



ADDENDUM 2 TO THE TECHNICAL DRAINAGE STUDY

Skye Canyon North Arroyo Storm Drain

OCTOBER 2022

PREPARED FOR:
Century Communities of Nevada, LLC.
Las Vegas, NV

PREPARED BY:

Westwood

Skye Canyon North Arroyo Storm Drain

Addendum 2 to the Technical Drainage Study

City of Las Vegas, NV

Prepared For:

Century Communities of Nevada, LLC
6345 South Jones Boulevard
Las Vegas, NV 89118
Phone: 702-873-5338

Prepared By:

Westwood Professional Services
5725 W. Badura Avenue, Suite 100
Las Vegas, NV 89118
Phone: (702) 284-5300
Fax: (702) 284-5339



Project Number: CEN2018.000
Date: October 2022

Lant Leavitt, P.E.
NV Professional Engineer No. 18287
Assisted by: Phil Koerschner

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon North Arroyo Storm Drain Addendum 2 Date: October 2022
 Location of Development: a) Descriptive (Cross Streets): North/South: Shaumber Road
East/West: Skye Canyon Park Drive
 b) Section: 12 Township: 19 South Range: 59 East
 c) APN: 126-12-515-101, 516-117, 610-009, 611-010, 613-014, 614-120, 616-082, 617-114

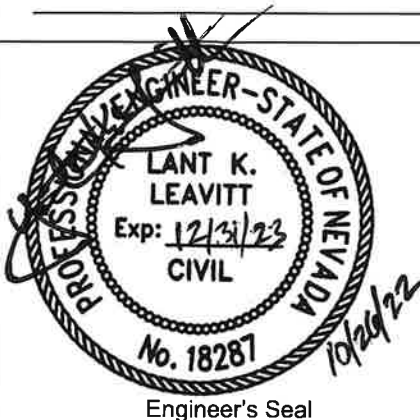
Name of Owner: Century Communities Nevada, LLC
 Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: Paulo.Chavez@centurycommur+
 Address: 6345 South Jones Boulevard Las Vegas NV 89118

Contact Person – Name: Lant Leavitt, P.E. Telephone No.: (702) 284-5300
 *E-mail Address: Lant.Leavitt@westwoodps.com Fax No.: (702) 284-5399
 Firm: Westwood Professional Services
 Address: 5725 W. Badura Av 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	☒ Storm Drain Infrastructure

- Total Owned Land Area: At Site: 4 AC Being Developed/Disturbed: 4 AC
- Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes** ☒ No
- Proposed type of development (Residential, Commercial, Etc.): Storm Drain Infrastructure to support future/existing Residential Development
- Approximate upstream land area which drains to the subject site: Approx 0.14 sqmi
- Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Master Drainage Study Update #7 for Skye Canyon (DS 4420) & Technical Drainage Study for Skye Canyon Infrastructure Phase 3B/3C (DS 4953)
- If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing storm drain in Skye Canyon 2.31 Park
- Briefly describe your proposed schedule for the subject project: ASAP



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.

***Newly Required Field**

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

Local Entity File No.	Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

CEN2018.000

October 26, 2022

Albert Sung, P.E.
City of Las Vegas
495 S. Main Street, 5th Floor
Las Vegas, NV 89101

**Subject: Technical Drainage Study Addendum #2 for
Skye Canyon North Arroyo Storm Drain**

Mr. Sung:

This letter certifies that all items provided on electronic submittal CD matches 100% of the *Technical Drainage Study Addendum 2 for Skye Canyon North Arroyo Storm Drain* bound paper version.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES



Lant Leavitt, P.E.
Project Manager – Water Resources Department

CEN2018.000

October 25, 2022

City of Las Vegas
Department of Public Works – Flood Control
495 S. Main Street
Las Vegas, Nevada 89101

**Subject: Skye Canyon North Arroyo Storm Drain
Addendum 2 to the Technical Drainage Study
(CLV# DS5598)**

This letter is submitted in response to the comments contained in the October 11, 2022 review memorandum, regarding the above referenced project. A copy of the City of Las Vegas comment letter and email coordination is provided in Appendix A. The comments in the review memorandum are individually addressed as follows:

1. **Comment:** *Coordinate the proposed Common Element/Landscape/Trail improvements required with the Skye Canyon North Arroyo project with the Planning Department (Fred Solis). Provide Planning with a schematic landscape design of the North Arroyo in Skye Canyon. Include the species, size and location of the vegetation and location of trail amenities (such as benches, trash receptacle and etc.). Ensure the vegetation is consistent with the plant list in Appendix A of the Skye Canyon Development Standards. The schematic landscape design plans need Planning Department approval prior to the Final Approval of the North Arroyo Storm Drain Drainage Study. The Landscape Plans shall be included as a part of the Civil Improvement Plans for the North Arroyo Storm Drain. The complete Improvement Plans shall be Bonded prior to the release of any further Building Permits adjacent to the North Arroyo.*

Response: Schematic landscape design plan approval from CLV Planning Department is provided in Appendix D. Additional requirements are noted.

2. **Comment:** *No Building Permits will be issued for lots adjacent to the North Arroyo. This includes Lots 174 through 186 as shown the Final Map for Skye Canyon 2.10 – Phase 2A, Bk 166/Pg 91 of Plats and APN 12612610009 – Parcel 2.10, Phase 2B. The permits will be released upon the approval of the drainage study and the bonding of the improvement plans. Occupancy under the building permits shall not be granted until the substantial completion of the North Arroyo drainage facilities.*

Response: Noted.

3. **Comment:** *Provide a 12-foot maintenance access road for access to each of the existing/proposed storm drain manholes.*

Response: 12-foot maintenance access road is provided. Access road extents are hatched in plan view on Plan & Profile sheets and a legend has been added to make this more clear. The maintenance access road section is included on Grading Details Sheet D-1.

4. **Comment:** *The Landscape Plan needs to show no trees within the 22' Maintenance Access (12-foot plus 5-foot shoulders on each side) cross-sections. Clearly show the 40-foot Public Drainage Easement on the Landscape Plans.*

Response: Schematic landscape design plans provide required offset for trees. This will be included in civil plans after drainage study approval. 40-foot public drainage easement is shown on schematic landscape plans and will also be included in final landscape plans.

5. **Comment:** *Structural plans for the storm drain improvements must be submitted for review and approval by the Building Department and included as a part of the civil plan set. The engineer must provide a copy of Building Department approval of the structures prior to final approval of the Improvement Plans by Flood Control.*

Response: Structural plans for the storm drain improvements will be included in the civil plan set and approval received from the Building Department after drainage study approval.

6. **Comment:** *The existing 40-foot Public Drainage Easement to be Privately Maintained is shown per Recorded Final Map (File 160/Pg.72 of Plats). The mainline North Arroyo storm drain is in a Public Drainage Easement with the storm drain system to be publicly maintained. The surface Improvements within the North Arroyo are to be Privately Maintained and noted as such on the plans. Structures associated with the mainline, built in this study, and accepting offsite flow are also publicly maintained. However, laterals not collecting offsite flow (SDDI 3 & SDDI 4) are to be privately maintained and should be label as such on the improvement plans.*

Response: Existing 40-ft Public Drainage Easement is shown on plans, including maintenance responsibility.

7. **Comment:** *If this project is being constructed first explain where basin WPRK12 is draining since SD STUB #1 is being stubbed during construction and SDDI#1 is not designed for the extra flow.*

Response: The North Arroyo and adjacent park project to the west are intended to be constructed concurrently. However, to avoid complications with construction timing, SDDI #1 is now proposed to be constructed with this North Arroyo project. Relevant reference material from the Parks 2.36/5.13 project has been included in Appendix E.

8. **Comment:** *Include the lateral for SD STUB #1 in Exhibit E. Include the lateral profile in the Improvement Plans.*

Response: Lateral included in Exhibit E, see Appendix B. Lateral profile included in improvement plans as profile #7.

9. **Comment:** *Create a section for the maximum flow in the ditches on either side of the arroyo.*

Response: Sections are included in Appendix C.

10. **Comment:** *Correct the length of the pipe for Facilities NA7 and NA8 on the Storm Drain Hydraulic Calculations for the laterals.*

Response: Lengths of proposed pipe match between improvement plans and hydraulic calculations, see Lateral Loss Computations subsection within Appendix C.

11. **Comment:** *The specific energy for both Skye Canyon 5.01 and Skye Canyon 2.08 & 2.09 is not contained within the boundaries of the sump provided. Review and revise accordingly.*

Response: Water surface at sump inlets is shown on improvement plan profiles. Sump depths are deeper than incoming specific energy depth. Once water ponds up at sump inlet grate, the ponding depth will be governed by the balance between depth of flow and interception capacity of the grate. Drop inlet interception capacity calculations are provided in Appendix C. Specific energy calculations are referenced from the Skye Canyon 2.08 & 2.09 and 5.01 & 5.03 studies, excerpts provided in Appendix F and Appendix G.

12. **Comment:** *Call out the side slopes of the arroyo on the plan view.*

Response: Arroyo side slopes are called out on improvement plans.

13. **Comment:** *Sheet R-1: Detail A: Remove Detail A from the improvement plans or explain what improvements will install what is being removed.*

Response: Sheet R-1 Detail A is removed.

14. **Comment:** *Sheet PP-6: Label the inverts on either end of the transition and the inverts of the existing box as it changes slope or size.*

Response: Invert elevations and labels added to existing downstream RCB.

15. **Comment:** *The following comments apply to Sheet PP-7:*

- a. *There are two profiles named Storm Drain Lateral #2. Rename one of the profiles to ensure all profiles names are unique.*

- b. The lateral extending from SDMH#3 does not match lengths or inverts in the WSPGW model, SDW.WSW. Provide the correct stations and improvement plans for the WSPGW summary of SDW.WSW. Provide updated WSPGW model and summary.
- c. Add the flow for the existing pipe downstream of EX SDDI#2.
- d. Add the missing manhole, SDMH#17 connecting downstream proposed 24" RCP, SDMH#3, and upstream existing 24" RCP, EX SDDI #2.
- e. Correct the sizing of the sump inlet SDDI#1. The improvement plans say it is a 6'x5' NDOT Type 2 sump inlet while the computations say it is a 6'x4' NDOT Type 2 sump inlet.
- f. Correct the labeling of the top-of-grate for SDDI#1. The profile says it is 2898.8' and the plan says it is 2898.7'.
- g. Correct the block that shows the pipe going into the middle of the side of the drop inlet SDDI#1 and correct the depth of SDDI#1.
- h. Place flow line tags in the existing easement and in the proposed ditch draining toward SDDI#1.
- i. Provide a detail parallel to the existing drainage easement on what is happening at the connection point from Skye Canyon Parcel 5.01/5.03 and SDDI#1.

Response:

- a. Profile names revised to be unique.
- b. The WSPG model 'SDW' for lateral extending from SDMH #3 has been revised to match improvement plans, see Appendix C.
- c. Flow rate added to existing pipe downstream of EX SDDI#2 on Lateral #1.
- d. Manhole symbol was missing from the plan view and has been added.
- e. Computations revised to 6'x5' NDOT Type 2 sump inlet to match improvement plans.
- f. Labeling for top-of-grate revised to match. Plan view and profile both call out 2898.8.
- g. SDDI#1 symbol revised to show pipe existing at invert. Additionally, the NDOT Standard Drawing requires the pipe to be placed such that the floor of the inlet has positive drainage to the outlet pipe.
- h. Additional flow line tags placed in the existing easement and the proposed ditch draining toward SDDI#1.
- i. Section centered on and parallel to the 5.01/5.03 drainage easement provided on 9 / Sheet D-1.

16. **Comment:** Sheet PP-9: Provide a WSPG model for the lateral connecting Skye Canyon 2.08 & 2.09 and the mainline North Arroyo storm drain.

Response: WSPG model 'NORTH' has been provided in Appendix C.

17. **Comment:** Sheet D-2, Detail 9: Revise the detail to say that the concrete collar can be used if the pipe matches existing slopes. Any change in slope requires a manhole connection.

Response: Concrete collar note revised accordingly.

We believe the above responses and revisions provided on the amended improvement plans have adequately satisfied the concerns in the subject review memorandum. The revised improvement plan sheets adopting the revisions addressed in this letter have been included in the last appendix of this addendum. If you have any questions or require additional information, please do not hesitate to contact our office at (702) 284-5300.

Respectfully Submitted,
WESTWOOD PROFESSIONAL SERVICES

Lant Leavitt, P.E.
Project Manager – Water Resources Services

CC: Todd Steadham, PE, LEED AP
Mark Failla, PE, CFM

List of Appendices

Appendix A	City of Las Vegas Comment Letter & Email Correspondence
Appendix B	Drainage Exhibits • Exhibit E – Proposed Condition Drainage Map
Appendix C	Hydraulic Analyses • Ditch Computations • Lateral Loss Computations • West Parcel 2.10 WSPG Model – SDW • Parcel 2.08/2.09 WSPG Model – NORTH • Inlet Sizing Computations
Appendix D	City Planning Approval Letter
Appendix E	Reference Material <i>Skye Canyon Parks 2.36 & 5.13 (DS05595)</i> • Approval Letter • Referenced Drainage Exhibit • Referenced Hydraulics • Referenced Improvement Plans
Appendix F	Reference Material <i>Skye Canyon Parcels 2.08 & 2.09 (DS05242)</i> • Approval Letter • Referenced Hydraulics
Appendix G	Reference Material <i>Skye Canyon 5.01 & 5.03 (DS5411)</i> • Approval Letter • Referenced Hydraulics
Appendix H	Improvement Plans

APPENDIX A

City of Las Vegas Comment Letter & Email Correspondence

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 11, 2022
TO: Land Development Services Department of Building & Safety		FROM: Peter Jackson, CFM <i>CA for PBJ</i> Senior Engineering Associate Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Skye Canyon North Arroyo Storm Drain	Westwood Professional Services
Cross Streets:	Shaumber Rd & Skye Canyon Park Dr	Century Communities
File Number:	F:\Depot\DSMemos\DS05598B.doc	Bart Anderson, P.E., DevCo
Parcel Number:	126-12-515-101	Fred Solis
Zoning Action:		
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES X NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	7/27/2022	8/23/2022	Not Approved	\$400.00	4882548: \$400
2 nd Submittal	9/19/2022	10/11/2022	See Comments Below	\$400.00	4958649: \$400
			TOTAL FEES (LDDRS):	\$800.00	----

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. Coordinate the proposed Common Element/Landscape/Trail improvements required with the Skye Canyon North Arroyo project with the Planning Department (Fred Solis). Provide Planning with a schematic landscape design of the North Arroyo in Skye Canyon. Include the species, size and location of the vegetation and location of trail amenities (such as benches, trash receptacle and etc.). Ensure the vegetation is consistent with the plant list in Appendix A of the Skye Canyon Development Standards. The schematic landscape design plans need Planning Department approval prior to the Final Approval of the North Arroyo Storm Drain Drainage Study. The Landscape Plans shall be included as a part of the Civil Improvement Plans for the North Arroyo Storm Drain. The complete Improvement Plans shall be Bonded prior to the release of any further Building Permits adjacent to the North Arroyo
2. No Building Permits will be issued for lots adjacent to the North Arroyo. This includes Lots 174 through 186 as shown the Final Map for Skye Canyon 2.10 – Phase 2A, Bk 166/Pg 91 of Plats and APN 12612610009 – Parcel 2.10, Phase 2B. The permits will be released upon the approval of the drainage study and the bonding of the improvement plans. Occupancy under the building permits shall not be granted until the substantial completion of the North Arroyo drainage facilities.
3. Provide a 12-foot maintenance access road for access to each of the existing/proposed storm drain manholes.

4. The Landscape Plan needs to show no trees within the 22' Maintenance Access (12-foot plus 5-foot shoulders on each side) cross-sections. Clearly show the 40-foot Public Drainage Easement on the Landscape Plans.
5. Structural plans for the storm drain improvements must be submitted for review and approval by the Building Department and included as a part of the civil plan set. The engineer must provide a copy of Building Department approval of the structures prior to final approval of the Improvement Plans by Flood Control.
6. The existing 40-foot Public Drainage Easement to be Privately Maintained is shown per Recorded Final Map (File 160/Pg.72 of Plats). The mainline North Arroyo storm drain is in a Public Drainage Easement with the storm drain system to be publicly maintained. The surface Improvements within the North Arroyo are to be Privately Maintained and noted as such on the plans. Structures associated with the mainline, built in this study, and accepting offsite flow are also publicly maintained. However, laterals not collecting offsite flow (SDDI 3 & SDDI 4) are to be privately maintained and should be label as such on the improvement plans.
7. If this project is being constructed first explain where basin WPRK12 is draining since SD STUB #1 is being stubbed during construction and SDDI#1 is not designed for the extra flow.
8. Include the lateral for SD STUB #1 in Exhibit E. Include the lateral profile in the Improvement Plans.
9. Create a section for the maximum flow in the ditches on either side of the arroyo.
10. Correct the length of the pipe for Facilities NA7 and NA8 on the Storm Drain Hydraulic Calculations for the laterals.
11. The specific energy for both Skye Canyon 5.01 and Skye Canyon 2.08 & 2.09 is not contained within the boundaries of the sump provided. Review and revise accordingly.
12. Call out the side slopes of the arroyo on the plan view.
13. **Sheet R-1: Detail A:** Remove Detail A from the improvement plans or explain what improvements will install what is being removed.
14. **Sheet PP-6:** Label the inverts on either end of the transition and the inverts of the existing box as it changes slope or size.
15. **The following comments apply to Sheet PP-7:**
 - a. There are two profiles named Storm Drain Lateral #2. Rename one of the profiles to ensure all profiles names are unique.
 - b. The lateral extending from SDMH#3 does not match lengths or inverts in the WSPGW model, SDW.WSW. Provide the correct stations and improvement plans for the WSPGW summary of SDW.WSW. Provide updated WSPGW model and summary.
 - c. Add the flow for the existing pipe downstream of EX SDDI#2.
 - d. Add the missing manhole, SDMH#17 connecting downstream proposed 24" RCP, SDMH#3, and upstream existing 24" RCP, EX SDDI #2.
 - e. Correct the sizing of the sump inlet SDDI#1. The improvement plans say it is a 6'x5' NDOT Type 2 sump inlet while the computations say it is a 6'x4' NDOT Type 2 sump inlet.
 - f. Correct the labeling of the top-of-grate for SDDI#1. The profile says it is 2898.8' and the plan says it is 2898.7'.
 - g. Correct the block that shows the pipe going into the middle of the side of the drop inlet SDDI#1 and correct the depth of SDDI#1.
 - h. Place flow line tags in the existing easement and in the proposed ditch draining toward SDDI#1.

- i. Provide a detail parallel to the existing drainage easement on what is happening at the connection point from Skye Canyon Parcel 5.01/5.03 and SDDI#1.
16. **Sheet PP-9:** Provide a WSPG model for the lateral connecting Skye Canyon 2.08 & 2.09 and the mainline North Arroyo storm drain.
17. **Sheet D-2, Detail 9:** Revise the detail to say that the concrete collar can be used if the pipe matches existing slopes. Any change in slope requires a manhole connection.

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
PBJ/CAA

T/R/S: T19S/R59E/S12
AREA F-12

Amy Poechmann

From: Phil Koerschner
Sent: Monday, October 24, 2022 9:46 AM
To: Amy Poechmann
Subject: FW: Skye Canyon North Arroyo Storm Drain

Phil Koerschner

Graduate Engineer
phil.koerschner@westwoodps.com

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cell (906) 271-0074

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Las Vegas, NV 89118

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(888) 937-5150

From: Lant Leavitt <Lant.Leavitt@westwoodps.com>
Sent: Thursday, October 20, 2022 4:10 PM
To: Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>; Peter Jackson <pjackson@LasVegasNevada.GOV>
Cc: Phil Koerschner <Phil.Koerschner@westwoodps.com>
Subject: RE: Skye Canyon North Arroyo Storm Drain

Hi Caitlyn,

Thanks for the response. We'll proceed accordingly.

Thanks,

Lant Leavitt, P.E.

Project Manager
lant.leavitt@westwoodps.com

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main (702) 284-5300

Westwood
5725 Badura Ave, Suite 100
Las Vegas, NV 89118

From: Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>
Sent: Thursday, October 20, 2022 4:08 PM
To: Lant Leavitt <Lant.Leavitt@westwoodps.com>; Peter Jackson <pjackson@LasVegasNevada.GOV>
Cc: Phil Koerschner <Phil.Koerschner@westwoodps.com>
Subject: RE: Skye Canyon North Arroyo Storm Drain

Hiya Lant,

We see no issue with your response, I just didn't see it on the profile plans.

Thank you,

Caitlyn Alcantara, P.E.

Engineer Associate
Department of Public Works
495 S Main St, 1st Floor
Las Vegas, NV 89101
P: (702)-229-6733



lasvegasnevada.gov



Your opinion is important! Click [here](#) to take a short survey.

From: Lant Leavitt <Lant.Leavitt@westwoodps.com>

Sent: Wednesday, October 19, 2022 3:04 PM

To: Peter Jackson <pjackson@LasVegasNevada.GOV>; Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>

Cc: Phil Koerschner <Phil.Koerschner@westwoodps.com>

Subject: RE: Skye Canyon North Arroyo Storm Drain

CAUTION: This email originated from an External Source. Please use caution before opening attachments, clicking links, or responding to this email. Do not sign-in with your City of Las Vegas account credentials.

Hi Peter,

We'd like to follow up on one other North Arroyo comment please. Comment #11 states: "The specific energy for both Skye Canyon 5.01 and Skye Canyon 2.08 & 2.09 is not contained within the boundaries of the sump provided. Review and revise accordingly."

For both of these field inlets, the proposed depth of sump is greater than the specific energy of the incoming flow. As the sump area fills with water, we believe flow entering ponded water will lose its momentum and the flow depth at the sump will be governed by the balance between depth of flow and interception capacity of the grate, which is addressed in our grate inlet sizing computations. If you see this differently, let me know and we can discuss if needed.

Thanks,

Lant Leavitt, P.E.

Project Manager

lant.leavitt@westwoodps.com

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main (702) 284-5300

Westwood

5725 Badura Ave, Suite 100
Las Vegas, NV 89118

From: Peter Jackson <pjackson@LasVegasNevada.GOV>

Sent: Wednesday, October 12, 2022 5:38 PM

To: Lant Leavitt <Lant.Leavitt@westwoodps.com>

Cc: Fred Solis <fsolis@LasVegasNevada.GOV>; Oh-Sang Kwon <okwon@LasVegasNevada.GOV>; Albert Sung <YSung@LasVegasNevada.GOV>; Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>; Mark Rex

<mrex@LasVegasNevada.GOV>

Subject: RE: Skye Canyon North Arroyo Storm Drain

Comment #1 - Conditional approval is typically for concurrence.

No Conditional Approval will be provided. The approval of the drainage study needs the schematic landscape design plans approved by Planning. Without schematic plans approved, how can design plans be included in the civil improvement plan set ?

In this case, schematic landscape design plans need to be approved by Planning before the actual Landscape Design plans can be included as part of the civil improvement plans.

Comment #3 – Maintenance access

Clearly show that you have 12-foot maintenance access roads to each manhole. In some areas the top & the hatch pattern make the limits hard to see and verify. Also show the maintenance access connection into the park improvements for Parcel 2.31. The park access from the east uses a different hatch pattern and does not conflict with the water easement pattern.

Give me a call if you have any questions.

Thanks,

Peter Jackson, CFM

Senior Engineering Associate
City of Las Vegas | Dept. of Public Works
City Engineering Division, Flood Control Section
City Hall, 5th Floor
495 S Main St. | Las Vegas, Nevada 89101



Work: 702-229-5266 Link: www.lasvegasnevada.gov
pjackson@lasvegasnevada.gov

"Building Community to Make Life Better"



Your opinion is important! Click [here](#) to take a short survey.

From: Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>

Sent: Wednesday, October 12, 2022 2:29 PM

To: Peter Jackson <pjackson@LasVegasNevada.GOV>

Subject: FW: Skye Canyon North Arroyo Storm Drain

Here are some questions.

Caitlyn Alcantara, P.E.

Engineer Associate
Department of Public Works
495 S Main St, 1st Floor
Las Vegas, NV 89101
P: (702)-229-6733



lasvegasnevada.gov



Your opinion is important! Click [here](#) to take a short survey.

From: Lant Leavitt <Lant.Leavitt@westwoodps.com>

Sent: Wednesday, October 12, 2022 11:00 AM

To: Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>

Cc: Phil Koerschner <Phil.Koerschner@westwoodps.com>; Abel Garcia Morales <Abel.Morales@westwoodps.com>;

Chris Langham <Chris.Langham@westwoodps.com>

Subject: RE: Skye Canyon North Arroyo Storm Drain

CAUTION: This email originated from an **External Source**. Please use caution before opening attachments, clicking links, or responding to this email. **Do not sign-in with your City of Las Vegas account credentials.**

Hi Caitlyn,

A couple follow-up questions:

Comment #1 states that "The schematic landscape design plans need Planning Department approval prior to the Final Approval of the North Arroyo Storm Drain Drainage Study." I assume this means we can get conditional TDS approval without landscape plans, then add them in at the IP review stage?

Comment #3 states "Provide a 12-foot maintenance access road for access to each of the existing/proposed storm drain manholes." Can you please provide specific manholes that aren't meeting this so we can address? We believe every manhole has access.

Thanks,

Lant Leavitt, P.E.

Project Manager

lant.leavitt@westwoodps.com

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main (702) 284-5300

Westwood

5725 Badura Ave, Suite 100

Las Vegas, NV 89118

From: Caitlyn Alcantara <calcantara@LasVegasNevada.GOV>

Sent: Tuesday, October 11, 2022 5:57 PM

To: Lant Leavitt <Lant.Leavitt@westwoodps.com>

Subject: Skye Canyon North Arroyo Storm Drain

Lant,

Attached is the comment letter for the subject study.

Caitlyn Alcantara, P.E.

Engineer Associate

Department of Public Works

495 S Main St, 1st Floor
Las Vegas, NV 89101
P: (702)-229-6733



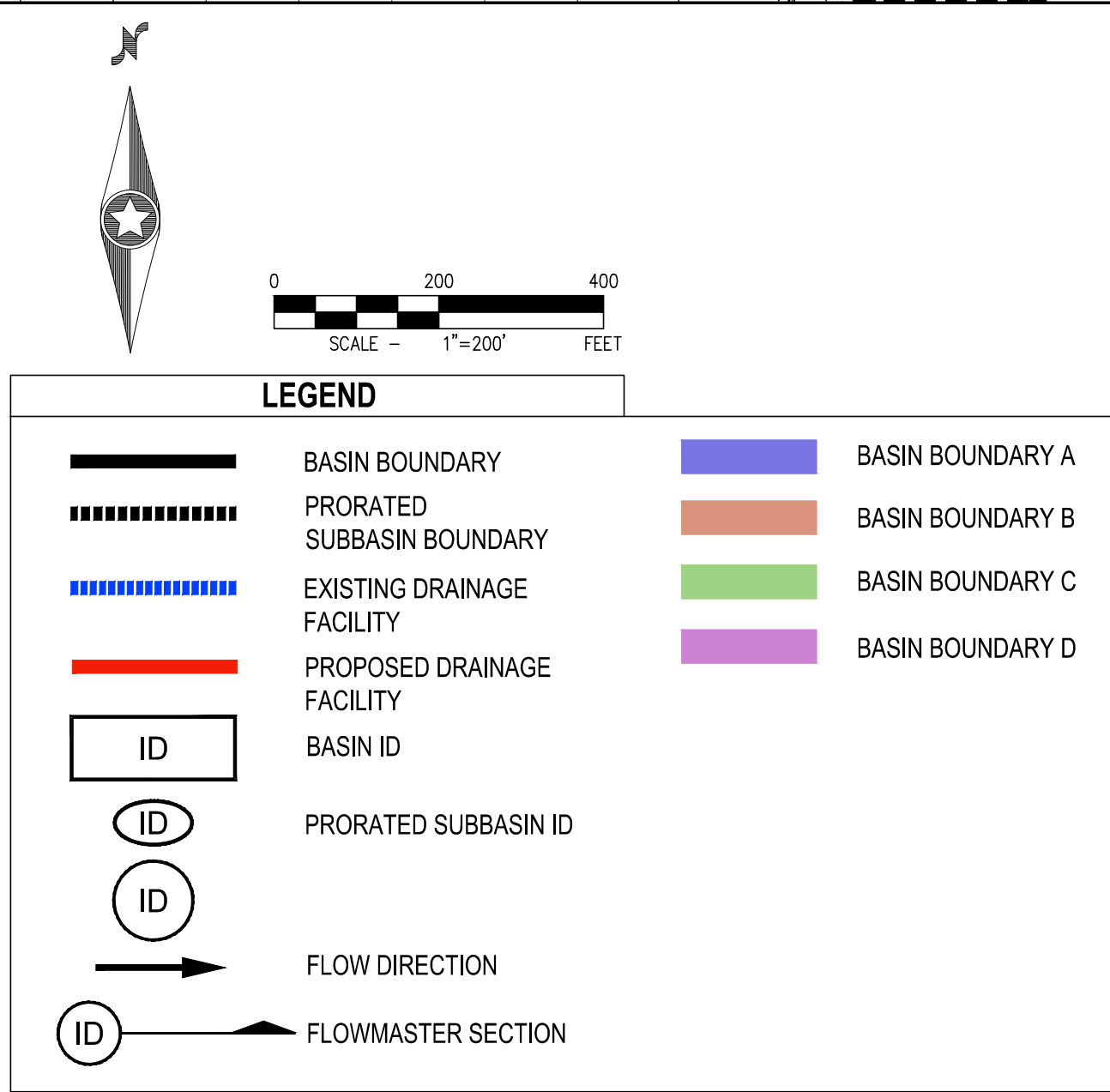
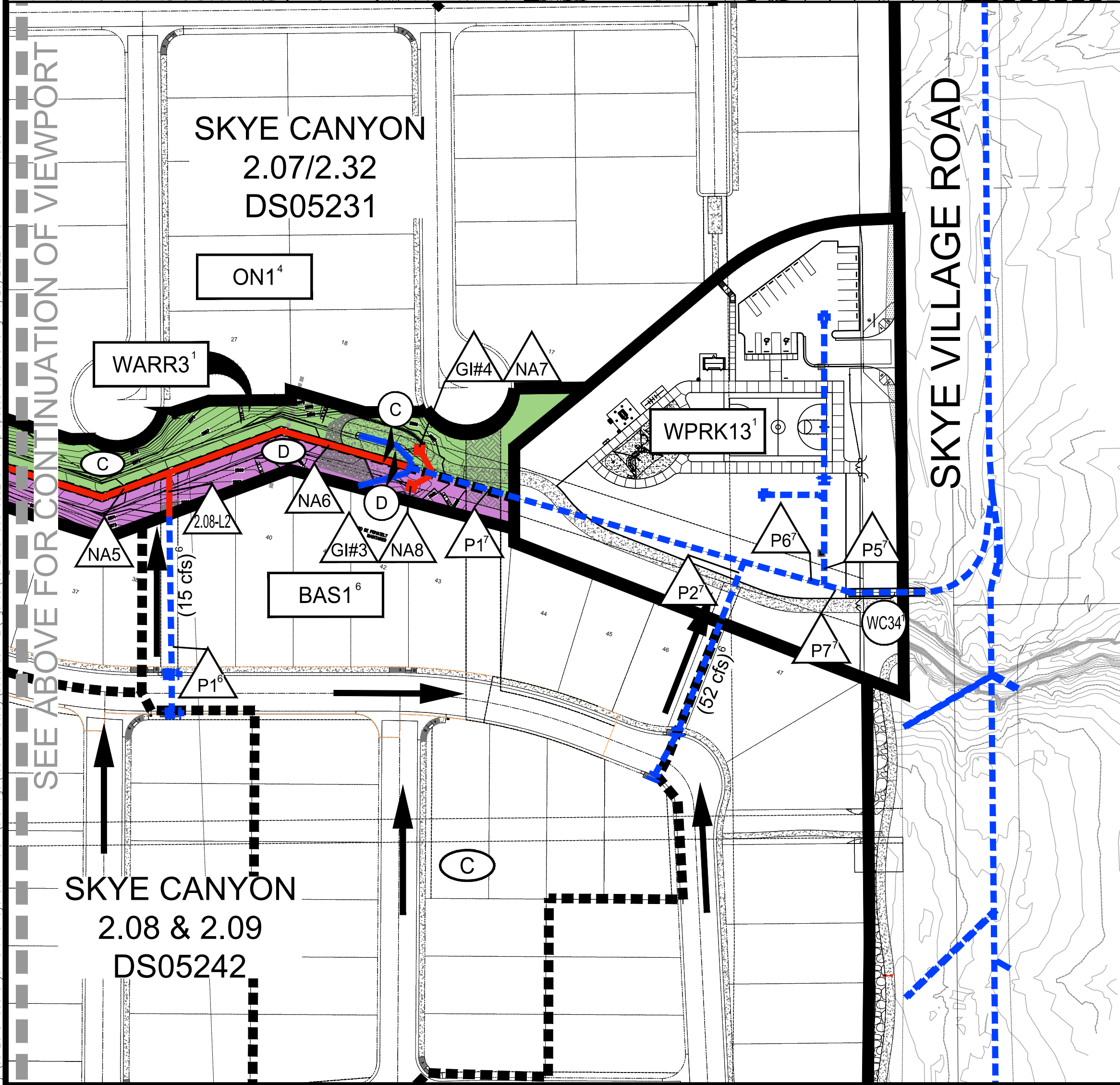
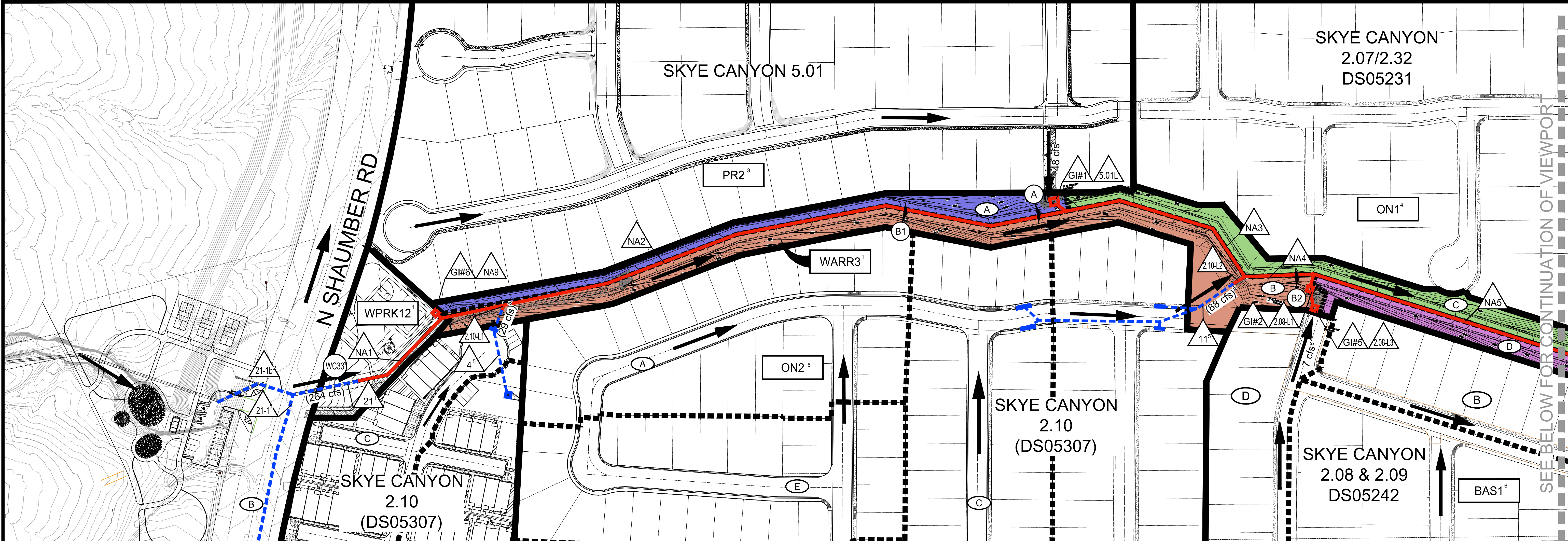
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APPENDIX B

Drainage Exhibits



Proposed Condition Flow Rate Summary		
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)
BAS1 ⁶	20.8	59
ON2 ⁵	30.0	88
PR2 ³	16.3	48
WARR3 ¹	3.3	9
WPRK12 ¹	0.8	2
WPRK13 ¹	2.2	5
WC33 ¹	N/A	264
WC34 ¹	N/A	527

Subbasin Prorated Flow Rate Summary			
Basin ID	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
WARR3	9	3.30	2.7
Subbasin ID			
WARR3(a)	1.50	0.62	2.7
WARR3(b)	4	1.44	2.7
WARR3(c)	3	1.13	2.7
WARR3(d)	1.50	0.64	2.7
TOTAL	10	3.83	

- NOTES:
1. REFERENCED FROM SKYE CANYON MDS
 2. REFERENCED FROM SKYE CANYON INFRA PHASE 3B/3C
 3. REFERENCED FROM SKYE CANYON 5.01 AND 5.03 TDS
 4. REFERENCED FROM SKYE CANYON 2.07/2.32
 5. REFERENCED FROM SKYE CANYON 2.10
 6. REFERENCED FROM SKYE CANYON 2.08/2.09
 7. REFERENCED FROM SKYE CANYON 2.31
 8. REFERENCED FROM SKYE CANYON 2.36/5.13 PARKS

Proposed Condition Onsite Hydraulic Section Summary					
Section ID	Q ₁₀₀ (cfs)	Section Description	Slope (%)	Depth (ft)	Velocity (fps)
Section A Q = WARR3(A)	1.5	6-ft TW Earthen Ditch w/3.1SS & min 1-ft depth	3.28	0.38	3.44
Section B1 Q = 1/2 of WARR3(B)	2.0	6-ft TW Earthen Ditch w/3.1SS & min 1-ft depth	4.79	0.36	3.97
Section B2 Q = WARR3(B)	4.0	6-ft TW Earthen Ditch w/3.1SS & min 1-ft depth	3.37	0.42	3.74
Section C Q = WARR3(C)	3.0	6-ft TW Earthen Ditch w/3.1SS & min 1-ft depth	4.89	0.39	4.30
Section D Q = WARR3(D)	1.5	6-ft TW Earthen Ditch w/3.1SS & min 1-ft depth	1.00	0.69	2.82
			4.56	0.52	4.98
			1.00	0.62	2.82
			3.94	0.48	4.39
			1.15	0.46	2.32
			3.52	0.38	3.53

Recommended Flood Control Facilities Summary				
Facility ID	Facility Description	Source of Flows	Q _{design} (cfs)	Notes
21-1b ¹	Existing 54" RCP		120	
21-1 ¹	Existing 54" RCP		124	
21 ¹	Existing 54" RCP	WC33 ¹	264	
NA1	Proposed 54" RCP	21 ¹	264	
SDD#6 ⁸	Proposed 2'x2.5' NDOT Grade Inlet	WPRK12 ¹	2	
NA9 ⁸	Proposed 18" RCP	Facility G#6	2	
4 ⁵	Existing 24" RCP	A portion of Basin ON2 ⁵	29	
2.10-L1	Proposed 24" RCP	Facility 4 ⁵	29	
NA2	Proposed 54" RCP	Facility NA1 + Facility 2.10-L1	293	
SDD#1	Proposed 6'x5' NDOT Grate Inlet	WARR3(A) + PR2 ³	49.5	
5.01L	Proposed 36" RCP	Facility G#1	49.5	
NA3	Proposed 60" RCP	Facility NA2 + Facility 5.01L	342.5	
11 ⁵	Existing 42" RCP	A portion of Basin ON2 ⁵	88	
2.10-L2	Proposed 42" RCP	Facility 11 ⁵	88	
NA4	Proposed 60" RCP	Facility NA3 + Facility 2.10-L2	430.5	
SDD#2	2.5x2' NDOT Type 2 Grate Inlet	WARR3(B)	4	
2.08-L1	Proposed 18" RCP	Facility G#2 + Facility G#5	11	
SDD#5	2.5x2' NDOT Type 2 Grate Inlet	BAS1 ⁶ (D)	7	
2.08-L3	Proposed 18" RCP	Facility G#5	7	
NA5	Proposed 60" RCP	Facility NA4 + Facility 2.08-L1	441.5	
P1 ⁶	Existing 24" RCP	A portion of Basin BAS1 ⁶	15	
2.08-L2	Proposed 24" RCP	Facility P1 ⁶	15	
NA6	Proposed 60" RCP	Facility NA5 + Facility 2.08-L2	456.5	
SDD#3	2.5x2' NDOT Type 2 Grate Inlet	WARR3(D)	1.5	
NA8	Proposed 18" RCP	Facility G#3	2	
SDD#4	2.5x2' NDOT Type 2 Grate Inlet	WARR3(C)	3.0	
NA7	Proposed 18" RCP	Facility G#4	3.0	
P1 ⁷	Existing 6W" X 6H"	Facility NA6 + NA7 + NA8	461	QREF=475. SEE NOTE 7
P2 ⁷	Existing 30" RCP	A portion of Basin BAS1 ⁶	52	
P6 ⁷	Existing 6W" X 6H"	P1 ⁷ + P2 ⁷	513	
P5 ⁷	Existing 18" RCP	WPRK13 ¹	5	
P7 ⁷	Existing 6W" X 6H"	WC34 ¹	518	QREF=527. SEE NOTE 1

Westwood
5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118
Phone (702) 284-5300
Fax (702) 284-5399
westwoodps.com
Westwood Professional Services, Inc.

NO.	DESCRIPTION	DATE	BY	APP.
1				

CENTURY

SKYE NORTH ARROYO STORM DRAIN
PROPOSED CONDITION DRAINAGE MAP

DATE: OCT 2022
DRAFTER: AA
DESIGNER: AA
CHECKED: LL
PROJECT NO.
CEN2018-000

EXHIBIT E
SHEET 1 OF 1

APPENDIX C

Hydraulic Analyses

Ditch Computations

Worksheet for A (min%)

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	3.28 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs

Results

Normal Depth	0.38 ft
Flow Area	0.4 ft ²
Wetted Perimeter	2.41 ft
Hydraulic Radius	0.18 ft
Top Width	2.29 ft
Critical Depth	0.43 ft
Critical Slope	1.62 %
Velocity	3.44 ft/s
Velocity Head	0.18 ft
Specific Energy	0.57 ft
Froude Number	1.390
Flow Type	Supercritical

GVF Input Data

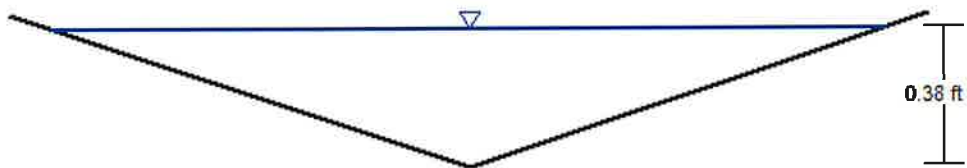
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.43 ft
Channel Slope	3.28 %
Critical Slope	1.62 %

Cross Section for A (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.28 %
Normal Depth	0.38 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs



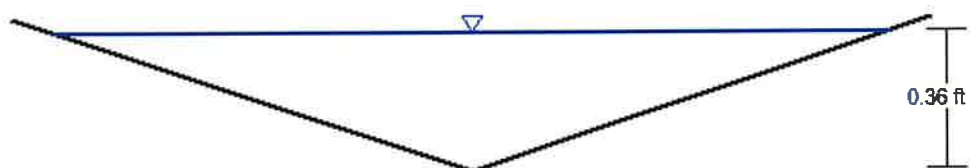
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H: 1

Worksheet for A (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.79 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs
Results	
Normal Depth	0.36 ft
Flow Area	0.4 ft ²
Wetted Perimeter	2.25 ft
Hydraulic Radius	0.17 ft
Top Width	2.13 ft
Critical Depth	0.43 ft
Critical Slope	1.62 %
Velocity	3.97 ft/s
Velocity Head	0.24 ft
Specific Energy	0.60 ft
Froude Number	1.660
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.36 ft
Critical Depth	0.43 ft
Channel Slope	4.79 %
Critical Slope	1.62 %

Cross Section for A (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.79 %
Normal Depth	0.36 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs



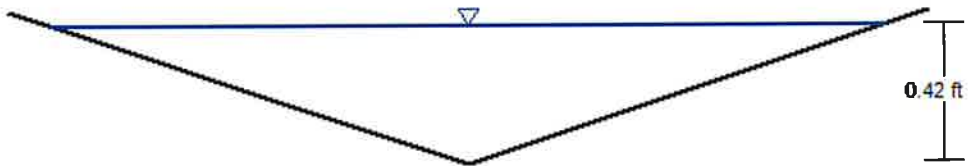
V: 1
H: 1

Worksheet for B1 (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.37 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	2.0 cfs
Results	
Normal Depth	0.42 ft
Flow Area	0.5 ft ²
Wetted Perimeter	2.67 ft
Hydraulic Radius	0.20 ft
Top Width	2.53 ft
Critical Depth	0.49 ft
Critical Slope	1.56 %
Velocity	3.74 ft/s
Velocity Head	0.22 ft
Specific Energy	0.64 ft
Froude Number	1.433
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.42 ft
Critical Depth	0.49 ft
Channel Slope	3.37 %
Critical Slope	1.56 %

Cross Section for B1 (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.37 %
Normal Depth	0.42 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	2.0 cfs



V: 1
H: 1

Worksheet for B1 (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.89 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	2.0 cfs
Results	
Normal Depth	0.39 ft
Flow Area	0.5 ft ²
Wetted Perimeter	2.49 ft
Hydraulic Radius	0.19 ft
Top Width	2.36 ft
Critical Depth	0.49 ft
Critical Slope	1.56 %
Velocity	4.30 ft/s
Velocity Head	0.29 ft
Specific Energy	0.68 ft
Froude Number	1.707
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.39 ft
Critical Depth	0.49 ft
Channel Slope	4.89 %
Critical Slope	1.56 %

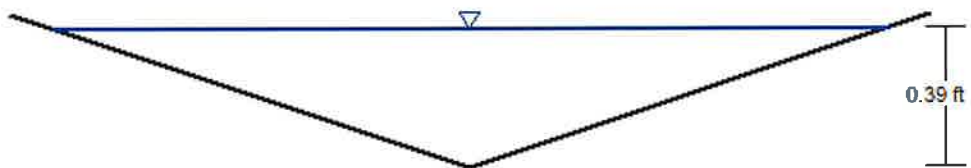
Cross Section for B1 (max%)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	4.89 %
Normal Depth	0.39 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	2.0 cfs



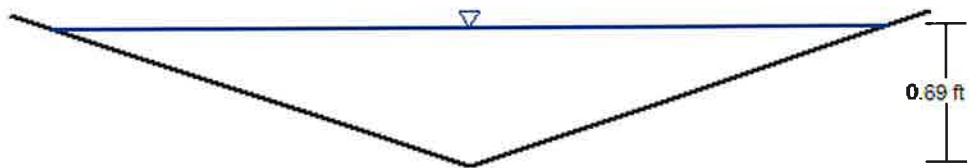
V: 1
H: 1

Worksheet for B2 (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	4.0 cfs
Results	
Normal Depth	0.69 ft
Flow Area	1.4 ft ²
Wetted Perimeter	4.35 ft
Hydraulic Radius	0.33 ft
Top Width	4.13 ft
Critical Depth	0.64 ft
Critical Slope	1.43 %
Velocity	2.82 ft/s
Velocity Head	0.12 ft
Specific Energy	0.81 ft
Froude Number	0.847
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.69 ft
Critical Depth	0.64 ft
Channel Slope	1.00 %
Critical Slope	1.43 %

Cross Section for B2 (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.69 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	4.0 cfs



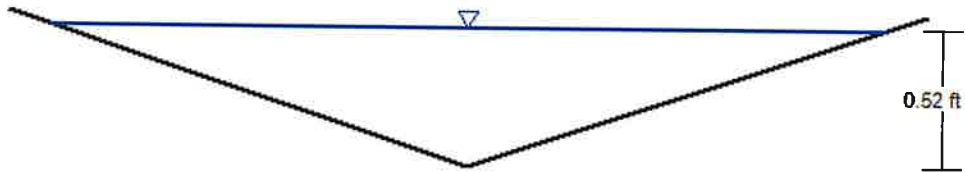
V: 1
H: 1

Worksheet for B2 (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.56 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	4.0 cfs
Results	
Normal Depth	0.52 ft
Flow Area	0.8 ft ²
Wetted Perimeter	3.27 ft
Hydraulic Radius	0.25 ft
Top Width	3.11 ft
Critical Depth	0.64 ft
Critical Slope	1.43 %
Velocity	4.98 ft/s
Velocity Head	0.38 ft
Specific Energy	0.90 ft
Froude Number	1.725
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.52 ft
Critical Depth	0.64 ft
Channel Slope	4.56 %
Critical Slope	1.43 %

Cross Section for B2 (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	4.56 %
Normal Depth	0.52 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	4.0 cfs



V: 1
H: 1

Worksheet for C (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	1.00 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	3.0 cfs
Results	
Normal Depth	0.62 ft
Flow Area	1.1 ft ²
Wetted Perimeter	3.91 ft
Hydraulic Radius	0.29 ft
Top Width	3.71 ft
Critical Depth	0.57 ft
Critical Slope	1.48 %
Velocity	2.62 ft/s
Velocity Head	0.11 ft
Specific Energy	0.72 ft
Froude Number	0.832
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.62 ft
Critical Depth	0.57 ft
Channel Slope	1.00 %
Critical Slope	1.48 %

Cross Section for C (min%)

Project Description

Friction Method

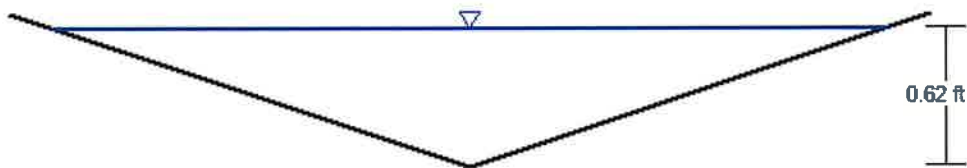
Manning
Formula

Solve For

Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	1.00 %
Normal Depth	0.62 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	3.0 cfs



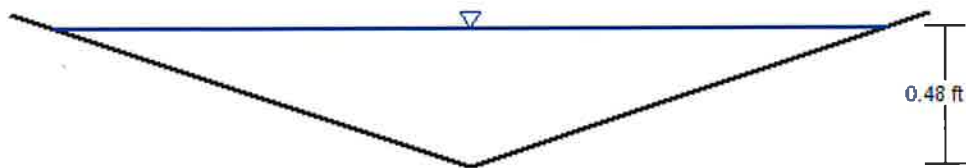
V: 1 
H: 1

Worksheet for C (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.94 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	3.0 cfs
Results	
Normal Depth	0.48 ft
Flow Area	0.7 ft ²
Wetted Perimeter	3.02 ft
Hydraulic Radius	0.23 ft
Top Width	2.87 ft
Critical Depth	0.57 ft
Critical Slope	1.48 %
Velocity	4.39 ft/s
Velocity Head	0.30 ft
Specific Energy	0.78 ft
Froude Number	1.582
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.48 ft
Critical Depth	0.57 ft
Channel Slope	3.94 %
Critical Slope	1.48 %

Cross Section for C (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.94 %
Normal Depth	0.48 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	3.0 cfs



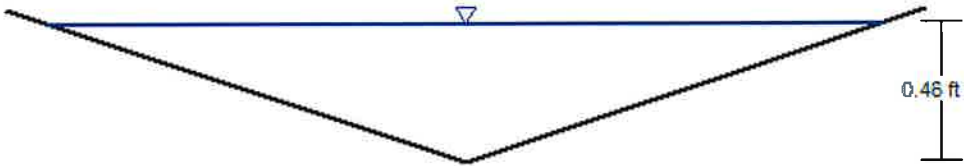
V: 1
H: 1

Worksheet for D (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	1.15 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs
Results	
Normal Depth	0.46 ft
Flow Area	0.6 ft ²
Wetted Perimeter	2.93 ft
Hydraulic Radius	0.22 ft
Top Width	2.78 ft
Critical Depth	0.43 ft
Critical Slope	1.62 %
Velocity	2.32 ft/s
Velocity Head	0.08 ft
Specific Energy	0.55 ft
Froude Number	0.850
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.46 ft
Critical Depth	0.43 ft
Channel Slope	1.15 %
Critical Slope	1.62 %

Cross Section for D (min%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	1.15 %
Normal Depth	0.46 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs



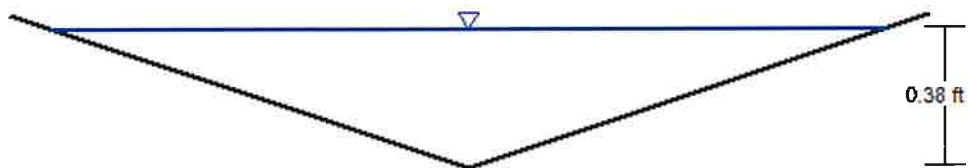
V: 1
H: 1

Worksheet for D (max%)

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.52 %
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs
Results	
Normal Depth	0.38 ft
Flow Area	0.4 ft ²
Wetted Perimeter	2.38 ft
Hydraulic Radius	0.18 ft
Top Width	2.26 ft
Critical Depth	0.43 ft
Critical Slope	1.62 %
Velocity	3.53 ft/s
Velocity Head	0.19 ft
Specific Energy	0.57 ft
Froude Number	1.437
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.38 ft
Critical Depth	0.43 ft
Channel Slope	3.52 %
Critical Slope	1.62 %

Cross Section for D (max%)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.025
Channel Slope	3.52 %
Normal Depth	0.38 ft
Left Side Slope	3.0 H:V
Right Side Slope	3.0 H:V
Discharge	1.5 cfs



V: 1
H: 1

Lateral Loss Computations

West Parcel 2.10 WSPG Model - SDW

Ultimate Condition WSPG Summary West Parcel 2.10 System (SDW.WSW)										
WSPG Station	Storm Drain Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1 - 'HGL Check' reflects the minimum 1-ft below finished grade.										
980.22	19+00.70 R 0.03	SD-04	24" RCP	2926.25	29.0	2927.18	20.21	2934.76	SDMH #3	OK
995.00	10+51.77	SD-04	24" RCP	2930.56	29.0	2931.96	12.32	2936.19	SDMH #17	OK
997.50		SD-04	24" RCP	2930.86	29.0	2932.37	11.37	2936.19		OK
1000.00		SD-04	24" RCP	2931.15	29.0	2933.00	9.57	2936.19		OK
1030.11		N/A	24" RCP	2931.48	29.0	2933.60	9.23	2943.70		OK
1030.11	N/A	N/A	24" RCP	2931.48	29.0	2934.94	0.68	2943.70	EX SDDI #2 (107Y5207)	OK
1032.61		N/A	24" RCP	2931.48	29.0	2934.94	0.68	2943.70		OK
1032.61		N/A	24" RCP	2931.48	14.0	2934.95	7.92	2943.70		OK
1035.11		N/A	18" RCP	2931.98	14.0	2934.99	7.92	2943.70		OK
1035.11		N/A	18" RCP	2931.98	14.0	2934.99	7.92	2943.70		OK
1143.85	N/A	N/A	18" RCP	2933.07	14.0	2936.92	7.92	2941.97	NDOT Type 2A	OK

SDW

T1 SKYE CANYON NORTH ARROYO - TDS									
T2 REFERENCED FROM SKYE CANYON PARCEL 2.10 - TDS ADDENDUM 2									
T3 ONSITE STORM DRAIN - WEST MAINLINE									
SO	0980.2202926.250	24	.013					2926.922	
R	0995.0002930.560	24	.013						
R	0997.5002930.855	24	.013						
R	1000.0002931.150	24	.013						
R	1030.1102931.479	24	.013						
WE	1030.1102931.479	2	.013						
R	1032.6102931.480	2	.013	15.000			2931.480	90.0	
JX	1032.6102931.480	2	.013						
R	1035.1102931.980	18	.013						
WX	1035.1102931.980	18	.013						
R	1143.8502933.070	18	.013						
SH	1143.8502933.070	18	.013						
CD	2	2	0	0.000	10.000	12.290	0.000	0.000	0.00
CD	18	4	0	0.000	1.500	0.000	0.000	0.0000.00	0.00
CD	24	4	0	0.000	2.000	0.000	0.000	0.0000.00	0.00
CD	30	4	0	0.000	2.500	0.000	0.000	0.0000.00	0.00
CD	36	4	0	0.000	3.000	0.000	0.000	0.0000.00	0.00
CD	42	4	0	0.000	3.500	0.000	0.000	0.0000.00	0.00
Q				14.000	.0				

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP WIDTH	AVE PIER WIDTH	HEIGHT 1	BASE ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	2	2	0	.000	10.000	12.290		.00										
CD	18	4	0		1.500													
CD	24	4	0		2.000													
CD	30	4	0		2.500													
CD	36	4	0		3.000													
CD	42	4	0		3.500													

PAGE NO 1

W S P G W
WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -
SKYE CANYON NORTH ARROYO - TDS
HEADING LINE NO 2 IS -
REFERENCED FROM SKYE CANYON PARCEL 2.10 - TDS ADDENDUM 2
HEADING LINE NO 3 IS -
ONSITE STORM DRAIN - WEST MAINLINE

PAGE NO 2

W S P G W
WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	2	IS A REACH	980.220	2926.250	24	2926.922	.000	.000	.000	0
ELEMENT NO	3	IS A REACH	995.000	2930.560	24		.000	.000	.000	0
ELEMENT NO	4	IS A REACH	997.500	2930.855	24		.000	.000	.000	0
ELEMENT NO	5	IS A REACH	1000.000	2931.150	24		.000	.000	.000	0
ELEMENT NO	6	IS A WALL ENTRANCE	1030.110	2931.479	24		.000	.000	.000	1
ELEMENT NO	7	IS A REACH	1030.110	2931.479	2		.000	.000	.000	0
ELEMENT NO	8	IS A JUNCTION	1032.610	2931.480	2		.000	.000	.000	0
			STATION	INVERT	SECT					
			1032.610	2931.480	2					
			Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
			.000	2931.480	.000	90.000	.000			
				RADIUS	ANGLE					
				.000	.000					

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

WATER SURFACE PROFILE LISTING

Date:10-18-2022 Time: 9:50:47

SKYE CANYON NORTH ARROYO - TDS
REFERENCED FROM SKYE CANYON PARCEL 2.10 - TDS ADDENDUM 2
ONSITE STORM DRAIN - WEST MAINLINE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/Dia.-FT	Base Wt or I.D.	No With Prs/Pip
L/Elem	Ch Slope						HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR Type Ch
980.220	2926.250	.932	2927.182	29.00	20.21	6.34	2933.52	.00	1.85	2.00	2.000	.000	.00 .0
1.009	.2916					.0818	.08	.93	4.20	.66	.013	.00	PIPE
981.229	2926.544	.945	2927.490	29.00	19.85	6.12	2933.61	.00	1.85	2.00	2.000	.000	.00 .0
2.402	.2916					.0750	.18	.95	4.09	.66	.013	.00	PIPE
983.631	2927.245	.981	2928.226	29.00	18.92	5.56	2933.79	.00	1.85	2.00	2.000	.000	.00 .0
2.075	.2916					.0660	.14	.98	3.81	.66	.013	.00	PIPE
985.707	2927.850	1.018	2928.868	29.00	18.04	5.06	2933.92	.00	1.85	2.00	2.000	.000	.00 .0
1.801	.2916					.0582	.10	1.02	3.55	.66	.013	.00	PIPE
987.507	2928.375	1.057	2929.433	29.00	17.20	4.60	2934.03	.00	1.85	2.00	2.000	.000	.00 .0
1.567	.2916					.0513	.08	1.06	3.30	.66	.013	.00	PIPE
989.074	2928.832	1.099	2929.931	29.00	16.40	4.18	2934.11	.00	1.85	1.99	2.000	.000	.00 .0
1.365	.2916					.0453	.06	1.10	3.07	.66	.013	.00	PIPE
990.439	2929.230	1.142	2930.372	29.00	15.64	3.80	2934.17	.00	1.85	1.98	2.000	.000	.00 .0
1.190	.2916					.0400	.05	1.14	2.85	.66	.013	.00	PIPE
991.629	2929.577	1.188	2930.765	29.00	14.91	3.45	2934.22	.00	1.85	1.96	2.000	.000	.00 .0
1.036	.2916					.0354	.04	1.19	2.64	.66	.013	.00	PIPE
992.665	2929.879	1.237	2931.116	29.00	14.22	3.14	2934.25	.00	1.85	1.94	2.000	.000	.00 .0
.898	.2916					.0314	.03	1.24	2.45	.66	.013	.00	PIPE

WATER SURFACE PROFILE LISTING

Date:10-18-2022 Time: 9:50:47

SDW

SKYE CANYON NORTH ARROYO - TDS
 REFERENCED FROM SKYE CANYON PARCEL 2.10 - TDS ADDENDUM 2

 ONSITE STORM DRAIN - WEST MAINLINE

Station	Invert Elev	Depth (Ft)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Height/ Dia.-FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
993.563	2930.141	1.288	2931.429	29.00	13.56	2.85	2934.28	.00	1.85	1.92	2.000	.000	.00	0 .0
.775	.2916					.0278	.02	1.29	2.26	.66	.013	.00	.00	PIPE
994.337	2930.367	1.343	2931.710	29.00	12.93	2.59	2934.30	.00	1.85	1.88	2.000	.000	.00	0 .0
.663	.2916					.0248	.02	1.34	2.08	.66	.013	.00	.00	PIPE
995.000	2930.560	1.402	2931.962	29.00	12.32	2.36	2934.32	.00	1.85	1.83	2.000	.000	.00	0 .0
1.138	.1180					.0225	.03	1.40	1.92	.85	.013	.00	.00	PIPE
996.138	2930.694	1.446	2932.140	29.00	11.92	2.21	2934.35	.00	1.85	1.79	2.000	.000	.00	0 .0
1.362	.1180					.0205	.03	1.45	1.80	.85	.013	.00	.00	PIPE
997.500	2930.855	1.514	2932.369	29.00	11.37	2.01	2934.38	.00	1.85	1.72	2.000	.000	.00	0 .0
.692	.1180					.0188	.01	1.51	1.64	.85	.013	.00	.00	PIPE
998.192	2930.937	1.558	2932.495	29.00	11.04	1.89	2934.39	.00	1.85	1.66	2.000	.000	.00	0 .0
.915	.1180					.0173	.02	1.56	1.55	.85	.013	.00	.00	PIPE
999.107	2931.044	1.638	2932.683	29.00	10.53	1.72	2934.40	.00	1.85	1.54	2.000	.000	.00	0 .0
.628	.1180					.0158	.01	1.64	1.39	.85	.013	.00	.00	PIPE
999.735	2931.119	1.730	2932.849	29.00	10.04	1.57	2934.41	.00	1.85	1.37	2.000	.000	.00	0 .0
.265	.1180					.0147	.00	1.73	1.22	.85	.013	.00	.00	PIPE
1000.000	2931.150	1.846	2932.996	29.00	9.57	1.42	2934.42	.00	1.85	1.07	2.000	.000	.00	0 .0
14.040	.0109					.0148	.21	1.85	1.00	2.00	.013	.00	.00	PIPE

▲ FILE: SDW.WSW

Program Package Serial Number: 7189
 W S P G W - CIVILDESIGN Version 14.08

WATER SURFACE PROFILE LISTING

SKYE CANYON NORTH ARROYO - TDS
 REFERENCED FROM SKYE CANYON PARCEL 2.10 - TDS ADDENDUM 2
 ONSITE STORM DRAIN - WEST MAINLINE

Date: 10-18-2022 Time: 9:50:47

SDW

Station	Invert Elev	Depth (Ft)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1014.040	2931.303	2.000	2933.303	29.00	9.23	1.32	2934.63	.00	1.85	.00	2.000	.000	.00	0 .0
16.070	.0109					.00159	.26	2.00	.00	2.00	.013	.00	.00	PIPE
1030.110	2931.479	2.124	2933.603	29.00	9.23	1.32	2934.93	.00	1.85	.00	2.000	.000	.00	0 .0
WALL ENTRANCE														
1030.110	2931.479	3.457	2934.936	29.00	.68	.01	2934.94	.00	.56	12.29	10.000	12.290	.00	0 .0
2.500	.0004					.00000	.00	3.46	.06	1.10	.013	.00	.00	RECTANG
1032.610	2931.480	3.456	2934.936	29.00	.68	.01	2934.94	.00	.56	12.29	10.000	12.290	.00	0 .0
JUNCT STR	.0000					.00000	.00	3.46	.06		.013	.00	.00	RECTANG
1032.610	2931.480	3.467	2934.947	14.00	7.92	.97	2935.92	.00	1.38	.00	1.500	.000	.00	0 .0
2.500	.2000					.0178	.04	3.47	.00	.56	.013	.00	.00	PIPE
1035.110	2931.980	3.011	2934.991	14.00	7.92	.97	2935.97	.00	1.38	.00	1.500	.000	.00	0 .0
WALL EXIT														
1035.110	2931.980	3.012	2934.992	14.00	7.92	.97	2935.97	.00	1.38	.00	1.500	.000	.00	0 .0
108.740	.0100					.0178	1.93	3.01	.00	1.50	.013	.00	.00	PIPE
1143.850	2933.070	3.854	2936.924	14.00	7.92	.97	2937.90	.00	1.38	.00	1.500	.000	.00	0 .0

Parcel 2.08/2.09 WSPG Model – NORTH

Ultimate Condition WSPG Summary										
Storm Drain Lateral #5 - Parcel 2.08/2.09 System (NORTH.WSW)										
WSPG Station	Storm Drain Station	Improvement Plan Sheet	Storm Drain Dimension	Invert Elevation (ft)	Q ₁₀₀ (cfs)	WSE (ft)	Velocity (ft/s)	FG Elevation	Facility Description	HGL Check ¹
1 - 'HGL Check' reflects the minimum 1-ft below finished grade.										
956.75	32+41.71	PP-9	24" RCP	2862.04	15.0	2862.68	17.32	2868.52	SDMH #15	OK
997.47	32+27.52	PP-9	24" RCP	2867.52	15.0	2868.83	6.90	2870.85	SDMH #19	OK
999.97		PP-9	24" RCP	2867.53	15.0	2868.81	7.07	2870.85		OK
1130.50	N/A	N/A	24" RCP	2868.58	15.0	2869.98	6.41	2874.30	EX SDDI #1	OK
1133.00			24" RCP	2868.78	15.0	2870.98	0.54	2874.30		OK
1133.00			24" RCP	2868.78	15.0	2870.98	0.54	2874.30		OK
1133.01			24" RCP	2868.78	15.0	2870.98	0.54	2874.30		OK
1133.02			24" RCP	2868.78	15.0	2870.98	0.55	2874.30		OK
1133.03			18" RCP	2868.78	11.0	2870.99	0.40	2874.30		OK
1133.03	N/A	N/A	18" RCP	2868.78	11.0	2870.99	3.50	2874.30	EX SDDI #2	OK
1166.33			18" RCP	2869.22	11.0	2871.05	3.65	2874.30		OK

1 - 'HGL Check' reflects the minimum 1-ft below finished grade.

NORTH

T1 SKYE CANYON NORTH ARROYO - TDS
T2 REFERENCED FROM SKYE CANYON PARCEL 2.08

T3 24" RCP TO THE SYSTEM OUTLET NORTH									
SO	956.7502862.040	24	.013				2862.050		1
R	997.4702867.520	24	.013						1
R	999.9702867.530	24	.013						
R	1130.5002868.580	24	.013						
WE		1	.013						
R	1133.0002868.778	1	.013					-15.0	1
R	1133.0102868.779	1	.013					-15.0	1
R	1133.0202868.780	1	.013					-6.0	1
JX	1133.0302868.780	1 42	.013	4.0			2868.780	90.0	
WX		24	.013						
R	1166.3302869.220	24	.013						1
SH	1166.3302869.220	24	.013						
CD	1 3 0	.000	8.120	12.5000	.000	.000	.000	.00	
CD	2 3 0	.000	8.980	15.0000	.000	.000	.000	.00	
CD	18 4 1	.000	1.500	.000	.000	.000	.000	.00	
CD	24 4 1	.000	2.000	.000	.000	.000	.000	.00	
CD	36 4 1	.000	3.000	.000	.000	.000	.000	.00	
CD	42 4 1	.000	3.500	.000	.000	.000	.000	.00	
CD	48 4 1	.000	4.000	.000	.000	.000	.000	.00	
Q			11.000	.0					

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
 ELEMENT NO 10 IS A WALL EXIT

U/S DATA STATION INVERT SECT

1133.030 2868.780 24

ELEMENT NO 11 IS A REACH

U/S DATA STATION INVERT SECT

1166.330 2869.220 24

W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 12 IS A SYSTEM HEADWORKS

U/S DATA STATION INVERT SECT

1166.330 2869.220 24

NORTH

RADIUS
.000
ANGLE
.000
ANG PT
.000
MAN
1
H
3
PAGE NO

W S ELEV
.000

WATER SURFACE PROFILE LISTING

Date:10-26-2022 Time:11:47:15

SKYE CANYON NORTH ARROYO - TDS
REFERENCED FROM SKYE CANYON PARCEL 2.08
24" RCP TO THE SYSTEM OUTLET NORTH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/ or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall		ZR	Type Ch
956.750	2862.040	.640	2862.680	15.00	17.32	4.66	2867.34	.00	1.40	1.87	2.000	.000	.00	.00	1 .0
3.024	.1346					.0877	.27	.64	4.48	.58	.013	.00	.00	.00	PIPE
959.774	2862.447	.647	2863.094	15.00	17.06	4.52	2867.61	.00	1.40	1.87	2.000	.000	.00	.00	1 .0
7.178	.1346					.0805	.58	.65	4.38	.58	.013	.00	.00	.00	PIPE
966.953	2863.413	.670	2864.083	15.00	16.26	4.11	2868.19	.00	1.40	1.89	2.000	.000	.00	.00	1 .0
5.462	.1346					.0706	.39	.67	4.10	.58	.013	.00	.00	.00	PIPE
972.415	2864.148	.693	2864.842	15.00	15.51	3.73	2868.58	.00	1.40	1.90	2.000	.000	.00	.00	1 .0
4.327	.1346					.0618	.27	.69	3.83	.58	.013	.00	.00	.00	PIPE
976.742	2864.731	.718	2865.449	15.00	14.79	3.39	2868.84	.00	1.40	1.92	2.000	.000	.00	.00	1 .0
3.520	.1346					.0542	.19	.72	3.58	.58	.013	.00	.00	.00	PIPE
980.262	2865.204	.744	2865.948	15.00	14.10	3.09	2869.03	.00	1.40	1.93	2.000	.000	.00	.00	1 .0
2.915	.1346					.0475	.14	.74	3.35	.58	.013	.00	.00	.00	PIPE
983.177	2865.597	.771	2866.367	15.00	13.44	2.81	2869.17	.00	1.40	1.95	2.000	.000	.00	.00	1 .0
2.446	.1346					.0417	.10	.77	3.13	.58	.013	.00	.00	.00	PIPE
985.623	2865.926	.798	2866.724	15.00	12.82	2.55	2869.27	.00	1.40	1.96	2.000	.000	.00	.00	1 .0
2.069	.1346					.0366	.08	.80	2.92	.58	.013	.00	.00	.00	PIPE
987.693	2866.204	.828	2867.032	15.00	12.22	2.32	2869.35	.00	1.40	1.97	2.000	.000	.00	.00	1 .0
1.762	.1346					.0321	.06	.83	2.73	.58	.013	.00	.00	.00	PIPE

Date:10-26-2022 Time:11:47:15

WATER SURFACE PROFILE LISTING

SKYE CANYON NORTH ARROYO - TDS
REFERENCED FROM SKYE CANYON PARCEL 2.08
24" RCP TO THE SYSTEM OUTLET NORTH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Dia.	Height/ or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall		ZR	Type Ch
989.454	2866.441	.858	2867.299	15.00	11.65	2.11	2869.41	.00	1.40	1.98	2.000	.000	.00	1	.0
1.504	.1346					.0282	.04	.86	2.55	.58	.013	.00	.00		PIPE
990.958	2866.644	.890	2867.533	15.00	11.11	1.92	2869.45	.00	1.40	1.99	2.000	.000	.00	1	.0
1.285	.1346					.0248	.03	.89	2.38	.58	.013	.00	.00		PIPE
992.243	2866.817	.923	2867.740	15.00	10.59	1.74	2869.48	.00	1.40	1.99	2.000	.000	.00	1	.0
1.098	.1346					.0218	.02	.92	2.21	.58	.013	.00	.00		PIPE
993.341	2866.965	.957	2867.922	15.00	10.10	1.58	2869.51	.00	1.40	2.00	2.000	.000	.00	1	.0
.933	.1346					.0192	.02	.96	2.06	.58	.013	.00	.00		PIPE
994.274	2867.090	.994	2868.083	15.00	9.63	1.44	2869.52	.00	1.40	2.00	2.000	.000	.00	1	.0
.789	.1346					.0169	.01	.99	1.92	.58	.013	.00	.00		PIPE
995.063	2867.196	1.032	2868.228	15.00	9.18	1.31	2869.54	.00	1.40	2.00	2.000	.000	.00	1	.0
.661	.1346					.0149	.01	1.03	1.79	.58	.013	.00	.00		PIPE
995.724	2867.285	1.071	2868.356	15.00	8.75	1.19	2869.55	.00	1.40	1.99	2.000	.000	.00	1	.0
.545	.1346					.0131	.01	1.07	1.66	.58	.013	.00	.00		PIPE
996.269	2867.358	1.113	2868.472	15.00	8.35	1.08	2869.55	.00	1.40	1.99	2.000	.000	.00	1	.0
.439	.1346					.0116	.01	1.11	1.55	.58	.013	.00	.00		PIPE
996.708	2867.417	1.158	2868.575	15.00	7.96	.98	2869.56	.00	1.40	1.97	2.000	.000	.00	1	.0
.343	.1346					.0103	.00	1.16	1.44	.58	.013	.00	.00		PIPE

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING

Date:10-26-2022 Time:11:47:15

SKYE CANYON NORTH ARROYO - TDS

REFERENCED FROM SKYE CANYON PARCEL 2.08

24" RCP TO THE SYSTEM OUTLET NORTH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Height/Dia.-FT or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
997.051	2867.464	1.205	2868.668	15.00	7.59	.89	2869.56	.00	1.40	1.96	2.000	.00	1 .0
.252	.1346					.0091	.00	1.20	1.33	.58	.013	.00	PIPE
997.303	2867.498	1.254	2868.752	15.00	7.23	.81	2869.56	.00	1.40	1.93	2.000	.00	1 .0
.167	.1346					.0080	.00	1.25	1.23	.58	.013	.00	PIPE
997.470	2867.520	1.307	2868.827	15.00	6.90	.74	2869.57	.00	1.40	1.90	2.000	.00	1 .0
2.500	.0040					.0078	.02	1.31	1.14	1.74	.013	.00	PIPE
999.970	2867.530	1.279	2868.810	15.00	7.07	.78	2869.59	.00	1.40	1.92	2.000	.00	1 .0
50.836	.0080					.0080	.41	1.28	1.18	1.28	.013	.00	PIPE
1050.806	2867.939	1.279	2869.219	15.00	7.07	.78	2869.99	.00	1.40	1.92	2.000	.00	1 .0
43.872	.0080					.0080	.35	1.28	1.18	1.28	.013	.00	PIPE
1094.678	2868.292	1.282	2869.574	15.00	7.05	.77	2870.35	.00	1.40	1.92	2.000	.00	1 .0
31.807	.0080					.0076	.24	1.28	1.18	1.28	.013	.00	PIPE
1126.485	2868.548	1.337	2869.884	15.00	6.72	.70	2870.59	.00	1.40	1.88	2.000	.00	1 .0
4.015	.0080					.0067	.03	1.34	1.09	1.28	.013	.00	PIPE
1130.500	2868.580	1.396	2869.976	15.00	6.41	.64	2870.61	.00	1.40	1.84	2.000	.00	1 .0
WALL ENTRANCE													
1130.500	2868.580	2.402	2870.982	15.00	.50	.00	2870.99	.00	.36	12.50	8.120	.00	0 .0
1.407	.0792					.0000	.00	2.40	.06	.14	.013	.00	BOX

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING

Date:10-26-2022 Time:11:47:15

SKYE CANYON NORTH ARROYO - TDS
REFERENCED FROM SKYE CANYON PARCEL 2.08
24" RCP TO THE SYSTEM OUTLET NORTH

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Width	Top Width	Height/Dia.-FT or I.D.	Base Wt	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1131.907	2868.691	2.290	2870.982	15.00	.52	.00	2870.99	.00	.36	12.50	8.120	12.500	.00	.00	.0
1.093	.0792					.0000	.00	2.29	.06	.14	.013	.00	.00	.00	BOX
1133.000	2868.778	2.203	2870.981	15.00	.54	.00	2870.99	.00	.36	12.50	8.120	12.500	.00	.00	.0
.010	.0976					.0000	.00	2.20	.06	.13	.013	.00	.00	.00	BOX
1133.010	2868.779	2.202	2870.981	15.00	.54	.00	2870.99	.00	.36	12.50	8.120	12.500	.00	.00	.0
.010	.0976					.0000	.00	2.20	.06	.13	.013	.00	.00	.00	BOX
1133.020	2868.780	2.201	2870.981	15.00	.55	.00	2870.99	.00	.36	12.50	8.120	12.500	.00	.00	.0
JUNCT STR	.0000					.0000	.00	2.20	.06		.013	.00	.00	.00	BOX
1133.030	2868.780	2.206	2870.986	11.00	.40	.00	2870.99	.00	.29	12.50	8.120	12.500	.00	.00	.0
WALL EXIT															
1133.030	2868.780	2.206	2870.986	11.00	3.50	.19	2871.18	.00	1.19	.00	2.000	.000	.00	.00	1 .0
19.516	.0132					.0023	.05	2.21	.00	.91	.013	.00	.00	.00	PIPE
1152.546	2869.038	2.000	2871.038	11.00	3.50	.19	2871.23	.00	1.19	.00	2.000	.000	.00	.00	1 .0
13.784	.0132					.0022	.03	2.00	.00	.91	.013	.00	.00	.00	PIPE
1166.330	2869.220	1.831	2871.051	11.00	3.65	.21	2871.26	.00	1.19	1.11	2.000	.000	.00	.00	1 .0

Inlet Sizing Computations

Grate Inlet Sizing Computation

Project Name & Number: CEN2018: SKYE CANYON NORTH ARROYO
Date: 10/24/2022
By: PK

Westwood

Notes:

Facility ID: SDDI#1
Drainage Condition: Proposed
Source of Flow: Q100 = WARR3(A)+PR2 = 48+1.5 = 49.5
Inlet Type: NDOT Type 2
Inlet Size: 6' X 5'

Known Information:

Q = Flow (cfs)	49.5
W = Width of Grate (ft)	5.00
L = Length of Grate (ft)	6.00
D = Diameter of Circle (in)	
Cf = Clogging Factor (%)	50

Weir Conditions:

$$HW = (Q/(C_w * P_c))^{2/3}$$

C _w = Weir Coefficient	3.00
P = Perimeter of grate (ft)	22.0
P _c = Perimeter (w/clogging) (ft)	11.0
HW = Headwater depth (ft)	1.31

Orifice Conditions:

$$HW = (Q/(C_o * A_c))^2 / 2 * g$$

C _o = Orifice Coefficient	0.67
A _g = Grate Area (ft ²)	30.00
G _f = Grate Opening Factor	0.70
A _c = Grate Open Area (w/ clogging) (ft ²)	10.50
g = Gravity (fps)	32.20
HW = Headwater depth (ft)	0.77

Output:

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth = 1.31 ft with grate

Grate Inlet Sizing Computation

Project Name & Number: CEN2018: SKYE CANYON NORTH ARROYO

Date: 10/26/2022

By: PK

Westwood

Notes:

Facility ID: SDDI#5
Drainage Condition: Proposed
Source of Flow: Q100= BAS1(D)
Inlet Type: NDOT Type 2
Inlet Size: 2' X 2.5'

Known Information:

Q = Flow (cfs) 7.0
W = Width of Grate (ft) 2.50
L = Length of Grate (ft) 2.00
D = Diameter of Circle (in)
Cf = Clogging Factor (%) 50

Weir Conditions:

$$HW = (Q/(Cw*Pc))^{2/3}$$

Cw = Weir Coefficient 3.00
P = Perimeter of grate (ft) 9.0
Pc = Perimeter (w/clogging) (ft) 4.5
HW = Headwater depth (ft) 0.65

Orifice Conditions:

$$HW = (Q/(Co*Ac))^2/2*g$$

Co = Orifice Coefficient 0.67
Ag = Grate Area (ft²) 5.00
Gf = Grate Opening Factor 0.70
Ac = Grate Open Area (w/ clogging) (ft²) 1.75
g = Gravity (fps) 32.20
HW = Headwater depth (ft) 0.55

Output:

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth = 0.65 ft with grate

APPENDIX D

City Planning Approval Letter

From: Fred Solis <fsolis@LasVegasNevada.GOV>
Sent: Monday, October 24, 2022 1:02 PM
To: Chris Langham <Chris.Langham@westwoodps.com>
Cc: Lant Leavitt <Lant.Leavitt@westwoodps.com>; Mark Rex <mrex@LasVegasNevada.GOV>; Peter Jackson <pjackson@LasVegasNevada.GOV>
Subject: RE: Skye Canyon North Arroyo Storm Drain

Chris,

I have reviewed the proposed landscaping and have one comment. Development Agreement Exhibit R calls for "enhanced" LS throughout the arroyo. The trees provided are noted as 24-inch box, which is the minimum size tree for development projects. In order to qualify as enhanced LS, we will need to see the provided trees exceeding the minimum standard of a 24-inch box tree. The provided trees should be a minimum of 36-inch box with a preferred size of 48-inch box. Other than the proposed tree size, Planning is ok with the remainder of the LS plan.

Thanks,

Fred Solis, AICP

Planning Manager
Department of Community Development
702-229-5409
495 S. Main Street | Las Vegas, NV 89101



lasvegasnevada.gov



Tell us how we're doing! Please [click here](#) to take a short online survey to help us improve our service.

Thanks,

From: Chris Langham <Chris.Langham@westwoodps.com>
Sent: Thursday, October 13, 2022 10:02 AM
To: Fred Solis <fsolis@LasVegasNevada.GOV>
Cc: Lant Leavitt <Lant.Leavitt@westwoodps.com>
Subject: FW: Skye Canyon North Arroyo Storm Drain

CAUTION: This email originated from an External Source. Please use caution before opening attachments, clicking links, or responding to this email. Do not sign-in with your City of Las Vegas account credentials.

Fred,

Attached is the plan we sent on 9/9/22, following our coordination meeting.

Is there a formal submittal process for obtaining schematic-level approval of the attached, or do we just need an email from you?

Chris Langham, PLA

Licensed in: NV #733, TX #3667

Local PLA Service Leader

Senior Landscape Architect

chris.langham@westwoodps.com

direct (702) 284-5339

main (702) 284-5300

cell (702) 505-0909

Westwood

5725 W. Badura Ave, Suite 100

Las Vegas, NV 89118

westwoodps.com

APPENDIX E

Reference Material

Skye Canyon Parks 2.36 & 5.13 (DS05595)

Approval Letter

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 13, 2022
TO: Land Development Services Department of Building & Safety		FROM: Peter Jackson, CFM <i>(A for)</i> Senior Engineering Associate Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Skye Canyon Parks 2.36 & 5.13	Westwood Professional Services
Cross Streets:	Shaumber Rd & Iron Mountain Rd	Century Communities
File Number:	F:\Depot\DSMemos\DS05595B.doc	Bart Anderson, P.E., DevCo
Parcel Number:	126-12-610-001	
Zoning Action:		
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES X NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	7/20/2022	8/18/2022	Not Approved	\$400.00	4873670: \$400
2 nd Submittal	9/21/2022	10/13/2022	Conditionally Approved	\$400.00	4963998: \$400
			TOTAL FEES (LDDRS):	\$800.00	----

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	is conditionally approved subject to conformance to all City standards and the following conditions:
	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. No Building Permits will be issued for lots adjacent to the North Arroyo. This includes Lots 174 through 186 as shown the Final Map for Skye Canyon 2.10 – Phase 2A, Bk 166/Pg 91 of Plats and APN 12612610009 – Parcel 2.10, Phase 2B. The permits will be released upon the approval of the drainage study and the bonding of the improvement plans. Occupancy under the building permits shall not be granted until the substantial completion of the North Arroyo drainage facilities.
2. 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.
3. Coordinate Park and the North Arroyo landscape improvements with the Planning Department (Fred Solis) to determine the Common Element/Landscape/Trail improvements required with the project for connectivity.
4. All storm drain inlets that are more than 10'-deep (e.g DI #1) require a special structural detail and calculations. Submit structural design and calculations for to *City Building & Safety Department* for review and approval prior to the final approval of the drainage study. The engineer must provide a copy of Building Department approval of the structures to Flood Control prior to final acceptance of the drainage study.

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.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS
PBJ/CAA

T/R/S: T19S/R59E/S12
AREA F-12

Referenced Drainage Exhibit

Referenced Hydraulics

Grate Inlet Sizing Computation

Project Name & Number: Skye Canyon Parks 5.13 & 2.36

Date: 5/13/2022

By: PK

Westwood

Notes:

Facility ID: All Proposed SDDIs
Drainage Condition: Proposed/Ultimate
Source of Flow: Max. flow rate to any proposed DI = 3cfs at 5.13(d). Conservatively apply to all DIs
Inlet Type: NDOT Type 2
Inlet Size: 2.5' x 2'

Known Information:

Q = Flow (cfs)	3.0
W = Width of Grate (ft)	2.50
L = Length of Grate (ft)	2.00
D = Diameter of Circle (in)	
Cf = Clogging Factor (%)	50

Weir Conditions:

Inlet sizing referenced
for SDDI #6 to be
installed with North
Arroyo Project.

$$HW = (Q / (C_w * P_c))^{2/3}$$

Cw = Weir Coefficient	3.00
P = Perimeter of grate (ft)	9.0
Pc = Perimeter (w/ clogging) (ft)	4.5
HW = Headwater depth (ft)	0.37

Orifice Conditions:

$$HW = (Q / (C_o * A_c))^2 / 2 * g$$

Co = Orifice Coefficient	0.65
Ag = Grate Area (ft ²)	5.00
Gf = Grate Opening Factor	0.60
Ac = Grate Open Area (w/ clogging) (ft ²)	1.50
g = Gravity (fps)	32.20
HW = Headwater depth (ft)	0.15

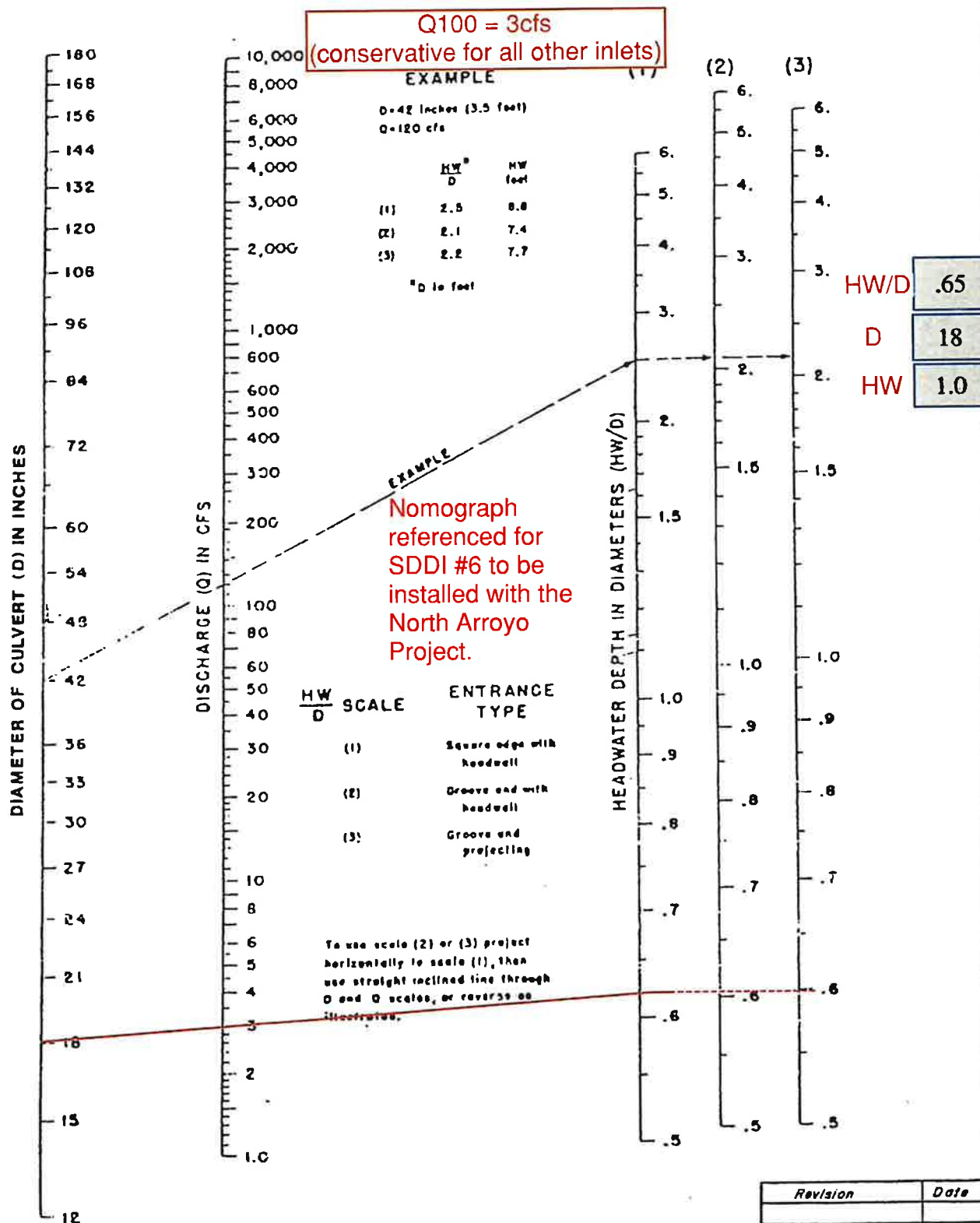
Output:

Worst Case Scenario Occurs Under Weir Conditions

Headwater Depth = 0.37 ft with grate

Average Grate Elevation	2,330.38
Headwater Elevation	2,330.75
Target Headwater Elevation = 2331.71	

NOMOGRAPH - INLET CONTROL RCP



Revision	Date

Referenced Improvement Plans

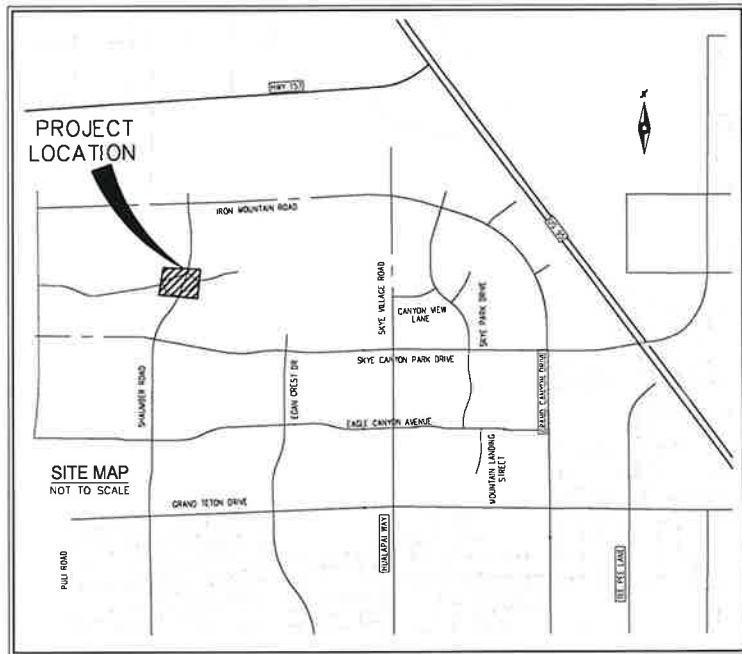


CENTURY COMMUNITIES

IMPROVEMENT PLANS FOR SKYE CANYON PARKS 2.36/5.13

CITY OF LAS VEGAS, NEVADA

APN: 126-12-610-001, 126-12-210-001, 126-12-212-068, 126-12-617-114 AND PORTION OF 126-12-610-009



SHEET INDEX		
SHEET NUMBER	DESCRIPTION	TITLE
1	C-1	COVER SHEET
2	C-2	STANDARD NOTES
3	C-3	QUANTITIES & LEGEND
4	G-1	GRADING PLAN
5	G-2	GRADING PLAN
6	U-1	UTILITY PLAN
7	U-2	UTILITY PLAN
8	SD-1	STORM DRAIN PLAN
9	SD-2	STORM DRAIN PLAN
10	DT-1	DETAIL SHEET
11	DT-2	DETAIL SHEET

APPROVALS

CITY ENGINEERING OFFICE

CITY FIRE & RESCUE

CITY PLANNING DEPARTMENT

CENTRAL TELEPHONE CO DBA CENTURYLINK

DATE

THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. 126-12-610-001 FIRST APPROVED DATE: 12/15/2022
LVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW N/A GPM
SHEETS: C-1, C-2, G-1, G-2, U-1, U-2, SD-1, SD-2

NV ENERGY

DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION

DATE

COX COMMUNICATIONS LAS VEGAS, INC.

DATE

OWNER/DEVELOPER

CENTURY COMMUNITIES OF NEVADA, LLC
6345 SOUTH JONES BLVD
LAS VEGAS, NV 89118
PH: (702) 873-5316
CONTACT: PAULO CHAVEZ

ENGINEER

WESTWOOD PS
3725 W. BARDURA AVE., SUITE 100
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: MELISSA L. MURPHY

BENCHMARK

BENCHMARK NUMBER: USDA 1934
U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD
ELEVATION = 2817.61 FEET, 858.81 METERS N.A.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 18 SOUTH, RANGE 59 EAST, W.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 160, PAGE 72 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (AREA OUTSIDE THE 500 YEAR FLOODPLAIN), PER THE FEMA FIRM PANELS 32003C1750C DATED SEPTEMBER 27, 2002

Melissa L. Murphy

Digitally signed by Melissa L. Murphy
DN: cn=Melissa L. Murphy, o=Westwood Professional Services, ou=Westwood Professional Services, email=melissa.murphy@westwoodps.com, c=US
Date: 2022.09.19 13:22:57-0700

DEVIATIONS FROM STANDARDS

NONE

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDPE). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: <http://www.state.nv.us/ndep/stormwater.htm>. PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDPE A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NV1000000 ALONG WITH THE APPROPRIATE FILING FEE.

EARTHWORK SUMMARY

CUT 2224 CY
FILL 888 CY
NET 1664 CY (CUT)

GEOTECHNICAL ENGINEER

PREPARED BY: GLOBE RESIDENTIAL, LLC
ADDRESS: 6835 SOUTH LAKESIDE AVE.
PHONE: 702-892-2213
PROJECT No: 12203JRC-LVR
DATED: 7/1/20
UPDATED: 7/1/21

Westwood

5725 W. Bardura Avenue
Suite 100
Las Vegas, NV 89118
Phone (702) 284-5300
Fax (702) 284-5399
westwoodps.com

Westwood Professional Services, Inc.

DATE BY APP DATE

DESCRIPTION

LAS VEGAS, NEVADA

CENTURY
COMMUNITIES

SKYE CANYON PARKS 2.36/5.13

COVER SHEET

12/15/2022

DATE: 9/6/2022

DRAFTER: PJS

DESIGNER: PJS

CHECKED: MM

PROJECT NO.

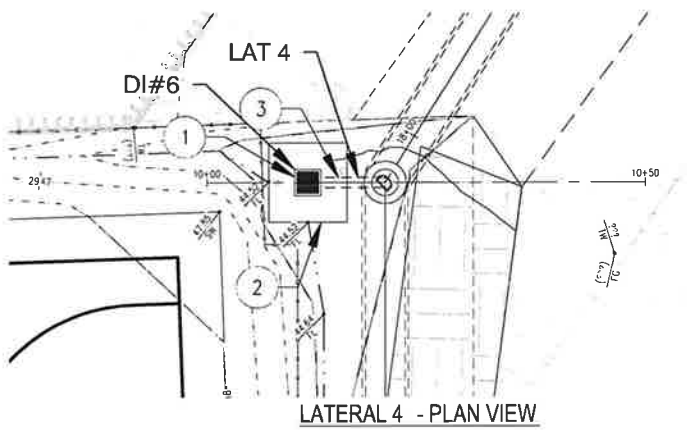
CEN2107



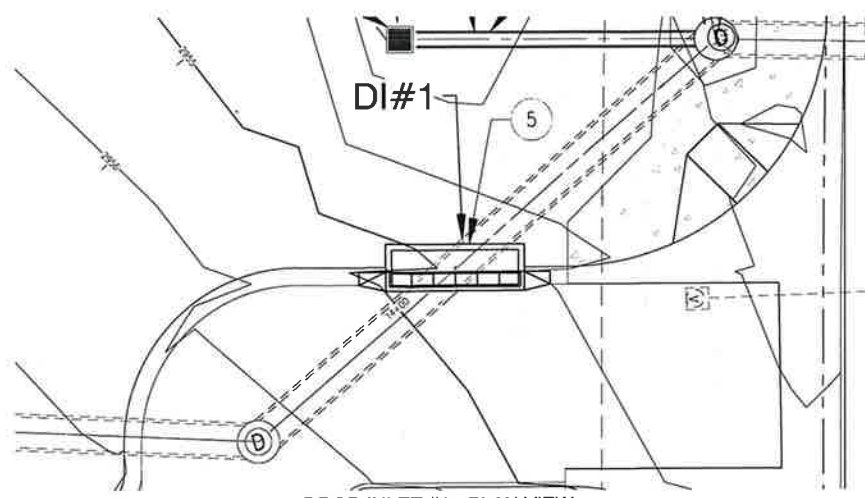
9-19-22

C-1

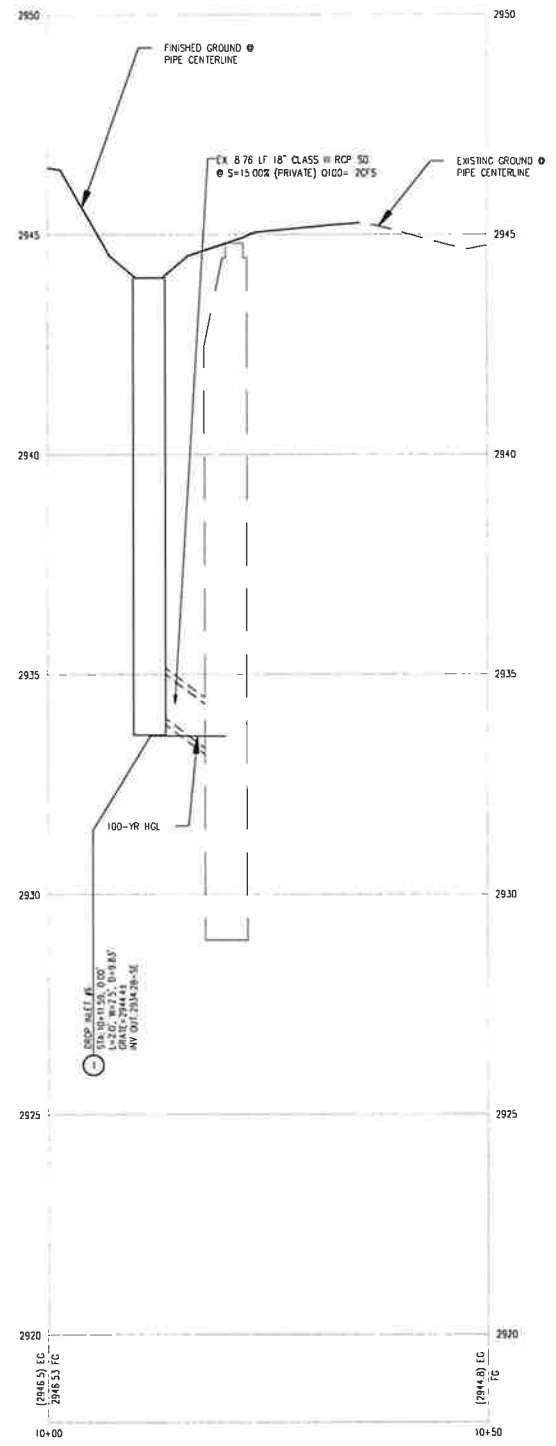
SHEET 1 OF 11



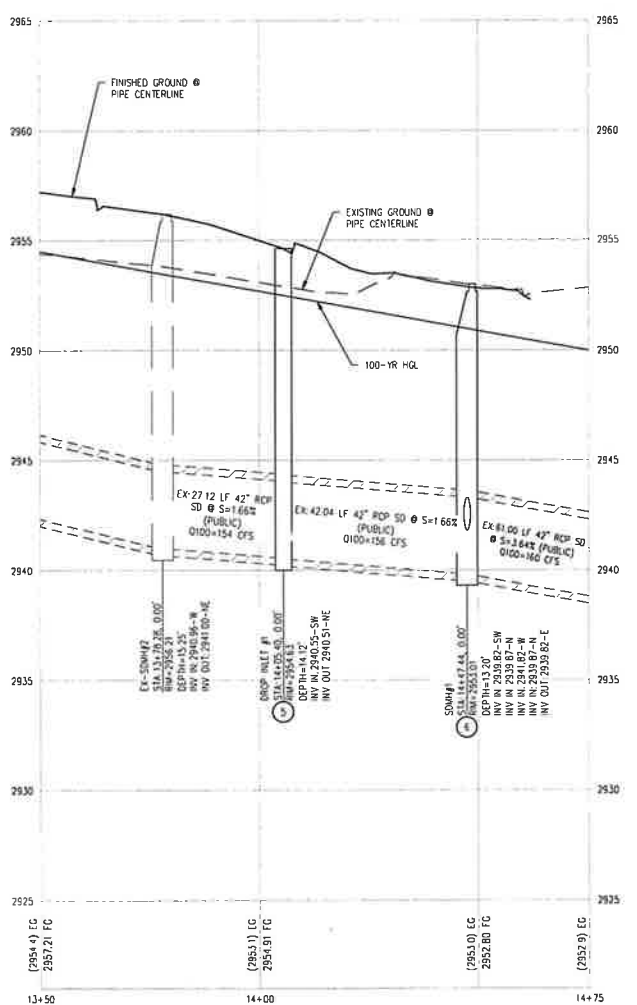
LATERAL 4 - PLAN VIEW



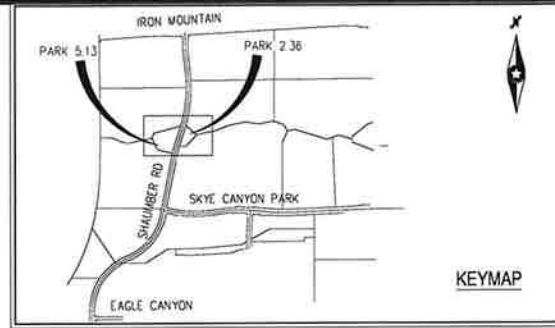
DROP INLET #1 - PLAN VIEW



LATERAL 4 - PROFILE VIEW
HORIZ. 1" = 10'
VERT. 1" = 2'



DROP INLET #1 - PROFILE VIEW
HORIZ. 1" = 20'
VERT. 1" = 4'



STORM DRAIN NOTES	
(1)	CONSTRUCT 2.5' x 2' NDOT TYPE 2 DROP INLET PER NDOT DETAIL NO. (DS-32)
(2)	CONSTRUCT DROP INLET CONCRETE APRON PER NDOT DETAIL NO. (DS-42) ON SHEET D-2
(3)	CONSTRUCT 18" CLASS III RCP SD
(4)	CONSTRUCT 48" TYPE II-SD MANHOLE (USDOCA STD. DIMS. NO. 405.2)
(5)	CONSTRUCT 10' TYPE DM-2 DROP INLET (3 GRATE) PER CCAUSD NO. 412.1 & 421

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

2) FOR ROADWAY WOENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SLOPE LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.

2. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.

3. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.

4. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.

5. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.

6. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CITY OF LAS VEGAS BUILDING DEPARTMENT.

7. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLETING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.

8. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONE.

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ. FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE. DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.

2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.

3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION II A.5.

4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION II A.12.

5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XXXXXXXX ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

MELISSA MURPHY, P.E., 18493 _____ DATE _____

SURVEY NOTE

OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION.

Call before you Dig
UnderGround
1-702-432-5300
FREEWAY & ARTERIAL SYSTEM
OF TRANSPORTATION (F.A.S.T.)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DIG
1-702-227-2929

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
OR
1-800-227-2600

Westwood
702) 284-5300
5725 W. Badura Avenue
Suite 100
Las Vegas, NV 89118
Phone (702) 284-5399
Fax westwoodjax.com
Westwood Professional Services, Inc.

CENTURY COMMUNITIES
LAS VEGAS, NEVADA
SKYE CANYON PARKS 2.36/5.13
STORM DRAIN PLAN

12 16S R30E
DATE: 9/6/2022
DRAFTER: PJS
DESIGNER: PJS
CHECKED: MM
PROJECT NO. CEN2107
10-10-22
SD-2
SHEET 9 OF 11

APPENDIX F

Reference Material

Skye Canyon Parcels 2.08 & 2.09 (DS05242)

Approval Letters

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		June 2, 2020
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E.  Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:	COPIES TO:
	Skye Canyon Parcels 2.08 & 2.09	Westwood Professional Services
Cross Streets:	Skye Village Road and Skye Canyon Park Drive	Century Communities Nevada, LLC
File Number:	F:\Depot\DSMemos\DS05242C.doc	Bart Anderson, P.E., DevCo
Parcel Number:	126-12-501-004	CCRFCD
Zoning Action:	TMP-78129	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	2/03/2020	2/24/2020	See Comments Below	\$400.00	3730987: \$400
2 nd Submittal	3/23/2020	4/14/2020	Conditionally Approved	\$400.00	3784959: \$400
3 rd Submittal	6/2/2020	6/2/2020	Concurrence Recv'd	N/C	N/A
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS:

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

X	is approved subject to conformance to all City standards and the following conditions:
	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.

- The study considers the Skye Canyon Phase 3A and 3B/C Infrastructure in place and functioning along with the upstream Skye Canyon Detention Basins 1 & 2 (DB1 and DB2). No occupancy permits within onsite 2.08/2.09 will be issued prior to the substantial completion of Phase 3A, and Phase 3B/C Infrastructure.
- Complete Grading Notes 18-20, referencing the existing storm drain facilities per Phase 1.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Update and accepted by the *City of Las Vegas Flood Control Section*. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

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

JKS

T/R/S: T19S/R59E/S12

AREA F-12

Referenced Hydraulics

Worksheet for Section 7

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.000 %
Discharge 7.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+23.00	0.43

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.48)	(0+07.50, 0.08)	0.013
(0+07.50, 0.08)	(0+23.00, 0.43)	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 0.40 ft
Elevation Range 0.00 to 0.48 ft
Flow Area 2.62 ft²
Wetted Perimeter 17.86 ft
Hydraulic Radius 0.15 ft

Worksheet for Section 7

Results

Top Width	17.75	ft
Normal Depth	0.40	ft
Critical Depth	0.43	ft
Critical Slope	0.00652	ft/ft
Velocity	2.67	ft/s
Velocity Head	0.11	ft
Specific Energy	0.51	ft
Froude Number	1.23	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.43	ft
Channel Slope	1.000	%
Critical Slope	0.00652	ft/ft

Cross Section for Section 7

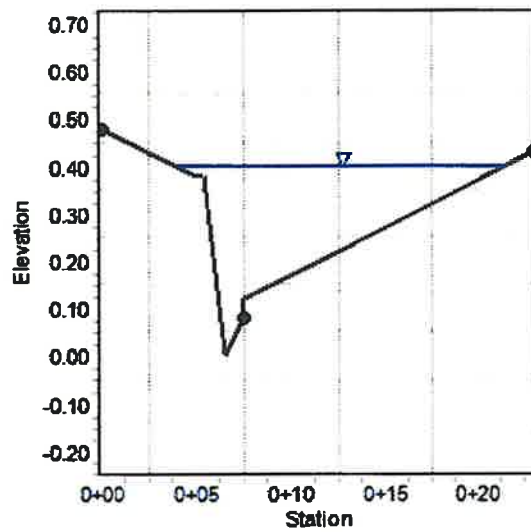
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.000	%
Normal Depth	0.40	ft
Discharge	7.00	ft ³ /s

Cross Section Image

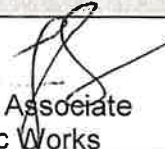


APPENDIX G

Reference Material

Skye Canyon 5.01 & 5.03 (DS5411)

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: March 31, 2021
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works 
SUBJECT:	Drainage Study for:	
	Skye Canyon 5.01 & 5.03	
Cross Streets:	Shaumber Rd. & Iron Mountain Rd.	
File Number:	F:\Depot\DSMemos\DS5411B.doc	
Parcel Number:	126-12-511-001 & -003	
Zoning Action:	20-0296-TMP1	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
COPIES TO:		
		Impulse
		RCI Engineering
		Century Communities Nevada, LLC
		Bart Anderson, P.E., DevCo
		CCRFCFCD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	1/19/2021	2/4/2021	See Comments Below	\$400.00	4135723: \$400
2 nd Submittal	3/10/2021	3/31/2021	Conditionally Approved	\$400.00	4199236: \$400
			TOTAL FEES (LDDRS):	\$800.00	----

REMARKS:

***** The Conditional Approval of this Drainage Study is to allow the engineer/developer to submit the Improvement Plans to City Land Development Only.**

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

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

- This drainage study is acceptable in concept;** however, *City of Las Vegas* will not formally accept the study until the *Clark County Regional Flood Control District (CCRFCFCD)* has issued a letter of concurrence. The engineer should contact the CCRFCFCD to confirm that they have begun their review.
- Label Section Detail 30/D-2 (Unit 3) as a "Public" Drainage Easement.

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/JKS

T/R/S: T19S/R60E/S07
AREA G-07

Referenced Hydraulics

Outlet to Channel 10-year
Worksheet for Irregular Channel

SECTION 4

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.010000 ft/ft		
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	20.00	0.013
0.00	0.20			
10.00	0.00			
20.00	0.20			
20.00	2.00			
Discharge	22.00	cfs		

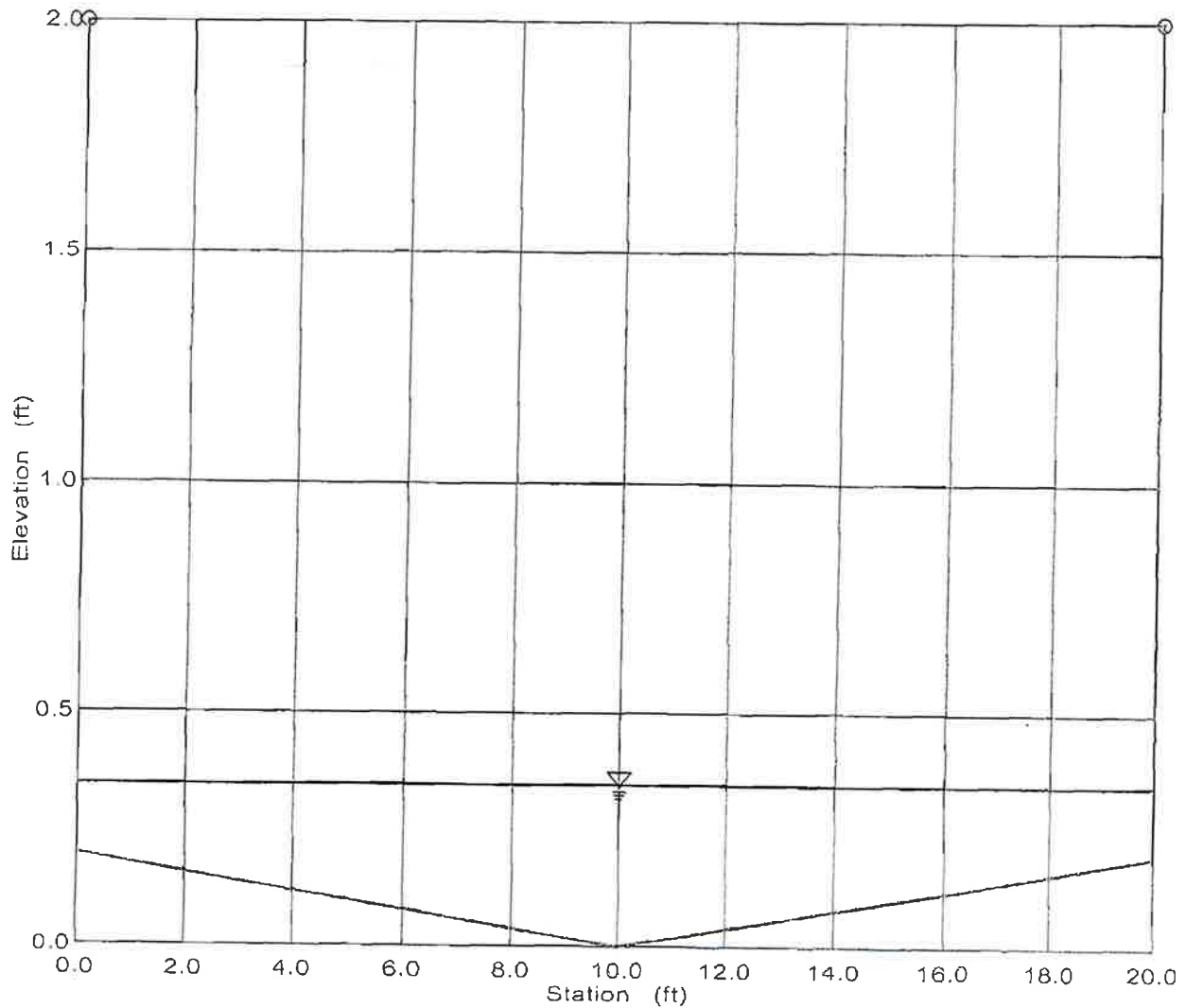
Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.35	ft
Flow Area	4.94	ft ²
Wetted Perimeter	20.30	ft
Top Width	20.00	ft
Height	0.35	ft
Critical Depth	0.44	ft
Critical Slope	0.003658	ft/ft
Velocity	4.45	ft/s
Velocity Head	0.31	ft
Specific Energy	0.66	ft
Froude Number	1.58	
Flow is supercritical.		

Cross Section
Cross Section for Irregular Channel

SECTION 4

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.013
Channel Slope	0.010000 ft/ft
Water Surface Elevation	0.35 ft
Discharge	22.00 cfs



Outlet to Channel 100-year
Worksheet for Irregular Channel

SECTION 4

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope		0.010000 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
0.00	2.00	0.00	20.00	0.013	
0.00	0.20				
10.00	0.00				
20.00	0.20				
20.00	2.00				
Discharge	48.00	cfs			

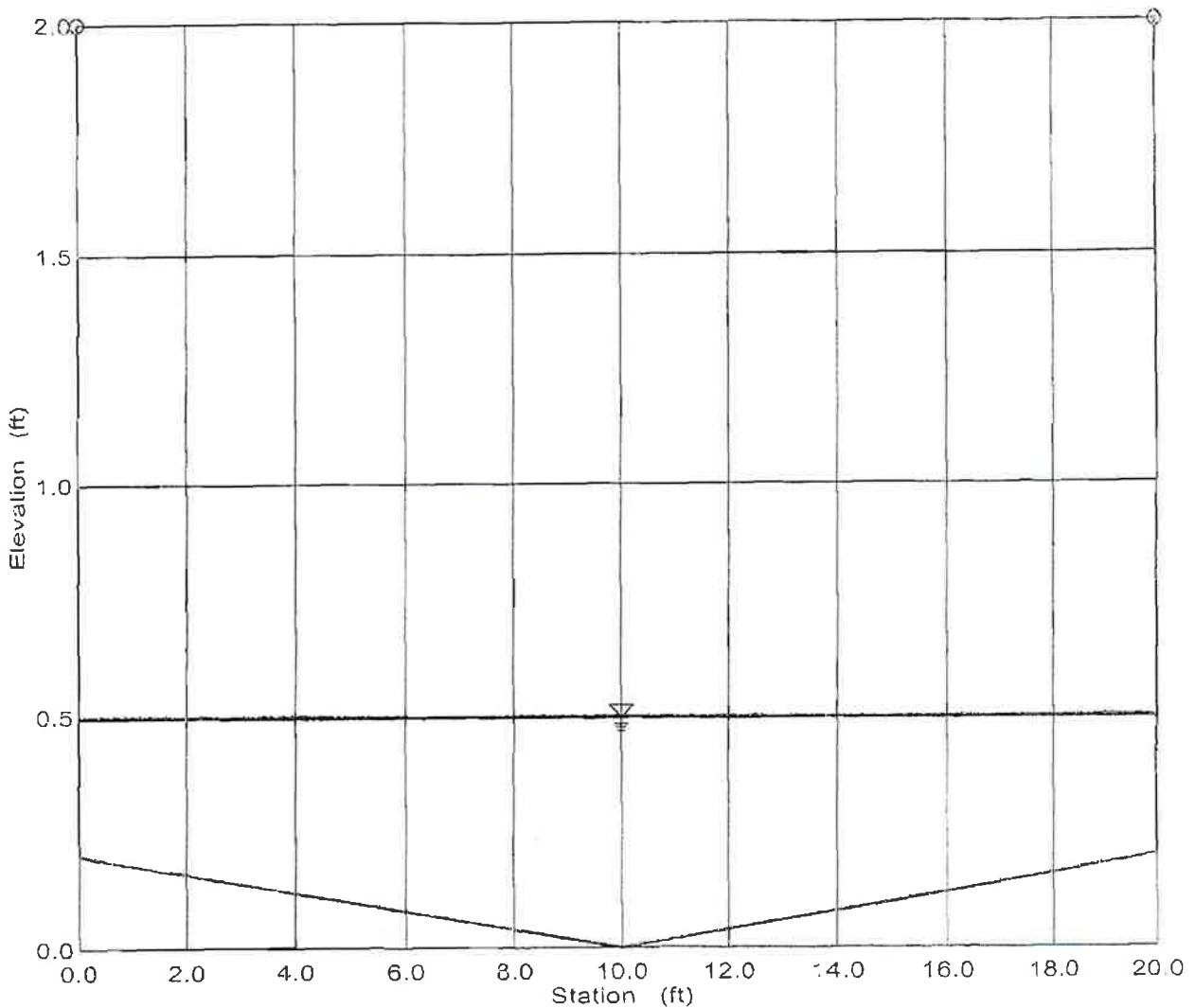
Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.50	ft
Flow Area	7.93	ft ²
Wetted Perimeter	20.60	ft
Top Width	20.00	ft
Height	0.50	ft
Critical Depth	0.66	ft
Critical Slope	0.003168	ft/ft
Velocity	6.05	ft/s
Velocity Head	0.57	ft
Specific Energy	1.07	ft
Froude Number	1.69	
Flow is supercritical.		

Cross Section
Cross Section for Irregular Channel

SECTION 4

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data			
Wtd. Mannings Coefficient	0.013		
Channel Slope	0.010000 ft/ft		
Water Surface Elevation	0.50	ft	
Discharge	48.00	cfs	



APPENDIX H

Improvement Plans