.00, 1.45)	(0+72.00, 1.59)	0.025

Worksheet for X2/D - 7th Street 80 ROW @ CP1B (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 1.59)	(0+77.50, 1.70)	0.013
(0+77.50, 1.70)	(0+80.00, 1.75)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.74	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		5.66	ft²
Wetted Perimeter		25.358	ft
Hydraulic Radius		0.22	ft
Top Width		24.869	ft
Normal Depth		0.74	ft
Critical Depth		0.77	ft
Critical Slope		0.00497	ft/ft
Velocity		3.18	ft/s
Velocity Head		0.16	ft
Specific Energy		0.89	ft
Froude Number		1.17	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.74	ft

Worksheet for X2/D - 7th Street 80 ROW @ CP1B (100yr)

GVF Output Data

Critical Depth	0.77	ft
Channel Slope	0.00700	ft/ft
Critical Slope	0.00497	ft/ft

Cross Section for X2/D - 7th Street 80 ROW @ CP1B (100yr)

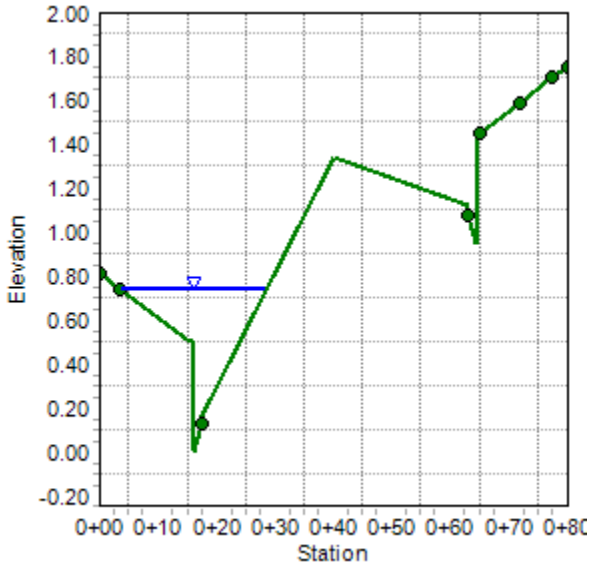
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00700	ft/ft
Normal Depth	0.74	ft
Discharge	18.00	ft³/s

Cross Section Image



Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	34.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.91
0+08.00	0.75
0+15.00	0.61
0+15.50	0.61
0+15.58	0.11
0+17.00	0.23
0+17.00	0.27
0+40.00	0.99
0+63.50	0.17
0+63.50	0.13
0+64.92	0.00
0+65.00	0.50
0+65.50	0.50
0+73.00	0.65
0+78.00	0.75
0+80.00	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.91)	(0+08.00, 0.75)	0.013
(0+08.00, 0.75)	(0+15.00, 0.61)	0.025
(0+15.00, 0.61)	(0+17.00, 0.23)	0.013
(0+17.00, 0.23)	(0+63.50, 0.13)	0.016
(0+63.50, 0.13)	(0+65.50, 0.50)	0.013

Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+65.50, 0.50)	(0+73.00, 0.65)	0.025
(0+73.00, 0.65)	(0+78.00, 0.75)	0.013
(0+78.00, 0.75)	(0+80.00, 0.79)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.78	ft
Elevation Range	0.000 to 0.987 ft		
Flow Area		14.27	ft²
Wetted Perimeter		61.139	ft
Hydraulic Radius		0.23	ft
Top Width		60.173	ft
Normal Depth		0.78	ft
Critical Depth		0.75	ft
Critical Slope		0.00820	ft/ft
Velocity		2.38	ft/s
Velocity Head		0.09	ft
Specific Energy		0.87	ft
Froude Number		0.86	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		

Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (10yr)

GVF Output Data

Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.78	ft
Critical Depth	0.75	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00820	ft/ft

Cross Section for X3/D - Clark Ave 80 ROW @ CP3 (10yr)

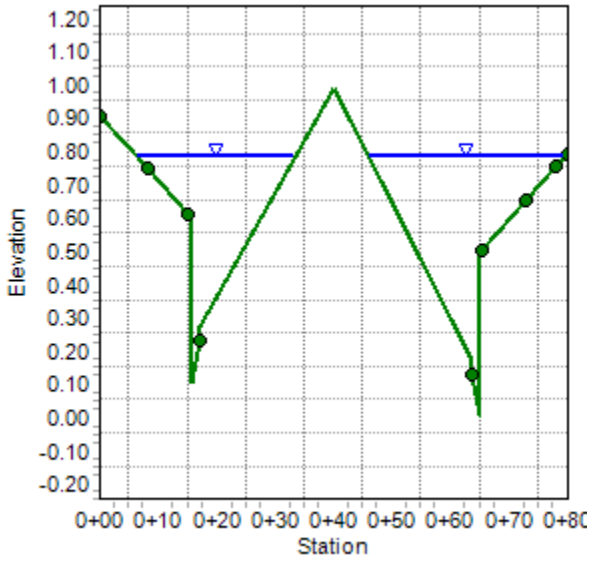
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.78	ft
Discharge	34.00	ft³/s

Cross Section Image



Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	69.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.91
0+08.00	0.75
0+15.00	0.61
0+15.50	0.61
0+15.58	0.11
0+17.00	0.23
0+17.00	0.27
0+39.50	0.99
0+63.50	0.17
0+63.50	0.13
0+64.92	0.00
0+65.00	0.50
0+65.50	0.50
0+73.00	0.65
0+78.00	0.75
0+80.00	0.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.91)	(0+08.00, 0.75)	0.013
(0+08.00, 0.75)	(0+15.00, 0.61)	0.025
(0+15.00, 0.61)	(0+17.00, 0.23)	0.013
(0+17.00, 0.23)	(0+63.50, 0.13)	0.016
(0+63.50, 0.13)	(0+65.50, 0.50)	0.013

Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+65.50, 0.50)	(0+73.00, 0.65)	0.025
(0+73.00, 0.65)	(0+78.00, 0.75)	0.013
(0+78.00, 0.75)	(0+80.00, 0.79)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.91	ft
Elevation Range	0.000 to 0.987 ft		
Flow Area		23.44	ft²
Wetted Perimeter		76.483	ft
Hydraulic Radius		0.31	ft
Top Width		75.385	ft
Normal Depth		0.91	ft
Critical Depth		0.89	ft
Critical Slope		0.00701	ft/ft
Velocity		2.94	ft/s
Velocity Head		0.13	ft
Specific Energy		1.05	ft
Froude Number		0.93	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		

Worksheet for X3/D - Clark Ave 80 ROW @ CP3 (100yr)

GVF Output Data

Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.91	ft
Critical Depth	0.89	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00701	ft/ft

Cross Section for X3/D - Clark Ave 80 ROW @ CP3 (100yr)

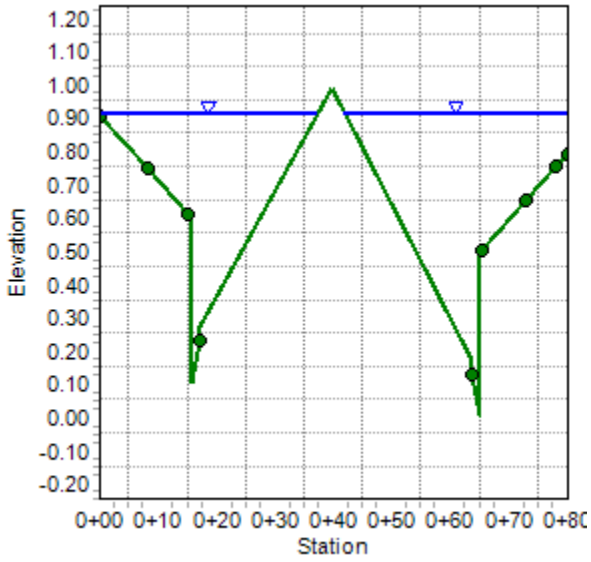
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.91	ft
Discharge	69.00	ft³/s

Cross Section Image



Worksheet for X4/D - 7th Street 80 ROW @ CP4 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	3.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.75
0+02.50	1.70
0+08.00	1.59
0+15.00	1.45
0+15.50	1.45
0+15.58	0.95
0+17.00	1.08
0+17.00	1.12
0+40.00	1.34
0+62.50	0.17
0+62.50	0.13
0+63.92	0.00
0+64.00	0.50
0+64.50	0.50
0+76.50	0.74
0+80.00	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.75)	(0+02.50, 1.70)	0.025
(0+02.50, 1.70)	(0+08.00, 1.59)	0.013
(0+08.00, 1.59)	(0+15.00, 1.45)	0.025
(0+15.00, 1.45)	(0+17.00, 1.08)	0.013
(0+17.00, 1.08)	(0+62.50, 0.13)	0.016

Worksheet for X4/D - 7th Street 80 ROW @ CP4 (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+62.50, 0.13)	(0+76.50, 0.74)	0.013
(0+76.50, 0.74)	(0+80.00, 0.81)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.44	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		1.26	ft²
Wetted Perimeter		7.155	ft
Hydraulic Radius		0.18	ft
Top Width		6.728	ft
Normal Depth		0.44	ft
Critical Depth		0.43	ft
Critical Slope		0.00647	ft/ft
Velocity		2.37	ft/s
Velocity Head		0.09	ft
Specific Energy		0.53	ft
Froude Number		0.97	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft

Worksheet for X4/D - 7th Street 80 ROW @ CP4 (10yr)

GVF Output Data

Critical Depth	0.43	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00647	ft/ft

Cross Section for X4/D - 7th Street 80 ROW @ CP4 (10yr)

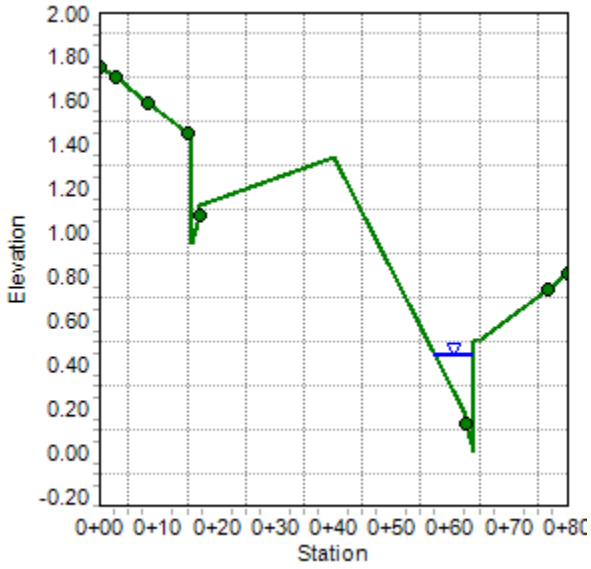
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.44	ft
Discharge	3.00	ft³/s

Cross Section Image



Worksheet for X4/D - 7th Street 80 ROW @ CP4 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.75
0+02.50	1.70
0+08.00	1.59
0+15.00	1.45
0+15.50	1.45
0+15.58	0.95
0+17.00	1.08
0+17.00	1.12
0+40.00	1.34
0+62.50	0.17
0+62.50	0.13
0+63.92	0.00
0+64.00	0.50
0+64.50	0.50
0+76.50	0.74
0+80.00	0.81

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.75)	(0+02.50, 1.70)	0.025
(0+02.50, 1.70)	(0+08.00, 1.59)	0.013
(0+08.00, 1.59)	(0+15.00, 1.45)	0.025
(0+15.00, 1.45)	(0+17.00, 1.08)	0.013
(0+17.00, 1.08)	(0+62.50, 0.13)	0.016

Worksheet for X4/D - 7th Street 80 ROW @ CP4 (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+62.50, 0.13)	(0+76.50, 0.74)	0.013
(0+76.50, 0.74)	(0+80.00, 0.81)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.57	ft
Elevation Range	0.000 to 1.750 ft		
Flow Area		2.43	ft²
Wetted Perimeter		13.532	ft
Hydraulic Radius		0.18	ft
Top Width		13.049	ft
Normal Depth		0.57	ft
Critical Depth		0.57	ft
Critical Slope		0.00586	ft/ft
Velocity		2.47	ft/s
Velocity Head		0.10	ft
Specific Energy		0.66	ft
Froude Number		1.01	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft

Worksheet for X4/D - 7th Street 80 ROW @ CP4 (100yr)

GVF Output Data

Critical Depth	0.57	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00586	ft/ft

Cross Section for X4/D - 7th Street 80 ROW @ CP4 (100yr)

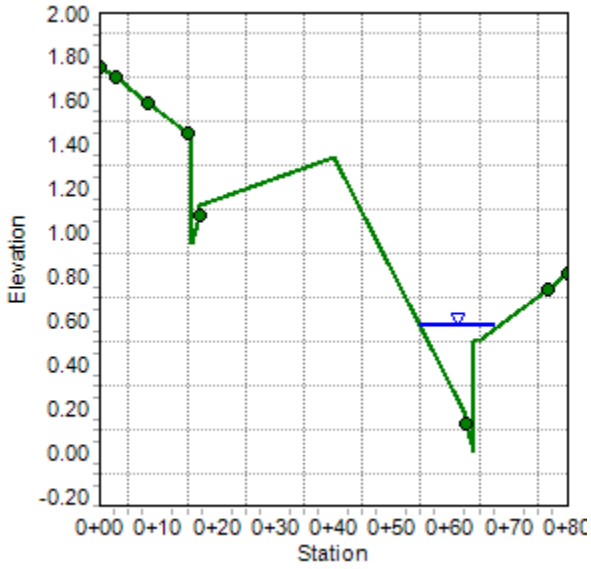
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.57	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for X5/D - Bridger Ave 80 ROW @ CP6 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Discharge	15.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.01
0+03.00	0.95
0+09.00	0.83
0+09.50	0.83
0+09.58	0.33
0+11.00	0.46
0+11.00	0.50
0+40.00	0.64
0+68.50	0.17
0+68.50	0.13
0+69.92	0.00
0+70.00	0.50
0+70.50	0.50
0+77.50	0.64
0+80.00	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.01)	(0+03.00, 0.95)	0.025
(0+03.00, 0.95)	(0+11.00, 0.46)	0.013
(0+11.00, 0.46)	(0+68.50, 0.13)	0.016
(0+68.50, 0.13)	(0+77.50, 0.64)	0.013
(0+77.50, 0.64)	(0+80.00, 0.69)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for X5/D - Bridger Ave 80 ROW @ CP6 (10yr)

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.56	ft
Elevation Range	0.000 to 1.010 ft		
Flow Area		6.13	ft²
Wetted Perimeter		43.620	ft
Hydraulic Radius		0.14	ft
Top Width		42.900	ft
Normal Depth		0.56	ft
Critical Depth		0.58	ft
Critical Slope		0.00688	ft/ft
Velocity		2.45	ft/s
Velocity Head		0.09	ft
Specific Energy		0.65	ft
Froude Number		1.14	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.58	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.00688	ft/ft

Cross Section for X5/D - Bridger Ave 80 ROW @ CP6 (10yr)

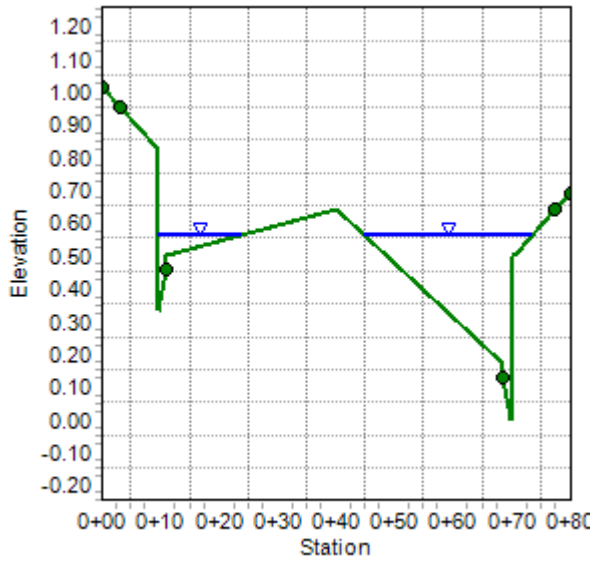
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Normal Depth	0.56	ft
Discharge	15.00	ft³/s

Cross Section Image



Worksheet for X5/D - Bridger Ave 80 ROW @ CP6 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Discharge	31.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.01
0+03.00	0.95
0+09.00	0.83
0+09.50	0.83
0+09.58	0.33
0+11.00	0.46
0+11.00	0.50
0+40.00	0.64
0+68.50	0.17
0+68.50	0.13
0+69.92	0.00
0+70.00	0.50
0+70.50	0.50
0+77.50	0.64
0+80.00	0.69

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.01)	(0+03.00, 0.95)	0.025
(0+03.00, 0.95)	(0+11.00, 0.46)	0.013
(0+11.00, 0.46)	(0+68.50, 0.13)	0.016
(0+68.50, 0.13)	(0+77.50, 0.64)	0.013
(0+77.50, 0.64)	(0+80.00, 0.69)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for X5/D - Bridger Ave 80 ROW @ CP6 (100yr)

Options

Closed Channel Weighting Method	Pavlovskii's Method		

Results

Normal Depth		0.65	ft
Elevation Range	0.000 to 1.010 ft		
Flow Area		11.44	ft²
Wetted Perimeter		69.331	ft
Hydraulic Radius		0.16	ft
Top Width		68.534	ft
Normal Depth		0.65	ft
Critical Depth		0.67	ft
Critical Slope		0.00638	ft/ft
Velocity		2.71	ft/s
Velocity Head		0.11	ft
Specific Energy		0.77	ft
Froude Number		1.17	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.65	ft
Critical Depth	0.67	ft
Channel Slope	0.00900	ft/ft
Critical Slope	0.00638	ft/ft

Cross Section for X5/D - Bridger Ave 80 ROW @ CP6 (100yr)

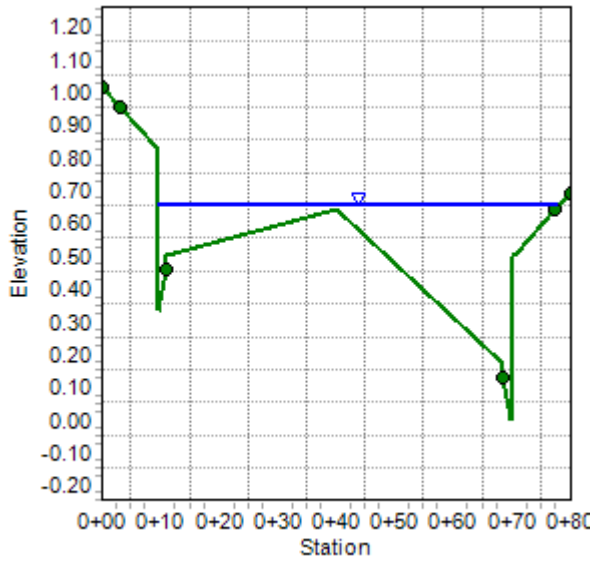
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00900	ft/ft
Normal Depth	0.65	ft
Discharge	31.00	ft³/s

Cross Section Image



Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Discharge	15.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.80
0+10.00	0.60
0+15.00	0.50
0+15.50	0.50
0+15.58	0.00
0+17.00	0.13
0+17.00	0.17
0+40.00	0.63
0+63.00	0.17
0+63.00	0.13
0+64.42	0.00
0+64.50	0.50
0+65.00	0.50
0+72.00	0.64
0+77.00	0.74
0+80.00	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.80)	(0+10.00, 0.60)	0.025
(0+10.00, 0.60)	(0+17.00, 0.13)	0.013
(0+17.00, 0.13)	(0+63.00, 0.13)	0.016
(0+63.00, 0.13)	(0+65.00, 0.50)	0.013
(0+65.00, 0.50)	(0+72.00, 0.64)	0.025

Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 0.64)	(0+77.00, 0.74)	0.013
(0+77.00, 0.74)	(0+80.00, 0.80)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.44	ft
Elevation Range	0.000 to 0.800 ft		
Flow Area		4.81	ft²
Wetted Perimeter		31.070	ft
Hydraulic Radius		0.15	ft
Top Width		30.225	ft
Normal Depth		0.44	ft
Critical Depth		0.48	ft
Critical Slope		0.00656	ft/ft
Velocity		3.12	ft/s
Velocity Head		0.15	ft
Specific Energy		0.59	ft
Froude Number		1.38	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft

Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (10yr)

GVF Output Data

Critical Depth	0.48	ft
Channel Slope	0.01300	ft/ft
Critical Slope	0.00656	ft/ft

Cross Section for X6/D - Lewis Ave 80 ROW @ CP7 (10yr)

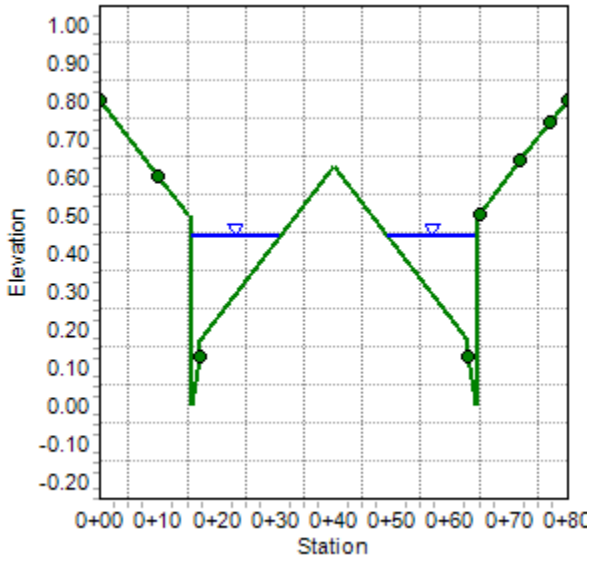
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Normal Depth	0.44	ft
Discharge	15.00	ft³/s

Cross Section Image



Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Discharge	29.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.80
0+10.00	0.60
0+15.00	0.50
0+15.50	0.50
0+15.58	0.00
0+17.00	0.13
0+17.00	0.17
0+40.00	0.63
0+63.00	0.17
0+63.00	0.13
0+64.42	0.00
0+64.50	0.50
0+65.00	0.50
0+72.00	0.64
0+77.00	0.74
0+80.00	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.80)	(0+10.00, 0.60)	0.025
(0+10.00, 0.60)	(0+17.00, 0.13)	0.013
(0+17.00, 0.13)	(0+63.00, 0.13)	0.016
(0+63.00, 0.13)	(0+65.00, 0.50)	0.013
(0+65.00, 0.50)	(0+72.00, 0.64)	0.025

Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+72.00, 0.64)	(0+77.00, 0.74)	0.013
(0+77.00, 0.74)	(0+80.00, 0.80)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.54	ft
Elevation Range	0.000 to 0.800 ft		
Flow Area		8.54	ft²
Wetted Perimeter		46.511	ft
Hydraulic Radius		0.18	ft
Top Width		45.560	ft
Normal Depth		0.54	ft
Critical Depth		0.60	ft
Critical Slope		0.00660	ft/ft
Velocity		3.40	ft/s
Velocity Head		0.18	ft
Specific Energy		0.72	ft
Froude Number		1.38	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.54	ft

Worksheet for X6/D - Lewis Ave 80 ROW @ CP7 (100yr)

GVF Output Data

Critical Depth	0.60	ft
Channel Slope	0.01300	ft/ft
Critical Slope	0.00660	ft/ft

Cross Section for X6/D - Lewis Ave 80 ROW @ CP7 (100yr)

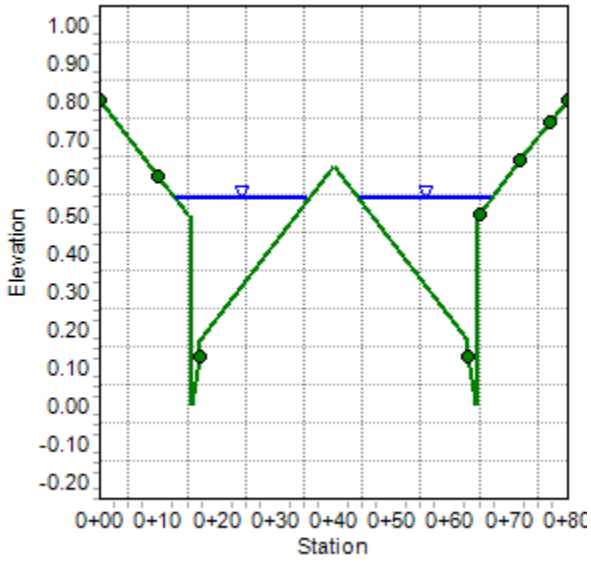
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01300	ft/ft
Normal Depth	0.54	ft
Discharge	29.00	ft³/s

Cross Section Image



Worksheet for X7/D -10th Street 80 ROW @ CP8 (10yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	3.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.80
0+03.00	0.74
0+08.00	0.64
0+15.00	0.50
0+15.50	0.50
0+15.83	0.00
0+17.00	0.13
0+17.00	0.17
0+40.00	0.63
0+63.00	0.17
0+63.00	0.13
0+64.42	0.00
0+64.50	0.50
0+65.00	0.50
0+70.00	0.60
0+80.00	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.80)	(0+03.00, 0.74)	0.025
(0+03.00, 0.74)	(0+08.00, 0.64)	0.013
(0+08.00, 0.64)	(0+15.00, 0.50)	0.025
(0+15.00, 0.50)	(0+17.00, 0.13)	0.013
(0+17.00, 0.13)	(0+63.00, 0.13)	0.016

Worksheet for X7/D -10th Street 80 ROW @ CP8 (10yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+63.00, 0.13)	(0+70.00, 0.60)	0.013
(0+70.00, 0.60)	(0+80.00, 0.80)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.33	ft
Elevation Range	0.000 to 0.800 ft		
Flow Area		2.01	ft²
Wetted Perimeter		19.436	ft
Hydraulic Radius		0.10	ft
Top Width		18.884	ft
Normal Depth		0.33	ft
Critical Depth		0.31	ft
Critical Slope		0.00792	ft/ft
Velocity		1.49	ft/s
Velocity Head		0.03	ft
Specific Energy		0.36	ft
Froude Number		0.80	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft

Worksheet for X7/D -10th Street 80 ROW @ CP8 (10yr)

GVF Output Data

Critical Depth	0.31	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00792	ft/ft

Cross Section for X7/D -10th Street 80 ROW @ CP8 (10yr)

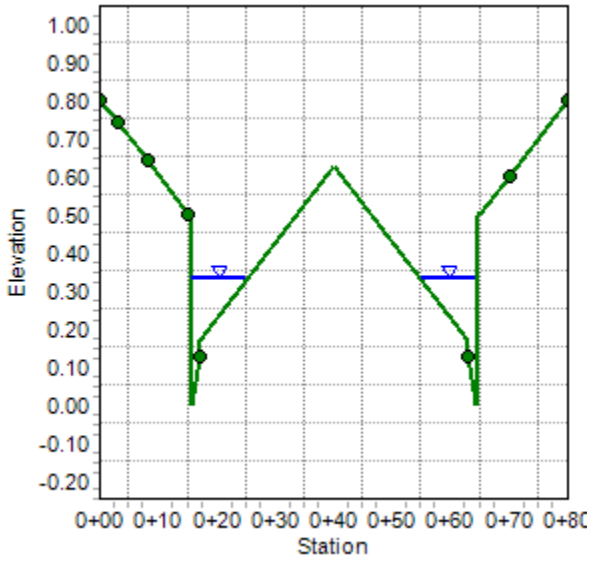
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.33	ft
Discharge	3.00	ft³/s

Cross Section Image



Worksheet for X7/D -10th Street 80 ROW @ CP8 (100yr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.80
0+03.00	0.74
0+08.00	0.64
0+15.00	0.50
0+15.50	0.50
0+15.83	0.00
0+17.00	0.13
0+17.00	0.17
0+40.00	0.63
0+63.00	0.17
0+63.00	0.13
0+64.42	0.00
0+64.50	0.50
0+65.00	0.50
0+70.00	0.60
0+80.00	0.80

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.80)	(0+03.00, 0.74)	0.025
(0+03.00, 0.74)	(0+08.00, 0.64)	0.013
(0+08.00, 0.64)	(0+15.00, 0.50)	0.025
(0+15.00, 0.50)	(0+17.00, 0.13)	0.013
(0+17.00, 0.13)	(0+63.00, 0.13)	0.016

Worksheet for X7/D -10th Street 80 ROW @ CP8 (100yr)

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+63.00, 0.13)	(0+70.00, 0.60)	0.013
(0+70.00, 0.60)	(0+80.00, 0.80)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.39	ft
Elevation Range	0.000 to 0.800 ft		
Flow Area		3.45	ft²
Wetted Perimeter		26.048	ft
Hydraulic Radius		0.13	ft
Top Width		25.405	ft
Normal Depth		0.39	ft
Critical Depth		0.37	ft
Critical Slope		0.00734	ft/ft
Velocity		1.74	ft/s
Velocity Head		0.05	ft
Specific Energy		0.44	ft
Froude Number		0.83	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft

Worksheet for X7/D -10th Street 80 ROW @ CP8 (100yr)

GVF Output Data

Critical Depth	0.37	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00734	ft/ft

Cross Section for X7/D -10th Street 80 ROW @ CP8 (100yr)

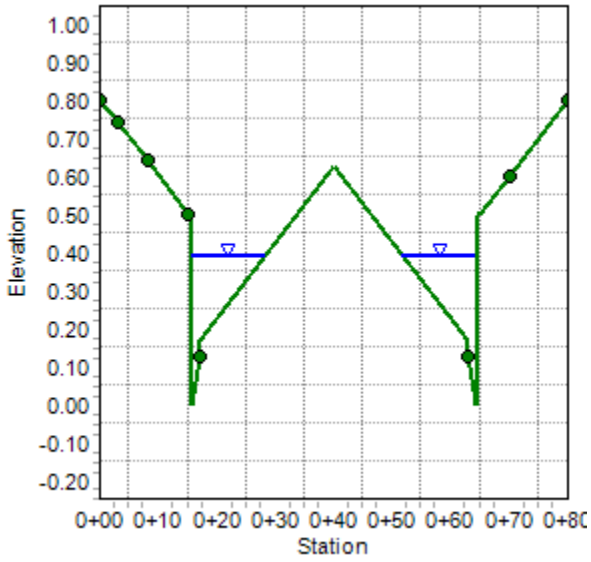
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.39	ft
Discharge	6.00	ft³/s

Cross Section Image



ONSITE INTERIM CONDITION

SWALE NORMAL DEPTH CALCULATIONS

KLEINFELDER
Bright People. Right Solutions.

Worksheet for X8 - Interim Onsite Swale @ S=0.5%, Q=1.4 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	50.00	ft/ft (H:V)
Discharge	1.40	ft³/s

Results

Normal Depth	0.23	ft
Flow Area	1.41	ft²
Wetted Perimeter	12.38	ft
Hydraulic Radius	0.11	ft
Top Width	12.35	ft
Critical Depth	0.18	ft
Critical Slope	0.02057	ft/ft
Velocity	0.99	ft/s
Velocity Head	0.02	ft
Specific Energy	0.24	ft
Froude Number	0.52	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.18	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.02057	ft/ft

Cross Section for X8 - Interim Onsite Swale @ S=0.5%, Q=1.4 cfs

Project Description

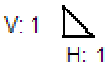
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.00500	ft/ft
Normal Depth	0.23	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	50.00	ft/ft (H:V)
Discharge	1.40	ft³/s

Cross Section Image





Worksheet for X9 - Interim Onsite Swale @ S=0.43% min, Q=2.3 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00430	ft/ft
Discharge	2.30	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.29
0+08.00	0.13
0+09.50	0.00
0+09.50	0.50
0+10.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.29)	(0+10.00, 0.50)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.31	ft
Elevation Range	0.000 to 0.500 ft	
Flow Area	1.23	ft²
Wetted Perimeter	9.845	ft
Hydraulic Radius	0.12	ft
Top Width	9.500	ft
Normal Depth	0.31	ft
Critical Depth	0.30	ft
Critical Slope	0.00520	ft/ft
Velocity	1.87	ft/s
Velocity Head	0.05	ft

Worksheet for X9 - Interim Onsite Swale @ S=0.43% min, Q=2.3 cfs

Results

Specific Energy		0.37	ft
Froude Number		0.92	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.30	ft
Channel Slope	0.00430	ft/ft
Critical Slope	0.00520	ft/ft

Cross Section for X9 - Interim Onsite Swale @ S=0.43% min, Q=2.3

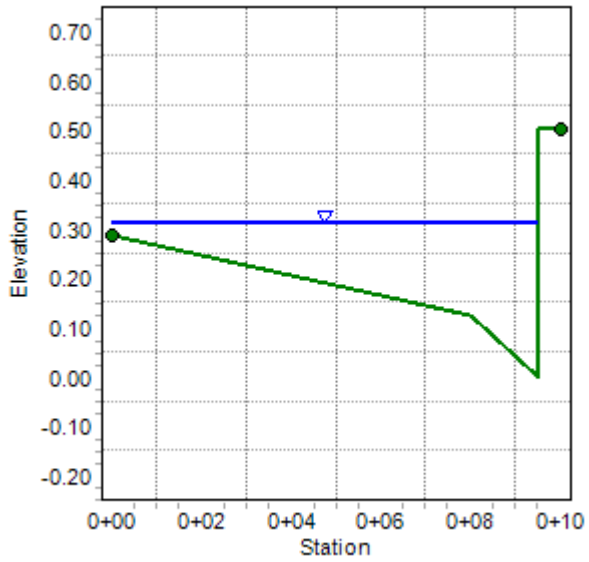
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00430	ft/ft
Normal Depth	0.31	ft
Discharge	2.30	ft³/s

Cross Section Image



Worksheet for X10 - Interim Onsite Swale @ S=2%, Q=7.1 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02000	ft/ft
Discharge	7.10	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.74
0+00.50	0.74
0+00.50	0.24
0+12.50	0.00
0+24.50	0.24

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.74)	(0+24.50, 0.24)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.20	ft
Elevation Range	0.000 to 0.740 ft	
Flow Area	2.03	ft²
Wetted Perimeter	20.135	ft
Hydraulic Radius	0.10	ft
Top Width	20.131	ft
Normal Depth	0.20	ft
Critical Depth	0.26	ft
Critical Slope	0.00476	ft/ft
Velocity	3.50	ft/s
Velocity Head	0.19	ft

Worksheet for X10 - Interim Onsite Swale @ S=2%, Q=7.1 cfs

Results

Specific Energy		0.39	ft
Froude Number		1.95	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.26	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00476	ft/ft

Cross Section for X10 - Interim Onsite Swale @ S=2%, Q=7.1 cfs

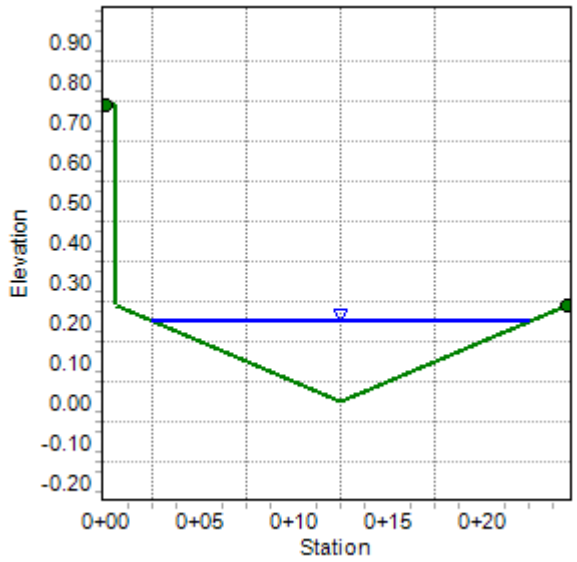
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02000	ft/ft
Normal Depth	0.20	ft
Discharge	7.10	ft³/s

Cross Section Image



Worksheet for X11 - Interim Onsite Swale @ S=1.50%, Q=7.1 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01500	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Discharge	7.10	ft³/s

Results

Normal Depth	0.65	ft
Flow Area	2.10	ft²
Wetted Perimeter	6.61	ft
Hydraulic Radius	0.32	ft
Top Width	6.47	ft
Critical Depth	0.66	ft
Critical Slope	0.01354	ft/ft
Velocity	3.39	ft/s
Velocity Head	0.18	ft
Specific Energy	0.83	ft
Froude Number	1.05	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.65	ft
Critical Depth	0.66	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.01354	ft/ft

Cross Section for X11 - Interim Onsite Swale @ S=1.50%, Q=7.1 cfs

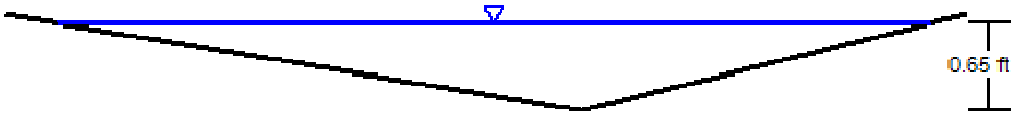
Project Description

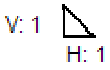
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01500	ft/ft
Normal Depth	0.65	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Discharge	7.10	ft³/s

Cross Section Image





Worksheet for X12 - Interim Onsite Swale @ S=1.8%, Q=1.4 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01800	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	1.40	ft^3/s

Results

Normal Depth	0.35	ft
Flow Area	0.57	ft^2
Wetted Perimeter	3.28	ft
Hydraulic Radius	0.17	ft
Top Width	3.19	ft
Critical Depth	0.36	ft
Critical Slope	0.01672	ft/ft
Velocity	2.47	ft/s
Velocity Head	0.09	ft
Specific Energy	0.45	ft
Froude Number	1.03	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.36	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.01672	ft/ft

Cross Section for X12 - Interim Onsite Swale @ S=1.8%, Q=1.4 cfs

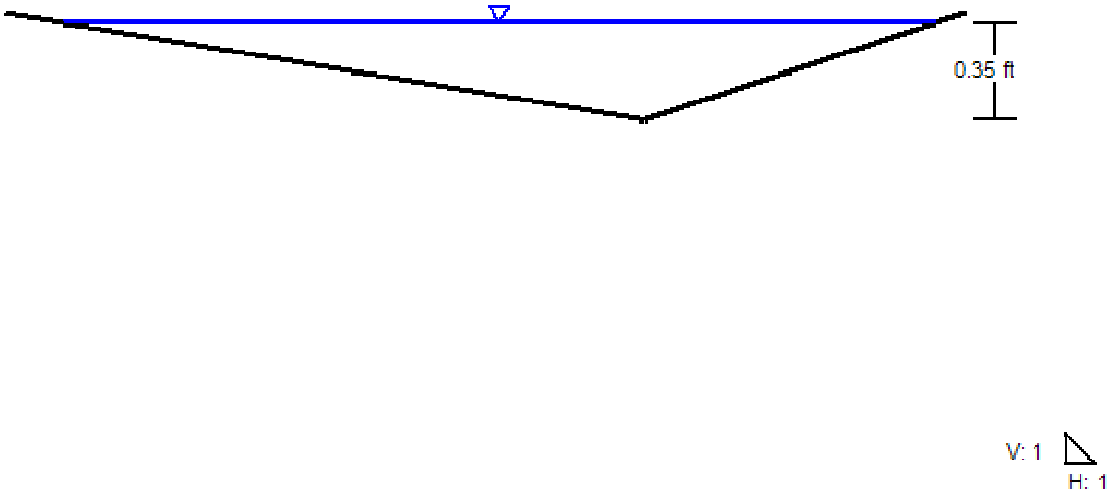
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	0.01800	ft/ft
Normal Depth	0.35	ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	1.40	ft³/s

Cross Section Image



Worksheet for X13 - Interim Onsite Swale @ S=0.4%, Q=2.7 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00580	ft/ft
Discharge	2.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.58	0.00
0+02.00	0.13
0+02.00	0.17
0+53.00	0.87

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+53.00, 0.87)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.35	ft
Elevation Range	0.000 to 0.867 ft	
Flow Area	1.65	ft²
Wetted Perimeter	15.215	ft
Hydraulic Radius	0.11	ft
Top Width	14.868	ft

Worksheet for X13 - Interim Onsite Swale @ S=0.4%, Q=2.7 cfs

Results

Normal Depth		0.35	ft
Critical Depth		0.34	ft
Critical Slope		0.00783	ft/ft
Velocity		1.64	ft/s
Velocity Head		0.04	ft
Specific Energy		0.39	ft
Froude Number		0.87	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.34	ft
Channel Slope	0.00580	ft/ft
Critical Slope	0.00783	ft/ft

Cross Section for X13 - Interim Onsite Swale @ S=0.4%, Q=2.7 cfs

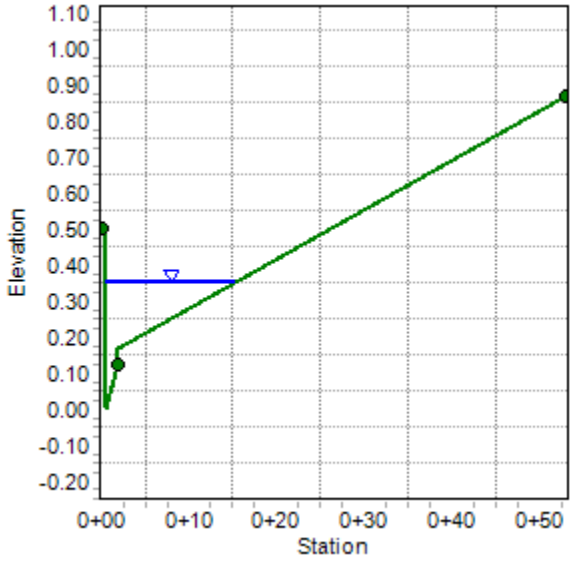
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00580	ft/ft
Normal Depth	0.35	ft
Discharge	2.70	ft³/s

Cross Section Image



Worksheet for X17A - Interim Onsite Swale @ S=0.5%, Q=2.8 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	2.80	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+28.00	0.39

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+28.00, 0.39)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.29	ft
Elevation Range	0.000 to 0.500 ft	
Flow Area	1.69	ft²
Wetted Perimeter	18.224	ft
Hydraulic Radius	0.09	ft
Top Width	17.929	ft
Normal Depth	0.29	ft
Critical Depth	0.29	ft
Critical Slope	0.00557	ft/ft
Velocity	1.66	ft/s
Velocity Head	0.04	ft

Worksheet for X17A - Interim Onsite Swale @ S=0.5%, Q=2.8 cfs

Results

Specific Energy		0.33	ft
Froude Number		0.95	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.29	ft
Critical Depth	0.29	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00557	ft/ft

Cross Section for X17A - Interim Onsite Swale @ S=0.5%, Q=2.8 cfs

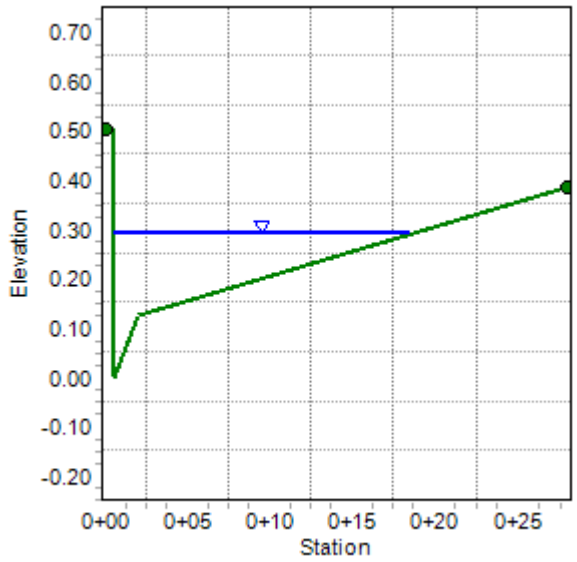
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.29	ft
Discharge	2.80	ft³/s

Cross Section Image



Worksheet for X17B - Interim Onsite Swale @ S=0.5%, Q=4 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	4.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+28.00	0.39

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+28.00, 0.39)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.32	ft
Elevation Range	0.000 to 0.500 ft	
Flow Area	2.22	ft²
Wetted Perimeter	20.991	ft
Hydraulic Radius	0.11	ft
Top Width	20.668	ft
Normal Depth	0.32	ft
Critical Depth	0.31	ft
Critical Slope	0.00531	ft/ft
Velocity	1.80	ft/s
Velocity Head	0.05	ft

Worksheet for X17B - Interim Onsite Swale @ S=0.5%, Q=4 cfs

Results

Specific Energy		0.37	ft
Froude Number		0.97	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.31	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00531	ft/ft

Cross Section for X17B - Interim Onsite Swale @ S=0.5%, Q=4 cfs

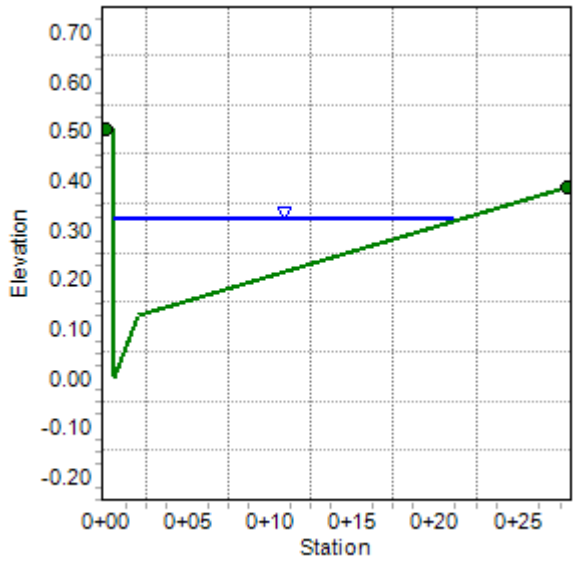
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.32	ft
Discharge	4.00	ft³/s

Cross Section Image



Worksheet for X17C - Interim Onsite Swale @ S=1.0%, Q=5.5 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Discharge	5.50	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+28.00	0.52

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+28.00, 0.52)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.34	ft
Elevation Range	0.000 to 0.515 ft	
Flow Area	1.96	ft²
Wetted Perimeter	16.211	ft
Hydraulic Radius	0.12	ft
Top Width	15.864	ft
Normal Depth	0.34	ft
Critical Depth	0.38	ft
Critical Slope	0.00486	ft/ft
Velocity	2.80	ft/s
Velocity Head	0.12	ft

Worksheet for X17C - Interim Onsite Swale @ S=1.0%, Q=5.5 cfs

Results

Specific Energy		0.46	ft
Froude Number		1.40	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.38	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00486	ft/ft

Cross Section for X17C - Interim Onsite Swale @ S=1.0%, Q=5.5 cfs

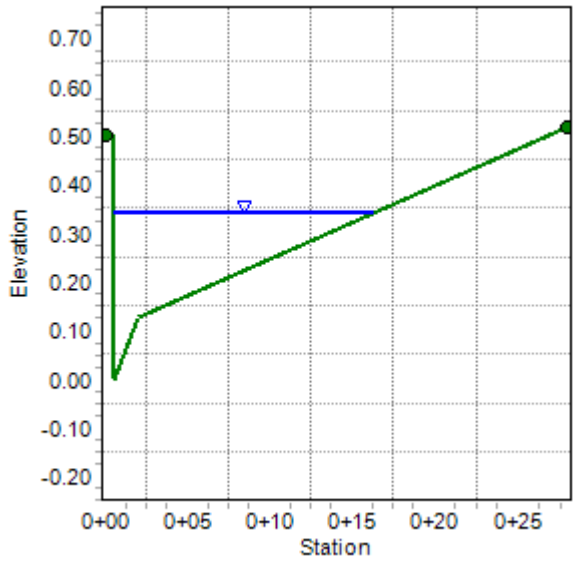
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Normal Depth	0.34	ft
Discharge	5.50	ft³/s

Cross Section Image



ONSITE DEVELOPED CONDITION

SWALE NORMAL DEPTH CALCULATIONS

KLEINFELDER
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Worksheet for X14 - Developed Onsite Swale @ S=1.0%, Q=23 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Discharge	23.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.46
0+20.50	0.17
0+20.50	0.13
0+21.92	0.00
0+22.00	0.50
0+22.00	0.50
0+22.50	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.46)	(0+20.50, 0.13)	0.016
(0+20.50, 0.13)	(0+22.50, 0.50)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.83	ft
Elevation Range	0.000 to 1.457 ft	
Flow Area	4.74	ft²
Wetted Perimeter	13.293	ft
Hydraulic Radius	0.36	ft

Worksheet for X14 - Developed Onsite Swale @ S=1.0%, Q=23 cfs

Results

Top Width		12.474	ft
Normal Depth		0.83	ft
Critical Depth		0.93	ft
Critical Slope		0.00498	ft/ft
Velocity		4.85	ft/s
Velocity Head		0.37	ft
Specific Energy		1.19	ft
Froude Number		1.39	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.83	ft
Critical Depth	0.93	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00498	ft/ft

Cross Section for X14 - Developed Onsite Swale @ S=1.0%, Q=23 cfs

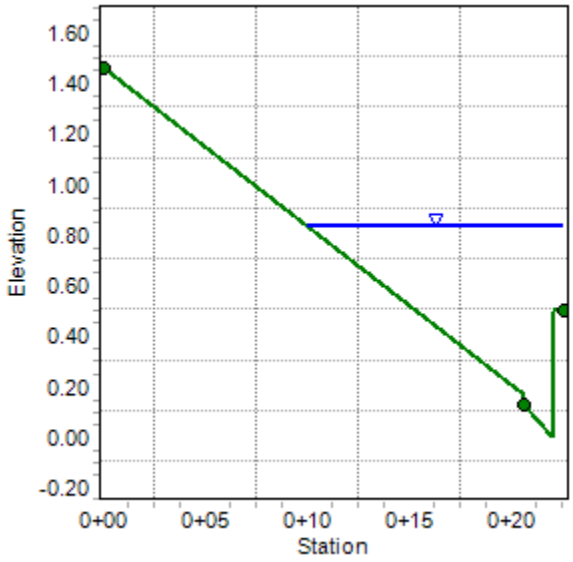
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01000	ft/ft
Normal Depth	0.83	ft
Discharge	23.00	ft³/s

Cross Section Image



Worksheet for X18 - Developed Onsite Swale @ S=0.5%, Q=5.9 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	5.90	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.18
0+08.00	0.10
0+09.50	0.00
0+11.00	0.10
0+19.00	0.18

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.18)	(0+11.00, 0.10)	0.013
(0+11.00, 0.10)	(0+19.00, 0.18)	0.025

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.30	ft
Elevation Range	0.000 to 0.180 ft	
Flow Area	3.39	ft²
Wetted Perimeter	19.256	ft
Hydraulic Radius	0.18	ft
Top Width	19.000	ft
Normal Depth	0.30	ft

Worksheet for X18 - Developed Onsite Swale @ S=0.5%, Q=5.9 cfs

Results

Critical Depth		0.27	ft
Critical Slope		0.01018	ft/ft
Velocity		1.74	ft/s
Velocity Head		0.05	ft
Specific Energy		0.35	ft
Froude Number		0.73	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth		0.00	ft
Length		0.000	ft
Number Of Steps		0	

GVF Output Data

Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.30	ft
Critical Depth		0.27	ft
Channel Slope		0.00500	ft/ft
Critical Slope		0.01018	ft/ft

Cross Section for X18 - Developed Onsite Swale @ S=0.5%, Q=5.9 cfs

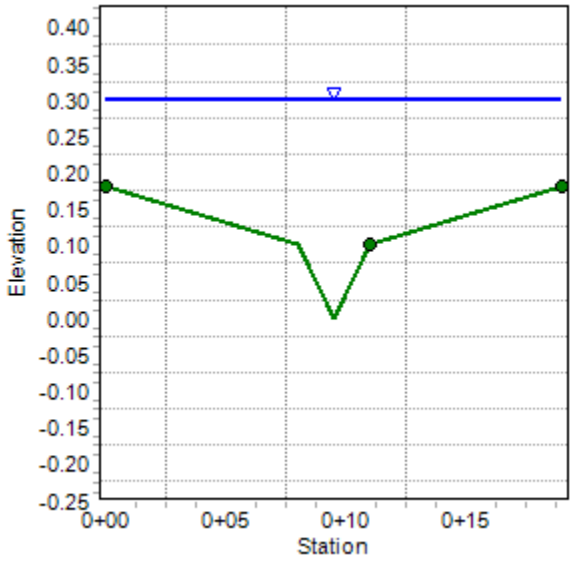
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.30	ft
Discharge	5.90	ft³/s

Cross Section Image



Worksheet for X19 - Developed Onsite Driveway @ S=0.5%, Q=3.3 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Discharge	3.30	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.70
0+10.00	0.50
0+10.50	0.50
0+10.58	0.00
0+12.00	0.13
0+12.00	0.17
0+36.00	0.65
0+60.00	0.17
0+60.00	0.13
0+61.42	0.00
0+61.50	0.50
0+62.00	0.50
0+76.00	0.78

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.70)	(0+12.00, 0.13)	0.013
(0+12.00, 0.13)	(0+60.00, 0.13)	0.016
(0+60.00, 0.13)	(0+76.00, 0.78)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X19 - Developed Onsite Driveway @ S=0.5%, Q=3.3 cfs

Results

Normal Depth		0.33	ft
Elevation Range	0.000 to 0.780 ft		
Flow Area		2.16	ft²
Wetted Perimeter		20.195	ft
Hydraulic Radius		0.11	ft
Top Width		19.530	ft
Normal Depth		0.33	ft
Critical Depth		0.31	ft
Critical Slope		0.00785	ft/ft
Velocity		1.53	ft/s
Velocity Head		0.04	ft
Specific Energy		0.37	ft
Froude Number		0.81	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.31	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00785	ft/ft

Cross Section for X19 - Developed Onsite Driveway @ S=0.5%, Q=3.3

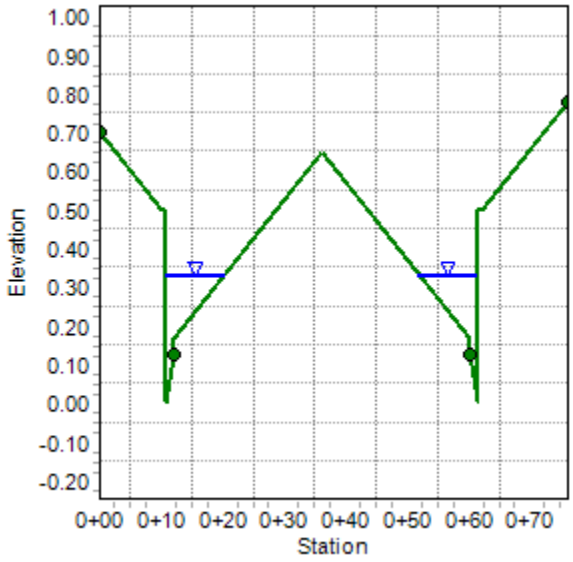
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00500	ft/ft
Normal Depth	0.33	ft
Discharge	3.30	ft³/s

Cross Section Image



Worksheet for X20 - Developed Onsite 9th Street (Private) @ S=0.4%,

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00400	ft/ft
Discharge	2.80	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.70
0+10.00	0.50
0+10.50	0.50
0+10.58	0.00
0+12.00	0.13
0+12.00	0.17
0+28.00	0.49
0+44.00	0.17
0+44.00	0.13
0+45.42	0.00
0+45.50	0.50
0+46.00	0.50
0+56.00	0.70

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.70)	(0+12.00, 0.13)	0.013
(0+12.00, 0.13)	(0+44.00, 0.13)	0.016
(0+44.00, 0.13)	(0+56.00, 0.70)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for X20 - Developed Onsite 9th Street (Private) @ S=0.4%,

Results

Normal Depth		0.33	ft
Elevation Range	0.000 to 0.700 ft		
Flow Area		2.07	ft²
Wetted Perimeter		19.719	ft
Hydraulic Radius		0.10	ft
Top Width		19.063	ft
Normal Depth		0.33	ft
Critical Depth		0.30	ft
Critical Slope		0.00800	ft/ft
Velocity		1.35	ft/s
Velocity Head		0.03	ft
Specific Energy		0.36	ft
Froude Number		0.72	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.30	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00800	ft/ft

Cross Section for X20 - Developed Onsite 9th Street (Private) @

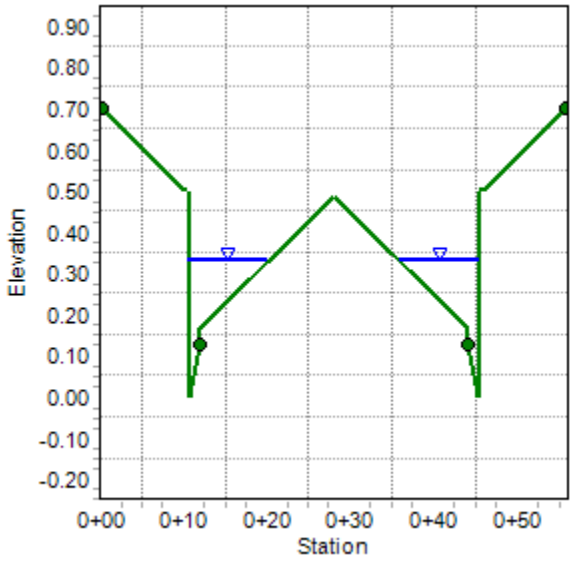
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00400	ft/ft
Normal Depth	0.33	ft
Discharge	2.80	ft³/s

Cross Section Image



Worksheet for X21 - Developed Onsite @ S=0.4%, Q=2.8 cfs

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00400	ft/ft
Discharge	3.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.24
0+13.50	0.10
0+15.00	0.00
0+16.50	0.10
0+30.00	0.24

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.24)	(0+30.00, 0.24)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.23	ft
Elevation Range	0.000 to 0.235 ft	
Flow Area	2.27	ft²
Wetted Perimeter	29.305	ft
Hydraulic Radius	0.08	ft
Top Width	29.297	ft
Normal Depth	0.23	ft
Critical Depth	0.22	ft

Worksheet for X21 - Developed Onsite @ S=0.4%, Q=2.8 cfs

Results

Critical Slope		0.00591	ft/ft
Velocity		1.32	ft/s
Velocity Head		0.03	ft
Specific Energy		0.26	ft
Froude Number		0.84	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.22	ft
Channel Slope	0.00400	ft/ft
Critical Slope	0.00591	ft/ft

Cross Section for X21 - Developed Onsite @ S=0.4%, Q=2.8 cfs

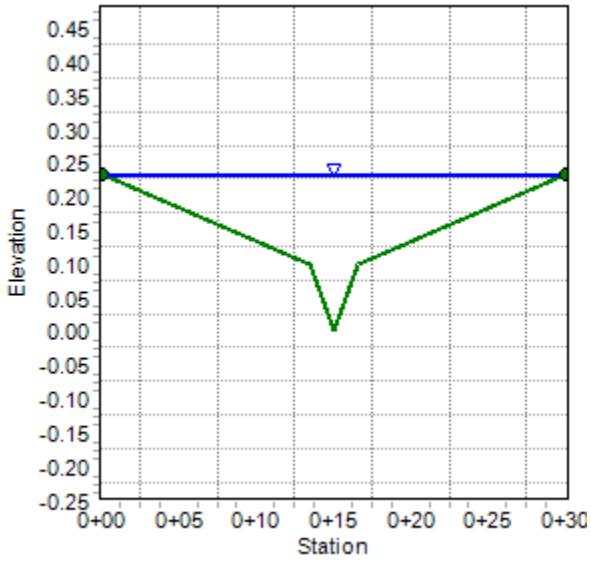
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00400	ft/ft
Normal Depth	0.23	ft
Discharge	3.00	ft³/s

Cross Section Image



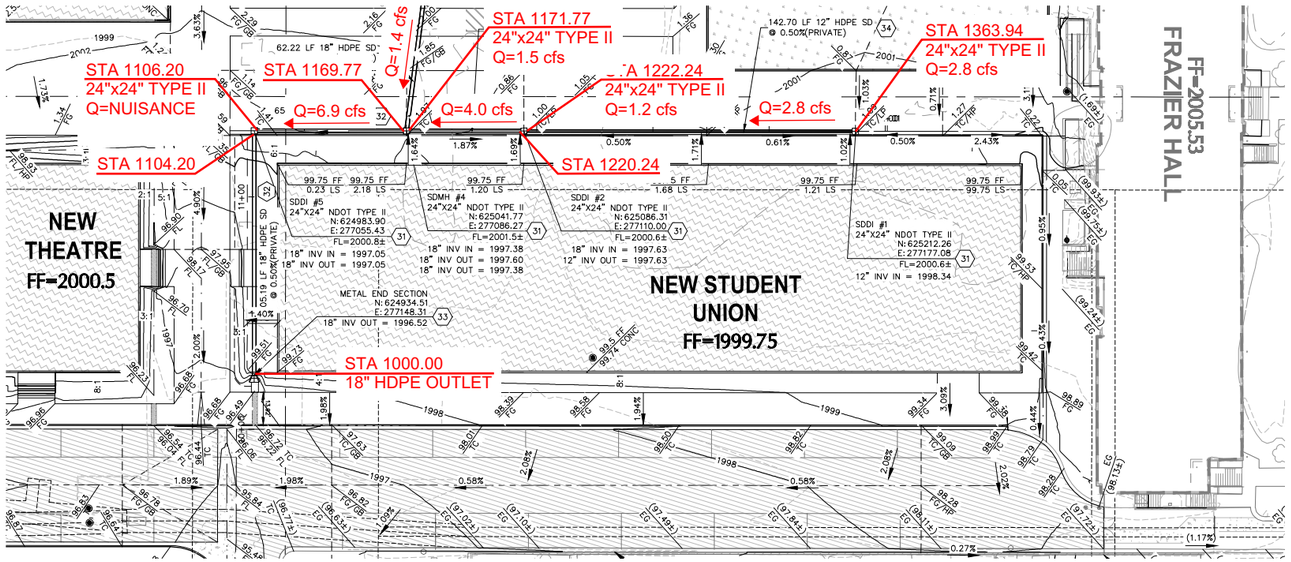
B.2 WSPG MODEL

KLEINFELDER
Bright People. Right Solutions.

WSPG EXHIBIT

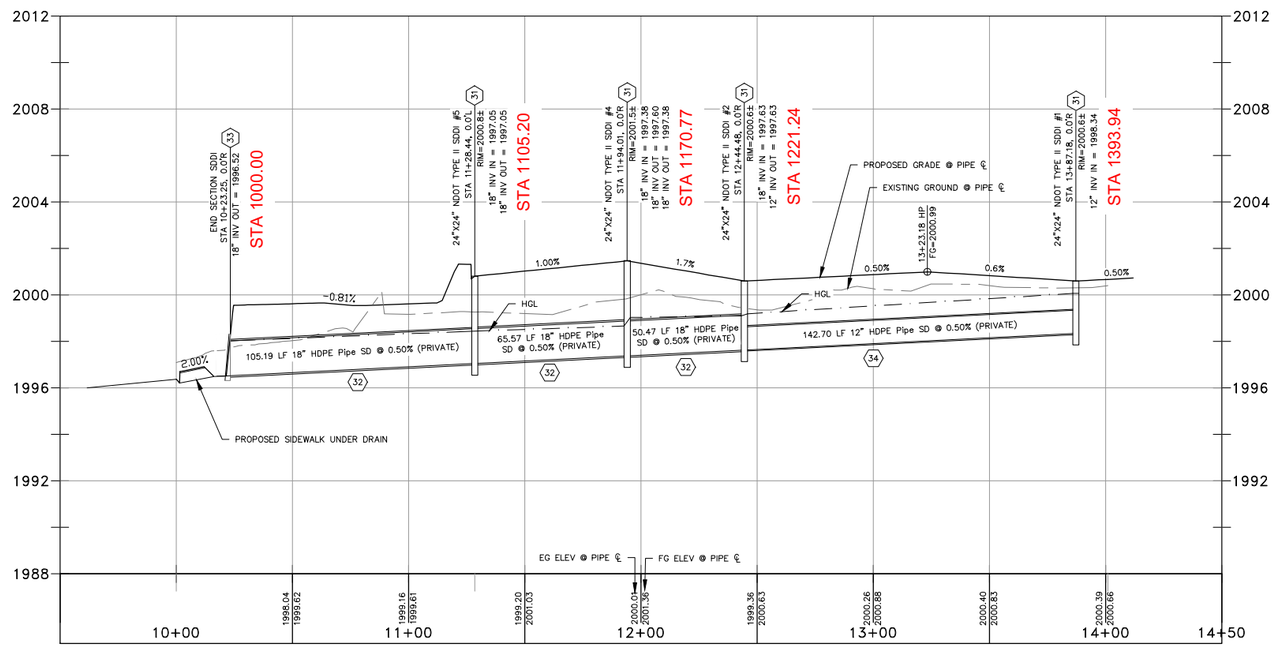
KLEINFELDER
Bright People. Right Solutions.

WSPG STATION EXHIBIT



PLAN AND PROFILE
ONSITE STORM DRAIN

SCALE: HORIZ. 1"=30', VERT. 1"=3'



(25) CONSTRUCT MODIFIED "L" TYPE CURB AND GUTTER(7") PER DETAIL 1, SHEET C6.03

STORM NOTES

(31) INSTALL 24" X 24" NDOT TYPE II DRAINAGE INLET PER NDOT DWG #R-4.2.1 AND DETAIL NO. 8 ON SHEET C6.02

(32) INSTALL 18" HDPE STORM DRAIN PIPE PER CCAUSD #503.2 AND 505

(33) INSTALL TYPE 2 METAL END SECTION PER NDOT DWG NO. R2.2.1.1

(34) NSTALL 12" HDPE STORM DRAIN PIPE PER CCAUSD #503.1 AND 505

NOTES:

1. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION
2. POST-CONSTRUCTION BMP'S (PCBMP'S) CONTROL MEASURES NOTED ON THE GRADING PLANS ARE MANDATORY PERMANENT REGULATORY STORM POLLUTION CONTROLS. THESE PCBMP'S MUST BE INSTALLED PER APPROVED PLANS AND MUST BE PERMANENTLY MAINTAINED.
3. ALL ONSITE STORM DRAINS AND THE ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE MAINTAINED BY THE SCHOOL DISTRICT.

BASIS OF BEARINGS:
GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FTUS)

DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)

ZONE:LAS VEGAS

PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORGIN):36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN:114°58'00"W
NORTHING AT GRID ORIGIN: 200,000.000 M (656,166.6667 FTUS)
EASTING AT CENTRAL MERIDIAN: 100,000.000 M (328,083.3333 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN; 1.0001 (EXACT)

NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.
(SCALE VALID AT FULL-SIZE, 24X36, ONLY)

BENCHMARK:
MONUMENT ID: 13LV0134NE6A
RIVET AND PLATE IN TOP OF CURB SE. CORNER OF FREMONT AND 7TH STREET
ELEVATION (METERS): 610.00, ELEVATION (FEET): 2,001.32

SOILS REPORT:
THE SITE SHALL BE GRADED IN ACCORDANCE WITH WITH THE PROJECT'S GEOTECHNICAL REPORT PREPARED BY XXXXXXXXX XX, DATED XX

FLOOD ZONE DESCRIPTION:
ACCORDING TO FLOOD INSURANCE RATE MAP, CLARK COUNTY, NEVADA AND INCORPORATED AREA, MAP NUMBER 32003C2569F & 32003C2590F, DATED NOV. 16, 2011. THE SUBJECT SITE IS LOCATED WITHIN ZONE "X", AN AREA IDENTIFIED TO BE OUTSIDE THE SPECIAL FLOOD HAZARD AREA.

REVISIONS

REV:	DESCRIPTION:	DATE:	BY:

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS

TIMOTHY E. PINTER, PE # DATE

DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Call before you Dig 811 1-800-227-2600 | 1-702-227-2929 | FAST Call before you Underground. 1-702-452-5000

PLANNING & DESIGN DATE
DESIGN MANAGER
DM MANAGER
CONSTRUCTION MANAGEMENT
PROJECT MANAGER
CM MANAGER
ADMINISTRATION
SITE ADMINISTRATOR
CODE COMPLIANCE
AHERA REVIEW
FSR/FSSR

ASBESTOS WORK IS:
REQUIRED ☐ NOT REQUIRED ☐

JOB ID/MPID

SEAL

CCSD PROJECT NO. XXX
CCSD REVIEW
APPROVED BY
DATE

DRAWN BY RPL 01/10/2023
CHECKED BY AB
SUBMITTAL 01/10/2023
A/E PROJECT NO. LV-20232208

CONSULTANT
KLEINFELDER
Bright People. Right Solutions.
6960 Smoke Ranch, Suite 110
Las Vegas, Nevada 89128
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F| 702.856.8370
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www.simpsoncoulter.com

CLARK COUNTY SCHOOL DISTRICT
PLANNING AND DESIGN DEPARTMENT 4170 McLEOD DRIVE LAS VEGAS, NV. 89121 PHONE: 702.799.6450

PROJECT: LAS VEGAS ACADEMY
DRAWING TITLE: PLAN AND PROFILE
FACILITY: 315 SOUTH 7TH STREET

SHEET NO. 07 of 10

C4.01

CLV NO.

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ONSITE.WSW OUTPUT

```
T1 LAS VEGAS ACADEMY                                                    0
T2 INTERIM CODNITION 100-YEAR ANALYSIS
T3 ONSITE DRAINAGE FACILITY
SO   1000.0001996.524  2                        1998.024
R    1099.2001997.020  2      .013                                .000  15.000 0
R    1100.2001997.025  2      .013                                .000  15.000 0
R    1101.2001997.030  2      .013                                .000  15.000 0
R    1102.2001997.035  2      .013                                .000  15.000 0
R    1103.2001997.040  2      .013                                .000  15.000 0
R    1104.2001997.045  2      .013                                .000  15.000 0
JX   1106.2001997.055  2      .013
R    1169.7701997.373  2      .013                                .000   0.000 0
JX   1171.7701997.383  2  2  2.013    1.4      1.5  1997.38 1997.38 -80.0 90.0
R    1220.2391997.625  2      .013                                .000   0.000 0
JX   1222.2391997.635  2  2   .013    1.2           1997.64          90.0
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SH   1363.9391998.344  1                        1998.344
CD   1  4   1    .000   1.000     .000  .000  .000   .00
CD   2  4   1    .000   1.500     .000  .000  .000   .00
Q             2.800   .0
```

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		1.000														
CD	2	4	1		1.500														

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
LAS VEGAS ACADEMY
HEADING LINE NO 2 IS -
INTERIM CODNITION 100-YEAR ANALYSIS
HEADING LINE NO 3 IS -
ONSITE DRAINAGE FACILITY

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.000	1996.524	2	1998.024

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1099.200	1997.020	2	.013	.000	.000	15.000	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1100.200	1997.025	2	.013	.000	.000	15.000	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1101.200	1997.030	2	.013	.000	.000	15.000	0

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1102.200	1997.035	2	.013	.000	.000	15.000	0

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1103.200	1997.040	2	.013	.000	.000	15.000	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1104.200	1997.045	2	.013	.000	.000	15.000	0

ELEMENT NO 8 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1106.200	1997.055	2	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 9 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1169.770	1997.373	2	.013	.000	.000	.000	0

ELEMENT NO 10 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1171.770	1997.383	2	2	2	.013	1.400	1.500	1997.380	1997.380	-80.000	90.000

RADIUS	ANGLE
.000	.000

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
 ELEMENT NO  11 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                               1220.239 1997.625    2              .013                           .000     .000      .000     0
 ELEMENT NO  12 IS A JUNCTION         *         *     *     *                *                     *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                               1222.239 1997.635    2     2     0   .013     1.200      .000  1997.640      .000  90.000     .000
                                                                                                RADIUS    ANGLE
                                                                                                  .000    .000
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
 ELEMENT NO  13 IS A REACH            *         *     *
                    U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                               1363.939 1998.344    1              .013                           .000     .000      .000     0
 ELEMENT NO  14 IS A SYSTEM HEADWORKS                *                    *
                    U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                               1363.939 1998.344    1                                  1998.344
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Program Package Serial Number: 7383

WATER SURFACE PROFILE LISTING Date: 2-16-2023 Time: 2:26:11

LAS VEGAS ACADEMY
INTERIM CODNITION 100-YEAR ANALYSIS
ONSITE DRAINAGE FACILITY

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	1996.524	1.500	1998.024	6.90	3.90	.24	1998.26	.00	1.02	.00	1.500	.000	.00	1 .0
17.109	.0050					.0043	.07	1.50	.00	1.14	.013	.00	.00	PIPE
1017.109	1996.610	1.500	1998.110	6.90	3.90	.24	1998.35	.00	1.02	.00	1.500	.000	.00	1 .0
82.091	.0050					.0040	.33	1.50	.00	1.14	.013	.00	.00	PIPE
1099.200	1997.020	1.401	1998.421	6.90	4.02	.25	1998.67	.00	1.02	.74	1.500	.000	.00	1 .0
1.000	.0050					.0037	.00	1.40	.47	1.14	.013	.00	.00	PIPE
1100.200	1997.025	1.400	1998.425	6.90	4.02	.25	1998.68	.00	1.02	.75	1.500	.000	.00	1 .0
1.000	.0050					.0037	.00	1.40	.47	1.14	.013	.00	.00	PIPE
1101.200	1997.030	1.398	1998.428	6.90	4.02	.25	1998.68	.00	1.02	.75	1.500	.000	.00	1 .0
1.000	.0050					.0037	.00	1.40	.47	1.14	.013	.00	.00	PIPE
1102.200	1997.035	1.397	1998.432	6.90	4.03	.25	1998.68	.00	1.02	.76	1.500	.000	.00	1 .0
1.000	.0050					.0037	.00	1.40	.47	1.14	.013	.00	.00	PIPE
1103.200	1997.040	1.395	1998.435	6.90	4.03	.25	1998.69	.00	1.02	.77	1.500	.000	.00	1 .0
1.000	.0050					.0037	.00	1.40	.47	1.14	.013	.00	.00	PIPE
1104.200	1997.045	1.394	1998.439	6.90	4.03	.25	1998.69	.00	1.02	.77	1.500	.000	.00	1 .0
JUNCT STR	.0050					.0037	.01	1.39	.48		.013	.00	.00	PIPE
1106.200	1997.055	1.390	1998.445	6.90	4.04	.25	1998.70	.00	1.02	.78	1.500	.000	.00	1 .0
53.744	.0050					.0038	.21	1.39	.48	1.14	.013	.00	.00	PIPE

Program Package Serial Number: 7383

WATER SURFACE PROFILE LISTING Date: 2-16-2023 Time: 2:26:11

LAS VEGAS ACADEMY
INTERIM CODNITION 100-YEAR ANALYSIS

ONSITE DRAINAGE FACILITY

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1159.944	1997.324	1.302	1998.626	6.90	4.24	.28	1998.90	.00	1.02	1.02	1.500	.000	.00	1 .0
9.826	.0050					.0040	.04	1.30	.59	1.14	.013	.00	.00	PIPE
1169.770	1997.373	1.287	1998.660	6.90	4.28	.28	1998.94	.00	1.02	1.05	1.500	.000	.00	1 .0
JUNCT STR	.0050					.0027	.01	1.29	.61		.013	.00	.00	PIPE
1171.770	1997.383	1.654	1999.037	4.00	2.26	.08	1999.12	.00	.77	.00	1.500	.000	.00	1 .0
43.589	.0050					.0014	.06	1.65	.00	.78	.013	.00	.00	PIPE
1215.359	1997.601	1.500	1999.101	4.00	2.26	.08	1999.18	.00	.77	.00	1.500	.000	.00	1 .0
4.880	.0050					.0014	.01	1.50	.00	.78	.013	.00	.00	PIPE
1220.239	1997.625	1.481	1999.106	4.00	2.27	.08	1999.19	.00	.77	.33	1.500	.000	.00	1 .0
JUNCT STR	.0050					.0010	.00	1.48	.17		.013	.00	.00	PIPE
1222.239	1997.635	1.555	1999.190	2.80	3.57	.20	1999.39	.00	.72	.00	1.000	.000	.00	1 .0
141.700	.0050					.0062	.88	1.55	.00	1.00	.013	.00	.00	PIPE
1363.939	1998.344	1.721	2000.065	2.80	3.57	.20	2000.26	.00	.72	.00	1.000	.000	.00	1 .0

APPENDIX C

REFERENCE MATERIAL

C.1 CCRFCD 2018 LAS VEGAS MPU

- CURVE NUMBER SUPPORTING CALCULATIONS FOR REFERENCED BASIN CH60A
- CURVE NUMBER MATRIX

KLEINFELDER
Bright People. Right Solutions.

Central Watershed

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE - COMPOSITE CURVE NUMBER BREAKDOWN											
WATERSHED	BASINID	LAND USE INDEX NUMBER	SOIL MAP UNIT #	SUBREGION CN	SUBREGION AREA (SQ FT)	SUBBASIN AREA (SQ FT)	PERCENT OF SUBBASIN	CUMULATIVE PERCENT	AREAL WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Central	CH09-C	9	1300	96	968646	10540366	9.2%	100.0%	8.82	92.57	
Central	CH09-C	12	1300	90	3147	10540366	0.0%	100.0%	0.03	92.59	**92.6**
Central	CH10	6	1300	91	2320574	7777985	29.8%	29.8%	27.15	27.15	
Central	CH10	7	1300	94	2050795	7777985	26.4%	56.2%	24.78	51.93	
Central	CH10	8	1300	96	613816	7777985	7.9%	64.1%	7.58	59.51	
Central	CH10	9	1300	96	2792800	7777985	35.9%	100.0%	34.47	93.98	**94.0**
Central	CH14-C	4	1300	87	140348	4679479	3.0%	3.0%	2.61	2.61	
Central	CH14-C	6	1300	91	1620579	4679479	34.6%	37.6%	31.51	34.12	
Central	CH14-C	7	1300	94	1427173	4679479	30.5%	68.1%	28.67	62.79	
Central	CH14-C	9	1300	96	1107041	4679479	23.7%	91.8%	22.71	85.50	
Central	CH14-C	12	1300	90	384337	4679479	8.2%	100.0%	7.39	92.90	**92.9**
Central	CH14A	2	1300	83	487732	4124217	11.8%	11.8%	9.82	9.82	
Central	CH14A	6	1300	91	2575327	4124217	62.4%	74.3%	56.82	66.64	
Central	CH14A	7	1300	94	968517	4124217	23.5%	97.8%	22.07	88.71	
Central	CH14A	9	1300	96	92642	4124217	2.2%	100.0%	2.16	90.87	**90.9**
Central	CH14B	4	1300	87	1024565	6040577	17.0%	17.0%	14.76	14.76	
Central	CH14B	5	1300	88	666210	6040577	11.0%	28.0%	9.71	24.46	
Central	CH14B	6	1300	91	717048	6040577	11.9%	39.9%	10.80	35.26	
Central	CH14B	7	1300	94	1063021	6040577	17.6%	57.5%	16.54	51.81	
Central	CH14B	8	1300	96	1302791	6040577	21.6%	79.0%	20.70	72.51	
Central	CH14B	9	1300	96	1266942	6040577	21.0%	100.0%	20.13	92.65	**92.6**
Central	CH15-C	4	1300	87	472925	6596008	7.2%	7.2%	6.24	6.24	
Central	CH15-C	6	1300	91	3271875	6596008	49.6%	56.8%	45.14	51.38	
Central	CH15-C	7	1300	94	1501819	6596008	22.8%	79.5%	21.40	72.78	
Central	CH15-C	9	1300	96	1349388	6596008	20.5%	100.0%	19.64	92.42	**92.4**
Central	CH18-C	4	1300	87	1647980	8074146	20.4%	20.4%	17.76	17.76	
Central	CH18-C	4	1390	83	691786	8074146	8.6%	29.0%	7.11	24.87	
Central	CH18-C	5	1390	84	445019	8074146	5.5%	34.5%	4.63	29.50	
Central	CH18-C	6	1390	88	113056	8074146	1.4%	35.9%	1.23	30.73	
Central	CH18-C	7	1300	94	1162061	8074146	14.4%	50.3%	13.53	44.26	
Central	CH18-C	7	1390	92	558271	8074146	6.9%	57.2%	6.36	50.62	
Central	CH18-C	9	1300	96	1079744	8074146	13.4%	70.6%	12.84	63.46	
Central	CH18-C	9	1390	95	1956420	8074146	24.2%	94.8%	23.02	86.48	
Central	CH18-C	12	1300	90	2541	8074146	0.0%	94.8%	0.03	86.51	
Central	CH18-C	12	1390	87	417268	8074146	5.2%	100.0%	4.50	91.00	**91.0**
Central	CH22-C	6	1390	88	74692	6403524	1.2%	1.2%	1.03	1.03	
Central	CH22-C	7	1390	92	1757128	6403524	27.4%	28.6%	25.24	26.27	
Central	CH22-C	7	1615	92	158354	6403524	2.5%	31.1%	2.28	28.55	
Central	CH22-C	9	1390	95	4413351	6403524	68.9%	100.0%	65.47	94.02	**94.0**
Central	CH50	7	1615	92	2354957	5499292	42.8%	42.8%	39.40	39.40	
Central	CH50	9	1615	95	3144336	5499292	57.2%	100.0%	54.32	93.72	**93.7**
Central	CH51	6	1615	88	1960087	7450496	26.3%	26.3%	23.15	23.15	
Central	CH51	7	1390	92	2445	7450496	0.0%	26.3%	0.03	23.18	
Central	CH51	7	1615	92	1687182	7450496	22.6%	49.0%	20.83	44.01	
Central	CH51	9	1615	95	3800781	7450496	51.0%	100.0%	48.46	92.48	**92.5**
Central	CH52	7	1615	92	3768406	9836658	38.3%	38.3%	35.25	35.25	
Central	CH52	9	1615	95	6068253	9836658	61.7%	100.0%	58.61	93.85	**93.9**
Central	CH56	2	1390	77	136788	10527984	1.3%	1.3%	1.00	1.00	
Central	CH56	6	1390	88	5081343	10527984	48.3%	49.6%	42.47	43.47	
Central	CH56	6	1615	88	59347	10527984	0.6%	50.1%	0.50	43.97	
Central	CH56	7	1390	92	2522842	10527984	24.0%	74.1%	22.05	66.02	
Central	CH56	7	1615	92	385494	10527984	3.7%	77.8%	3.37	69.38	
Central	CH56	9	1390	95	1109396	10527984	10.5%	88.3%	10.01	79.40	
Central	CH56	9	1615	95	911310	10527984	8.7%	96.9%	8.22	87.62	
Central	CH56	12	1390	87	321464	10527984	3.1%	100.0%	2.66	90.28	**90.3**
Central	CH59	7	1615	92	3418606	8785611	38.9%	38.9%	35.80	35.80	
Central	CH59	9	1615	95	5367004	8785611	61.1%	100.0%	58.03	93.83	**93.8**
Central	CH60A	6	1390	88	114488	12267733	0.9%	0.9%	0.82	0.82	
Central	CH60A	7	1270	92	35688	12267733	0.3%	1.2%	0.27	1.09	
Central	CH60A	7	1390	92	3006020	12267733	24.5%	25.7%	22.54	23.63	
Central	CH60A	7	1615	92	4559201	12267733	37.2%	62.9%	34.19	57.82	
Central	CH60A	9	1270	95	102411	12267733	0.8%	63.7%	0.79	58.62	
Central	CH60A	9	1390	95	399246	12267733	3.3%	67.0%	3.09	61.71	
Central	CH60A	9	1615	95	3611622	12267733	29.4%	96.4%	27.97	89.68	
Central	CH60A	12	1615	87	439059	12267733	3.6%	100.0%	3.11	92.79	**92.8**
Central	CH63	6	1325	74	2290632	5664514	40.4%	40.4%	29.92	29.92	
Central	CH63	6	1390	88	1312630	5664514	23.2%	63.6%	20.39	50.32	
Central	CH63	6	1615	88	10908	5664514	0.2%	63.8%	0.17	50.49	
Central	CH63	7	1325	84	918212	5664514	16.2%	80.0%	13.62	64.10	
Central	CH63	7	1390	92	560681	5664514	9.9%	89.9%	9.11	73.21	
Central	CH63	7	1615	92	7296	5664514	0.1%	90.0%	0.12	73.33	
Central	CH63	9	1325	92	159970	5664514	2.8%	92.9%	2.60	75.93	
Central	CH63	9	1390	95	396939	5664514	7.0%	99.9%	6.66	82.58	
Central	CH63	9	1615	95	7247	5664514	0.1%	100.0%	0.12	82.70	**82.7**
Central	CH64	6	1325	74	460062	8158378	5.6%	5.6%	4.17	4.17	
Central	CH64	6	1390	88	3835387	8158378	47.0%	52.7%	41.37	45.54	
Central	CH64	6	1615	88	4853	8158378	0.1%	52.7%	0.05	45.60	
Central	CH64	7	1325	84	218367	8158378	2.7%	55.4%	2.25	47.84	
Central	CH64	7	1390	92	2540042	8158378	31.1%	86.5%	28.64	76.49	
Central	CH64	7	1615	92	271505	8158378	3.3%	89.8%	3.06	79.55	
Central	CH64	9	1390	95	243418	8158378	3.0%	92.8%	2.83	82.38	
Central	CH64	9	1615	95	584744	8158378	7.2%	100.0%	6.81	89.19	**89.2**
Central	CH67	6	1325	74	3207176	5969633	53.7%	53.7%	39.76	39.76	
Central	CH67	6	1615	88	129059	5969633	2.2%	55.9%	1.90	41.66	
Central	CH67	7	1325	84	1578548	5969633	26.4%	82.3%	22.21	63.87	
Central	CH67	7	1615	92	410343	5969633	6.9%	89.2%	6.32	70.19	

Curve Number Matrix

SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1100	6	0	0	59	35	87.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1105	55	40	0	5	0	70.0	56.0	65.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1107	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1112	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1113	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1117	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1120	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1127	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1129	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1130	65	0	25	10	0	71.0	58.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1132	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1133	70	0	10	0	20	71.0	58.0	67.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1134	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1135	84	0	0	16	0	67.0	52.0	62.0	64.0	66.0	76.0	85.0	90.0	92.0	87.0	92.0	74.0	30.0
1140	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1141	8	0	2	70	20	86.0	81.0	85.0	86.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1150	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1151	41	0	0	59	0	78.0	68.0	74.0	76.0	77.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1152	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1155	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1156	1	10	0	89	0	87.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1160	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1160dn	46	1	0	53	0	76.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1165	32	40	15	13	0	75.0	64.0	71.0	73.0	74.0	82.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1181	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1182	95	0	5	0	0	64.0	48.0	58.0	61.0	63.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1183	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1184	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1187	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1190	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1191	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1192	55	35	0	10	0	70.0	57.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	88.0	93.0	76.0	30.0
1200	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1206	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1207	3	85	5	7	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1222	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1225	9	20	50	21	0	82.0	73.0	79.0	80.0	81.0	86.0	91.0	94.0	95.0	92.0	95.0	85.0	30.0
1230	54	0	0	46	0	75.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1235	66	25	0	9	0	69.0	55.0	64.0	66.0	68.0	77.0	86.0	91.0	93.0	88.0	93.0	75.0	30.0
1236	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1237	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1240	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1252	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1255	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1260	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1262	75	0	0	25	0	69.0	56.0	64.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1263	95	0	0	5	0	64.0	48.0	59.0	61.0	64.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1264	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1270	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1278	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1282	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1300	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0

Curve Number Matrix

SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1301	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1302	35	20	0	45	0	77.0	67.0	73.0	75.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1305	5	0	35	60	0	86.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1307	10	0	30	60	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	96.0	93.0	96.0	87.0	30.0
1313	8	68	0	24	0	79.0	68.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1314	80	5	0	15	0	67.0	53.0	62.0	65.0	67.0	77.0	86.0	91.0	92.0	88.0	92.0	74.0	30.0
1320	0	2	0	83	15	88.0	83.0	87.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1323	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1325	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1326	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1340	9	0	0	71	20	86.0	81.0	85.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1341	0	100	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1342	0	7	0	78	15	88.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1360	15	0	0	35	50	85.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1380	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1390	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1400	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1415	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1417	5	0	55	10	30	86.0	80.0	84.0	85.0	86.0	89.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1419	35	0	55	10	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1440	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1450	1	0	0	89	10	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1484	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1500	60	0	0	35	5	73.0	61.0	69.0	71.0	73.0	81.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1501	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1502	60	0	0	40	0	73.0	61.0	69.0	71.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1505	55	0	0	40	5	74.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1506	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1508	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1510	10	0	0	55	35	86.0	82.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1540	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1541	4	0	0	76	20	87.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1542	60	0	30	10	0	72.0	59.0	67.0	69.0	71.0	80.0	87.0	92.0	93.0	89.0	93.0	78.0	30.0
1545	60	0	10	30	0	73.0	60.0	68.0	70.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	78.0	30.0
1600	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1605	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1610	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1615	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1630	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1635	7	0	5	63	25	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1640	0	0	0	10	90	90.0	90.0	91.0	91.0	92.0	94.0	96.0	96.0	97.0	96.0	97.0	94.0	30.0
1645	0	0	100	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1674	27	26	0	45	2	78.0	69.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	83.0	30.0
1700	0	0	3	93	4	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1710	2	89	0	9	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1731	10	2	0	88	0	85.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1732	3	0	0	96	1	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1753	0	8	0	90	2	87.0	81.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1850	0	0	0	94	6	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1853	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1871	17	0	0	83	0	84.0	76.0	81.0	82.0	83.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1999	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0

APPENDIX D

IMPROVEMENT PLANS

KLEINFELDER
Bright People. Right Solutions.