

ADDENDUM #1 TO THE TECHNICAL DRAINAGE STUDY

FOR
Red Rock Elementary School

KNC-22-004

DS-05647

City of Las Vegas

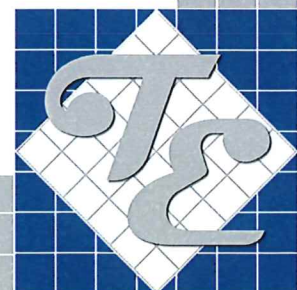
March 2023

Prepared for:

KNIT Designing Communities
Cameron Tate
7250 Peak Drive, Ste. #216
Las Vegas, NV 89128
Tel: 702-341-2275
Email: Camt@knitstudios.com



TANEY & ENGINEERING



6030 S. Jones Blvd.
Las Vegas, NV 89118
Phone (702) 362-8844
Fax (702) 362-5233

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Red Rock Elementary School Date: Mar 29, 2023

Location of Development: a) Descriptive (Cross Streets) North/South: Upland Boulevard
East/West: Mayflower Lane

b) Section: 36 Township: 20 S Range: 60 E

c) APN : 138-36-201-001

Name of Owner: Clark County School District

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

Address: _____

Contact Person-Name: Janelle Klein, P.E. Telephone No.: (702) 362-8844

* E-Mail Address: JanelleK@taneycorp.com Fax No.: (702) 362-5233

Firm: Taney Engineering

Address: 6030 S. Jones, Suite 100, Las Vegas NV. 89118

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: 5.31+/- acres Being Developed/Disturbed: 5.31+/- 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

5. Approximate upstream land area which drains to the subject site: 68+/- acres

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Technical drainage Study for Red Rock Elementary School Site Improvements, DS-4389.

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: The site will discharge to Mayflower Lane.

8. Briefly describe your proposed schedule for the subject project: A.S.A.P



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



Job No. KNC-22-004

Date: March 23, 2023

JURISDICTION:

Caitlyn Alcantara, P.E
Flood Control, Engr. Associate
Department of Public Works
City of Las Vegas
495 South Main Street
Las Vegas, NV 89101

**ADDENDUM #1 to the Technical Drainage Study for Red Rock Elementary School
CLV #5647**

Dear Ms. Alcantara:

Taney Engineering is submitting Addendum #1 in response to comments and questions on the Technical Drainage Study for **Red Rock Elementary School**. A response to each comment from City of Las Vegas review memorandum dated on February 9, 2023, is provided below.

Comment 1: Provide a copy of the zoning/planning conditions associated with this site 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.

A copy of the zoning /planning conditions associated with the site has been included with the submittal.

Comment 2: Include the area of Mayflower Lane and Upland Boulevard in your hydrologic and hydraulic analysis.

The area of Mayflower Lane and Upland Boulevard has been included in the hydrologic analysis as two street basins ST-1 and ST-2 respectively and the hydraulic calculations have been revised accordingly.

Comment 3: The standard size of drainage exhibits should be 24" X 36". Provide drainage figures that are 24" X 36" in size and extend the map view north and south of the basins so we may ensure that the proposed basins encompass the entirety of the area contributing to the streets adjacent to the project site.

The drainage exhibits printed at 24"X36" are included with this submittal.



Comment 4: From the provided Existing Condition Map, Figure 6, the contour on the southern boundary looks as if it is flowing east towards Falcon Lane and not north towards Mayflower Lane. Provide additional reference materials to show if the entirety of the existing project site is meant to flow north toward Mayflower Lane.

The flow split analysis was conducted for Upland Boulevard and southern driveway of project site using Water Surface Elevation Method (WSE) in flowmaster. The difference in water surface elevation between Upland Boulevard and southern driveway was used to determine the direction of flow from the concentration point CP5. It was found that WSE on Upland Boulevard was lower than that of southern driveway, indicating that the highpoint on the southern driveway is high enough to protect the site from 100- Yr flow. The flow split calculation can be found in Appendix D with this submittal.

Comment 5: For the above reasons, also provide additional reference to find how much flow was previously accepted in the downstream drainage easement at the end of Mayflower Lane.

No additional reference was available in the vicinity of the subject site to find the flow previously accepted in the downstream drainage easement at the end of Mayflower Lane as this area was developed in late 1950's and 1960's.

Comment 6: Existing Condition Map, Figure 6: The figure shows Basin XON while Standard Form 4 lists Basin XON1. Review and revise accordingly.

Standard Form 4 and HEC-1 have been revised to match Exhibit.

Comment 7: Developed Condition Map, Figure 7: Add a slopes column for the Developed Condition cross section summary table.

Developed Condition Map, Figure 7 has been revised and slopes column has been added to the cross-section summary table.

Comment 8: The following comments apply to Figure 8, Offsite Basins:

a. Provide flow arrows on the exhibit.

Flow arrows have been added, and the revised exhibit is included with the submittal.

b. Provide contours and contour labels on the exhibit so we may verify the basin lines.

Contours and contour labels have been added.

c. Fix the basin boundaries of all offsite basins. From the aerial provided the basins look misaligned. For example, the western boundary of all basins bisects several homes and Basin XOF1A cuts off the northwestern portion of Wisteria Lane and does not consider the high point south of the intersection of Mallard Street and Wisteria Avenue. The street view of Upland Boulevard



shows a valley gutter across Temple Drive at the intersection, and basin XOFIB is not accounting for the additional area.

The offsite basins boundaries were demarcated based on the regional subbasins from Master plan Update (MPU). The basins have been aligned with the aerial and lot lines and the revised exhibit is included with the submittal.

- d. Extend the boundary of Basin XOF2B east along Mayflower Lane to align better with the eastern boundary of the project site.**

The boundary of Basin XOF2B has been extended along Mayflower Lane to align to the eastern boundary of the project site and is shown in the Existing condition figure attached to the submittal.

- e. Show the computations for Sections Q and R on the table of cross sections.**

The computations for Sections Q and R have been added and shown on the table of cross sections.

Comment 9: It is difficult to believe that the entire flow turns ninety degrees without a cross gutter when Upland Boulevard looks to be evenly divided between the west and east half of the road. It is agreed that a majority of flow turns due to the high slope on Mayflower Lane and asymmetrical crown on Upland Boulevard, however some of the flow must continue south onto Upland Boulevard. Provide a capacity section on western half of Upland Boulevard at the intersection of Upland Boulevard and Mayflower Lane or prove the provided flow split is valid by providing an explanation or additional computations.

The calculations have been revised and split flow calculations have been included with the submittal and the results have been redistributed to the respective streets.

Comment 10: Show the existing finished floors of the project site so we may verify that the proposed finished floor is not higher than the existing.

The existing floors of the project site is shown in the Red Rock Elementary School Site Improvements attached in Appendix E. The finished floors of the existing buildings range from 2882- 2281.8 ft elevation.

Comment 11: In the grading plans, the proposed building does not meet the Regional Flood Control District minimum criteria of 6-inch minimum above the highest adjacent top of curb (CCRFCD Manual Section 1602 304.4.E.1) on either Upland Boulevard or Mayflower Lane.

A finished floor waiver will be requested.

Comment 12: Provide BMP design calculations and BMP facilities such as landscape swales or sand/oil interceptors for the proposed site parking



lot and LIDS per Section 1500 from the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual.

The BMP design calculation has been included with the submittal.

Comment 13: A recent site visit performed by flood control staff shows a retaining wall on the northern boundary of the project site. State whether this wall will be removed or will remain with the proposed design.

The wall will be removed. There will be a solid grouted wall 2 courses above TC around the west and north perimeter.

Comment 14: Provide cross sections at the property lines. Typical sections are to extend through a building finish floor, parking, drive isle, landscape area, perimeter wall, and property line. Show the existing and proposed improvements in the sections.

The sections have been provided and included with the submittal.

Comment 15: 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.

Notes on grading plans has been provided.

Comment 16: The following comments apply to the improvement plans in their entirety:

a. Show proposed contours given on Figure 7 on improvement plans as well.

The contours given on Figure 7 are shown in master grading plan.

b. Label the existing L-curb and asphalt on the east boundary of the site and clearly label the boundary between existing and proposed.

The existing L- curb and asphalt on the east boundary has been labelled.

c. Correct the construction notes on the grading plan. For example, construction note 6 labels the chain link fence however the southern parking lot is likely not filled with them, and construction note 12 states a curb transition but that is not shown northeast of the building.

The construction notes on the grading plan have been corrected.

d. Sheet G2: Show the existing flow line on the northeastern boundary of the project site.

The proposed flow line on the northeastern boundary has been shown in the plans.

e. Sheet G4: South of the proposed building where the L-curb breaks for a zero-type curb, provide a 3-foot valley gutter through the entrance to mitigate nuisance flows.

3-foot valley gutter has been added and is shown in the plans.

f. Change the grading certification note on the improvement plans to state the CLV# not the HTE#.



The grading certification note on the improvement plans has changed to CLV #5647.

- g. Properly label all components in the grading plans (ex. Sidewalks, Landscape).**

Grading plans have been revised to have proper labels.

- h. Large landscape areas are not permitted to drain over sidewalks. Wherever a large landscape area drains through a sidewalk, provide a sidewalk underdrain.**

Swale has been added with sidewalk underdrain.

A copy of the Clark County Public Works comments has been provided directly following this letter. If you need any additional information, please do not hesitate to call our office.

Sincerely,
TANEY ENGINEERING

Udaya Neupane,
Water Resources Specialist I



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

BRIAN KNUDSEN
Mayor Pro Tem

VICTORIA SEAMAN
OLIVIA DIAZ

FRANCIS ALLEN-PALENSKE
CEDRIC CREAR
NANCY E. BRUNE

JORGE CERVANTES
City Manager

DEPARTMENT OF
COMMUNITY DEVELOPMENT

SETH T. FLOYD
DIRECTOR

CITY HALL
495 S. MAIN ST.
3RD FLOOR
LAS VEGAS, NV 89101

702.229.6301 | VOICE
702.464.2545 | FAX
711 | TTY



cityoflasvegas
lasvegasnevada.gov

January 11, 2023

Clark County School Board of Trustees
1180 Military Tribute Place
Henderson, Nevada 89074

**RE: 22-0595 [VAR1 AND SDR1]
PLANNING COMMISSION MEETING OF JANUARY 10, 2023**

Dear Applicant:

The Planning Commission at a regular meeting held on *January 10, 2023* voted to **APPROVE** of the following Land Use Entitlement project requests on 5.31 acres at the southeast corner of Mayflower Lane and Upland Boulevard (APN 138-36-201-001), C-V (Civic) Zone, Ward 1 (Knudsen)

22-0595-VAR1 - VARIANCE - TO ALLOW DEVIATIONS FROM TITLE 19.10 C-V (CIVIC) DEVELOPMENT STANDARDS

22-0595-SDR1 - SITE DEVELOPMENT PLAN REVIEW - FOR A PROPOSED TWO-STORY, 85,500 SQUARE-FOOT PRIMARY PUBLIC SCHOOL

This approval is subject to the following conditions:

22-0595-VAR1 Conditions:

Planning

1. Approval of and conformance to the Conditions of Approval for Site Development Plan Review (22-0595-SDR1) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All City Code requirements and design standards of all City departments must be satisfied, except as modified herein.

22-0595-SDR1 Conditions:

Planning

1. Approval of and conformance to the Conditions of Approval for Variance (22-0595-VAR1) shall be required, if approved.
2. This approval shall be void two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.
3. All development shall be in conformance with the site plan (date stamped 12/13/22), landscape plan date stamped 11/21/22, and building elevations date stamped 10/20/22, except as amended by conditions herein.
4. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.
5. The applicant shall obtain written verification by the FAA and/or the Clark County Department of Aviation of the following:
 - a. Applicant is required to file a valid FAA Form 7460-1, "Notice of Proposed Construction or Alteration" with the FAA, in accordance with 14 CFR Part 77, or submit to the Clark County Director of Aviation a "Property Owner's Shielding Determination Statement" and request written concurrence from the Clark County Department of Aviation.
 - b. No Building Permit or other construction permit shall be issued for any structure greater than 35 feet above the surface of land that, based upon the FAA's 7460 airspace determination (the outcome of filing the FAA Form 7460-1) would (a) constitute a hazard to air navigation, (b) would result in an increase to minimum flight altitudes during any phase of flight (unless approved by the Department of Aviation), or (c) would otherwise be determined to pose a significant adverse impact on airport or aircraft operations.
 - c. Applicant is advised that FAA's airspace determinations are dependent on petitions by any interested party and the height that will not present a hazard as determined by the FAA may change based on these comments.
 - d. Applicant is advised that the FAA's airspace determinations include expiration dates and that the separate airspace determinations will be needed for construction cranes or other temporary equipment.
6. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

7. The sidewalk adjacent to this site shall meet Public Right-of-Way Accessibility Guidelines (PROWAG) in accordance with code requirements of Title 13.56.040 to the satisfaction of the City Engineer concurrent with development of this site. Grant any Pedestrian Access Easement needed to complete this requirement
8. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections.
9. A Traffic Impact Analysis must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits, submittal of any construction drawings or the recordation of a Map subdividing this site, whichever may occur first. The Traffic Impact Analysis shall also include a pedestrian circulation/access plan to identify nearby pedestrian attractors and recommend measures to accommodate pedestrians, such as but not limited to pedestrian access, crosswalk, pedestrian activated flashers and temporary sidewalks. Comply with the recommendations of the approved Traffic Impact Analysis prior to occupancy of the site. Phased compliance will be allowed if recommended by the approved Traffic Impact Analysis. No recommendation of the approved Traffic Impact Analysis, nor compliance therewith, shall be deemed to modify or eliminate any condition of approval imposed by the Planning Commission or the City Council on the development of this site.
10. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

This action by the Planning Commission on January 10, 2023 is final unless a written appeal is filed with the City Clerk within ten days of the date of the Planning Commission's decision as allowed by code or there is a review action filed by the City Council within the same time period. For additional information on appeals or review requests submitted please access <https://www.lasvegasnevada.gov/Business/Permits-Licenses/Building-Permits/Permit-Application-Status>, or contact the Department of Planning and Development at 702.229.6301 after January 24, 2023. No building permits or business licenses related to these items shall be issued prior to the expiration of the required ten day waiting period, or until any filed appeal is resolved pursuant to LVMC Title 19.18.

Sincerely,

A handwritten signature in black ink, appearing to read "Nicole Eddowes", written in a cursive style.

Nicole Eddowes
Community Development Coordinator
Case Planning Division

NE:ew

cc:

Clark County School District Facilities Services
1180 Military Tribute Place
Henderson, Nevada 89074

Paulette Marshall
CCSD Real Property Management
1180 Military Tribute Place
Henderson, Nevada 89074



APPENDIX

APPENDIX A

Comment Letter

APPENDIX B

Figures

APPENDIX C

Hydrologic Calculations

APPENDIX D

Hydraulic Calculations

APPENDIX E

Reference Material

APPENDIX F

Improvement Plans



APPENDIX A

Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: February 9, 2023
TO: Land Development Services Department of Building & Safety		FROM: Caitlyn Alcantara, P.E. <i>CA</i> Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Red Rock Elementary School	Taney Engineering
Cross Streets:	Upland Blvd & Mayflower Lane	Clark County School Board of Trustees
File Number:	F:\Depot\DSMemos\DS05647A.doc	
Parcel Number:	138-36-201-001	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	1/23/2023	2/9/2023	See Comments Below	\$400	5113910: \$400
			TOTAL FEES (LDDRS):	\$400	----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site 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.
2. Include the area of Mayflower Lane and Upland Boulevard in your hydrologic and hydraulic analysis.
3. The standard size of drainage exhibits should be 24" X 36". Provide drainage figures that are 24" X 36" in size and extend the map view north and south of the basins so we may ensure that the proposed basins encompass the entirety of the area contributing to the streets adjacent to the project site.
4. From the provided Existing Condition Map, Figure 6, the contours on the southern boundary looks as if it is flowing east towards Falcon Lane and not north towards Mayflower Lane. Provide additional reference materials to show if the entirety of the existing project site is meant to flow north toward Mayflower Lane
5. For the above reasons, also provide additional reference to find how much flow was previously accepted in the downstream drainage easement at the end of Mayflower Lane.

6. **Existing Condition Map, Figure 6:** The figure shows Basin XON while Standard Form 4 lists Basin XON1. Review and revise accordingly.
7. **Developed Condition Map, Figure 7:** Add a slopes column for the Developed Condition cross section summary table.
8. **The following comments apply to Figure 8, Offsite Basins:**
 - a. Provide flow arrows on the exhibit.
 - b. Provide contours and contour labels on the exhibit so we may verify the basin lines.
 - c. Fix the basin boundaries of all offsite basins. From the aerial provided the basins look misaligned. For example the western boundary of all basins bisects several homes and Basin XOF1A cuts off the northwestern portion of Wisteria Lane and does not consider the high point south of the intersection of Mallard Street and Wisteria Avenue. The street view of Upland Boulevard shows a valley gutter across Temple Drive at the intersection, and basin XOF1B is not accounting for the additional area.
 - d. Extend the boundary of Basin XOF2B east along Mayflower Lane to align better with the eastern boundary of the project site.
 - e. Show the computations for Sections Q and R on the table of cross sections.
9. It is difficult to believe that the entire flow turns ninety degrees without a cross gutter when Upland Boulevard looks to be evenly divided between the west and east half of the road. It is agreed that a majority of flow turns due to the high slope on Mayflower Lane and asymmetrical crown on Upland Boulevard, however some of the flow must continue south onto Upland Boulevard. Provide a capacity section on western half of Upland Boulevard at the intersection of Upland Boulevard and Mayflower Lane or prove the provided flow split is valid by providing an explanation or additional computations.
10. Show the existing finished floors of the project site so we may verify that the proposed finished floor is not higher than the existing.
11. In the grading plans, the proposed building does not meet the Regional Flood Control District minimum criteria of 6-inch minimum above the highest adjacent top of curb (CCRFCD Manual Section 1602 304.4.E.1) on either Upland Boulevard or Mayflower Lane.
12. Provide BMP design calculations and BMP facilities such as landscape swales or sand/oil interceptors for the proposed site parking lot and LIDs per Section 1500 from the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual.
13. A recent site visit performed by flood control staff shows a retaining wall on the northern boundary of the project site. State whether this wall will be removed or will remain with the proposed design.
14. Provide cross sections at the property lines. Typical sections are to extend through a building finish floor, parking, drive isle, landscape area, perimeter wall, and property line. Show the existing and proposed improvements in the sections.
15. 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.
16. The following comments apply to the improvement plans in their entirety:
 - a. Show proposed contours given on Figure 7 on improvement plans as well.
 - b. Label the existing L-curb and asphalt on the east boundary of the site and clearly label the boundary between existing and proposed.
 - c. Correct the construction notes on the grading plan. For example, construction note 6 labels the chain link fence however the southern parking lot is likely not filled with them, and construction note 12 states a curb transition but that is not shown northeast of the building.

- d. **Sheet G2:** Show the existing flow line on the northeastern boundary of the project site.
- e. **Sheet G4:** South of the proposed building where the L-curb breaks for a zero type curb, provide a 3-foot valley gutter through the entrance to mitigate nuisance flows.
- f. Change the grading certification note on the improvement plans to state the CLV# not the HTE#.
- g. Properly label all components in the grading plans (ex. Sidewalks, Landscape).
- h. Large landscape areas are not permitted to drain over sidewalks. Wherever a large landscape area drains through a sidewalk, provide a sidewalk underdrain.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

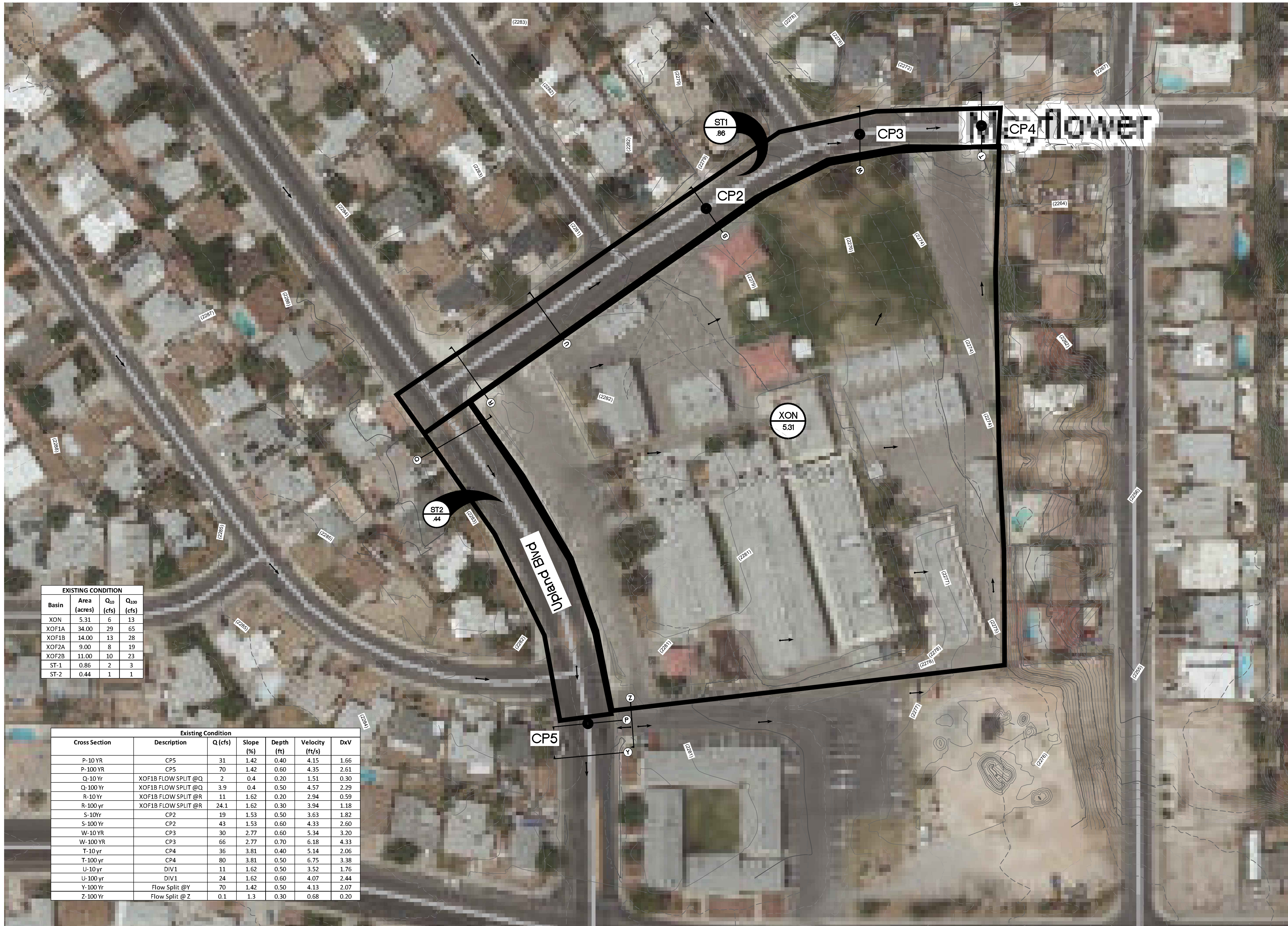
END OF REMARKS
HDR/CAA

T/R/S: T20S/R60E/S36
AREA L-36



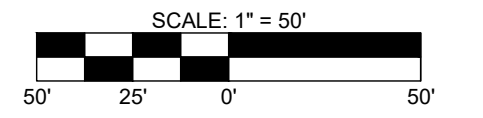
APPENDIX B

Figures



EXISTING CONDITION			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
XON	5.31	6	13
XOF1A	34.00	29	65
XOF1B	14.00	13	28
XOF2A	9.00	8	19
XOF2B	11.00	10	23
ST-1	0.86	2	3
ST-2	0.44	1	1

Existing Condition					
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)
P-10 YR	CP5	31	1.42	0.40	4.15
P-100 YR	CP5	70	1.42	0.60	4.35
Q-10 Yr	XOF1B FLOW SPLIT @Q	2	0.4	0.20	1.51
Q-100 Yr	XOF1B FLOW SPLIT @Q	3.9	0.4	0.50	4.57
R-10 Yr	XOF1B FLOW SPLIT @R	11	1.62	0.20	2.94
R-100 Yr	XOF1B FLOW SPLIT @R	24.1	1.62	0.30	3.94
S-10Yr	CP2	19	1.53	0.50	3.63
S-100 Yr	CP2	43	1.53	0.60	4.33
W-10 YR	CP3	30	2.77	0.60	5.34
W-100 YR	CP3	66	2.77	0.70	6.18
T-10yr	CP4	36	3.81	0.40	5.14
T-100 yr	CP4	80	3.81	0.50	6.75
U-10 yr	DIV1	11	1.62	0.50	3.52
U-100 yr	DIV1	24	1.62	0.60	4.07
Y-100 Yr	Flow Split @Y	70	1.42	0.50	4.13
Z-100 Yr	Flow Split @Z	0.1	1.3	0.30	0.68



DRAINAGE LEGEND	
	BASIN IDENTIFICATION
	BASIN AREA (ACRES)
	BASIN BOUNDARY
	CONCENTRATION POINT
	FLOW PATH
	PROJECT SITE
	CROSS SECTION
	10-YR/100-YR FLOW (CFS)
	REFERENCE FLOW (CFS)

FIGURE 6

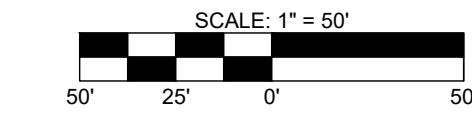
Existing Condition

DATE: 3.29.2023
JOBNO: KNC-22-004



DEVELOPED CONDITION			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
DON	5.31	6	13
XOF1A	34.00	29	65
XOF1B	14.00	13	28
XOF2A	9.00	8	19
XOF2B	11.00	10	23
ST-1	0.86	2	3
ST-2	0.44	1	1

Developed Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
P-10 Yr	CP5	31	1.42	0.40	4.15	1.66
P-100 Yr	CP5	70	1.42	0.60	4.35	2.61
Q-10 Yr	XOF1B FLOW SPLIT @Q	2	0.4	0.20	1.51	0.30
Q-100 Yr	XOF1B FLOW SPLIT @Q	3.9	0.4	0.50	4.57	2.29
R-10 Yr	XOF1B FLOW SPLIT @R	11	1.62	0.20	2.94	0.59
R-100 Yr	XOF1B FLOW SPLIT @R	24.1	1.62	0.30	3.94	1.18
S-10 Yr	CP2	19	1.53	0.50	3.63	1.82
S-100 Yr	CP2	43	1.53	0.60	4.33	2.60
W-10 Yr	CP3	30	2.77	0.60	5.34	3.20
W-100 Yr	CP3	66	2.77	0.70	6.18	4.33
T-10 Yr	CP4	36	3.81	0.40	5.14	2.06
T-100 Yr	CP4	80	3.81	0.50	6.75	3.38
U-10 Yr	DIV1	11	1.62	0.50	3.52	1.76
U-100 Yr	DIV1	24	1.62	0.60	4.07	2.44
A-10 Yr	section A	1.5	0.5	0.30	1.29	0.39
A-100 Yr	section A	3.25	0.5	0.40	1.61	0.64
B-10 Yr	section B	6	1.61	0.40	3.24	1.30
B-100 Yr	section B	13	1.61	0.50	3.88	1.94
E- DEV 10 Yr	section E	1.5	0.53	0.30	1.26	0.38
E- DEV 100 Yr	section E	3.25	0.53	0.30	1.50	0.45
Y-DEV 10 YR	CP5	31	1.42	0.40	3.77	1.51
Y-DEV 100 YR	CP5	70	1.42	0.50	4.13	2.07

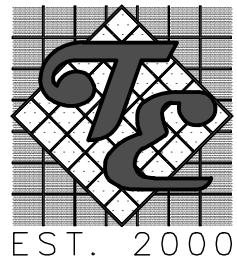


DRAINAGE LEGEND	
	BASIN IDENTIFICATION
	BASIN AREA (ACRES)
	BASIN BOUNDARY
	CONCENTRATION POINT
	FLOW PATH
	PROJECT SITE
	CROSS SECTION
	10-YR/100-YR FLOW (CFS)
	REFERENCE FLOW (CFS)

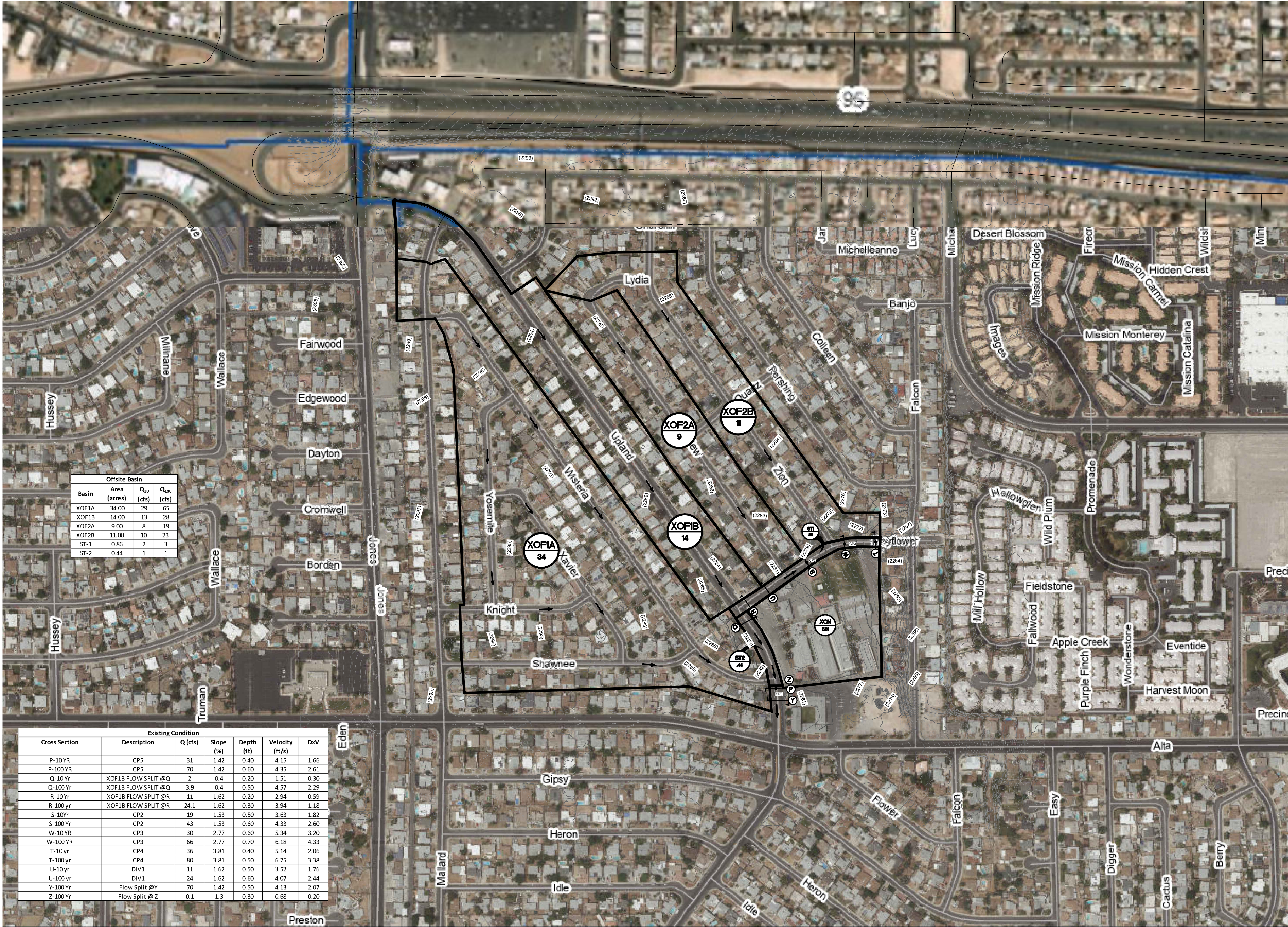
FIGURE 7

Developed Condition

DATE: 3.29.2023
JOBNO: KNC-22-004

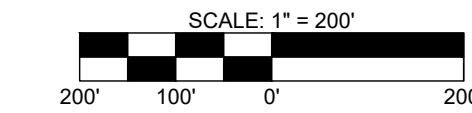


TANAY ENGINEERING
CIVIL ENGINEERING
& LAND SURVEYING
6030 S. JONES BLVD
LAS VEGAS, NV 89118
(702) 362-8844
INFO@TANAYCORP.COM



Offsite Basin			
Basin	Area (acres)	Q ₁₀ (cfs)	Q ₁₀₀ (cfs)
XOF1A	34.00	29	65
XOF1B	14.00	13	28
XOF2A	9.00	8	19
XOF2B	11.00	10	23
ST-1	0.86	2	3
ST-2	0.44	1	1

Existing Condition						
Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
P-10 Yr	CP5	31	1.42	0.40	4.15	1.66
P-100 Yr	CP5	70	1.42	0.60	4.35	2.61
Q-10 Yr	XOF1B FLOW SPLIT @Q	2	0.4	0.20	1.51	0.30
Q-100 Yr	XOF1B FLOW SPLIT @Q	3.9	0.4	0.50	4.57	2.29
R-10 Yr	XOF1B FLOW SPLIT @R	11	1.62	0.20	2.94	0.59
R-100 Yr	XOF1B FLOW SPLIT @R	24.1	1.62	0.30	3.94	1.18
S-10 Yr	CP2	19	1.53	0.50	3.63	1.82
S-100 Yr	CP2	43	1.53	0.60	4.33	2.60
W-10 Yr	CP3	30	2.77	0.60	5.34	3.20
W-100 Yr	CP3	66	2.77	0.70	6.18	4.33
T-10 Yr	CP4	36	3.81	0.40	5.14	2.06
T-100 Yr	CP4	80	3.81	0.50	6.75	3.38
U-10 Yr	DIV1	11	1.62	0.50	3.52	1.76
U-100 Yr	DIV1	24	1.62	0.60	4.07	2.44
Y-100 Yr	Flow Split @Y	70	1.42	0.50	4.13	2.07
Z-100 Yr	Flow Split @Z	0.1	1.3	0.30	0.68	0.20

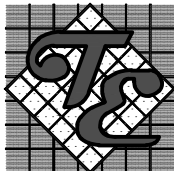


DRAINAGE LEGEND	
	BASIN IDENTIFICATION
	BASIN AREA (ACRES)
	BASIN BOUNDARY
	CONCENTRATION POINT
	FLOW PATH
	PROJECT SITE
	CROSS SECTION
	10-YR/100-YR FLOW (CFS)
	REFERENCE FLOW (CFS)

FIGURE 8

OFFSITE BASINS

DATE: 3.29.2023
JOBNO: KNC-22-004

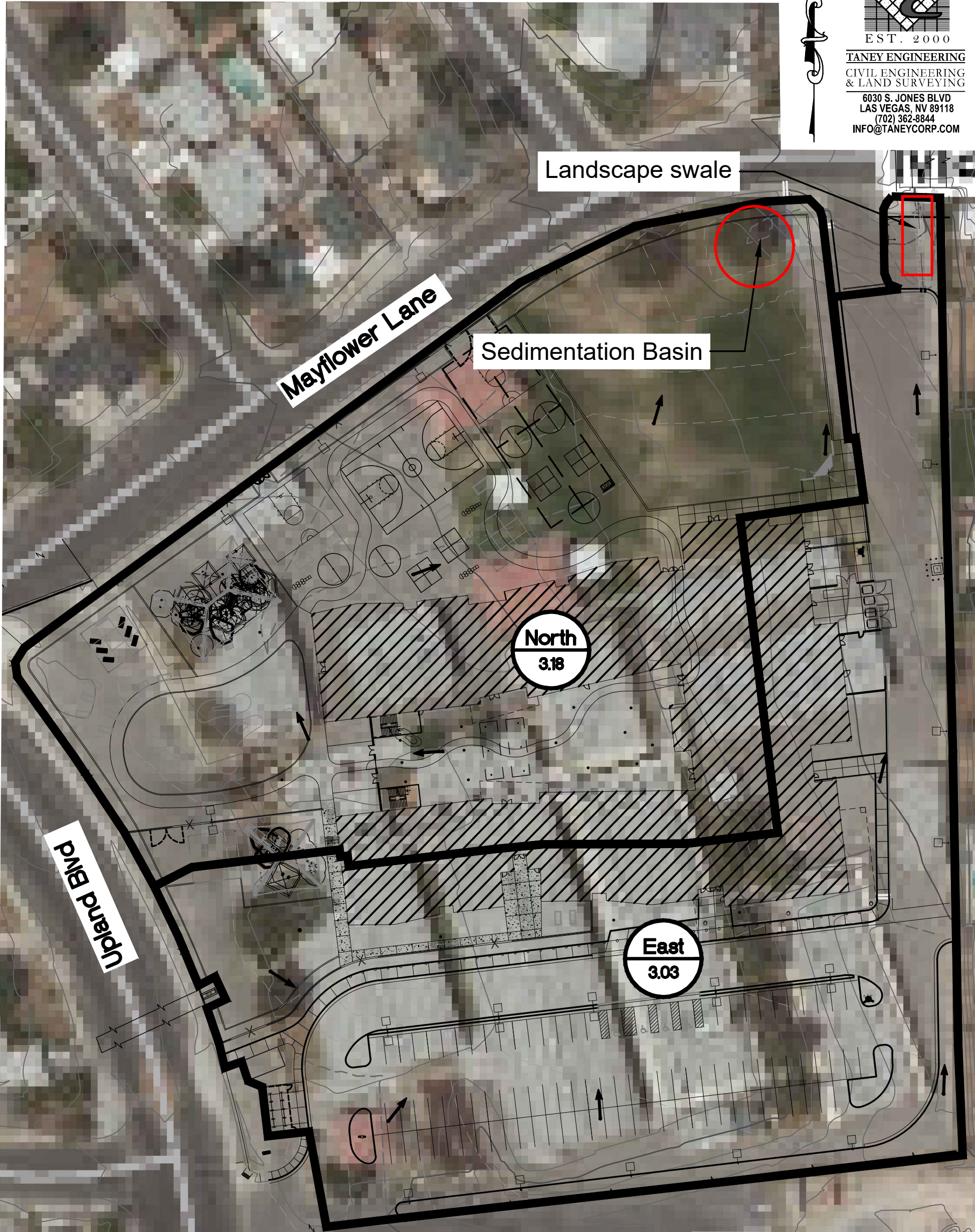


EST. 2000

TANEY ENGINEERING
CIVIL ENGINEERING
& LAND SURVEYING

6030 S. JONES BLVD
LAS VEGAS, NV 89118
(702) 362-8844
INFO@TANEYCORP.COM





Cross Section	Description	Q (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV
V-Riprap (BMP)	Design flow	2.6	0.95	0.30	1.73	0.52

BMP Table		
Facility	Facility Type	Tributary Area (ac)
V	LANDSCAPE SWALE	3.03
A	SEDIMENTATION BASIN	3.18

Notes:
1. RipRap D50=6"; Thickness =12"



APPENDIX C

Hydrologic Calculations



TANEY ENGINEERING

6030 S. JONES BOULEVARD, SUITE #100

LAS VEGAS, NV 89118

TELEPHONE: 702-362-8844

FAX: 702-362-5233

Composite Curve Number Calculations

Proj. No: KNC-22-004
Date: 3/16/2023

Project Name: Red Rock ES
Designed By: UN

Basin	Basin Area (ac)	Soil Map Unit	Land Use Category	Soil Composite CN	Sub-region Area (ac)	Percent of Basin	Cumulative Percent	Areal Weighted CN	Cumulative CN	Composite CN
XON	5.31	1300	Schools	90	5.31	100.0%	100.0%	90.0	90.0	90
DON	5.31	1300	Schools	90	5.31	100.0%	100.0%	90.0	90.0	90
XOF1a	34.00	1152	High Density Residential, 4-8 units per acre	91	32.30	95.0%	95.0%	86.5	86.5	
XOF1a	34.00	1300	High Density Residential, 4-8 units per acre	91	1.70	5.0%	100.0%	4.6	91.0	91
XOF1b	14.00	1152	High Density Residential, 4-8 units per acre	91	13.30	95.0%	95.0%	86.5	86.5	
XOF1b	14.00	1300	High Density Residential, 4-8 units per acre	91	0.70	5.0%	100.0%	4.6	91.0	91
XOF2a	9.00	1152	High Density Residential, 4-8 units per acre	91	3.60	40.0%	40.0%	36.4	36.4	
XOF2a	9.00	1300	High Density Residential, 4-8 units per acre	91	5.40	60.0%	100.0%	54.6	91.0	91
XOF2b	11.00	1152	High Density Residential, 4-8 units per acre	91	3.30	30.0%	30.0%	27.3	27.3	
XOF2b	11.00	1300	High Density Residential, 4-8 units per acre	91	7.70	70.0%	100.0%	63.7	91.0	91
ST-1	0.86	1300	Impervious	98	0.86	100.0%	100.0%	98.0	98.0	98
ST-2	0.44	1300	Impervious	98	0.44	100.0%	100.0%	98.0	98.0	98

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL - STANDARD FORM 4



Taney Engineering
6030 S. Jones, Suite #100
Las Vegas, NV 89118

PROJECT NO. : KNC-22-004

PROJECT: RED ROCK ES

FILE : STD_FRM4_Offsite basin

CALCULATED BY: UN

DATE : 03/16/23

Sub-Basin Data					Initial/Overland Time (T _i)			Travel Time (T _t)					T _c	T _c Check (Urbanized Basins)		Final T _c	T _{lag}	Remarks
DESIG	CN	K	AREA (acres)	AREA (mi ²)	LENGTH (ft)	SLOPE (%)	T _i (min)	LENGTH (ft)	SLOPE (%)	V ₁ (fps)	V ₂ (fps)	T _t (min)	T _c =T _i +T _t (min)	TOTAL (ft)	T _c (min)	T _c (min)	T _{lag} (hrs)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
EXISTING AND DEVELOPED CONDITION																		
XON	90	0.798	5.31	0.0083	110	1.2	5.4	668	1.0	2.02	3.06	5.0	10.4	778	14.3	10.41	0.104	6.243
DON	90	0.798	5.31	0.0083	100	0.9	5.6	668	1.0	2.02	3.06	5.0	10.7	768	14.3	10.67	0.107	6.402
XOF1A	91	0.811	34.00	0.0531	200	1.0	7.4	2760	0.4	1.28	1.94	26.0	33.3	2960	26.4	26.44	0.264	15.867
XOF1B	91	0.811	14.00	0.0219	150	1.0	6.4	2278	0.4	1.28	1.94	21.8	28.2	2428	23.5	23.49	0.235	14.093
XOF2A	91	0.811	9.00	0.0141	150	1.0	6.4	1656	0.4	1.28	1.94	16.5	22.8	1806	20.0	20.03	0.200	12.020
XOF2B	91	0.811	11.00	0.0172	150	1.0	6.4	1670	0.4	1.28	1.94	16.6	23.0	1820	20.1	20.11	0.201	12.067
ST1	98	0.904	0.86	0.0013	40	1.0	2.2	312	1.6	2.56	N/A	2.0	4.3	352	12.0	4.27	0.050	3.000
ST2	98	0.904	0.44	0.0007	40	1.0	2.2	760	0.9	1.92	2.90	5.8	8.1	800	14.4	8.08	0.081	4.846

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

$$T_c = T_i + T_t$$

$$K = 0.0132(CN) - 0.39$$

$$T_{lag} = 0.6T_c$$

For the travel time (T_t) calculations,

V₁ applies to the first 500 feet of travel distance;

V₂ applies to the remaining travel distance.

Existing

$$V_1 = 14.8 * (S/100)^{1/2}$$

$$V_2 = 29.4 * (S/100)^{1/2}$$

Developed

$$V_1 = 20.2 * (S/100)^{1/2}$$

$$V_2 = 30.6 * (S/100)^{1/2}$$

are calculated by the equation

$$T_{lag} = 20Kn(L * L_c / S^{0.5})^{0.33}$$

and denoted by shaded gray

(See Worksheet).

REFERENCE:

CCRFCD HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

STANDARD FORM 4

As per manual section 602, Min T lag of 5 min is used for the calculation in HEC-1.


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

X	X	XXXXXXXX	XXXXXX		X
X	X	X	X	X	XX
X	X	X	X		X
XXXXXXXX	XXXX	X		XXXXX	X
X	X	X	X		X
X	X	X	X	X	X
X	X	XXXXXXXX	XXXXXX		XXX

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

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

1 HEC-1 INPUT PAGE 1

```

LINE      ID      1.....2.....3.....4.....5.....6.....7.....8.....9.....10.....
          *DIAGRAM
1         ID
2         ID      <><><><><><><><><><><><><><>
3         ID      RED ROCK ES OFFSITE
4         ID      HYDROLOGIC MODEL
5         ID      -----
6         ID
7         ID      10-YR AND 100-YR STORM EVENT
8         ID      -----
9         ID      TANEY ENGINEERING
10        ID      EXISTING CONDITION
11       ID      FILE: EX.DAT
12       ID      PROJECT No: KNC-22-004
13       ID      DATE: JAN 2023
14       ID      <><><><><><><><><><><><><>
15       ID
16       ID      ---> 6-HOUR / SDN 3 <---
17       ID
18       IT      5           0           0           300
19       IO      5
20       IN      5
21       JR      PREC      0.57      1.00
22       *
23
24       KK      XOF1b
25       BA      .0219
26       PB      2.77
27       PC      .000      .020      .057      .070      .087      .108      .124      .130      .130      .130
28       PC      .130      .130      .130      .133      .140      .142      .148      .158      .172      .181
29       PC      .190      .197      .199      .200      .201      .204      .214      .229      .241      .249
30       PC      .251      .256      .270      .278      .281      .283      .295      .322      .352      .409
31       PC      .499      .590      .710      .744      .781      .812      .819      .835      .851      .856
32       PC      .860      .868      .876      .888      .910      .926      .937      .950      .970      .976
33       PC      .982      .985      .987      .989      .990      .993      .993      .994      .995      .998
34       PC      .998      .999      1.00
35       LS      0           91
36       UD      .235
37       *
38
39       KK      DIV1
40       KM      DIVERSION (DIV1 DIVERSION TO MAYFLOWER, D1 DIVERSION TO UPLAND)
41       KM      ('DT' IS NAME OF WHAT YOU ARE DIVERTING;'DI' IS THE TOTAL FLOW; THE 'DQ' CARD
42       DT      01
43       DI      28
44       DQ      3.9
45       *
46
47       KK      XOF2A
48       BA      .0141
49       LS      0           91
50       UD      .200
51       *

```

1 HEC-1 INPUT PAGE 2

LINE	ID	1	2	3	4	5	6	7	8	9	10
45	KK	CP2									
46	KM	COMBINES	DIV1,XOF2A								
47	HC	2									
	*										
48	KK	XOF2B									
49	BA	.0172									
50	LS	0	91								
51	UD	.201									
	*										
52	KK	CP3									
53	KM	COMBINES	CP2, XOF2B								
54	HC	2									
	*										
55	KK	XON									
56	BA	.0083									
57	LS	0	90								
58	UD	.104									
	*										
59	KK	ST-1									
60	BA	.0013									
61	LS	0	98								
62	UD	.084									
	*										
63	KK	CP4									
64	KM	COMBINES	CP3,XON, ST-1								
65	HC	3									
	*										
66	KK	XOF1a									
67	BA	.0531									
68	LS	0	91								
69	UD	0.264									
	*										
70	KK	ST-2									
71	BA	.0007									
72	LS	0	98								
73	UD	.084									
	*										
74	KK	RETD1									
75	KM	RETRIEVE D1 - (THIS CARD RETRIEVES THE DIVERTED FLOW)									
76	DR	D1									
	*										

1

HEC-1 INPUT

PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
77	KK	CP5									
78	KM	COMBINES	XOF1a,ST-2,RETD1								
79	HC	3									
	*										
80	ZZ										

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

```

22  XOF1b
    .
    .
38  .-----> D1
35  DIV1
    .
    .
41  .      XOF2A
    .      .
    .      .
45  CP2.....
    .
    .
48  .      XOF2B
    .      .
    .      .
52  CP3.....
    .
    .
55  .      XON
    .      .
    .      .
59  .      .      ST-1
  
```

1


```

1  (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
*****
*                                     *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*           JUN 1998                  *
*   VERSION 4.1                      *
*                                     *
* RUN DATE   21MAR23   TIME  08:26:53 *
*                                     *
*****

```

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

IO	OUTPUT CONTROL VARIABLES		5	PRINT CONTROL
	IPRNT		0	PLOT 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		

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

HYDROGRAPH AT +	XOF1b	.02	1	FLOW TIME	13. 3.67	28. 3.67
DIVERSION TO +	D1	.02	1	FLOW TIME	2. 3.67	4. 3.67
HYDROGRAPH AT +	DIV1	.02	1	FLOW TIME	11. 3.67	24. 3.67
HYDROGRAPH AT +	XOF2A	.01	1	FLOW TIME	8. 3.58	19. 3.58
2 COMBINED AT +	CP2	.04	1	FLOW TIME	19. 3.67	43. 3.67
HYDROGRAPH AT +	XOF2B	.02	1	FLOW TIME	10. 3.67	23. 3.58
2 COMBINED AT +	CP3	.05	1	FLOW TIME	30. 3.67	66. 3.67
HYDROGRAPH AT +	XON	.01	1	FLOW TIME	6. 3.50	13. 3.50
HYDROGRAPH AT +	ST-1	.00	1	FLOW TIME	2. 3.50	3. 3.50
3 COMBINED AT +	CP4	.06	1	FLOW TIME	36. 3.58	80. 3.58
HYDROGRAPH AT +	XOF1a	.05	1	FLOW TIME	29. 3.67	65. 3.67
HYDROGRAPH AT +	ST-2	.00	1	FLOW TIME	1. 3.50	1. 3.50
HYDROGRAPH AT +	RETD1	.00	1	FLOW TIME	2. 3.67	4. 3.67
3 COMBINED AT +	CP5	.05	1	FLOW TIME	31. 3.67	70. 3.67

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


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

X	X	XXXXXXXX	XXXXXX		X
X	X	X	X	X	XX
X	X	X	X		X
XXXXXXXX	XXXX	X		XXXXX	X
X	X	X	X		X
X	X	X	X	X	X
X	X	XXXXXXXX	XXXXXX		XXX

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

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

```

*DIAGRAM
1 ID
2 ID <><><><><><><><><><><>
3 ID RED ROCK ES OFFSITE
4 ID HYDROLOGIC MODEL
5 ID -----
6 ID
7 ID 10-YR AND 100-YR STORM EVENT
8 ID -----
9 ID TANAY ENGINEERING
10 ID DEVELOPED CONDITION
11 ID FILE: DEV.DAT
12 ID PROJECT No: KNC-22-004
13 ID DATE: JAN 2023
14 ID <><><><><><><><><><><>
15 ID
16 ID ---> 6-HOUR / SDN 3 <---
17 ID
18 IT 5 0 0 300
19 IO 5
20 IN 5
21 JR PREC 0.57 1.00
*

22 KK XOF1b
23 BA .0219
24 PB 2.77
25 PC .000 .020 .057 .070 .087 .108 .124 .130 .130 .130
26 PC .130 .130 .130 .133 .140 .142 .148 .158 .172 .181
27 PC .190 .197 .199 .200 .201 .204 .214 .229 .241 .249
28 PC .251 .256 .270 .278 .281 .283 .295 .322 .352 .409
29 PC .499 .590 .710 .744 .781 .812 .819 .835 .851 .856
30 PC .860 .868 .876 .888 .910 .926 .937 .950 .970 .976
31 PC .982 .985 .987 .989 .990 .993 .993 .994 .995 .998
32 PC .998 .999 1.00
33 LS 0 91
34 UD .235
*

35 KK DIV1
36 KM DIVERSION (DIV1 DIVERSION TO MAYFLOWER, D1 DIVERSION TO UPLAND,REFER TO SPLIT
37 DT D1
38 DI 28
39 DQ 3.9
*

40 KK XOF2A
41 BA .0141
42 LS 0 91
43 UD .200
*
```

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

44	KK	CP2		
45	KM	COMBINES	DIV1,XOF2A	
46	HC	2		
	*			
47	KK	XOF2B		
48	BA	.0172		
49	LS	0	91	
50	UD	.201		
	*			
51	KK	CP3		
52	KM	COMBINES	CP2, XOF2B	
53	HC	2		
	*			
54	KK	DON		
55	BA	.0083		
56	LS	0	90	
57	UD	.107		
	*			
58	KK	ST-1		
59	BA	.0013		
60	LS	0	98	
61	UD	.084		
	*			
62	KK	CP4		
63	KM	COMBINES	CP3,XON, ST-1	
64	HC	3		
	*			
65	KK	XOF1a		
66	BA	.0531		
67	LS	0	91	
68	UD	0.264		
	*			
69	KK	ST-2		
70	BA	.0007		
71	LS	0	98	
72	UD	.084		
	*			
73	KK	RETD1		
74	KM	RETRIEVE D1 - (THIS CARD RETRIEVES THE DIVERTED FLOW)		
75	DR	D1		
	*			

1

HEC-1 INPUT

PAGE 3

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

76	KK	CP5	
77	KM	COMBINES	XOF1a,ST-2,RETD1
78	HC	3	
	*		
79	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
22	XOF1b	
	.	
37	.	
35	.----->	D1
	DIV1	
	.	
40	.	
	XOF2A	
	.	
44	CP2.....	
	.	
47	.	
	XOF2B	
	.	
51	CP3.....	
	.	
54	.	
	DON	
	.	
58	.	
	ST-1	
	.	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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

10-YR AND 100-YR STORM EVENT

TANEY ENGINEERING
DEVELOPED CONDITION
FILE: DEV.DAT
PROJECT No: KNC-22-004
DATE: JAN 2023

[illegible]

---> 6-HOUR / SDN 3 <---

19	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

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

HYDROGRAPH AT +	XOF1b	.02	1	FLOW TIME	13. 3.67	28. 3.67
DIVERSION TO +	D1	.02	1	FLOW TIME	2. 3.67	4. 3.67
HYDROGRAPH AT +	DIV1	.02	1	FLOW TIME	11. 3.67	24. 3.67
HYDROGRAPH AT +	XOF2A	.01	1	FLOW TIME	8. 3.58	19. 3.58
2 COMBINED AT +	CP2	.04	1	FLOW TIME	19. 3.67	43. 3.67
HYDROGRAPH AT +	XOF2B	.02	1	FLOW TIME	10. 3.67	23. 3.58
2 COMBINED AT +	CP3	.05	1	FLOW TIME	30. 3.67	66. 3.67
HYDROGRAPH AT +	DON	.01	1	FLOW TIME	6. 3.58	13. 3.50
HYDROGRAPH AT +	ST-1	.00	1	FLOW TIME	2. 3.50	3. 3.50
3 COMBINED AT +	CP4	.06	1	FLOW TIME	36. 3.58	80. 3.58
HYDROGRAPH AT +	XOF1a	.05	1	FLOW TIME	29. 3.67	65. 3.67
HYDROGRAPH AT +	ST-2	.00	1	FLOW TIME	1. 3.50	1. 3.50
HYDROGRAPH AT +	RETD1	.00	1	FLOW TIME	2. 3.67	4. 3.67
3 COMBINED AT +	CP5	.05	1	FLOW TIME	31. 3.67	70. 3.67

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



TANEY ENGINEERING

6030 S. JONES BOULEVARD, SUITE #100

LAS VEGAS, NV 89118

TELEPHONE: 702-362-8844

FAX: 702-362-5233

Water Quality Design Storm Calculations for Projects inside McCarran Airport Rainfall Area

Project Name: Red Rock ES

Proj. Number: HRZ-22-004

Cross Streets: Upland Boulevard and Mayflower Lane

Designed By:

Date: 3/20/2023

Sub-Basin Description

DON

BMP Design Precipitation

$D_{85} = 0.32$ 85th Percentile Rainfall Depth

Average Unit Discharge per 90% Impervious

$Q_p/A = 0.47$

Adjustment for Q_p/A Relative to 90% Impervious

CN = 98 Percent Impervious
0.50 Adjustment Factor

Peak design discharge

A = 5.31 acres
 $Q_p = 2.6$ cfs

Design Volume

V = 0.18 acre-ft

Reference:

Hydrologic Criteria and Drainage Design Manual, CCRFCD, Aug. 1999
Section 1502.3



APPENDIX D

Hydraulic Calculations

Worksheet for P- Upland-10 Yr- 80' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Discharge	31.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.60
0+05.00	1.50
0+05.50	1.50
0+05.50	1.00
0+07.00	1.17
0+40.00	1.41
0+73.00	0.75
0+75.50	0.70
0+78.00	0.75
0+93.00	1.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.60)	(0+07.00, 1.17)	0.013
(0+07.00, 1.17)	(0+73.00, 0.75)	0.016
(0+73.00, 0.75)	(0+78.00, 0.75)	0.013
(0+78.00, 0.75)	(0+93.00, 1.42)	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	0.4 ft
Roughness Coefficient	0.015
Elevation	1.13 ft
Elevation Range	0.70 to 1.60 ft
Flow Area	7.5 ft ²
Wetted Perimeter	34.15 ft
Hydraulic Radius	0.2 ft
Top Width	34.00 ft

Worksheet for P- Upland-10 Yr- 80' EX and DEV

Results

Normal Depth	0.4 ft
Critical Depth	0.5 ft
Critical Slope	0.575 %
Velocity	4.15 ft/s
Velocity Head	0.27 ft
Specific Energy	0.70 ft
Froude Number	1.561
Flow Type	Supercritical

GVF Input Data

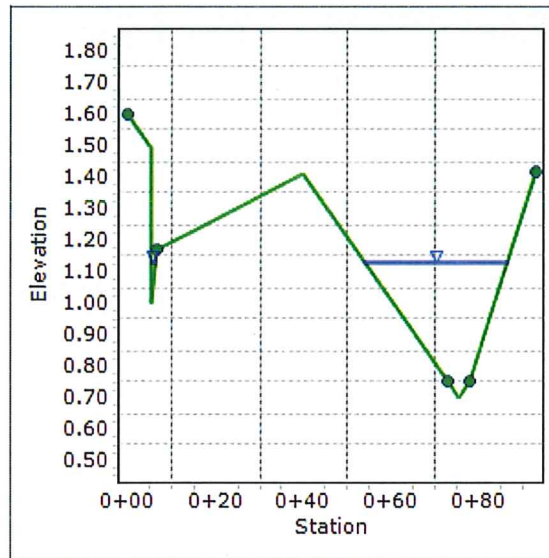
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 ft
Critical Depth	0.5 ft
Channel Slope	1.420 %
Critical Slope	0.575 %

Cross Section for P- Upland-10 Yr- 80' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Normal Depth	0.4 ft
Discharge	31.00 cfs



Worksheet for P- Upland-100 Yr- 80' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Discharge	70.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	1.60
0+05.00	1.50
0+05.50	1.50
0+05.50	1.00
0+07.00	1.17
0+40.00	1.41
0+73.00	0.75
0+75.50	0.70
0+78.00	0.75
0+93.00	1.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.60)	(0+07.00, 1.17)	0.013
(0+07.00, 1.17)	(0+73.00, 0.75)	0.016
(0+73.00, 0.75)	(0+78.00, 0.75)	0.013
(0+78.00, 0.75)	(0+93.00, 1.42)	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	0.6 ft
Roughness Coefficient	0.016
Elevation	1.31 ft
Elevation Range	0.70 to 1.60 ft
Flow Area	16.1 ft ²
Wetted Perimeter	67.04 ft
Hydraulic Radius	0.2 ft
Top Width	66.70 ft

Worksheet for P- Upland-100 Yr- 80' EX and DEV

Results

Normal Depth	0.6 ft
Critical Depth	0.7 ft
Critical Slope	0.560 %
Velocity	4.35 ft/s
Velocity Head	0.29 ft
Specific Energy	0.91 ft
Froude Number	1.562
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Channel Slope	1.420 %
Critical Slope	0.560 %

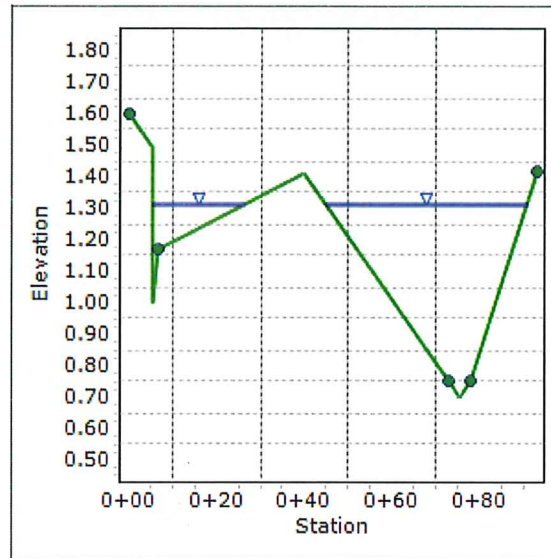
Cross Section for P- Upland-100 Yr- 80' EX and DEV

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.420 %
Normal Depth	0.6 ft
Discharge	70.00 cfs



Worksheet for U- Mayflower Ln-10 Yr- 80' EX and DEV

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	1.620 %		
Discharge	11.00 cfs		
Section Definitions			
	Station (ft)	Elevation (ft)	
	0+00.00	10.60	
	0+05.00	10.50	
	0+05.50	10.50	
	0+05.50	10.00	
	0+07.00	10.17	
	0+40.00	10.98	
	0+73.00	9.90	
	0+74.50	9.72	
	0+74.50	10.22	
	0+75.00	10.22	
	0+80.00	10.32	
Roughness Segment Definitions			
	Start Station	Ending Station	Roughness Coefficient
	(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
	(0+07.00, 10.17)	(0+73.00, 9.90)	0.016
	(0+73.00, 9.90)	(0+80.00, 10.32)	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	0.5 ft		
Roughness Coefficient	0.015		
Elevation	10.26 ft		
Elevation Range	9.72 to 10.98 ft		
Flow Area	3.1 ft ²		
Wetted Perimeter	20.85 ft		
Hydraulic Radius	0.1 ft		
Top Width	20.07 ft		

Worksheet for U- Mayflower Ln-10 Yr- 80' EX and DEV

Results

Normal Depth	0.5 ft
Critical Depth	0.6 ft
Critical Slope	0.631 %
Velocity	3.52 ft/s
Velocity Head	0.19 ft
Specific Energy	0.73 ft
Froude Number	1.572
Flow Type	Supercritical

GVF Input Data

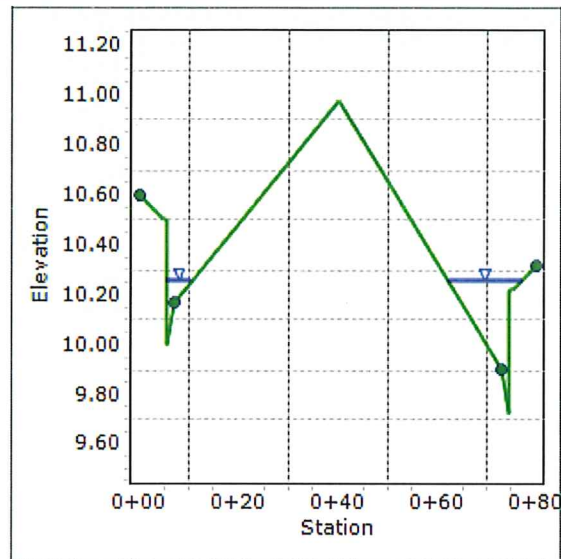
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Channel Slope	1.620 %
Critical Slope	0.631 %

Cross Section for U- Mayflower Ln-10 Yr- 80' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Normal Depth	0.5 ft
Discharge	11.00 cfs



Worksheet for U- Mayflower Ln-100 Yr- 80' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Discharge	24.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+07.00	10.17
0+40.00	10.98
0+73.00	9.90
0+74.50	9.72
0+74.50	10.22
0+75.00	10.22
0+80.00	10.32

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
(0+07.00, 10.17)	(0+73.00, 9.90)	0.016
(0+73.00, 9.90)	(0+80.00, 10.32)	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	0.6 ft
Roughness Coefficient	0.015
Elevation	10.37 ft
Elevation Range	9.72 to 10.98 ft
Flow Area	5.9 ft ²
Wetted Perimeter	31.64 ft
Hydraulic Radius	0.2 ft
Top Width	30.70 ft

Worksheet for U- Mayflower Ln-100 Yr- 80' EX and DEV

Results	
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Critical Slope	0.564 %
Velocity	4.07 ft/s
Velocity Head	0.26 ft
Specific Energy	0.90 ft
Froude Number	1.636
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Channel Slope	1.620 %
Critical Slope	0.564 %

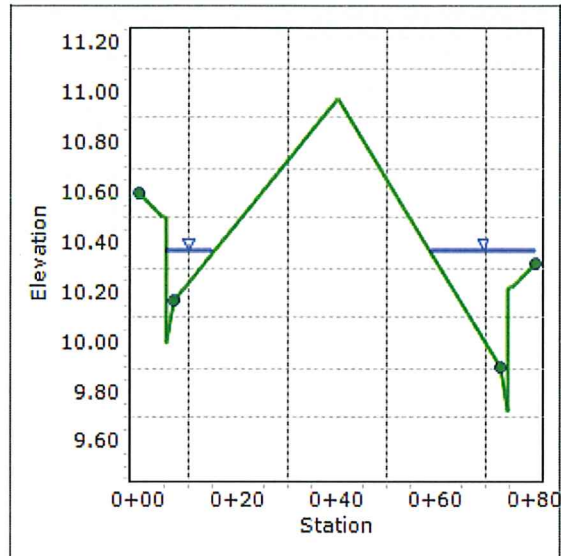
Cross Section for U- Mayflower Ln-100 Yr- 80' EX and DEV

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.620 %
Normal Depth	0.6 ft
Discharge	24.00 cfs



Worksheet for S-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	1.530 %		
Discharge	19.00 cfs		
Section Definitions			
	Station (ft)	Elevation (ft)	
	0+00.00	10.60	
	0+05.00	10.50	
	0+05.50	10.50	
	0+05.50	10.00	
	0+07.00	10.17	
	0+20.00	10.59	
	0+53.00	10.00	
	0+55.00	9.83	
	0+55.00	10.33	
	0+55.50	10.33	
	0+60.00	10.43	
Roughness Segment Definitions			
	Start Station	Ending Station	Roughness Coefficient
	(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
	(0+07.00, 10.17)	(0+53.00, 10.00)	0.016
	(0+53.00, 10.00)	(0+60.00, 10.43)	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	0.5 ft		
Roughness Coefficient	0.015		
Elevation	10.35 ft		
Elevation Range	9.83 to 10.60 ft		
Flow Area	5.2 ft ²		
Wetted Perimeter	31.04 ft		
Hydraulic Radius	0.2 ft		
Top Width	30.16 ft		

Worksheet for S-Mayflower Ln- 10 Yr-60' EX and DEV

Results

Normal Depth	0.5 ft
Critical Depth	0.6 ft
Critical Slope	0.623 %
Velocity	3.63 ft/s
Velocity Head	0.20 ft
Specific Energy	0.73 ft
Froude Number	1.534
Flow Type	Supercritical

GVF Input Data

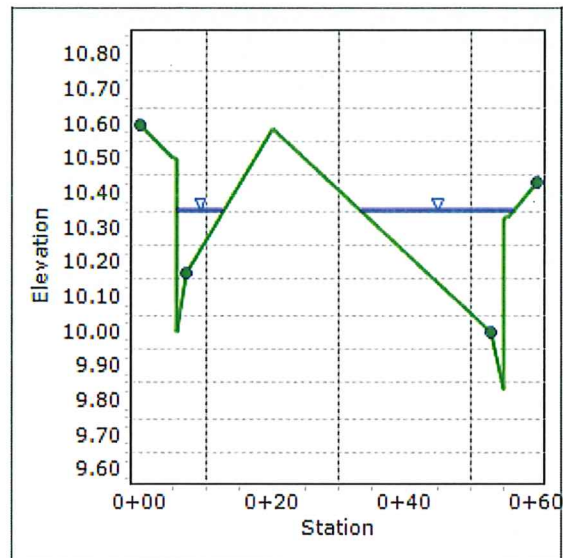
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Channel Slope	1.530 %
Critical Slope	0.623 %

Cross Section for S-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.530 %
Normal Depth	0.5 ft
Discharge	19.00 cfs



Worksheet for S-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.530 %
Discharge	43.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+07.00	10.17
0+20.00	10.59
0+53.00	10.00
0+55.00	9.83
0+55.00	10.33
0+55.50	10.33
0+60.00	10.43

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
(0+07.00, 10.17)	(0+53.00, 10.00)	0.016
(0+53.00, 10.00)	(0+60.00, 10.43)	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	0.6 ft
Roughness Coefficient	0.015
Elevation	10.47 ft
Elevation Range	9.83 to 10.60 ft
Flow Area	9.9 ft ²
Wetted Perimeter	45.53 ft
Hydraulic Radius	0.2 ft
Top Width	44.48 ft

Worksheet for S-Mayflower Ln- 100 Yr-60' EX and DEV

Results	
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Critical Slope	0.558 %
Velocity	4.33 ft/s
Velocity Head	0.29 ft
Specific Energy	0.94 ft
Froude Number	1.613
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Channel Slope	1.530 %
Critical Slope	0.558 %

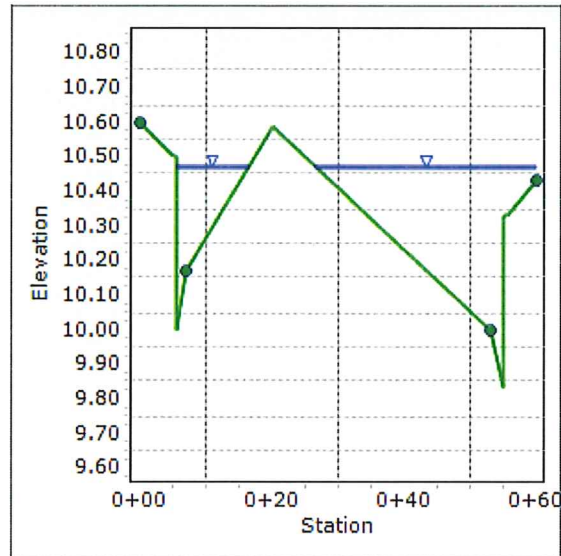
Cross Section for S-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.530 %
Normal Depth	0.6 ft
Discharge	43.00 cfs



Worksheet for W-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Channel Slope	2.770 %
Discharge	30.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+07.00	10.17
0+20.00	10.43
0+53.00	9.77
0+55.00	9.60
0+55.00	10.10
0+55.00	10.10
0+60.00	10.20

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
(0+07.00, 10.17)	(0+53.00, 9.77)	0.016
(0+53.00, 9.77)	(0+60.00, 10.20)	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

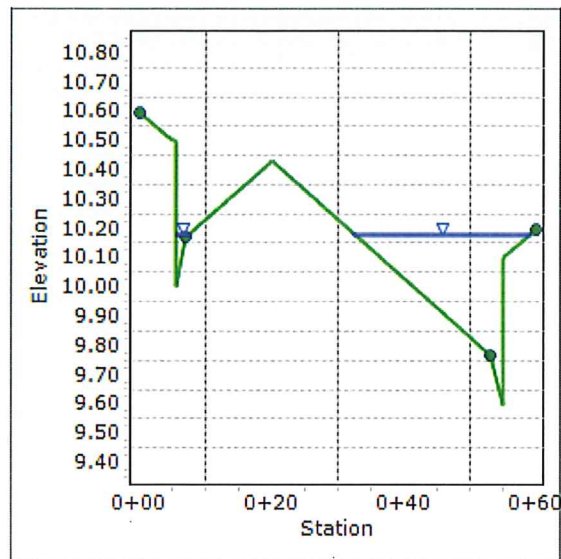
Normal Depth	0.6 ft
Roughness Coefficient	0.015
Elevation	10.18 ft
Elevation Range	9.60 to 10.60 ft
Flow Area	5.6 ft ²
Wetted Perimeter	29.83 ft
Hydraulic Radius	0.2 ft
Top Width	29.13 ft

Worksheet for W-Mayflower Ln- 10 Yr-60' EX and DEV

Results	
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Critical Slope	0.555 %
Velocity	5.34 ft/s
Velocity Head	0.44 ft
Specific Energy	1.03 ft
Froude Number	2.144
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.6 ft
Critical Depth	0.7 ft
Channel Slope	2.770 %
Critical Slope	0.555 %

Cross Section for W-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.770 %
Normal Depth	0.6 ft
Discharge	30.00 cfs



Worksheet for W-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.770 %
Discharge	66.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+07.00	10.17
0+20.00	10.43
0+53.00	9.77
0+55.00	9.60
0+55.00	10.10
0+55.00	10.10
0+60.00	10.20

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
(0+07.00, 10.17)	(0+53.00, 9.77)	0.016
(0+53.00, 9.77)	(0+60.00, 10.20)	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	0.7 ft
Roughness Coefficient	0.015
Elevation	10.32 ft
Elevation Range	9.60 to 10.60 ft
Flow Area	10.7 ft ²
Wetted Perimeter	44.65 ft
Hydraulic Radius	0.2 ft
Top Width	43.68 ft

Worksheet for W-Mayflower Ln- 100 Yr-60' EX and DEV

Results

Normal Depth	0.7 ft
Critical Depth	0.9 ft
Critical Slope	0.504 %
Velocity	6.18 ft/s
Velocity Head	0.59 ft
Specific Energy	1.32 ft
Froude Number	2.205
Flow Type	Supercritical

GVF Input Data

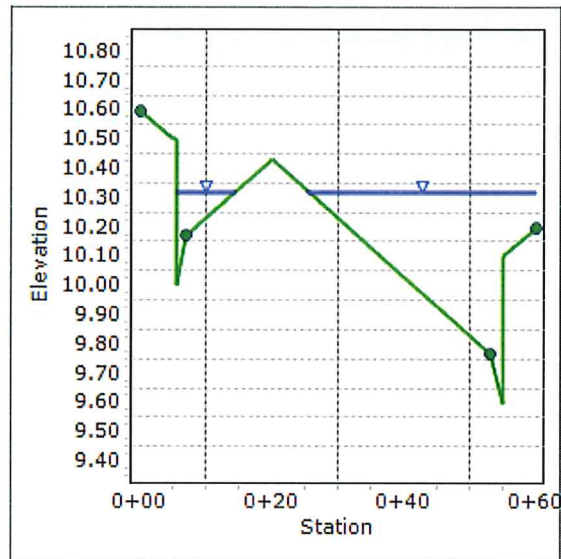
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.7 ft
Critical Depth	0.9 ft
Channel Slope	2.770 %
Critical Slope	0.504 %

Cross Section for W-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	2.770 %
Normal Depth	0.7 ft
Discharge	66.00 cfs



Worksheet for T-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.810 %
Discharge	36.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+07.00	10.17
0+17.00	10.44
0+53.00	10.14
0+54.50	9.97
0+54.50	10.47
0+55.00	10.47
0+60.00	10.57

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
(0+07.00, 10.17)	(0+53.00, 10.14)	0.016
(0+53.00, 10.14)	(0+60.00, 10.57)	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	0.4 ft
Roughness Coefficient	0.016
Elevation	10.42 ft
Elevation Range	9.97 to 10.60 ft
Flow Area	7.0 ft ²
Wetted Perimeter	47.48 ft
Hydraulic Radius	0.1 ft
Top Width	46.59 ft

Worksheet for T-Mayflower Ln- 10 Yr-60' EX and DEV

Results

Normal Depth	0.4 ft
Critical Depth	0.6 ft
Critical Slope	0.602 %
Velocity	5.14 ft/s
Velocity Head	0.41 ft
Specific Energy	0.86 ft
Froude Number	2.335
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

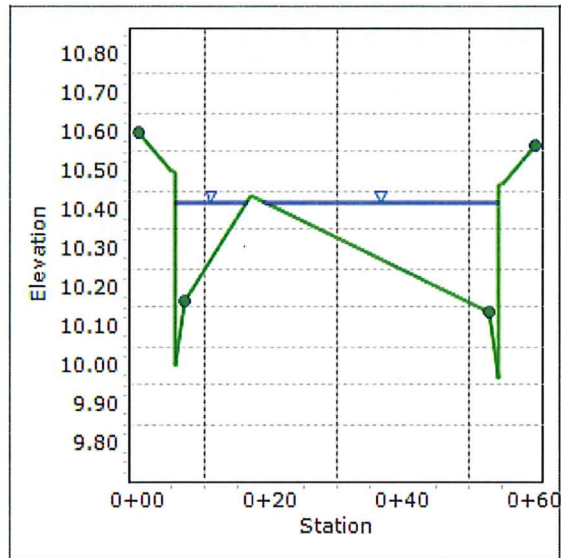
GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 ft
Critical Depth	0.6 ft
Channel Slope	3.810 %
Critical Slope	0.602 %

Cross Section for T-Mayflower Ln- 10 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data	
Channel Slope	3.810 %
Normal Depth	0.4 ft
Discharge	36.00 cfs



Worksheet for T-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	3.810 %		
Discharge	80.00 cfs		
Section Definitions			
	Station (ft)	Elevation (ft)	
	0+00.00	10.60	
	0+05.00	10.50	
	0+05.50	10.50	
	0+05.50	10.00	
	0+07.00	10.17	
	0+17.00	10.44	
	0+53.00	10.14	
	0+54.50	9.97	
	0+54.50	10.47	
	0+55.00	10.47	
	0+60.00	10.57	
Roughness Segment Definitions			
	Start Station	Ending Station	Roughness Coefficient
	(0+00.00, 10.60)	(0+07.00, 10.17)	0.013
	(0+07.00, 10.17)	(0+53.00, 10.14)	0.016
	(0+53.00, 10.14)	(0+60.00, 10.57)	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	0.5 ft		
Roughness Coefficient	0.016		
Elevation	10.52 ft		
Elevation Range	9.97 to 10.60 ft		
Flow Area	11.8 ft ²		
Wetted Perimeter	54.24 ft		
Hydraulic Radius	0.2 ft		
Top Width	53.21 ft		

Worksheet for T-Mayflower Ln- 100 Yr-60' EX and DEV

Results

Normal Depth	0.5 ft
Critical Depth	0.7 ft
Critical Slope	0.502 %
Velocity	6.75 ft/s
Velocity Head	0.71 ft
Specific Energy	1.26 ft
Froude Number	2.522
Flow Type	Supercritical

GVF Input Data

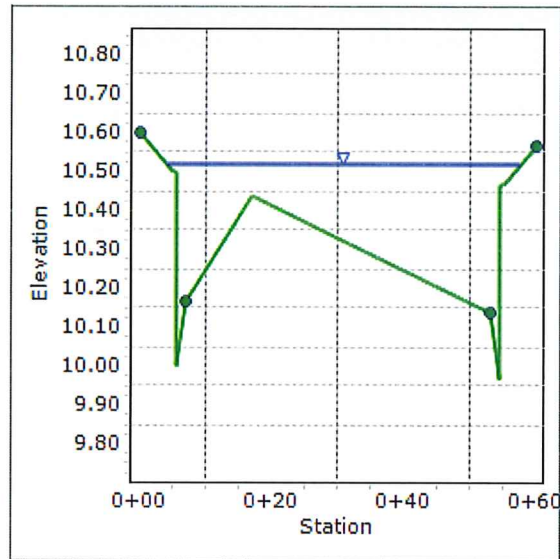
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.7 ft
Channel Slope	3.810 %
Critical Slope	0.502 %

Cross Section for T-Mayflower Ln- 100 Yr-60' EX and DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	3.810 %
Normal Depth	0.5 ft
Discharge	80.00 cfs



Worksheet for A- DEV 10 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.500 %
Discharge	1.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.17
0+31.00	0.44
0+31.00	0.82
0+33.00	0.82

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05.00, 0.50)	(0+07.00, 0.17)	0.013
(0+07.00, 0.17)	(0+31.00, 0.44)	0.016
(0+31.00, 0.44)	(0+33.00, 0.82)	0.013

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

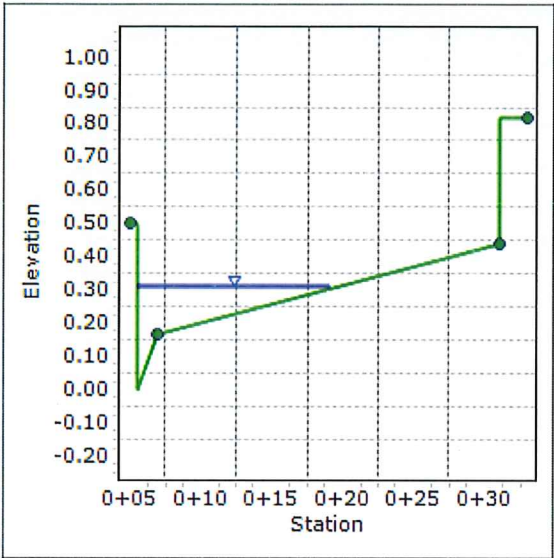
Results	
Normal Depth	0.3 ft
Roughness Coefficient	0.016
Elevation	0.31 ft
Elevation Range	0.00 to 0.82 ft
Flow Area	1.2 ft ²
Wetted Perimeter	14.00 ft
Hydraulic Radius	0.1 ft
Top Width	13.68 ft
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Critical Slope	0.863 %
Velocity	1.29 ft/s

Worksheet for A- DEV 10 YR

Results	
Velocity Head	0.03 ft
Specific Energy	0.33 ft
Froude Number	0.776
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Channel Slope	0.500 %
Critical Slope	0.863 %

Cross Section for A- DEV 10 YR

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.500 %
Normal Depth	0.3 ft
Discharge	1.50 cfs



Worksheet for A- DEV 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.500 %
Discharge	3.25 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+05.00	0.50
0+05.50	0.50
0+05.50	0.00
0+07.00	0.17
0+31.00	0.44
0+31.00	0.82
0+33.00	0.82

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05.00, 0.50)	(0+07.00, 0.17)	0.013
(0+07.00, 0.17)	(0+31.00, 0.44)	0.016
(0+31.00, 0.44)	(0+33.00, 0.82)	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	0.4 ft
Roughness Coefficient	0.016
Elevation	0.37 ft
Elevation Range	0.00 to 0.82 ft
Flow Area	2.1 ft ²
Wetted Perimeter	19.23 ft
Hydraulic Radius	0.1 ft
Top Width	18.85 ft
Normal Depth	0.4 ft
Critical Depth	0.3 ft
Critical Slope	0.789 %
Velocity	1.54 ft/s

Worksheet for A- DEV 100 YR

Results

Velocity Head	0.04 ft
Specific Energy	0.40 ft
Froude Number	0.809
Flow Type	Subcritical

GVF Input Data

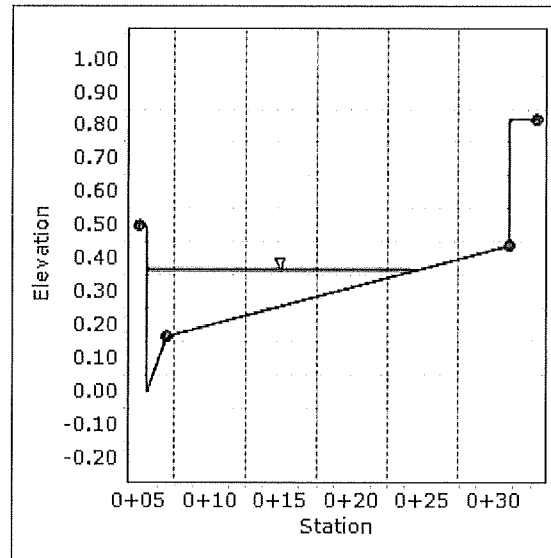
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 ft
Critical Depth	0.3 ft
Channel Slope	0.500 %
Critical Slope	0.789 %

Cross Section for A- DEV 100 YR

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.500 %
Normal Depth	0.4 ft
Discharge	3.25 cfs



Worksheet for B- DEV10 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.610 %
Discharge	6.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+02.50	10.60
0+05.00	10.50
0+05.50	10.50
0+05.50	10.00
0+60.00	8.90
0+62.00	8.73
0+62.00	9.23
0+65.00	9.29

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+02.50, 10.60)	(0+05.50, 10.00)	0.013
(0+05.50, 10.00)	(0+60.00, 8.90)	0.016
(0+60.00, 8.90)	(0+62.00, 9.23)	0.013
(0+62.00, 9.23)	(0+65.00, 9.29)	0.035

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

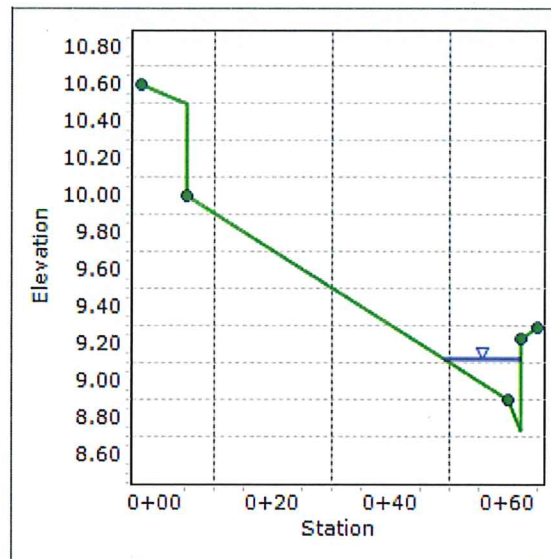
Results	
Normal Depth	0.4 ft
Roughness Coefficient	0.016
Elevation	9.12 ft
Elevation Range	8.73 to 10.60 ft
Flow Area	1.9 ft ²
Wetted Perimeter	13.46 ft
Hydraulic Radius	0.1 ft
Top Width	13.06 ft
Normal Depth	0.4 ft
Critical Depth	0.4 ft

Worksheet for B- DEV10 Yr

Results	
Critical Slope	0.662 %
Velocity	3.24 ft/s
Velocity Head	0.16 ft
Specific Energy	0.56 ft
Froude Number	1.519
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 ft
Critical Depth	0.4 ft
Channel Slope	1.610 %
Critical Slope	0.662 %

Cross Section for B- DEV10 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.610 %
Normal Depth	0.4 ft
Discharge	6.00 cfs



Worksheet for B- DEV 100 Yr

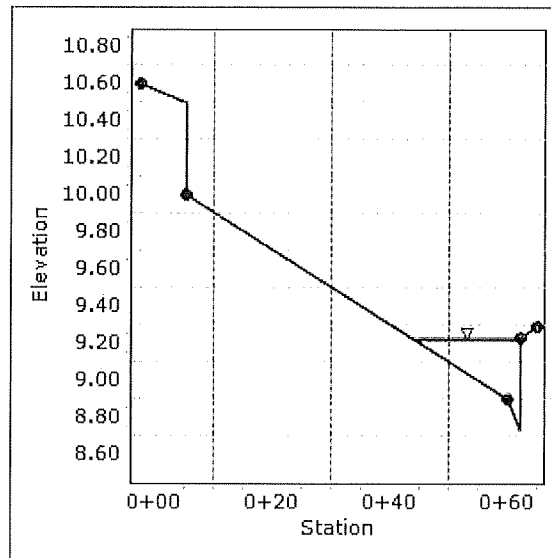
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	1.610 %		
Discharge	13.00 cfs		
Section Definitions			
	Station (ft)	Elevation (ft)	
	-0+02.50	10.60	
	0+05.00	10.50	
	0+05.50	10.50	
	0+05.50	10.00	
	0+60.00	8.90	
	0+62.00	8.73	
	0+62.00	9.23	
	0+65.00	9.29	
Roughness Segment Definitions			
Start Station	Ending Station	Roughness Coefficient	
(-0+02.50, 10.60)	(0+05.50, 10.00)	0.013	
(0+05.50, 10.00)	(0+60.00, 8.90)	0.016	
(0+60.00, 8.90)	(0+62.00, 9.23)	0.013	
(0+62.00, 9.23)	(0+65.00, 9.29)	0.035	
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	0.5 ft		
Roughness Coefficient	0.016		
Elevation	9.22 ft		
Elevation Range	8.73 to 10.60 ft		
Flow Area	3.3 ft ²		
Wetted Perimeter	18.36 ft		
Hydraulic Radius	0.2 ft		
Top Width	17.86 ft		
Normal Depth	0.5 ft		
Critical Depth	0.6 ft		

Worksheet for B- DEV 100 Yr

Results	
Critical Slope	0.621 %
Velocity	3.88 ft/s
Velocity Head	0.23 ft
Specific Energy	0.72 ft
Froude Number	1.580
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Channel Slope	1.610 %
Critical Slope	0.621 %

Cross Section for B- DEV 100 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.610 %
Normal Depth	0.5 ft
Discharge	13.00 cfs



Worksheet for E- DEV 10 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.530 %
Discharge	1.50 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+02.50	1.60
0+05.00	1.50
0+05.50	1.50
0+05.50	1.00
0+44.00	0.65
0+46.00	0.48
0+46.00	1.00
0+48.00	0.96

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+02.50, 1.60)	(0+05.50, 1.00)	0.013
(0+05.50, 1.00)	(0+44.00, 0.65)	0.016
(0+44.00, 0.65)	(0+46.00, 1.00)	0.013
(0+46.00, 1.00)	(0+48.00, 0.96)	0.035

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	0.3 ft
Roughness Coefficient	0.016
Elevation	0.77 ft
Elevation Range	0.48 to 1.60 ft
Flow Area	1.2 ft ²
Wetted Perimeter	15.41 ft
Hydraulic Radius	0.1 ft
Top Width	15.11 ft
Normal Depth	0.3 ft
Critical Depth	0.3 ft

Worksheet for E- DEV 10 Yr

Results

Critical Slope	0.872 %
Velocity	1.26 ft/s
Velocity Head	0.02 ft
Specific Energy	0.31 ft
Froude Number	0.792
Flow Type	Subcritical

GVF Input Data

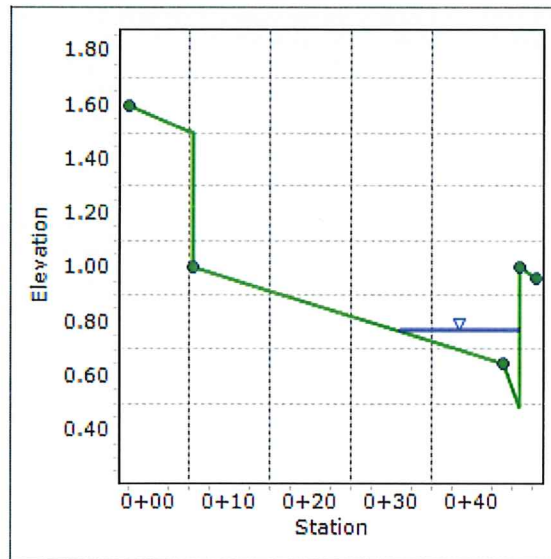
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Channel Slope	0.530 %
Critical Slope	0.872 %

Cross Section for E- DEV 10 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.530 %
Normal Depth	0.3 ft
Discharge	1.50 cfs



Worksheet for E -DEV 100 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.530 %
Discharge	3.25 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+02.50	1.60
0+05.00	1.50
0+05.50	1.50
0+05.50	1.00
0+44.00	0.65
0+46.00	0.48
0+46.00	1.00
0+48.00	0.96

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+02.50, 1.60)	(0+05.50, 1.00)	0.013
(0+05.50, 1.00)	(0+44.00, 0.65)	0.016
(0+44.00, 0.65)	(0+46.00, 1.00)	0.013
(0+46.00, 1.00)	(0+48.00, 0.96)	0.035

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	0.3 ft
Roughness Coefficient	0.016
Elevation	0.82 ft
Elevation Range	0.48 to 1.60 ft
Flow Area	2.2 ft ²
Wetted Perimeter	21.43 ft
Hydraulic Radius	0.1 ft
Top Width	21.08 ft
Normal Depth	0.3 ft
Critical Depth	0.3 ft

Worksheet for E -DEV 100 Yr

Results

Critical Slope	0.803 %
Velocity	1.50 ft/s
Velocity Head	0.03 ft
Specific Energy	0.38 ft
Froude Number	0.822
Flow Type	Subcritical

GVF Input Data

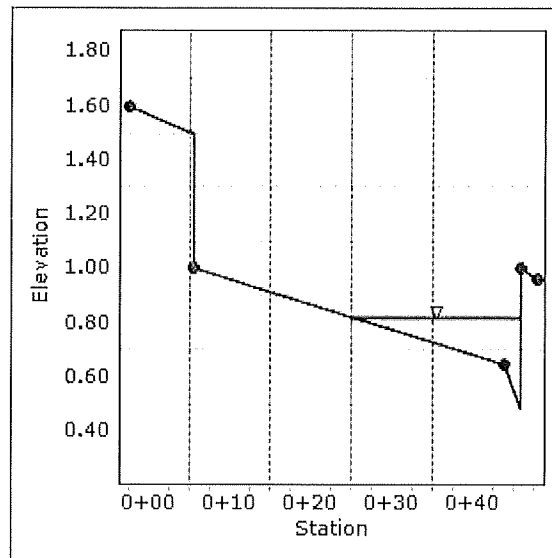
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Channel Slope	0.530 %
Critical Slope	0.803 %

Cross Section for E -DEV 100 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.530 %
Normal Depth	0.3 ft
Discharge	3.25 cfs



Worksheet for Y-sec - Upland -10 Yr -DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Discharge	31.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,280.73
0+00.19	2,280.73
0+00.43	2,280.60
0+00.83	2,280.31
0+18.99	2,280.48
0+21.55	2,280.52
0+22.04	2,280.51
0+23.91	2,280.50
0+30.78	2,280.49
0+40.78	2,280.35
0+43.10	2,280.33
0+49.26	2,280.24
0+66.54	2,279.99
0+66.71	2,279.99
0+70.24	2,279.98
0+71.17	2,279.99
0+72.91	2,280.05
0+75.13	2,280.13
0+75.21	2,280.18
0+76.18	2,280.81
0+76.75	2,280.82
0+76.85	2,280.83
0+78.34	2,280.87
0+78.57	2,280.88

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,280.73)	(0+00.83, 2,280.31)	0.013
(0+00.83, 2,280.31)	(0+71.17, 2,279.99)	0.016
(0+71.17, 2,279.99)	(0+78.57, 2,280.88)	0.013

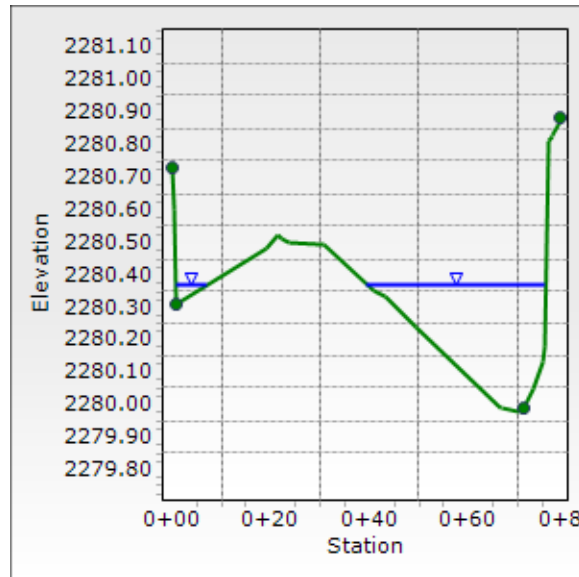
Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Y-sec - Upland -10 Yr -DEV

Options	
Closed Channel Weighting Method	Pavlovskii's Method
Results	
Normal Depth	0.4 ft
Roughness Coefficient	0.016
Elevation	2,280.37 ft
Elevation Range	2,279.98 to 2,280.88 ft
Flow Area	8.2 ft ²
Wetted Perimeter	42.57 ft
Hydraulic Radius	0.2 ft
Top Width	42.47 ft
Normal Depth	0.4 ft
Critical Depth	0.5 ft
Critical Slope	0.605 %
Velocity	3.77 ft/s
Velocity Head	0.22 ft
Specific Energy	0.61 ft
Froude Number	1.510
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.4 ft
Critical Depth	0.5 ft
Channel Slope	1.420 %
Critical Slope	0.605 %

Cross Section for Y-sec - Upland -10 Yr -DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Normal Depth	0.4 ft
Discharge	31.00 cfs



Worksheet for Y-sec - Upland -100 Yr- DEV

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Discharge	70.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,280.73
0+00.19	2,280.73
0+00.43	2,280.60
0+00.83	2,280.31
0+18.99	2,280.48
0+21.55	2,280.52
0+22.04	2,280.51
0+23.91	2,280.50
0+30.78	2,280.49
0+40.78	2,280.35
0+43.10	2,280.33
0+49.26	2,280.24
0+66.54	2,279.99
0+66.71	2,279.99
0+70.24	2,279.98
0+71.17	2,279.99
0+72.91	2,280.05
0+75.13	2,280.13
0+75.21	2,280.18
0+76.18	2,280.81
0+76.75	2,280.82
0+76.85	2,280.83
0+78.34	2,280.87
0+78.57	2,280.88

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,280.73)	(0+00.83, 2,280.31)	0.013
(0+00.83, 2,280.31)	(0+71.17, 2,279.99)	0.016
(0+71.17, 2,279.99)	(0+78.57, 2,280.88)	0.013

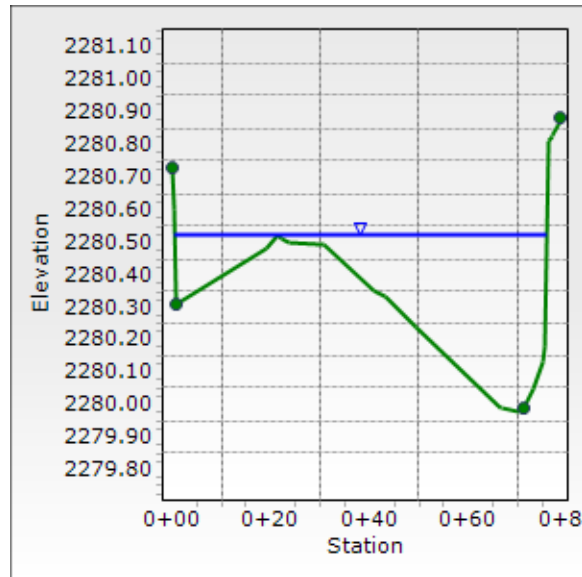
Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Y-sec - Upland -100 Yr- DEV

Options	
Closed Channel Weighting Method	Pavlovskii's Method
Results	
Normal Depth	0.5 ft
Roughness Coefficient	0.016
Elevation	2,280.52 ft
Elevation Range	2,279.98 to 2,280.88 ft
Flow Area	16.9 ft ²
Wetted Perimeter	75.39 ft
Hydraulic Radius	0.2 ft
Top Width	75.20 ft
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Critical Slope	0.547 %
Velocity	4.13 ft/s
Velocity Head	0.27 ft
Specific Energy	0.81 ft
Froude Number	1.536
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Channel Slope	1.420 %
Critical Slope	0.547 %

Cross Section for Y-sec - Upland -100 Yr- DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Normal Depth	0.5 ft
Discharge	70.00 cfs



Worksheet for V- Riprap 100 Yr DEV

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	0.950 %		
Discharge	2.60 cfs		
Section Definitions			
	Station (ft)	Elevation (ft)	
	0+00.00		0.50
	0+02.50		0.45
	0+05.00		0.50
Roughness Segment Definitions			
Start Station	Ending Station	Roughness Coefficient	
(0+00.00, 0.50)	(0+05.00, 0.50)	0.035	
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	0.3 ft		
Roughness Coefficient	0.035		
Elevation	0.78 ft		
Elevation Range	0.45 to 0.50 ft		
Flow Area	1.5 ft ²		
Wetted Perimeter	5.55 ft		
Hydraulic Radius	0.3 ft		
Top Width	5.00 ft		
Normal Depth	0.3 ft		
Critical Depth	0.2 ft		
Critical Slope	3.329 %		
Velocity	1.73 ft/s		
Velocity Head	0.05 ft		
Specific Energy	0.37 ft		
Froude Number	0.557		
Flow Type	Subcritical		
GVF Input Data			

Worksheet for V- Riprap 100 Yr DEV

GVF Input Data

Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.3 ft
Critical Depth	0.2 ft
Channel Slope	0.950 %
Critical Slope	3.329 %

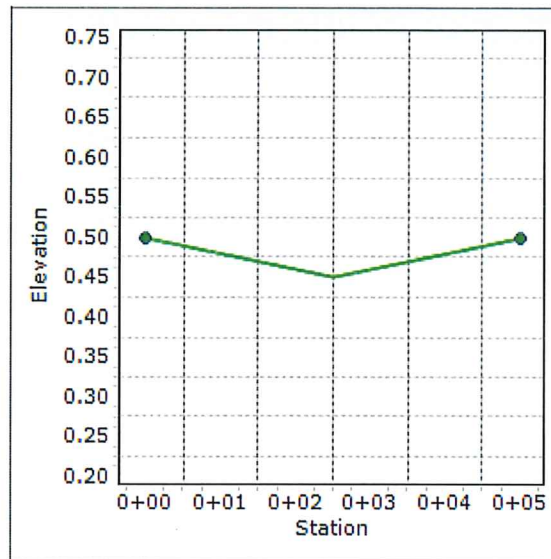
Worksheet for V- Riprap 100 Yr DEV

Messages:

Water Surface Elevation exceeds lowest end station by 0.27540540794305ft.

Cross Section for V- Riprap 100 Yr DEV

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.950 %
Normal Depth	0.3 ft
Discharge	2.60 cfs





FLOW- SPLIT ANALYSIS

Worksheet for Flow split @ Q- Upland 10 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.490 %
Discharge	2.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.54	2,282.73
0+04.62	2,282.77
0+25.47	2,282.99
0+25.63	2,282.98
0+25.81	2,282.98
0+26.01	2,282.98
0+26.25	2,282.97
0+26.51	2,282.97
0+26.79	2,282.96
0+27.08	2,282.95
0+27.38	2,282.94
0+27.68	2,282.93
0+27.97	2,282.92
0+34.77	2,282.64
0+39.40	2,282.48
0+40.67	2,282.44
0+42.63	2,282.37
0+61.90	2,281.74
0+62.88	2,281.73
0+63.99	2,281.71
0+64.23	2,281.71
0+64.97	2,281.83
0+65.56	2,281.93
0+65.93	2,281.99
0+65.95	2,281.99

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.54, 2,282.73)	(0+63.99, 2,281.71)	0.016
(0+63.99, 2,281.71)	(0+65.95, 2,281.99)	0.013

Options

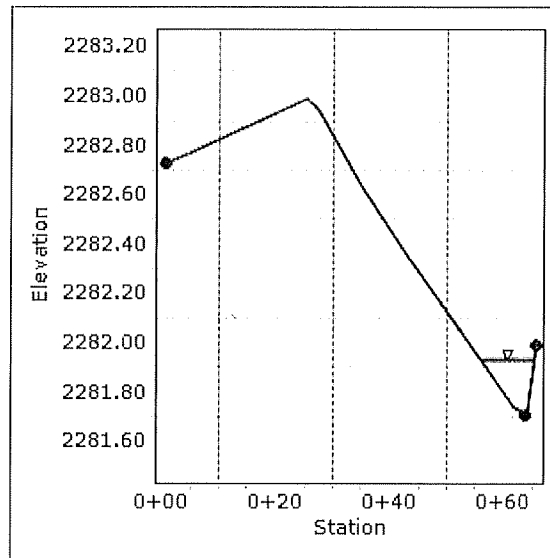
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Flow split @ Q- Upland 10 Yr

Options	
Closed Channel Weighting Method	Pavlovskii's Method
Results	
Normal Depth	0.2 ft
Roughness Coefficient	0.016
Elevation	2,281.93 ft
Elevation Range	2,281.71 to 2,282.99 ft
Flow Area	1.2 ft ²
Wetted Perimeter	9.56 ft
Hydraulic Radius	0.1 ft
Top Width	9.54 ft
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Critical Slope	0.723 %
Velocity	1.67 ft/s
Velocity Head	0.04 ft
Specific Energy	0.27 ft
Froude Number	0.834
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.2 ft
Critical Depth	0.2 ft
Channel Slope	0.490 %
Critical Slope	0.723 %

Cross Section for Flow split @ Q- Upland 10 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.490 %
Normal Depth	0.2 ft
Discharge	2.00 cfs



Worksheet for Flow split @ R - Mayflower 10 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Discharge	11.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,281.99
0+00.21	2,281.94
0+01.23	2,281.69
0+01.54	2,281.69
0+04.31	2,281.72
0+18.99	2,281.94
0+22.79	2,281.87
0+31.71	2,281.70
0+32.14	2,281.94

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,281.99)	(0+01.23, 2,281.69)	0.013
(0+01.23, 2,281.69)	(0+31.71, 2,281.70)	0.016
(0+31.71, 2,281.70)	(0+32.14, 2,281.94)	0.013

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

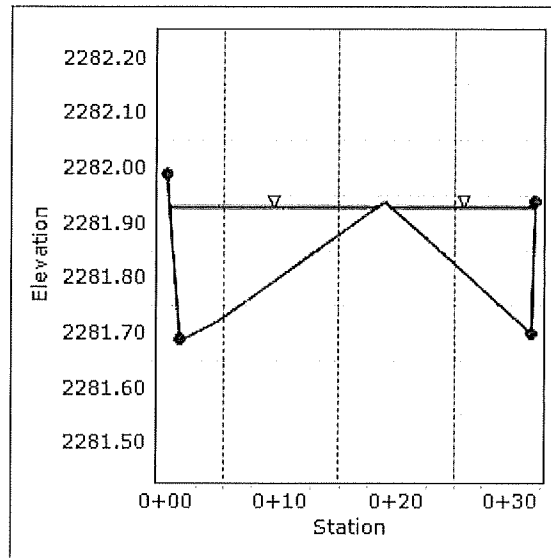
Results	
Normal Depth	0.2 ft
Roughness Coefficient	0.016
Elevation	2,281.93 ft
Elevation Range	2,281.69 to 2,281.99 ft
Flow Area	3.8 ft ²
Wetted Perimeter	30.89 ft
Hydraulic Radius	0.1 ft
Top Width	30.80 ft
Normal Depth	0.2 ft
Critical Depth	0.3 ft

Worksheet for Flow split @ R - Mayflower 10 Yr

Results	
Critical Slope	0.688 %
Velocity	2.93 ft/s
Velocity Head	0.13 ft
Specific Energy	0.37 ft
Froude Number	1.477
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.2 ft
Critical Depth	0.3 ft
Channel Slope	1.620 %
Critical Slope	0.688 %

Cross Section for Flow split @ R - Mayflower 10 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Normal Depth	0.2 ft
Discharge	11.00 cfs



Worksheet for Flow split @Q- Upland 100 Yr

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.490 %
Discharge	3.90 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.54	2,282.73
0+04.62	2,282.77
0+25.47	2,282.99
0+25.63	2,282.98
0+25.81	2,282.98
0+26.01	2,282.98
0+26.25	2,282.97
0+26.51	2,282.97
0+26.79	2,282.96
0+27.08	2,282.95
0+27.38	2,282.94
0+27.68	2,282.93
0+27.97	2,282.92
0+34.77	2,282.64
0+39.40	2,282.48
0+40.67	2,282.44
0+42.63	2,282.37
0+61.90	2,281.74
0+62.88	2,281.73
0+63.99	2,281.71
0+64.23	2,281.71
0+64.97	2,281.83
0+65.56	2,281.93
0+65.93	2,281.99
0+65.95	2,281.99

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.54, 2,282.73)	(0+63.99, 2,281.71)	0.016
(0+63.99, 2,281.71)	(0+65.95, 2,281.99)	0.013

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

Worksheet for Flow split @Q- Upland 100 Yr

Options	
Closed Channel Weighting Method	Pavlovskii's Method
Results	
Normal Depth	0.3 ft
Roughness Coefficient	0.016
Elevation	2,282.00 ft
Elevation Range	2,281.71 to 2,282.99 ft
Flow Area	2.0 ft ²
Wetted Perimeter	12.12 ft
Hydraulic Radius	0.2 ft
Top Width	12.08 ft
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Critical Slope	0.661 %
Velocity	1.99 ft/s
Velocity Head	0.06 ft
Specific Energy	0.35 ft
Froude Number	0.870
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.3 ft
Critical Depth	0.3 ft
Channel Slope	0.490 %
Critical Slope	0.661 %

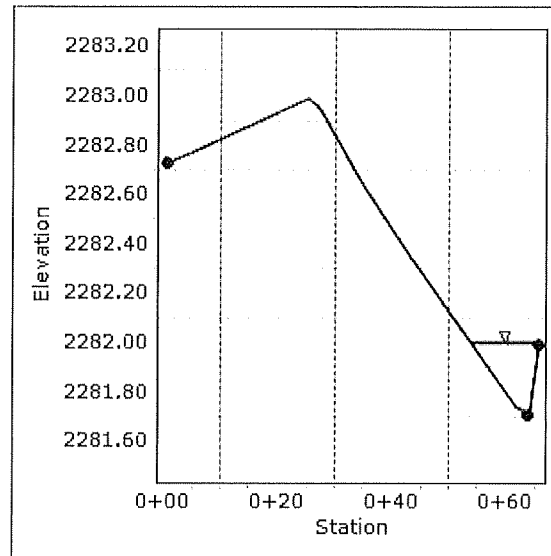
Worksheet for Flow split @Q- Upland 100 Yr

Messages:

Water Surface Elevation exceeds lowest end station by 0.0126755263704581ft.

Cross Section for Flow split @Q- Upland 100 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	0.490 %
Normal Depth	0.3 ft
Discharge	3.90 cfs



Worksheet for Flow split @ R - Mayflower 100 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Discharge	24.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,281.99
0+00.21	2,281.94
0+01.23	2,281.69
0+01.54	2,281.69
0+04.31	2,281.72
0+18.99	2,281.94
0+22.79	2,281.87
0+31.71	2,281.70
0+32.14	2,281.94

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,281.99)	(0+01.23, 2,281.69)	0.013
(0+01.23, 2,281.69)	(0+31.71, 2,281.70)	0.016
(0+31.71, 2,281.70)	(0+32.14, 2,281.94)	0.013

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

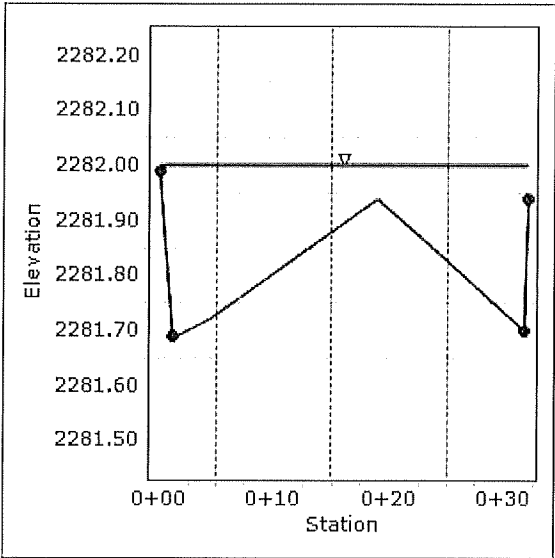
Results	
Normal Depth	0.3 ft
Roughness Coefficient	0.016
Elevation	2,282.00 ft
Elevation Range	2,281.69 to 2,281.99 ft
Flow Area	6.1 ft ²
Wetted Perimeter	32.32 ft
Hydraulic Radius	0.2 ft
Top Width	32.14 ft
Normal Depth	0.3 ft
Critical Depth	0.4 ft

Worksheet for Flow split @ R - Mayflower 100 Yr

Results	
Critical Slope	0.581 %
Velocity	3.94 ft/s
Velocity Head	0.24 ft
Specific Energy	0.56 ft
Froude Number	1.590
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.3 ft
Critical Depth	0.4 ft
Channel Slope	1.620 %
Critical Slope	0.581 %

Cross Section for Flow split @ R - Mayflower 100 Yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.620 %
Normal Depth	0.3 ft
Discharge	24.10 cfs



Worksheet for Flow-split @ Z-sec

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.300 %
Discharge	0.10 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,281.16
0+00.43	2,281.18
0+00.46	2,281.17
0+00.56	2,281.06
0+01.12	2,281.02
0+01.22	2,280.97
0+16.44	2,280.83
0+21.02	2,280.80
0+33.06	2,280.72
0+33.43	2,280.72
0+34.25	2,280.73
0+40.97	2,280.78
0+47.85	2,280.82
0+51.19	2,280.82
0+58.57	2,280.81
0+59.28	2,281.42
0+59.36	2,281.48
0+63.21	2,281.25

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,281.16)	(0+01.22, 2,280.97)	0.013
(0+01.22, 2,280.97)	(0+58.57, 2,280.81)	0.016
(0+58.57, 2,280.81)	(0+63.21, 2,281.25)	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	0.0 ft
Roughness Coefficient	0.016

Worksheet for Flow-split @ Z-sec

Results

Elevation	2,280.75 ft
Elevation Range	2,280.72 to 2,281.48 ft
Flow Area	0.1 ft ²
Wetted Perimeter	9.08 ft
Hydraulic Radius	0.0 ft
Top Width	9.08 ft
Normal Depth	0.0 ft
Critical Depth	0.0 ft
Critical Slope	1.484 %
Velocity	0.68 ft/s
Velocity Head	0.01 ft
Specific Energy	0.04 ft
Froude Number	0.941
Flow Type	Subcritical

GVF Input Data

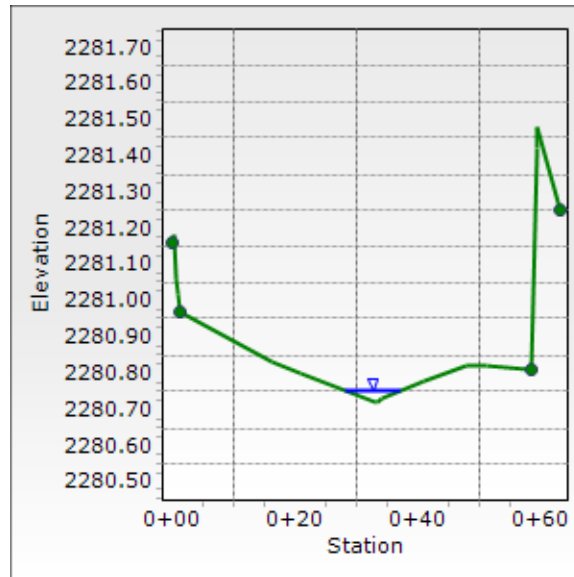
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.0 ft
Critical Depth	0.0 ft
Channel Slope	1.300 %
Critical Slope	1.484 %

Cross Section for Flow-split @ Z-sec

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.300 %
Normal Depth	0.0 ft
Discharge	0.10 cfs



Worksheet for Flow-split @ Y-sec

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Discharge	70.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2,280.73
0+00.19	2,280.73
0+00.43	2,280.60
0+00.83	2,280.31
0+18.99	2,280.48
0+21.55	2,280.52
0+22.04	2,280.51
0+23.91	2,280.50
0+30.78	2,280.49
0+40.78	2,280.35
0+43.10	2,280.33
0+49.26	2,280.24
0+66.54	2,279.99
0+66.71	2,279.99
0+70.24	2,279.98
0+71.17	2,279.99
0+72.91	2,280.05
0+75.13	2,280.13
0+75.21	2,280.18
0+76.18	2,280.81
0+76.75	2,280.82
0+76.85	2,280.83
0+78.34	2,280.87
0+78.57	2,280.88

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2,280.73)	(0+00.83, 2,280.31)	0.013
(0+00.83, 2,280.31)	(0+71.17, 2,279.99)	0.016
(0+71.17, 2,279.99)	(0+78.57, 2,280.88)	0.013

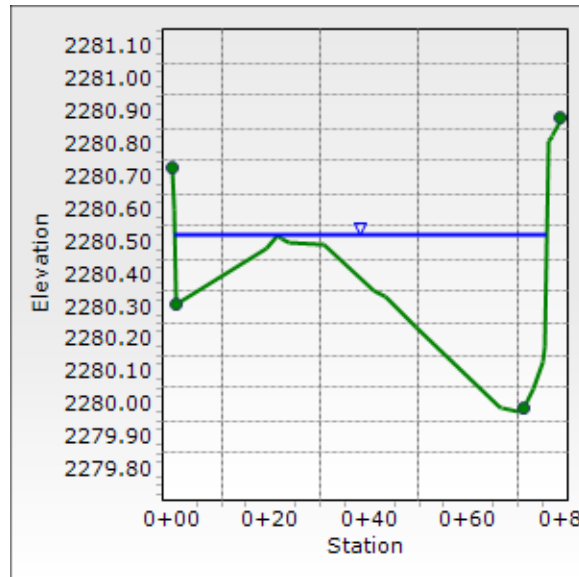
Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Flow-split @ Y-sec

Options	
Closed Channel Weighting Method	Pavlovskii's Method
Results	
Normal Depth	0.5 ft
Roughness Coefficient	0.016
Elevation	2,280.52 ft
Elevation Range	2,279.98 to 2,280.88 ft
Flow Area	16.9 ft ²
Wetted Perimeter	75.39 ft
Hydraulic Radius	0.2 ft
Top Width	75.20 ft
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Critical Slope	0.547 %
Velocity	4.13 ft/s
Velocity Head	0.27 ft
Specific Energy	0.81 ft
Froude Number	1.536
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.5 ft
Critical Depth	0.6 ft
Channel Slope	1.420 %
Critical Slope	0.547 %

Cross Section for Flow-split @ Y-sec

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Channel Slope	1.420 %
Normal Depth	0.5 ft
Discharge	70.00 cfs



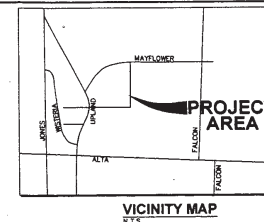
WSE @ Y- Section (upland) < WSE @ Z-section (Southern border of the site).
 So ,the high point on the southern border is high enough to protect the site from
 the 100- Yr flow.



APPENDIX E

Reference Material

DEVELOPED CONDITION			
BASIN/CP	AREA (acres)	Q10 (cfs)	Q100 (cfs)
(F01)	2.30	2.8	5.5



APN: 138-36-201-001

M.P.I.D.# 2444

CONSTRUCTION NOTES:

1. CONSTRUCT "X" TYPE CURB AND GUTTER PER C.A.U.S.D. #218.
2. CONSTRUCT "A" TYPE CURBS PER C.A.U.S.D. #219.
3. CONSTRUCT COMMERCIAL/INDUSTRIAL DRIVEWAY PER C.A.U.S.D. #225
WITH GEOMETRIC PER C.A.U.S.D. #222A. CONSTRUCT 8' CROSS
OVER PER C.A.U.S.D. #222B.
4. INSTALL 6" WIDE "X" HIGH CHAIN LINK FENCE PER C.A.U.S.D. #235
5. CONSTRUCT SIDEWALK RAMP CASE PER C.A.U.S.D. #235
6. INSTALL ACCESSIBLE BURNING BARREL PER C.A.U.S.D. #236
7. INSTALL PRECAST BUMPER BLOCK PER C.A.U.S.D. #238.
8. CONSTRUCT MAZE PER DETAIL 5-C-700.
9. CONSTRUCT "H" FENCE WITH MOW CURB PER DETAIL 5-C-700.
10. CONSTRUCT CONCRETE SIDEWALK PER C.A.U.S.D. #234.
11. CONSTRUCT LIGHT AC PAVEMENT PER DETAIL 2-C-700.
12. INSTALL "H" HIGH CHAINLINK FENCE PER C.A.U.S.D. NO. 252.
13. N/A
14. LAYDOWING STRIPING SEE GENERAL NOTE #1.
15. INSTALL BASKETBALL COURTS FOR DETAIL 1-A-SECT 94. C7.00.
16. INSTALL BENCH RAIL, CHAIN LINK FENCE, 3-SHEET MC. C7.00.
17. INSTALL 4" WIDE "X" HIGH CHAIN LINK GATE.
18. INSTALL TWO (2) 12" WIDE "X" HIGH CHAIN LINK GATES.
19. CONSTRUCT MAZE PER DETAIL 2-C-700.
20. INSTALL TWO (2) 12" WIDE "X" HIGH CHAIN LINK GATES. VERIFY W/ CSDO
HOW MUCH GATE CONTACT LENGTH TO BE INSTALLED.
21. INSTALL 10" WIDE "X" HIGH CHAIN LINK GATES.
22. INSTALL ACCESSIBLE PARKING SIGN PER DETAIL 5-C-700.
23. INSTALL NO PARKING SIGN PER DETAIL 5-C-700.

FLOOD ZONE NOTE

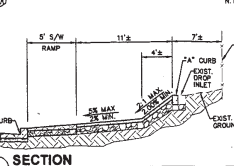
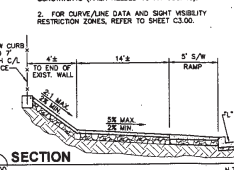
pb THE SITE IS LOCATED ENTIRELY WITHIN FLOOD
ZONE X MAP 32003C2188E REVISED SEPTEMBER
27TH, 2002

**GENERAL NOTE
(ADA ACCESSIBILITY):**

ALL ACCESSIBLE SIDEWALKS AND ROUTES MUST BE CONSTRUCTED WITH LESS THAN 2% CROSS SLOPES. THE AC PAVING IN ALL ACCESSIBLE PARKING STALLS AND ACCESS AISLES SHALL BE LESS THAN A 2% SLOPE IN ANY DIRECTION. FOR ACCESSIBLE SIDEWALKS AND ROUTES THAT ARE NOT A RAMPED CONDITION THE SLOPE SHALL BE LESS THAN 5% IN THE DIRECTION OF TRAVEL. IN A RAMPED

CONDITION THE SLOPE SHALL BE LE
IN THE DIRECTION OF TRAVEL.

- GENERAL NOTES:**
1. CONTRACTOR TO VERIFY DIMENSIONS OF EXISTING PLAYGROUND MARGINS PRIOR TO DEMOLITION WORK. PLAYGROUND MARGINS TO BE RESTORED AFTER PAVING WORK COMPLETED IN LOCATION AS SHOWN ON PLANS. LOCATION OF PLAYGROUND MARGINS MAY CHANGE BECAUSE OF SURFACE FEATURES (V-GUTTERS, DROP INLETS) AND/OR SITE CONSTRAINTS (AREA NEEDED TO FIT COURTS).



DO NOT SCALE DRAWINGS

CCSD **APPROVED**
ENGINEERING

CCSDN	ENC
CLARK COUNTY	

SCHOOL DISTRICT	DRAFTED:
	SPECIALIST:

☐ K IS REQUIRED
☒ WORK REQUIRED

ARCHITECTURAL
ELECTRICAL
MECHANICAL
CIVIL
COORDINATION

REQUIREMENTS

SITE ADMINISTRATION
 CODE COMPLIANCE
 MEDIA REVIEW
 PERMITS

PROJECT MANAGER	
-----------------	--

ESTOS	SBS	SPECIAL PROJECTS
-------	-----	------------------

NCE	A58	NO A	THO
			GATTS

Call before you Dig
Avoid cutting underground
cables or pipes.

Call 800-451-4511

Underground **Call** **811**
1-702-455-7511 **before you**

1-702-455-7540 OVERHEAD 1-800-227-2800

1-702-432-5300	1-702-427-2000	1-702-432-7544
DOOR	WALLS	FENCES
		SPOT
		ROADS

		LEVELS	ELEVATIONS	
	■ ■ ■ ■ ■	* — * — *	(12.3±) 12.34 BC	- - -

--	--	--	--	--

Nevada By Design

RED ROCK ELEMENTARY SCHOOL SITE IMPROVEMENTS

**ONSITE DRAINAGE BASIN
FOR ON-SITE "L" CURB AND GUTTER**

PROJECT:	
DRAWING TITLE:	

SHEET NO.:
FIG

SHEET
MPID
CLV

100



APPENDIX F

Improvement Plans