TECHNICAL DRAINAGE STUDY

# Soldo Memorial Park at Skye Canyon

JULY 2022

PREPARED FOR:

Century Communities
Las Vegas, Nevada

PREPARED BY:

Westwood

Westwood

# Soldo Memorial Park at Skye Canyon

## 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




7/29/2022

Project Number: CEN2201.000
Date: July 2022

Kellin Collins, P.E.
NV Professional Engineer No. 21860

Assisted by: Phil Koershner, EI
Christopher Wolfe

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

# DRAINAGE STUDY INFORMATION FORM

Name of Development: Soldo Memorial Park at Skye Canyon Date: July 2022

Location of Development:
a) Descriptive (Cross Streets): North/South: Alpine Ridge Way
East/West: Iron Mountain Road
b) Section: 1 Township: 19 Range: 59
c) APN: 126-01-401-013

Name of Owner: USA and Las Vegas City Lease / Century Communities
Telephone No.: 702-873-5338 Fax No.: E-mail Address:
Address: 6345 South Jones Boulevard Las Vegas NV 89118

Contact Person – Name: Kellin Collins Telephone No.: (702) 284-5300
*E-mail Address: kellin.collins@westwoodps.com Fax No.: (702) 284-5399
Firm: Westwood Professional Services
Address: 5725 W. Badura Ave, #100 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Rezoning | ☐ | Subdivison Map | ☐ | Clearing and grading Only |
| ☐ | Parcel Map | ☐ | Planned Unit Development | ☒ | Other (Please specify below) |
| ☐ | Large Parcel Map | ☐ | Building Permit | ☐ | Park |

1. Total Owned Land Area: At Site: 10 Being Developed/Disturbed: 10

2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No

4. Proposed type of development (Residential, Commercial, Etc.): Park

5. Approximate upstream land area which drains to the subject site: 28 +/- acres

6. Has the site drainage been evaluated in the past? ☐ Yes** ☒ No If yes, please identify documentation:

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: northeast to the intersection of Radley and Alpine Ridge

8. Briefly describe your proposed schedule for the subject project: ASAP




7/24/2022

Engineer's Seal

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

*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

# CITY OF LAS VEGAS

## MINIMUM DRAINAGE STUDY CRITERIA
## STANDARD FORM 2 CHECKLIST SUPPLEMENT

**(Revised 5/18/11)**

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

**If items are not applicable for the subject site, provide N/A.**

| I. GENERAL REQUIREMENT | | |
|---|---|---|
| Yes | No | |
| - | N/A | A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.) |
| - | N/A | Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions. |
| X | - | An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file.<br>_____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas. |

| II. GRADING PLAN INFORMATION | | |
|---|---|---|
| Yes | No | |
| X | - | (1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer. |
| X | - | Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required. |
| X | - | Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.) |

| II. GRADING PLAN INFORMATION | | |
|---|---|---|
| Yes | No | |
| X | - | Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains. |
| X | - | All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property. |
| X | - | Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met. |
| - | N/A | Back of lot elevations and lot drainage pattern for all lots including common lots. |
| X | - | Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study. |
| X | - | On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.) |
| - | N/A | This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included. |
| - | N/A | Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW. |

| III. Local Entity Criteria - City of Las Vegas – Manual Section 1600 | | |
|---|---|---|
| Yes | No | |
| X | - | Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac. |
| - | N/A | Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation. |
| - | N/A | The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc. |
| X | - | Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections. |
| - | N/A | Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater. |

| III. Local Entity Criteria - City of Las Vegas – Manual Section 1600 | | |
|---|---|---|
| Yes | No | |
| - | N/A | Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options. |
| - | N/A | Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided. |

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

This document is intended as an **aid** in preparing Technical Drainage Studies for the City of Las Vegas. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all-inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

# DRAINAGE SUBMITTAL CHECKLIST

| | |
|---|---|
| Project Name: Soldo Memorial Park at Skye Canyon | Map ID: |
| Firm Name: Westwood Professional Services | Engineer: Kellin Collins |
| Address: 5725 W. Badura Ave, #100 | |
| City: Las Vegas | State: NV Zip: 89118 |
| Phone Number: (702) 284-5300 | Fax Number: (702) 284-5399 |
| Property Owner: USA and Las Vegas City Lease / Century Communities | |
| Address: 6345 South Jones Boulevard | |
| City: Las Vegas | State: NV Zip: 89118 |

| Reviewed By: | Date Received: | Date Accepted for Review: |
|---|---|---|
| | | |

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

## I. GENERAL REQUIREMENT

| Yes | No | |
|---|---|---|
| X | - | Design Manual **Standard Form 1** with the engineer's seal and signature. |
| X | - | Design Manual **Standard Form 4**. |
| X | - | 2 copies of the 24" x 36" Drainage Plan. |
| - | N/A | A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge. |

## II. MAPS AND EXHIBITS

| Yes | No | |
|---|---|---|
| X | - | A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated. |
| X | - | A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated. |

| REFERENCE: | STANDARD FORM 2 |
|---|---|
| | |

# DRAINAGE SUBMITTAL CHECKLIST

## II. MAPS AND EXHIBITS (Continued)

| Yes | No | |
|---|---|---|
| X | - | Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs. |
| X | - | On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs. |
| X | - | Vicinity Map with local and major cross streets identified and a north arrow. |

## III. DRAINAGE PLAN

| Yes | No | |
|---|---|---|
| X | - | Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada. |
| X | - | Minimum scale: 1" = 60'. |
| X | - | Project name. |
| X | - | Vicinity Map with local and major cross streets. |
| X | - | Revision box. |
| X | - | North arrow and bar scale. |
| X | - | Engineer's/consultant's address and phone number. |
| X | - | Elevation datum and benchmark. |
| X | - | Legend for symbols and abbreviations. |
| X | - | Cut/fill scarps, where applicable. |
| X | - | Street names, grades, widths. |
| X | - | Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. |
| X | - | Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate. |
| X | - | Minimum finish floor elevations with top-of-curb elevations at upstream end of lot. |
| X | - | Proposed typical street sections. |

| **REFERENCE:** | **STANDARD FORM 2** |
|---|---|

# DRAINAGE SUBMITTAL CHECKLIST

**III. DRAINAGE PLAN (Continued)**

| Yes | No | |
|---|---|---|
| - | N/A | Streets with off-set crowns. |
| X | - | Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes. |
| X | - | Property lines. |
| X | - | Right-of-way lines and widths, existing and proposed. |
| X | - | Existing improvements and their elevations. |
| X | - | Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points. |
| X | - | Concentration points and drainage flow direction with $Q_{100}$ and $V_{100}$ and $D_{100}$ in streets. |
| X | - | Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows. |
| X | - | Location and cross-section of street capacity calculations. |
| X | - | Cross-sectional detail for channels, including cutoff wall locations. |
| X | - | Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations. |
| - | N/A | Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement. |
| - | N/A | Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs. |
| - | N/A | Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc. |
| X | - | Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit. |
| X | - | Building and/or lot numbers. |
| X | - | Alignment of all existing, proposed, or future Regional Facilities adjacent to the site. |
| X | - | Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information. |

| **REFERENCE:** | **STANDARD FORM 2** |
|---|---|

# DRAINAGE SUBMITTAL CHECKLIST

## III. DRAINAGE PLAN (Continued)

| Yes | No | |
|---|---|---|
| - | N/A | For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE. |
| - | N/A | Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the $Q_{100}$ flows. |
| X | - | Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent. |
| - | N/A | Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required). |

## IV. HYDROLOGIC ANALYSIS

| Yes | No | |
|---|---|---|
| X | - | Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated. |
| X | - | Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models. |
| X | - | Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models. |
| X | - | Use of correct precipitation values in and around the McCarran Airport rainfall area. |
| X | - | A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations. |
| X | - | A summary table of stormwater flows showing basin area, $Q_{10}$ and $Q_{100}$ for both individual basins and combined basin flows, where applicable. |
| X | - | Copies of supporting technical information referenced from a previously approved study and a statement accepting these results. |
| X | - | On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law. |
| - | N/A | Calculation for impervious area for parking lots and LIDs (if required). |

| **REFERENCE:** | **STANDARD FORM 2** |
|---|---|

# DRAINAGE SUBMITTAL CHECKLIST

## V. HYDRAULIC ANALYSIS

| Yes | No | |
|---|---|---|
| - | N/A | Flow split calculations and supporting documentation or reference for the method of flow split calculations used. |
| X | - | Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the $Q_{100}$ and $Q_{10}$ flows representing the worst case for interior and all perimeter streets. $Q_{100}$ d x v $\leq$ 8. $Q_{10}$ d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan. |
| X | - | A summary table of interior and exterior street capacity calculations showing the street name, $Q_{100}$ flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria. |
| - | N/A | Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.) |
| - | N/A | Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate. |
| X | - | Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the $Q_{100}$ weir height or flow depth, whichever is greater. |
| - | N/A | A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones.<br>• Field survey data.<br>• Input and output information.<br>• Plotted cross-sections based on survey with proper encroachments.<br>• A map showing the location of the cross-sections.<br>• Analysis of both sub and super-critical flow segments.<br>• A summary table and a discussion of the results in the text of the report. |
| X | - | Provide a 50 percent clogging factor in the capacity calculation for drop inlets. |
| X | - | Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation. |
| X | - | The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed. |
| - | N/A | Provide BMP type, size and supporting calculations for parking lots and LIDs (if required). |

| REFERENCE: | STANDARD FORM 2 |
|---|---|

# Table of Contents

**Table of Contents** ..... i

**List of Tables** ..... iii

**List of Appendices** ..... iv

**1.0 Introduction** ..... 1
1.1 Project Overview ..... 1
1.2 Study Purpose ..... 1
1.3 Site Description ..... 1
1.4 FEMA Flood Zone Designation ..... 1
1.5 CCRFCD Facility Information ..... 1
1.6 CCRFCD Watershed Information ..... 1
1.7 Referenced Documents ..... 2

**2.0 Methodology** ..... 2
2.1 Compliance ..... 2
2.2 Hydrologic Modeling ..... 2
2.3 Hydraulic Modeling ..... 4
2.4 Structural Best Management Practices ..... 4

**3.0 Existing Drainage Condition** ..... 5
3.1 Definition of Existing Condition ..... 5
3.2 Discussion of Existing Condition ..... 5
3.3 Summary of Existing Condition Flows ..... 5

**4.0 Proposed Drainage Condition** ..... 5
4.1 Definition of Proposed Condition ..... 5
4.2 Discussion of Proposed Condition ..... 5
4.3 Summary of Proposed Condition Flows ..... 5

**5.0 Developed Drainage Condition** ..... 6
5.1 Definition of Developed Condition ..... 6
5.2 Discussion of Developed Condition ..... 6
5.3 Summary of Developed Condition Flows ..... 6

**6.0 Ultimate Drainage Condition** ..... 6
6.1 Definition of Ultimate Condition ..... 6
6.2 Discussion of Ultimate Condition ..... 6

**7.0 Flow Rate Comparison** ..... 6

**8.0 Street Improvements** ..... 8

9.0 Drainage Facilities ..... 8

10.0 Finished Floor Elevations ..... 9

11.0 Structural Best Management Practices ..... 9

12.0 Conclusions & Recommendations ..... 9

13.0 References ..... 10

# List of Tables

Table 1: Comparison of 100-year Flow Rates ..... 7

# List of Appendices

**Appendix A** **Drainage Exhibits**
- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Map
- Exhibit C1 – CCRFCD MPU Facilities Map
- Exhibit C2 – CCRFCD MPU Facilities Inventory
- Exhibit C3 – CCRFCD MPU Hydrologic Map
- Exhibit D – Soils Map
- Exhibit E – Proposed Condition Drainage Map
- Exhibit F – Developed Condition Drainage Map
- Exhibit G – Facilities & Cross Section Map

**Appendix B** **Hydrologic Analyses**
- Precipitation Data
- CN Computation, Soils & Land Use Data
- Lag Time Computations (Standard Form 4)
- Proposed Condition HEC-1 Model
- Developed Condition HEC-1 Model

**Appendix C** **Street & Hydraulic Sections**
- Perimeter Street Flow Computations – 100 Yr
- Interior Drive Isle Flow Computations – 100 Yr
- Ditch Sizing Computations
- Water Quality Swale Assessment

**Appendix D** **Storm Drain Analyses**
- Inlet Sizing Computations
- Inlet Control Nomographs
- WSPG Model
- Lateral Sizing Computations

**Appendix E** **Finished Floor Analyses**

**Appendix F** **Reference Material**
***Technical Drainage Study for Alpine Ridge East***
**(DS 5564)**
- Referenced Drainage Exhibits
- Referenced Hydrology
- Referenced Hydraulics
- Referenced Plan Sheets

**Appendix G** **Reference Material**
***Technical Drainage Study for Iron Mountain***
**(DS 5508)**
- Approval Letters
- Referenced Drainage Exhibits
- Referenced Hydrology
- Referenced Hydraulics
- Referenced Plan Sheets

**Appendix H** **Reference Material**

***Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure* (DS 4953)**

- Approval Letters
- Referenced Drainage Exhibits
- Referenced Hydraulics
- Referenced Plan Sheets

**Appendix I** **Improvement Plans**

# 1.0 Introduction

## 1.1 Project Overview

Century Communities is proposing to develop 10 ± acres into a park, located north of Iron Mountain Rd and west of Alpine Ridge Way within the City of Las Vegas, Nevada. The project site is identified as *Soldo Memorial Park at Skye Canyon* (hereinafter referred to as the project site or Soldo Park). The proposed improvements include fields, a playground, tennis courts, a restroom structure, and parking lot.

## 1.2 Study Purpose

The purpose of this study is to provide detailed hydrologic and hydraulic analysis for the project site to protect the property from onsite and offsite runoff in accordance with local stormwater criteria. The study addresses offsite drainage impacts to the project site, establishes onsite drainage patterns, and accommodates the allowable discharge restrictions at appropriate downstream locations. The study also assesses the required drainage infrastructure and establishes finished floor elevations of the proposed buildings.

## 1.3 Site Description

The project site is located within APN 126-01-401-013 and is bound by Iron Mountain Rd to the south and Alpine Ridge Way to the east. Also along the eastern limit is an anticipated residential subdivision known as *Iron Mountain*. To the northeast of the project site is an anticipated residential subdivision known as *Alpine Ridge East*. To the west and northwest is undeveloped land. The current condition of the project site is undeveloped desert terrain with sparse desert shrub typical of southern Nevada.

The project site improvements include a playground, splash pad, soccer fields, tennis courts, an onsite parking area, and a restroom structure.

A location map identified as Exhibit A has been included in Appendix A for reference.

## 1.4 FEMA Flood Zone Designation

The project site is not located within a FEMA designated Special Flood Hazard Area (SFHA). The project site has been identified on the current FEMA FIRM Panel Map 32003C1750E, dated September 27, 2002, as indicated in Exhibit B, provided in Appendix A. Per the FIRM Panel, the project site is located within a FEMA designated unshaded Zone 'X'. An unshaded Zone 'X' is located outside the 0.20% annual chance floodplain.

## 1.5 CCRFCD Facility Information

Figures F-10 and F-11 from the 2018 Las Vegas Valley Flood Control Master Plan Update (hereinafter referred to as the 2018 MPU, Reference 1) is presented on Exhibit C1, identifying the project site on the 2018 MPU facilities figure. Exhibit C1 is provide in Appendix A and shows that the project site is adjacent to a 2018 MPU regional facility (MOIR 0041). Exhibit C2, also provided in Appendix A, is the 2018 MPU facilities inventory.

## 1.6 CCRFCD Watershed Information

Figure W-2B from the 2018 MPU shows that the project site is located in subbasin NW35-C and drains east. Exhibit C3, identifying the project site on the 2018 MPU hydrologic figure, has been included in Appendix A for reference.

### 1.7 Referenced Documents

This study was prepared in coordination with various relevant documents, studies and improvement plans previously reviewed and approved by the governing agency. The following drainage studies and improvement plans were utilized in the preparation of this study. These approved studies have been reviewed and are considered acceptable for referencing with exceptions noted in this report.

- *Technical Drainage Study for Alpine Ridge East* (DS 5564, hereinafter referred to as the Alpine Ridge East Study, Reference 4) prepared by Westwood, established the existing condition and anticipated drainage pattern and flow rate conveyed in Radley Avenue adjacent to Soldo Park as well as an anticipated storm drain system in Radley Avenue that heads north in Alpine Ridge Way. The Alpine Ridge East study shows the contributing watershed limits to and through the Project Site. Relevant reference material from the Alpine Ridge East Study has been included in Appendix F.

- *Technical Drainage Study for Iron Mountain* (DS 5508, hereinafter referred to as the Iron Mountain Study, Reference 5) prepared by Westwood, established existing, developed, and ultimate condition flowrates for Alpine Ridge Way establishes the existing storm drain facilities in Alpine Ridge Way that heads east in Radley Ave. Relevant reference material from the Iron Mountain Study has been included in Appendix G.

- *Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure* (DS4953, hereinafter referred to as the Skye Canyon 3B and 3C Study, Reference 7) updates and addenda, prepared by Slater Hanifan Group, established interim and ultimate condition flowrates for Iron Mountain Rd and the analyses of the drop inlet on Iron Mountain Road west of Shaumber Rd. Relevant reference material from the Skye Canyon 3B and 3C Study has been included in Appendix H.

# 2.0 Methodology

### 2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic and Drainage Design Manual (hereinafter referred to as the CCRFCD Manual, adopted in 1999, Reference 2).

### 2.2 Hydrologic Modeling

**Modeling**: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers HEC-1 Flood Hydrograph Package program was utilized to model the drainage basins analyzed by this study.

**100-year and 10-year Precipitation**: The project site is located outside of the McCarran Airport Rainfall Area. The adjusted precipitation values utilized in the HEC-1 models, per CCRFCD Manual Figures 503 and 506 and Table 501, are 1.61 and 3.00 inches for the 6-hour, 10-year and 100-year storm events, respectively. Referenced tables and figures from the CCRFCD Manual are included in Appendix B.

**Storm Distribution**: Since the drainage area of the contributing watershed is less than 8 square miles, the SDN 3 design storm distribution as taken from Table 503 in the CCRFCD Manual is used. Referenced tables and figures from the CCRFCD Manual are included in Appendix B.

Since the overall watershed does not exceed 8 square miles, SDN3 design storm distributions as referenced from Table 503 of the CCRFCD Manual were utilized for hydrologic models as appropriate.

**Curve Number**: The SCS curve number loss rate methodology has been utilized to approximate infiltration for the drainage basins. The soils information for the site has been obtained from the NRCS Web Soil Survey of the Las Vegas Valley Area (hereinafter referred to as the Soil Survey, Reference 3). Exhibit D, included in Appendix A, depicts the project site on a soils map. Per the Soil Survey, the basins delineated for this study lie within the following soil types and associated hydrologic soil group (HSG) for each soil type:

- Soil Type 155 (Cave gravelly fine sandy loam, 4 to 15 percent slopes); 100% HSG 'D'
- Soil Type 400 (Tencee very gravelly fine sandy loam, 2 to 8 percent slopes); 100% HSG 'D'

The curve numbers utilized for the basins analyzed with this study were determined as follows:

- **1 – Undeveloped Land / Open Desert:** utilized anywhere that improvements do not exist
- **2 – Parks, golf Courses:** utilized for areas consisting of parks, golf courses and open space
- **3 – Rural (0.5-1 units/acre):** utilized according to existing and proposed density within the range of 0.5 to 1 unit per acre
- **4 – Low Density Residential (1-2 units/acre):** utilized according to existing and proposed density within the range of 1 to 2 units per acre
- **5 – Medium Density Residential (2-4 units/acre):** utilized according to existing and proposed density within the range of 2 to 4 units per acre
- **6 – High Density Residential (4-8 units/acre):** utilized according to existing and proposed density within the range of 4 to 8 units per acre
- **7 – Public Facility and Residential (8-12 units/acre):** utilized according to existing and proposed density within the range of 8 to 12 units per acre and for any roadway that includes landscape easements
- **8 – Very High Density Residential (12 units/acre or more):** utilized according to existing and proposed density equal to 12 units or more per acre
- **9 – Commercial/Retail:** utilized according to existing or planned land uses
- **10 - Light Industrial:** utilized for areas considered for light industrial
- **11 - Heavy Industrial:** utilized for areas considered heavy industrial
- **12 – Schools:** utilized according to existing or planned land uses
- **13 - Lakes:** utilized for pools of water

Refer to Appendix B for the composite curve number computations for each analyzed basin.

**Lag Time**: The lag time is defined as the time measured from the center of mass of effective rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the

time required for runoff to flow from the hydraulically most distant point of a basin to the outlet point of the basin. Standard Form 4, as outlined in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. The lag time computations have been included in Appendix B.

### 2.3 Hydraulic Modeling

**Street Flow:** Street flows have been analyzed utilizing FlowMaster Connect Edition Update 3 by Bentley Systems. In accordance with Section 304.4 of the CCRFCD Manual, the depth times velocity factor (D x V) for street flow for the minor 10-year storm event must be less than or equal to 6, with a maximum depth of 1-ft. The depth times velocity factor (D x V) for street flow for the major 100-year storm event must be less than or equal to 8, with a maximum depth of 2-ft.

Specific to streets with rights-of-way width that are 80-ft wide or greater, they are required to meet the 10-year dry lane criteria. A 12-ft wide dry lane (excluding center turning lane) must be provided in each direction of traffic during the 10-year storm event. Additionally, the 10-year depth of flow at intersections with other streets with 80-ft and or greater right-of-way width must be limited to curb height.

When transverse flow crosses a roadway (not as a result of a culvert) during the 100-year event, the depth of flow and D x V shall not exceed 1-ft and 8, respectively.

**Drop Inlets:** Drop inlets have been assessed using an in-house computation spreadsheet which utilizes equations outlined in Section 805 of the CCRFCD Manual, which includes a 50% clogging factor in determining sizes.

**Storm Drains:** The hydraulic analysis for the proposed storm drain has been performed utilizing the Water Surface and Pressure Gradient (WSPG) Hydraulic Analysis System software by the Los Angeles County Department of Public Works. As outlined in the Section 800 of the CCRFCD Manual, storm drain facilities are designed to maintain its hydraulic gradient line (HGL) minimum 1-ft below above finished grade and limit the flow velocities in the facility to less than 25 ft/s.

**Storm Drain Laterals:** A lateral loss computation spreadsheet has been provided for the proposed single-reach laterals. If laterals are not under pressure, the HGL is shown at the top of pipe at the upstream end.

**Ditches:** The hydraulic computations for recommended ditches have been performed utilizing the FlowMaster Connect Edition Update 3 by Bentley Systems. The ditches are designed in with 6-inch freeboard. Where applicable, erosion prevention measures have been recommended.

### 2.4 Structural Best Management Practices

**Water Quality Design Storm:** The water quality 85th percentile rainfall depth are determined by utilizing Table 505 of the CCRFCD Manual, in conjunction with the equations and procedures described in Section 1502.3 of the CCRFCD Manual.

**Low Impact Development (LID):** The 10 acre project site has been analyzed in the medium category for parking lots, as the total parking lot area is equal to 1 acre. Medium category parking lots require that BMPs treat stormwater runoff from at least 75% of the parking lot area.

# 3.0 Existing Drainage Condition

## 3.1 Definition of Existing Condition

The existing drainage condition considers watershed in its current condition. The onsite watershed is undeveloped with sparse desert shrub. The current offsite watershed is also undeveloped. Located downstream of the project site are two planned (on-going) residential projects that are considered developed for the existing condition. The downstream projects are identified as *Alpine Ridge East* and *Iron Mountain*.

## 3.2 Discussion of Existing Condition

Refer to referenced Exhibit F, included in Appendix F, for a detailed illustration of the existing condition drainage patterns.

During the existing condition, the watershed approaching towards and thru the project site is in an east and northeasterly direction. The project site is located within a portion of referenced Basins OFF3-E, OFF4-E and OF2-E which discharges towards Radley Avenue and Alpine Ridge Way.

## 3.3 Summary of Existing Condition Flows

A summary of the referenced existing condition flow rates, as determined by the reference material, are presented in a summary table on referenced Exhibit F in Appendix F. Relevant hydrologic data for the referenced basins are provided in the appendix of the appropriate reference study.

# 4.0 Proposed Drainage Condition

## 4.1 Definition of Proposed Condition

The proposed drainage condition considers the offsite watershed as undeveloped as defined for the existing condition. The onsite watershed is developed with the planned park and storm drain extension from the *Alpine Ridge East* and *Iron Mountain* projects.

## 4.2 Discussion of Proposed Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns.

During the proposed condition, there is one basin that define the offsite watershed from the west (Basin OFF-P) and one basin that defines the project site (ON1). The perimeter roadways are defined as Basins RS-P, AR-P, and IM-P. Although, the future *Alpine Ridge West* residential project to the north is not yet considered completed but for downstream comparison points, it is added to the drainage map and considered in the watershed assessment. Note that the basin boundary of WEST-D is the same whether the *Alpine Ridge West* project is complete or mass graded per the *Alpine Ridge East* project.

## 4.3 Summary of Proposed Condition Flows

A summary of proposed condition flow rates, as determined by the HEC-1 and reference material, are presented in a summary table on Exhibit E in Appendix A. Refer to Appendix B for the proposed condition HEC-1 model. Relevant hydrologic data for the referenced basins are provided in the appendix of the appropriate reference study.

# 5.0 Developed Drainage Condition

## 5.1 Definition of Developed Condition

The developed drainage condition considers the offsite watershed to be fully developed. The anticipated Sheep Mountain Parkway improvements are also considered complete. The onsite watershed is developed as outlined for the proposed condition.

## 5.2 Discussion of Developed Condition

Refer to Exhibit F, included in Appendix A, for a detailed illustration of the developed condition drainage patterns.

The developed condition is similar to the proposed condition where the offsite and onsite watershed drains in an easterly direction. Besides the offsite watershed being considered fully improved, the anticipated Sheep Mountain Parkway and Iron Mountain Road improvements adjusts the basin boundary to Basins OFF-D and IM-D.

## 5.3 Summary of Developed Condition Flows

A summary of developed condition flow rates, as determined by the HEC-1 and reference material, are presented in a summary table on Exhibit F in Appendix A. Refer to Appendix B for the developed condition HEC-1 model. Relevant hydrologic data for the referenced basins are provided in the appendix of the appropriate reference study.

# 6.0 Ultimate Drainage Condition

## 6.1 Definition of Ultimate Condition

The ultimate condition considers the offsite and onsite watershed fully developed with all planned upstream CCRFCD regional facilities constructed.

## 6.2 Discussion of Ultimate Condition

The ultimate condition is similar to the developed condition with exception that Puli Road is considered as a drainage cutoff from offsite flows from the west. Therefore, the ultimate condition watershed generates less surface runoff than the developed condition and does not control the hydraulic design of the project site. No hydrologic analysis for the ultimate condition is necessary and has not been provided.

# 7.0 Flow Rate Comparison

The following table summarizes the previously anticipated flow rates to the flow rates established by the drainage conditions presented in this study.

**TABLE 1: COMPARISON OF 100-YEAR FLOW RATES**

| Location | Anticipated By Others $Q_{100}$ (cfs) | Existing Condition Q100 (cfs) | Proposed Condition Q100 (cfs) | Developed Condition Q100 (cfs) |
|---|---|---|---|---|
| **Surface Runoff** | | | | |
| Location #1: Radley Ave adjacent to the Project Site | 59 Basin OFF4-D* | 65 OFF4-E* | 8 RS-P + ON1(A) | 8 RS-P + ON1(A) |
| Location #2: Alpine Ridge Way adjacent to the Project Site | 19 WPRK10** | 23 OF2-E** | 13 AR-P + ON1(B) | 13 AR-P + ON1(B) |
| **Storm Drain Runoff** | | | | |
| Location #3: Radley Ave storm drain system (Facility E1) | 69 Facility ID P6* | 80 Facility ID P6* | 74 Facility E1 | <74 Facility E1 |
| Location #4: Radley Ave storm drain system (Facility E3) | 71 Facility ID P7* | 80 Facility ID P7* | 85 Facility E3 | <85 Facility E3 |
| Location #5: Alpine Ridge Way storm drain lateral (Facility E4) | 9 Facility ID A4** | 9 Facility ID A4** | 5 DI#4 | 5 DI#4 |
| Location #6: Iron Mountain Rd storm drain lateral (Facility E5) | 8 Facility ID P17*** | 0 Facility ID P17*** (Facility is currently capped) | 7 DI#5 | 7 DI#5 |

* Data obtained from the Alpine Ridge East Study
** Data obtained from the Iron Mountain Study
*** Data obtained from the Skye Canyon 3B and 3C Study

The following discussion is provided for each location based on the findings presented in Table 1 and its acceptability:

- At Locations #1 and #2, the proposed and developed conditions are less than the existing condition and previously anticipated. Therefore, there is no adverse impacts, and the resulting surface runoff is acceptable. Note that the substantial decrease in runoff from existing condition and previously anticipated is because it was assumed that all approaching runoffs would be on the surface.
- At Locations #5, and #6, the proposed and developed conditions are less than the existing condition and previously anticipated. Therefore, there is no adverse impacts, and the resulting surface runoff is acceptable. Note that the decrease in runoff is based on the resulting flow rates of the basin delineation and hydrologic parameters of the proposed improvements instead of assumed improvements.
- At Locations #3 and #4, the overall hydrologic results of the developed condition discharging to Facilities E1 and E3 are less than the proposed condition. As such, the

developed condition does not control the facility design/assessment and the specific flow rate to these locations are not established.

- At Location #3, the proposed condition flow rate is greater than the anticipated but less than the existing condition. Due to the system being oversized for the existing condition, there is no adverse impact.
- At location #4 which is the next downstream storm drain segment to Location #3, the proposed condition flow rate is greater than the existing and anticipated flow rate. Note that the system has been oversized for the existing condition flow rate. The 5 cfs increase from the existing condition is considered acceptable for the following reasons:
    - The existing system can accommodate the increase (HGL and velocity).
    - Although there is an increase in runoff, the further downstream system conveys a much larger watershed with an offset in peak runoff. As such, there would a little to no increase in runoff to the downstream RCB system.

# 8.0 Street Improvements

A summary table of the street flow hydraulic computations for the perimeter roadway and interior drive isle has been provided on Exhibit G, in Appendix A. The hydraulic calculations are provided in Appendix C. All sections have been analyzed to meet 100-year and 10-year criteria stated in Section 2.3.

*Interior Section(s):* Sections A is representative of the proposed interior drive isle. The section is described as 24-ft wide with a 4.5% cross fall. Note that the cross fall is towards the parking stalls, but an assumed vertical wall is placed at the parking stall to represent the obstruction. This is a conservative method in determining the resulting flow depth and deemed acceptable for use in checking the proposed finished floor elevation.

*Perimeter Section(s):* Sections 1, 2, and 3 are representative of half streets to Radley Avenue, Alpine Ridge Way, and Iron Mountain Road, respectively. The roadways have been analyzed with the following details at the minimum and maximum street slopes adjacent to the project site:

- Section 1 is modelled as the south half of Radley Avenue (20-ft) for the 100-yr event.
- Section 2 is modelled as the west half of Alpine Ridge Way (32-ft Half Street ROW) for the 100-year and 10-year events.
- Section 3 is modelled as the north half of Iron Mountain Road (32-ft) for the 100-yr event only. The 10-yr flow depth and DxV criteria is met with the 100-yr flow rates. No 10-yr dry lane assessment is necessary because the Skye Canyon 3B and 3C Study established laterals upstream of the project site along Iron Mountain Rd for the roadway to meet the 10-yr dry lane criteria.

# 9.0 Drainage Facilities

As part of the project site design, inlets and storm drain laterals/systems are provided at various locations to meet street flow criteria and to route flows to their necessary discharge points. A summary table of the recommended drainage facilities have been identified and summarized on Exhibit G, in Appendix A. There are three receiving systems and are defined as follows:

- A 100-yr system (Facilities E1 thru E3) that is intended to convey flows from Radley Avenue, west of Alpine Ridge Way to head north in Alpine Ridge Way. As part of the

project site design, the system is extended west in Radley Avenue and then south along the western limit of the project site (WSPG Model 36Soldo). The starting water surface elevation is referenced from the Alpine Ridge East Study. The incidental components to the 36Soldo system are as follow:

  - Two field inlets with direct discharge into the 36Soldo system.
  - One field inlet and lateral that connects to the 36Soldo system.
  - Three ditches that routes runoff towards each of the proposed field inlets. Velocity is less than 5 fps; therefore, the ditches remain unlined.

- A 10-yr system (Facility E4) that is intended to convey the 10-yr runoff along Alpine Ridge Way and route the flows east in Radley Avenue.
- A lateral (Facility E5) that routes a portion of the 100-yr conveyed in Iron Mountain Rd into the mainline system in Iron Mountain Rd. The mainline system is a CCRFCD MPU regional facility.

The ditches have been sized with 6-inch freeboard, inlets are sized with a 50% clogging factor and the resulting HGL for the proposed closed conduit systems are a minimum of 1-ft below finished grade with velocity less than 25 fps. The supporting hydraulic assessments are provided in Appendix D.

# 10.0 Finished Floor Elevations

Finished floor elevations for the proposed lots (within the City of Las Vegas) are determined to be a vertical distance above the gutter flow line of twice the depth of flow in the street on the high side of the structure, and 6-inches above the top of curb at the high side of the lot, whichever is higher.

# 11.0 Structural Best Management Practices

The water quality 85th percentile rainfall depth has not been determined for the project site. Instead, the 10-yr flow rate has been used as a conservative measure. A normal depth assessment utilizing the 10-yr event (1/3 the flow rate from Subbasin ON1(b)) for each swale is less than 0.5-ft deep and 4-ft wide. The assumption of 1/3 of Subbasin ON1(b) is based on approximately 1/3 of the subbasins that does not contribute flows to the parking lot that would reach the water quality swales. Each swale services approximately 0.5 acre of the parking lot and is greater than 40-ft in length. Therefore, the LID requirements for the site are met. Refer to Appendix C for the hydraulic assessment.

# 12.0 Conclusions & Recommendations

1. This project site is in compliance with the applicable drainage laws as recognized by the state of Nevada and with the CCRFCD Manual.

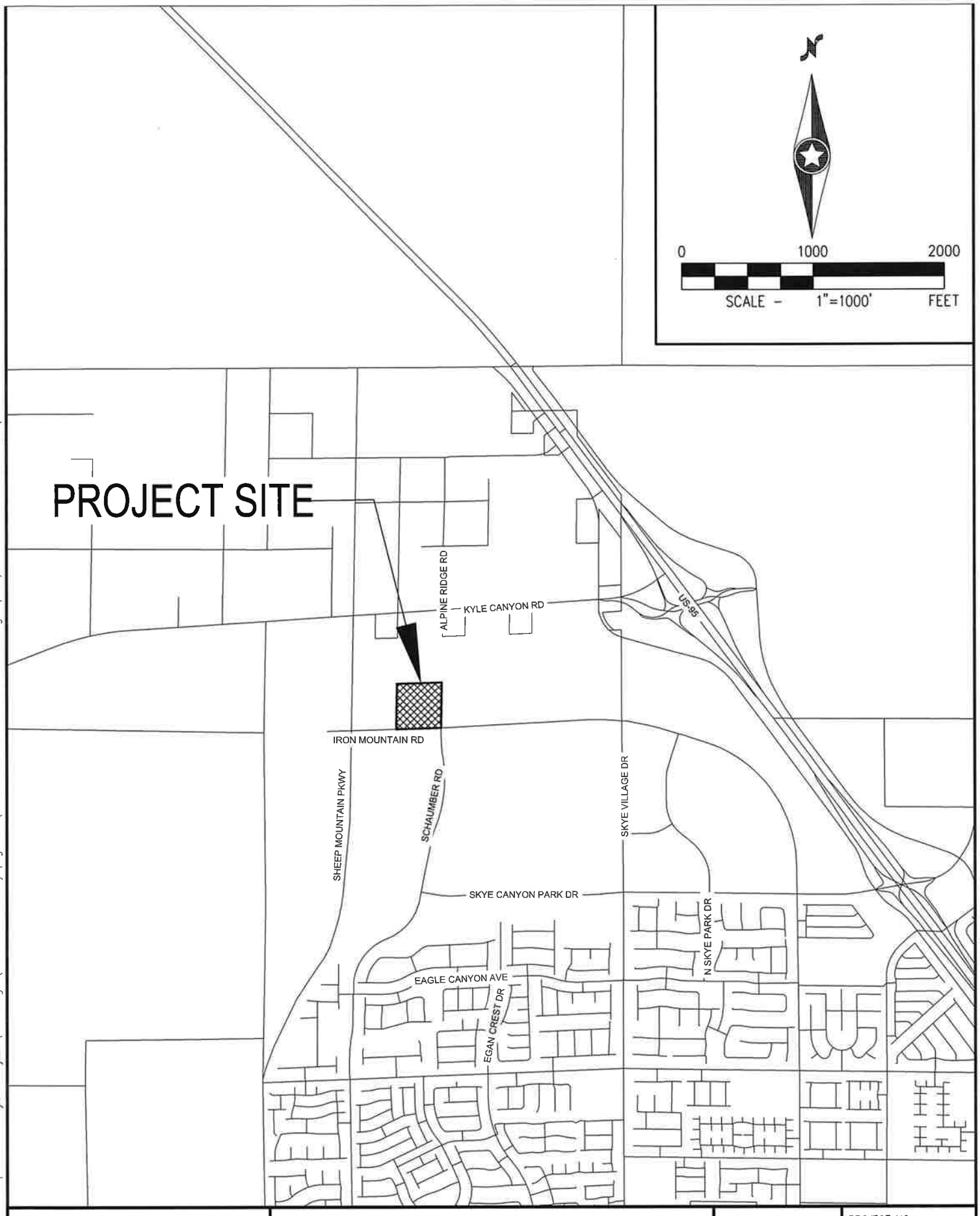
2. The project site is not located within a FEMA designated Special Flood Hazard Area (SFHA). The project site and the proposed improvements are located within a FEMA Flood Zone "X" (unshaded). Therefore, FEMA notification will not be required.
3. The project site is adjacent to an existing CCRFCD regional facility. Therefore, concurrence from CCRFCD is anticipated.
4. The recommended storm drain facilities meet all CCRFCD Manual criteria as discussed in Section 2.3 of this report.
5. The perimeter roadways meet all CCRFCD Manual criteria as discussed in Section 2.3 of this report.
6. Water quality requirements per the CCRFCD Manual as discussed in Section 2.4 of this this report are met.
7. Finished floor elevations for the proposed lots (within the City of Las Vegas) are determined to be a vertical distance above the gutter flow line of twice the depth of flow in the street on the high side of the lot, and 6-inches above the top of curb at the high side of the lot, whichever is higher.
8. The improvement plans for this project has been included in the last appendix of this study. These improvement plans support the drainage patterns and conclusions detailed in this study.

# 13.0 References

1. *Las Vegas Valley Flood Control Master Plan Update.* Atkins, 2018.
2. *Hydrologic Criteria and Drainage Design Manual.* Clark County Regional Flood Control District, 1999.
3. *Soil Survey of Las Vegas Valley Area, Nevada.* U.S. Department of Agriculture, Soil Conservation Service, August 2020.
4. *Technical Drainage Study for Alpine Ridge East.* Westwood Professional Services, April 2022.
5. *Technical Drainage Study Addendum 2 for Iron Mountain.* Westwood Professional Services, April 2022.
6. *Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure Update No. 1.* Slater Hanifan Group, May 2019.

# APPENDIX A

Drainage Exhibits





**Westwood**

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118
westwoodps.com

Westwood Professional Services, Inc.

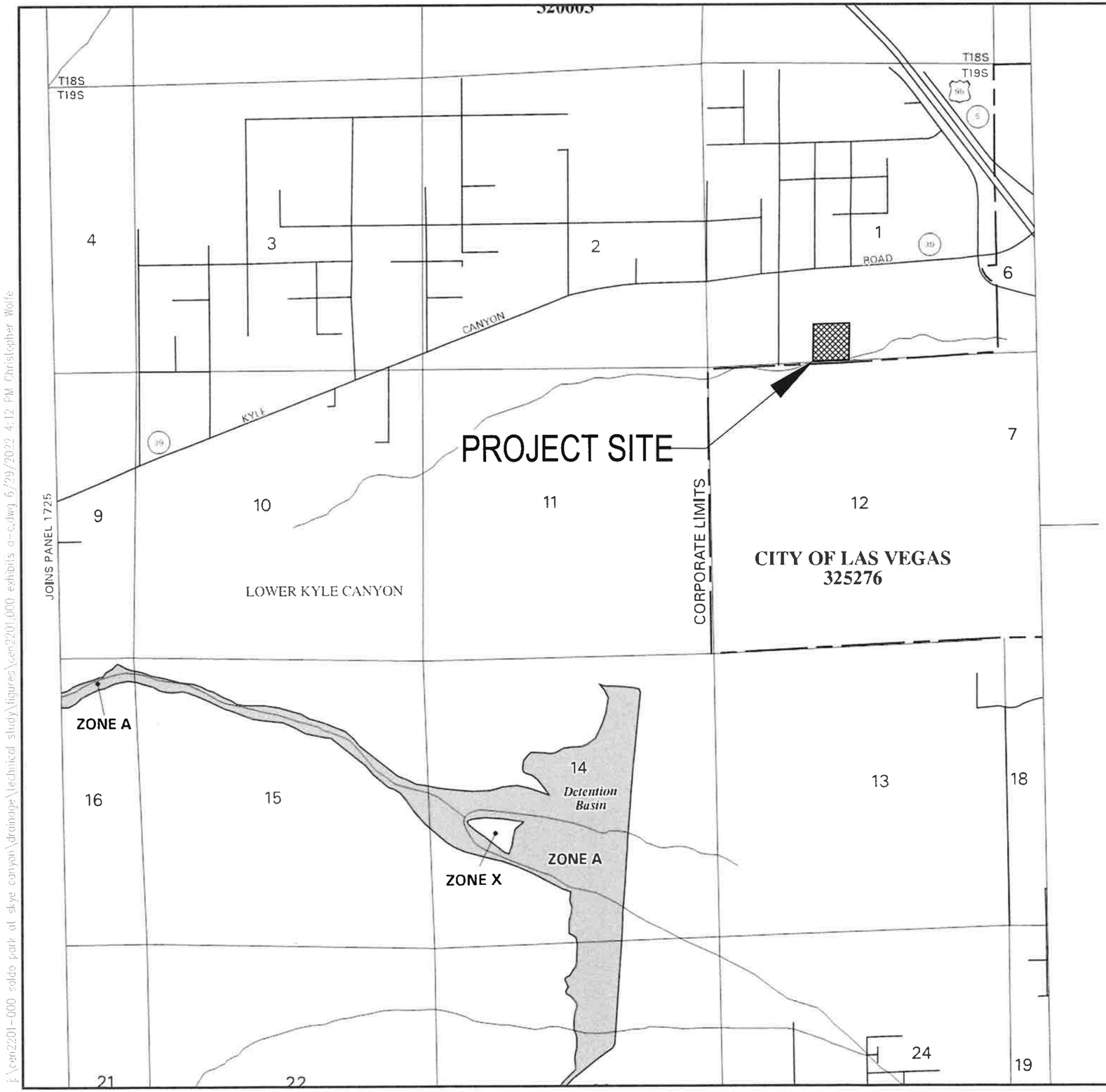

CENTURY COMMUNITIES OF NEVADA, LLC.

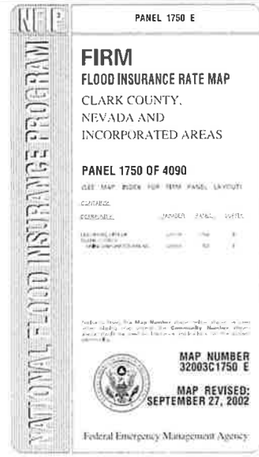
SOLDO MEMORIAL PARK AT SKYE CANYON

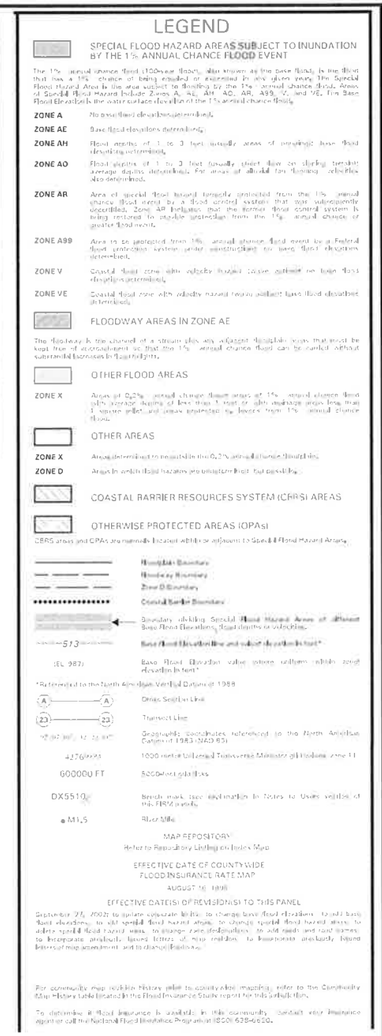
VICINITY MAP

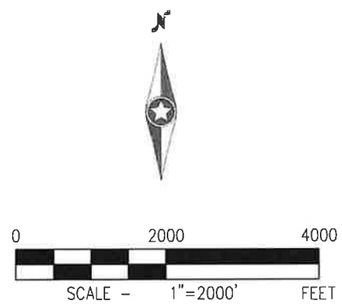
| | |
|---|---|
| DATE: JUNE 2022 | PROJECT NO. CEN2201.000 |
| DRAFTER: CW | |
| DESIGNER: CW | EXHIBIT A |
| CHECKED: KC | SHEET 1 OF 1 |

j:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201.000 exhibits a-c.dwg 6/29/2022 4:12 PM Christopher Wolfe




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

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|---|---|---|---|---|---|
| | | | | | |

CENTURY COMMUNITIES OF NEVADA, LLC.

SOLDO MEMORIAL PARK AT SKYE CANYON
FEMA FIRM PANEL MAP

DATE: JUNE 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC
PROJECT NO.
CEN2201.000

EXHIBIT B
SHEET 1 OF 1

J:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201.000 exhibits a-c.dwg 6/29/2022 4:12 PM Christopher Wolfe

PROJECT SITE

F-5 F-6 F-10 F-11

MOKC 0115 MOKC 0225 MOKC 0172 MOKC 0166 MOKC 0116

LVMC 0445 LVMC 0396 LVMC 0346 MOCCASIN RD LVMC 0280 LVMC 0276 LVMC 0226 LVMC 0184 LVMC 0144 LVMC 0001 LVMC 0000

MOIR 0065 MOIR 0066 MOIR 0098 MOIR 0041 MOIR 0020 MOIR 0009 MOIR 0049

MOHU 0167 MOHU 0179 MOHU 0180 MOHU 0191 MOHU 0160 MOHU 0116 MOHU 0111 MOHU 0095 MOHU 0000

MOLC 0157 MOLC 0162 MOLC 0172 MOLC 0000

KYLE CANYON RD

95

CN95 0233 CN95 0318 CN95 0255 CN95 0257 CN95 0199 CN95 0197 CN95 0104 CN95 0102

CNKC 0050 CNKC 0024 CNKC 0007 CNKC 0000

CNGT 0222 CNGT 0234 CNGT 0247 CNGT 0119 CNGT 0043 CNGT 0129 CNGT 0008

PACO 0064

BRDB 0167 BRDB 0107 BRDB 0059

CNFR 0000

LVMD 3314 LVMD 3315 LVMD 2099

LOG CABIN WY

FORT APACHE RD

IRON MOUNTAIN RD

EL CAPITAN WY

DURANGO DR

GRAND TETON DR

GILCREASE AV

FARM RD

SEVERENCE LA

CANYON CREST DR

APACHE RD

## 2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

### FIGURE F-11
### FLOOD CONTROL FACILITIES

**LEGEND**

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

**Remove & Replace/Parallel Facilities**

| Category A | Category B |
|---|---|
| Channel | Channel |
| Stormdrain | Stormdrain |
| Crossing | Crossing |

0 2000 4000

SCALE – 1"=2000' FEET


Westwood

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118

westwoodps.com

Westwood Professional Services, Inc.


| NO. | DESCRIPTION | DATE | BY | APP DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CENTURY COMMUNITIES OF NEVADA, LLC.

SOLDO MEMORIAL PARK AT SKYE CANYON
CCRFCD MPU FACILITY MAP

DATE: JUNE 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC
PROJECT NO. CEN2201.000

EXHIBIT C1
SHEET 1 OF 1

J:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201 tds exhibits a-c.dwg 7/5/2022 9:50 AM Kelin Collins

| ID / Mile | Status | Facility Description | Length (ft.) | Flow (cfs) | HEC-1 Node | HEC-1 Model | Tributary Area (sq.mi.) | Channel Slope (%) ** |
|---|---|---|---|---|---|---|---|---|
| BCHU | | **BELTWAY CHANNEL - HUALAPAI** | | | | | | |
| 0000 | E | 12' X 5' RCAP | 853 | 206 | DBA3-C | WEST3 | 0.84 | 1.11 |
| 0017 | E | 8' X 5' RCAP | 1216 | 218 | DBA3-C | WEST3 | 0.84 | 1.33 |
| 0040 | E | 48" RCP | 60 | 57 | DNW26-C | WEST3 | 0.51 | 1.04 |
| 0042 | E | 60" RCP | 615 | 57 | DNW26-C | WEST3 | 0.51 | 1.42 |
| 0054 | E | 54" RCP | 615 | 57 | DNW26-C | WEST3 | 0.51 | 1.23 |
| BRDB | | **BRENT DRAINAGE SYSTEM** | | | | | | |
| 0000 | E | 36" RCP WITH 15" ORIFICE PLATE | 2170 | 36 | BRDB | WEST3 | 2.37 | 0.40 |
| 0031 | E | 45,080 CFS PMF SPILLWAY | | 45069 | CBRDB | WEST3 | 2.37 | |
| 0032 | E | 450 AC-FT SOUTH ENVIRONMENTAL ENHANCEMENT AREA | | 1885 | CBRDB | WEST3 | 2.37 | |
| 0039 | E | ENERGY DISSIPATOR | 100 | 1052 | CNW147W | WEST3 | 1.75 | |
| 0043 | E | 20' X 7' RCBC | 135 | 1052 | CNW147W | WEST3 | 1.75 | 0.50 |
| 0045 | E | CONC CHNL 12'W 7'D 2:1 SS | 923 | 1052 | CNW147W | WEST3 | 1.75 | 2.00 |
| 0058 | E | 12' X 6' RCB | 1689 | 951 | CNW113-C | WEST3 | 1.47 | 1.81 |
| 0107 | P | 8' X 6' RCB | 2560 | 951 | CNW113-C | WEST3 | 1.47 | 2.40 |
| 0157 | P | 12' X 7' RCB | 2560 | 621 | CNW99-C | WEST3 | 0.84 | 0.25 |
| CN95 | | **CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH** | | | | | | |
| 0000 | E | 20' X 7' RCB | 3335 | 2778 | CNW93-C | WEST3 | 3.35 | 2.00 |
| 0068 | E | 20' X 7' RCB | 2500 | 2725 | CNW103-C | WEST3 | 3.04 | 2.10 |
| 0102 | E | CONC CHNL 20W 9'D 0:1 SS | 375 | 2548 | 2CNW89-C | WEST3 | 2.65 | 1.77 |
| 0104 | E | 2: 12' X 10' RCB | 300 | 2548 | 2CNW89-C | WEST3 | 2.65 | 1.10 |
| 0197 | E | 16' X 8' RCB | 3521 | 2548 | 2CNW89-C | WEST3 | 2.65 | 1.58 |
| 0199 | E | 15' X 9' RCB | 467 | 1467 | 2CNW72-C | WEST3 | 1.13 | 0.41 |
| 0216 | E | 15' X 9' RCB | 1227 | 1467 | 2CNW72-C | WEST3 | 1.13 | 0.82 |
| 0257 | E | TRANSITION STRUCTURE | 59 | 1467 | 2CNW72-C | WEST3 | 1.13 | 0.77 |
| 0259 | E | 15' X 9' RCB | 284 | 599 | CNW74-C | WEST3 | 0.40 | 0.77 |
| 0313 | E | 10' X 6' RCB | 2680 | 599 | CNW74-C | WEST3 | 0.40 | 2.50 |
| 0318 | E | TRANSITION STRUCTURE | 60 | 599 | CNW74-C | WEST3 | 0.40 | 1.50 |
| 0333 | E | 5' X 5' RCB | 870 | 259 | NW62-S | WEST3 | 0.16 | 1.50 |
| CNFR | | **CENTENNIAL PKWY CHANNEL WEST / FARM ROAD** | | | | | | |
| 0000 | P | 8' X 6' RCB | 8350 | 776 | CNW89-C | WEST3 | 1.05 | 2.00 |
| CNGT | | **CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH** | | | | | | |
| 0000 | E | 10' X 5' RCB | 2376 | 543 | CNW71-E | WEST3 | 0.47 | 2.58 |
| 0020 | E | 10' X 5' RCB | 1570 | 543 | CNW71-E | WEST3 | 0.47 | 3.50 |
| 0043 | E | 8' X 6' RCB | 2470 | 543 | CNW71-E | WEST3 | 0.47 | 3.60 |
| 0118 | E | 6' X 5' RCAP | 5472 | 349 | KYLEDET | KYLEDB | 58.61 | 3.72 |
| CNKC | | **CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH** | | | | | | |
| 0000 | E | 12' X 4' RCB | 377 | 954 | CNW72-C | WEST3 | 0.74 | 4.58 |
| 0007 | E | 10' X 5' RCB | 874 | 954 | CNW72-C | WEST3 | 0.74 | 3.26 |
| 0024 | E | 8' X 5' RCB | 1385 | 954 | CNW72-C | WEST3 | 0.74 | 2.40 |
| 0050 | E | 72" RCP | 2757 | 437 | NW45-S | WEST3 | 0.31 | 3.60 |
| CNWE | | **CENTENNIAL PKWY CHANNEL WEST** | | | | | | |
| 0195 | E | CONC CHNL 36'W 9'D 0:1 SS | 1130 | 3771 | CNW363-C | WEST3 | 5.64 | 0.60 |
| 0200 | E | CONC CHNL 36'W 9'D 0:1 SS | 1340 | 3523 | CNW204-C | WEST3 | 5.14 | 1.00 |
| 0226 | E | 2: 18' X 8.5' RCBC @ RIO VISTA | 100 | 3523 | CNW204-C | WEST3 | 5.14 | 0.51 |
| 0241 | E | CONC CHNL 36'W 9.5'D 0:1 SS | 405 | 3523 | CNW204-C | WEST3 | 5.14 | 0.51 |
| 0251 | E | CONC CHNL 36'W 9'D 0:1 SS | 575 | 3234 | CNW203-C | WEST3 | 4.64 | 0.51 |
| 0271 | E | CONC CHNL 32'W 10'D 0:1 SS | 229 | 3234 | CNW203-C | WEST3 | 4.64 | 0.51 |
| 0274 | E | 32' X 10' RCBC @ TENAYA | 142 | 3234 | CNW203-C | WEST3 | 4.64 | 0.51 |
| 0277 | E | CONC CHNL 32'W 9'D 0:1 SS | 579 | 3234 | CNW203-C | WEST3 | 4.64 | 0.64 |
| 0287 | E | CONC CHNL 32'W 8'D 0:1 SS | 865 | 2992 | CNW282-C | WEST3 | 3.83 | 1.59 |
| 0301 | E | 2: 15' X 7' RCB | 1738 | 2992 | CNW282-C | WEST3 | 3.83 | 1.38 |
| 0304 | E | 22' X 7' RCB | 3410 | 2992 | CNW282-C | WEST3 | 3.83 | 1.85 |
| 0314 | E | 22' X 7' RCB | 703 | 2822 | CNWBD2-N | WEST3 | 3.45 | 1.94 |
| EKBU | | **ELKHORN SPRINGS AND BUFFALO** | | | | | | |
| 0000 | E | 60" RCP | 1046 | 255 | NW134-C | WEST3 | 0.46 | 0.89 |
| EKDB | | **ELKHORN SPRINGS DETENTION BASIN** | | | | | | |
| 0000 | E | GRASS CHNL 15'W 5.8'D 3.5:1 SS | 2575 | 221 | CNW150-C | WEST3 | 1.41 | 0.39 |
| 0025 | E | 4' X 3' RCB | 160 | 106 | ELKBASIN | WEST3 | 0.84 | 0.50 |
| 0026 | E | 48" RCP | 1270 | 106 | ELKBASIN | WEST3 | 0.84 | 1.23 |
| 0049 | E | 60" RCP | 1095 | 106 | ELKBASIN | WEST3 | 0.84 | 0.13 |
| 0070 | E | 48 AC-FT ELKHORN SPRINGS DETENTION BASIN | | 456 | CNW133-C | WEST3 | 0.84 | |

| ID / Mile | Status | Facility Description | Length (ft.) | Flow (cfs) | HEC-1 Node | HEC-1 Model | Tributary Area (sq.mi.) | Channel Slope (%) ** |
|---|---|---|---|---|---|---|---|---|
| EKHU | | **ELKHORN AND HUALAPAI** | | | | | | |
| 0003 | E | 8' X 4' RCAP | 980 | 390 | CNW26-C | WEST3 | 0.51 | 3.61 |
| 0020 | E | 8' X 5' RCAP | 150 | 393 | CNW26-C | WEST3 | 0.51 | 3.61 |
| 0023 | E | 8' X 5' RCAP | 1200 | 393 | CNW26-C | WEST3 | 0.51 | 0.99 |
| GOEC | | **GOWAN NORTH - EL CAPITAN BRANCH** | | | | | | |
| 0178 | P | 78" RCP | 1320 | 190 | CCPFR-C | GOW3A | 0.46 | 1.15 |
| GONO | | **GOWAN NORTH SYSTEM** | | | | | | |
| 0511 | P | 6' X 5' RCB | 1320 | 325 | CCPHW-C | GOW3A | 0.60 | 1.14 |
| LVMD | | **LAS VEGAS WASH - MIDDLE** | | | | | | |
| 2507 | E | 2: 13' X 9' RCB | 2831 | 1808 | CNW138-C | CWEST3 | 4.43 | 0.36 |
| 2525 | E | 24' X 8' RCB | 1140 | 1598 | CNW159-C | CWEST3 | 3.92 | 0.40 |
| 2550 | E | 24' X 8' RCB | 1445 | 1312 | CD161-C | CWEST3 | 3.42 | 0.40 |
| 2574 | E | 24' X 8' RCB | 1430 | 1312 | CD161-C | CWEST3 | 3.42 | 0.41 |
| 2599 | E | CONC CHNL 24'W 7'D 2:1 SS | 1577 | 1268 | CNW162-C | CWEST3 | 3.10 | 0.51 |
| 2632 | E | 16' X 5' RCB | 1443 | 695 | CNW138-C | WEST3 | 1.16 | 0.47 |
| 2661 | E | 16' X 5' RCB | 3000 | 695 | CNW138-C | WEST3 | 1.16 | 0.78 |
| 2711 | E | 10' X 5' RCB | 2440 | 560 | CNW139-C | WEST3 | 0.93 | 2.00 |
| 2737 | E | 8' X 5' RCB | 265 | 560 | CNW139-C | WEST3 | 0.93 | 2.25 |
| 2763 | E | 8' X 5' RCB | 1565 | 560 | CNW139-C | WEST3 | 0.93 | 2.41 |
| 2780 | E | 8' X 5' RCB | 910 | 560 | CNW139-C | WEST3 | 0.93 | 2.60 |
| MOHU | | **MOCCASIN-HUALAPAI BRANCH** | | | | | | |
| 0000 | P0 | 12' X 6' RCB | 1476 | 924 | 2CNW33-C | LOWER3 | 2.08 | 1.80 |
| 0026 | P0 | 11' X 6' RCB | 1654 | 560 | CNW45-N | LOWER3 | 1.25 | 0.50 |
| 0061 | P0 | 9' X 5' RCB | 779 | 560 | CNW45-N | LOWER3 | 1.25 | 0.50 |
| 0076 | P0 | 60" RCP | 1000 | 283 | CNW45-C | LOWER3 | 1.03 | 3.69 |
| 0095 | P0 | NATURAL WASH | 665 | 283 | CNW45-C | LOWER3 | 1.03 | 3.00 |
| 0111 | P0 | 6' X 5' RCBC @ EGAN CREB DR | 164 | 283 | CNW45-C | LOWER3 | 1.03 | 6.10 |
| 0116 | P0 | NATURAL WASH | 1900 | 283 | CNW45-C | LOWER3 | 1.03 | 3.09 |
| 0151 | P0 | 54" RCPC @ SHAUMBER | 433 | 72 | MODB1 | LOWER3 | 0.26 | 2.00 |
| MOIR | | **MOCCASIN - IRON MOUNTAIN BRANCH** | | | | | | |
| 0000 | P0 | 60" RCP | 1060 | 410 | CNW33-C | LOWER3 | 0.83 | 4.50 |
| 0020 | P0 | 54" RCP | 1161 | 71 | MODB2 | LOWER3 | 0.56 | 3.20 |
| 0041 | P0 | 42" RCP | 1236 | 71 | MODB2 | LOWER3 | 0.56 | 5.00 |
| 0065 | P0 | 60" RCP | 1099 | 71 | MODB2 | LOWER3 | 0.56 | 0.40 |
| MOKC | | **MOCCASIN AND KYLE CANYON** | | | | | | |
| 0000 | P0 | 9' X 6' RCB | 5140 | 1072 | CNW33-C | LOWER3 | 2.89 | 3.40 |
| MOLC | | **MOCCASIN - LOG CABIN BRANCH** | | | | | | |
| 0000 | P0 | 20' X 10' RCB | 2206 | 2265 | 2CNW64 | LOWER3 | 6.06 | 0.65 |
| 0072 | P0 | 12' X 8' RCB | 4493 | 2265 | 2CNW64 | LOWER3 | 6.06 | 2.66 |
| 0149 | E | 12' X 8' RCB | 520 | 1817 | CNW62-N | LOWER3 | 4.88 | 2.60 |
| 0157 | P | 13' X 8' RCB | 288 | 1817 | CNW62-N | LOWER3 | 4.88 | 1.40 |
| 0162 | P0 | 13' X 6' RCB | 435 | 1817 | CNW62-N | LOWER3 | 4.88 | 1.80 |
| MSNV | | **MOUNTAIN SPA/VISTA RANCH** | | | | | | |
| 0000 | E | 6: 12' X 5' RCBC @ GRAND TETON | 273 | 839 | CNW163-C | CWEST3 | 1.69 | 0.40 |
| 0005 | E | GRASS CHNL 100'W 4.5'D 10:1 SS | 6325 | 259 | CNW155-C | WEST3 | 4.46 | 0.40 |
| 0125 | E | GRASS CHNL 100'W 4.5'D 10:1 SS | 1300 | 66 | CNW147E | WEST3 | 1.55 | 0.40 |
| RACO | | **RACEL STREET COLLECTOR** | | | | | | |
| 0000 | E | 14' X 7' RCB BAFFLED ENERGY DISSIPATOR | 87 | 424 | CNW111S | WEST3 | 0.55 | 0.29 |
| 0001 | E | 78" RCP | 3245 | 424 | CNW111S | WEST3 | 0.55 | 2.46 |
| 0084 | E | 78" RCP | 2650 | 347 | CNW111S | WEST3 | 0.44 | 2.09 |
| RCBC | | **RANCHO ROAD SYSTEM - BELTWAY CHANNEL** | | | | | | |
| 0000 | E | 6' X 5' RCB | 1062 | 173 | FADB | WEST3 | 1.54 | 1.04 |
| 0002 | E | 54" RCP OUTLET WITH 41" ORIFICE | 503 | 173 | FADB | WEST3 | 1.54 | 2.38 |
| 0003 | E | 2,341 CFS PMF SPILLWAY | | 2341 | FADBIN | WEST3 | 1.54 | |
| 0004 | E | 76 AC-FT FORT APACHE DETENTION BASIN | | 658 | FADBIN | WEST3 | 1.54 | |
| 0007 | E | ENERGY DISSIPATOR | 100 | 658 | FADBIN | WEST3 | 1.54 | |
| 0009 | E | 12' X 6' RCBC @ FORT APACHE DETENTION BASIN | 133 | 658 | FADBIN | WEST3 | 1.54 | 1.79 |
| 0012 | E | CONC CHNL 12'W 6'7'D 0:1 SS | 1937 | 658 | FADBIN | WEST3 | 1.54 | 3.15 |
| 0048 | E | 12' X 6' RCBC @ GRAND CANYON | 140 | 559 | CMNA1 | WEST3 | 1.27 | 3.15 |
| 0051 | E | CONC CHNL 12'W 6'8'D 0:1 SS | 2650 | 559 | CMNA1 | WEST3 | 1.27 | 3.44 |
| 0095 | E | 11' 10" X 6' AND 11' 6" X 6' RCBC @ HUALAPAI WAY | 190 | 559 | CMNA1 | WEST3 | 1.27 | 1.93 |
| 0100 | E | CONC CHNL 12'W 5.5'D 0:1 SS | 2085 | 475 | CDMNA1 | WEST3 | 0.43 | 2.65 |

| ID / Mile | Status | Facility Description | Length (ft.) | Flow (cfs) | HEC-1 Node | HEC-1 Model | Tributary Area (sq.mi.) | Channel Slope (%) ** |
|---|---|---|---|---|---|---|---|---|
| RCBC | | **RANCHO ROAD SYSTEM - BELTWAY CHANNEL** | | | | | | |
| 0140 | E | CONC CHNL 16'W 5'D 0:1 SS | 2155 | 475 | CDMNA1 | WEST3 | 0.43 | 1.65 |
| RCHB | | **RANCHO ROAD SYSTEM - BELTWAY** | | | | | | |
| 0050 | E | 2: 12' X 8' RCBC @ SOUTH RAMP CONNECTOR | 85 | 1465 | CDW1C1-C | WEST3 | 3.55 | 1.40 |
| 0054 | E | CONC CHNL 21'W 8'D 0:1 SS | 432 | 1465 | CDW1C1-C | WEST3 | 3.55 | 1.51 |
| 0062 | E | TRANSITION STRUCTURE | 130 | 1465 | CDW1C1-C | WEST3 | 3.55 | 1.51 |
| 0065 | E | 24' X 7' RCB | 480 | 1465 | CDW1C1-C | WEST3 | 3.55 | 0.30 |
| 0074 | E | 24' X 6' RCB | 50 | 1414 | CNWBC6-C | WEST3 | 3.41 | 0.30 |
| 0075 | E | 20' X 6' RCBC @ BELTWAY | 428 | 1414 | CNWBC6-C | WEST3 | 3.41 | 2.81 |
| 0083 | P | 20' X 4' RCB | 950 | 1414 | CNWBC6-C | WEST3 | 3.41 | 2.49 |
| 0101 | P | CONC CHNL 20'W 5'D 0:1 SS | 980 | 1414 | CNWBC6-C | WEST3 | 3.41 | 2.38 |
| 0120 | E | 20' X 6' RCBC @ GRAND MONTECITO | 120 | 1414 | CNWBC6-C | WEST3 | 3.41 | 1.00 |
| 0122 | P | CONC CHNL 16'-20'W 5'D 0:1 SS | 350 | 1414 | CNWBC6-C | WEST3 | 3.41 | 1.84 |
| 0130 | P | CONC CHNL 16'W 5.5'D 0:1 SS | 1012 | 1414 | CNWBC6-C | WEST3 | 3.41 | 2.67 |
| 0149 | P | CONC CHNL 16'W 5-5.5'D 0:1 SS | 97 | 1115 | CNWBC3 | WEST3 | 2.99 | 2.27 |
| 0151 | P | CONC CHNL 16'W 5'D 0:1 SS | 1256 | 1115 | CNWBC3 | WEST3 | 2.99 | 2.05 |
| 0171 | E | 16' X 6' RCBC @ EL CAPITAN WAY | 234 | 1115 | CNWBC3 | WEST3 | 2.99 | 1.75 |
| 0175 | E | CONC CHNL 14'W 7'D 0:1 SS | 1220 | 1115 | CNWBC3 | WEST3 | 2.99 | 2.93 |
| 0198 | E | CONC CHNL 14'W 7'D 0:1 SS | 225 | 788 | CNWBA6-C | WEST3 | 1.88 | 2.93 |
| 0227 | E | 12' X 6' RCB | 995 | 788 | CNWBA6-C | WEST3 | 1.88 | 1.73 |
| 0250 | E | 12' X 6' RCB | 4020 | 788 | CNWBA6-C | WEST3 | 1.88 | 1.12 |
| 0275 | E | 7' X 6' RCB | 2650 | 535 | CNW66-C | WEST3 | 1.04 | 3.30 |
| 0295 | P | 7' X 6' RCB | 2880 | 431 | CNW53-C | WEST3 | 0.80 | 3.50 |
| TSDB | | **TULE SPRINGS DRAINAGE SYSTEM** | | | | | | |
| 0000 | E | 2: 10' X 4' RCBC @ ECHO GRANDE | 100 | 25 | TULEDB | WEST3 | 1.37 | 1.04 |
| 0002 | E | 36" RCP WITH 22" ORIFICE PLATE | 320 | 25 | TULEDB | WEST3 | 1.37 | 0.33 |
| 0010 | E | 14,013 CFS PMF SPILLWAY | | 14013 | CTULEDB | WEST3 | 1.37 | |
| 0011 | E | 117 AC-FT NORTH ENVIRONMENTAL ENHANCEMENT AREA | | 551 | CTULEDB | WEST3 | 1.37 | |
| 0012 | E | ENERGY DISSIPATOR | 260 | 333 | CNW148-C | WEST3 | 0.59 | |
| 0023 | P | 78" RCP | 1320 | 333 | CNW148-C | WEST3 | 0.59 | 0.89 |
| 0059 | P | 72" RCP | 2640 | 333 | CNW148-C | WEST3 | 0.59 | 1.03 |

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.
**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.
^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

**2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE**

**FACILITY INVENTORY FIGURE F-11**

LEGEND

ID (Facility Identifier) AABB
Parent Stream Name
Stream Name
Mile 0000
Distance Above Confluence with Parent Stream (Miles)
Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
Category A..... P
Category B..... P0

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

| | | | |
|---|---|---|---|
| Cast in Place Concrete Pipe | CIPCP | Reinforced Concrete Arch Culvert | RCAC |
| Corrugated Metal Arch Pipe Culvert | CMAP | Reinforced Concrete Box | RCB |
| Corrugated Metal Pipe Culvert | CMPC | Reinforced Concrete Box Culvert | RCBC |
| High Density Polyethylene | HDPE | Reinforced Concrete Pipe | RCP |
| Horizontal Elliptical Reinforced Concrete Pipe | HERCP | Reinforced Concrete Pipe Culvert | RCPC |
| Reinforced Concrete Arch Pipe | RCAP | Storm Sewer Pipe | SSP |

ATKINS
Member of the SNC-Lavalin Group
Louis Berger


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 DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CENTURY COMMUNITIES OF NEVADA, LLC.

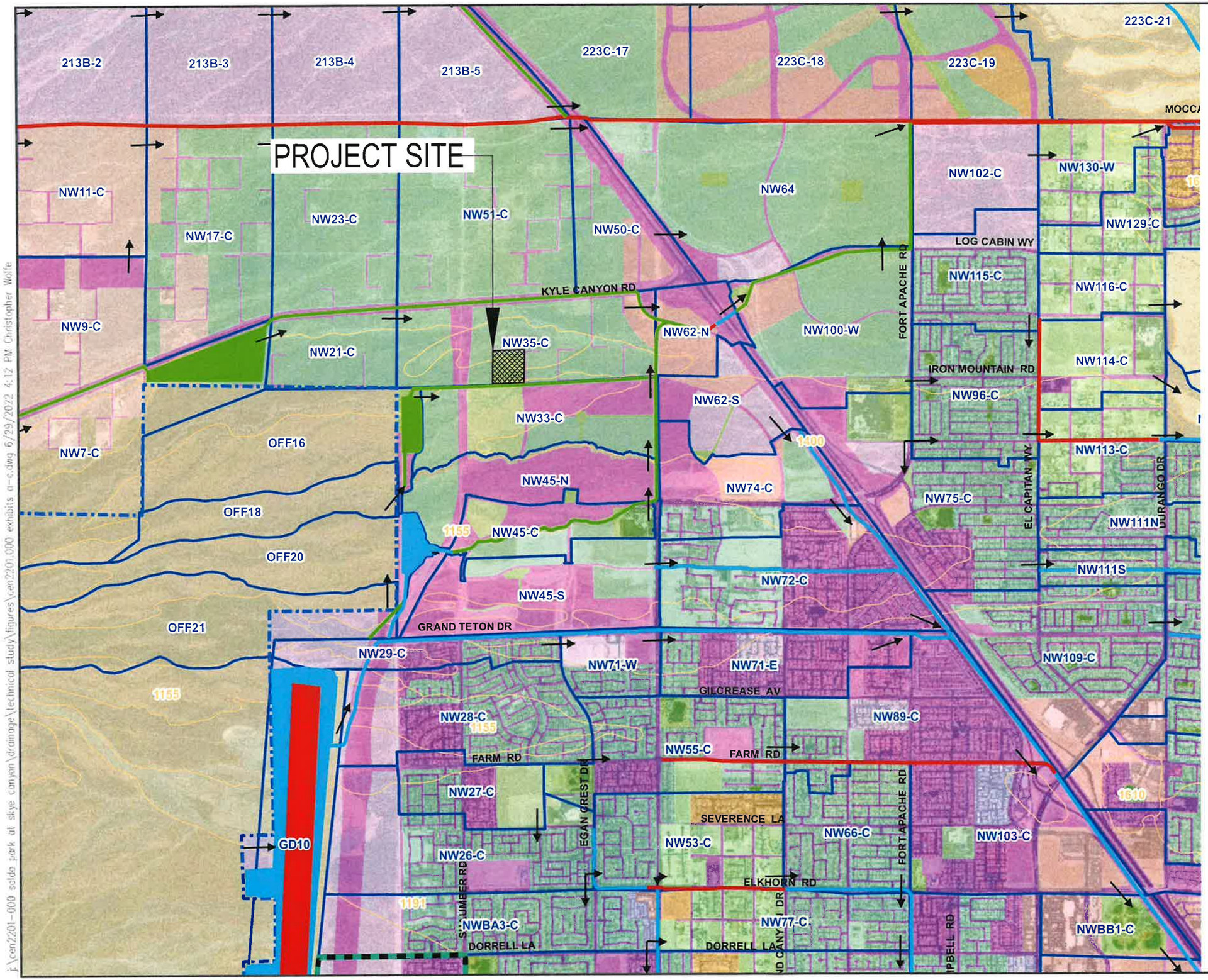
SOLDO MEMORIAL PARK AT SKYE CANYON
MPU F-INVENTORY

DATE: JUNE 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC

PROJECT NO.
CEN2201.000

EXHIBIT C2
SHEET 1 OF 1

j:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201 000 exhibits a-c.dwg 6/29/2022 4:12 PM Christopher Wolfe




REGIONAL FLOOD CONTROL DISTRICT

# 2018 Las Vegas Valley Master Plan Update

Figure W-2B
Upper Northern Las Vegas Wash Watershed

## Legend

- Flow Arrows
- Concentration Points
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Ultimate Development Boundary
- Watershed
- Subbasins
- Soils
- 1: Undeveloped Land, Open desert
- 2: Parks, Golf Courses
- 3: Rural, 0.5-1 units per acre (uses 1 unit/acre)
- 4: Low-Density Residential, 1-2 units per acre (uses 2 units/acre)
- 5: Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)
- 6: High-Density Residential, 4-8 units per acre (uses 6 units/acre)
- 7: Public Facility and Residential, 8-12 units/acre
- 8: Very High-Density Residential, 12 units/acre or more
- 9: Commercial, Retail, Casino, High Rise Condominiums
- 10: Light Industrial
- 11: Heavy Industrial
- 12: Schools
- 13: Lakes

0 2000 4000
SCALE – 1"=2000' FEET


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'D DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

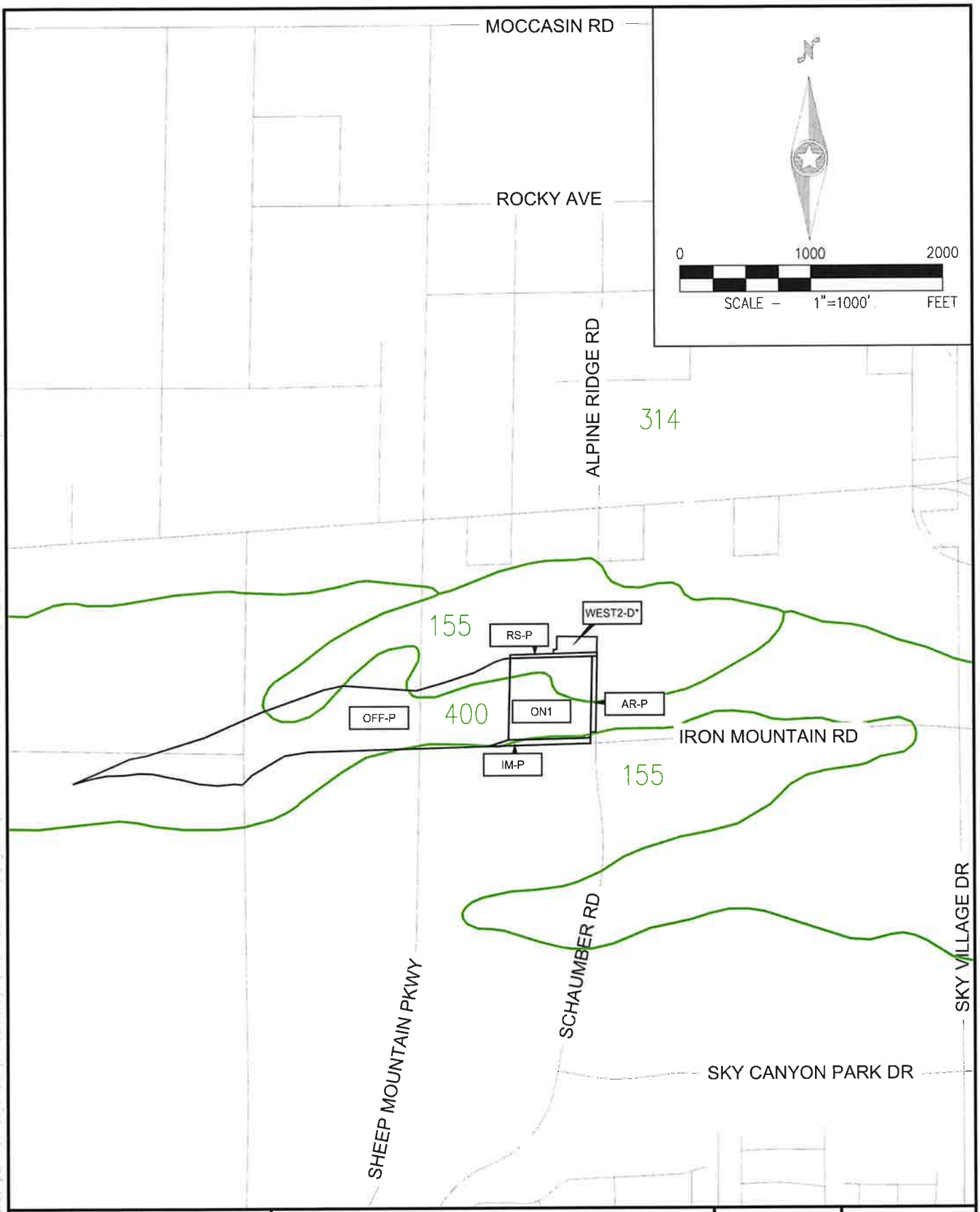
CENTURY COMMUNITIES OF NEVADA, LLC.

SOLDO MEMORIAL PARK AT SKYE CANYON
MPU WATERSHED MAP

DATE: JUNE 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC
PROJECT NO. CEN2201.000

EXHIBIT C3
SHEET 1 OF 1

F:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201.000 exhibits a-c.dwg 6/29/2022 4:12 PM Christopher Wolfe




**Westwood**

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118
westwoodps.com

Westwood Professional Services, Inc.

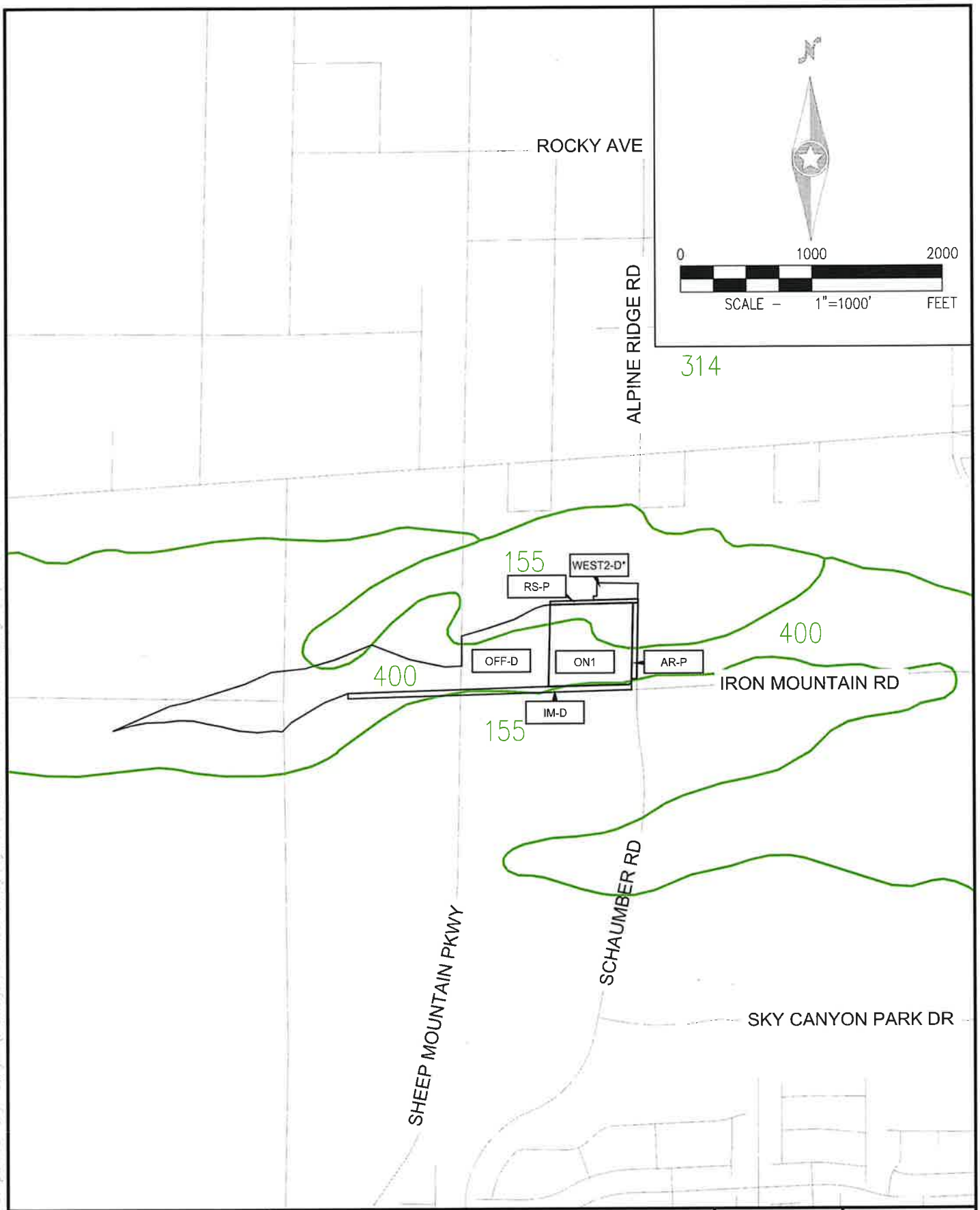
CENTURY COMMUNITIES OF NEVADA, LLC.

SOLDO MEMORIAL PARK AT SKYE CANYON
SOILS MAP - PROPOSED

DATE: JULY 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC

PROJECT NO
CEN2201.000

EXHIBIT D1
SHEET 1 OF 1





**Westwood**

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave.
Suite 100
Las Vegas, NV 89118

westwoodps.com

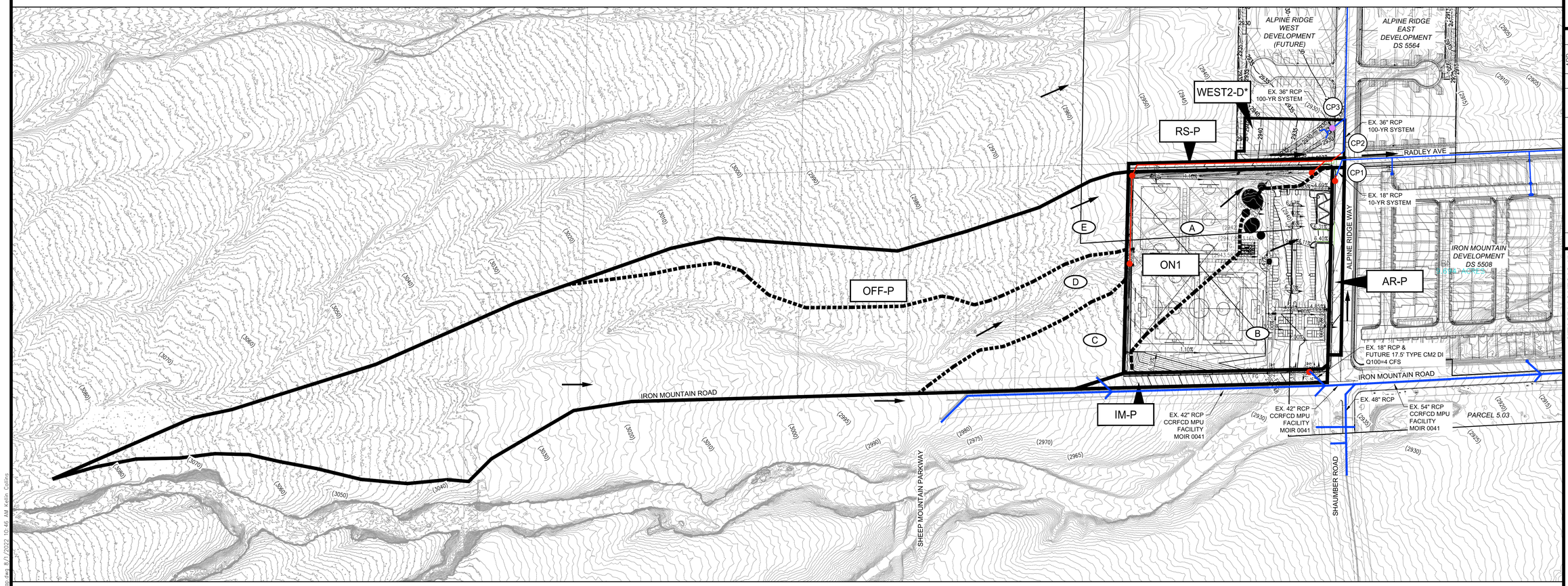
Westwood Professional Services, Inc.


CENTURY COMMUNITIES OF NEVADA, LLC.

SOLDO MEMORIAL PARK AT SKYE CANYON

SOILS MAP - DEVELOPED

| | |
|---|---|
| DATE: JULY 2022 | PROJECT NO: CEN2201.000 |
| DRAFTER: CW | |
| DESIGNER: CW | EXHIBIT D2 |
| CHECKED: KC | SHEET 1 OF 1 |




**Proposed Condition Flow Rate Summary**

| Basin/Concentration Point ID | Area (ac) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| OFF-P | 28.83 | 67 | 26 |
| ON1 | 9.03 | 18 | 6 |
| RS-P | 0.41 | 1 | 1 |
| IM-P | 0.71 | 3 | 1 |
| AR-P | 0.51 | 2 | 1 |
| WEST2-D* | 0.91 | 3 | 1 |
| CP1<br>Q = ON1(B) + AR-P | N/A | 13 | 5 |
| CP2<br>Q = OFF-P + ON1(A) + RS-P | N/A | 75 | 29 |
| CP3<br>Q = CP1 Bypass + CP2 + WEST2-D* | N/A | 86 | 30 |

*Referenced from the AR East Study (DS5564)

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| ON1 | 18 | 6 | 9.03 | 2.0 | 0.7 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| ON1(A) | 7 | 2 | 3.66 | 2.0 | 0.7 |
| ON1(B) | 11 | 4 | 5.37 | 2.0 | 0.7 |
| ***TOTAL*** | ***18*** | ***6*** | ***9.03*** | | |

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| OFF-P | 67 | 26 | 28.83 | 2.3 | 0.9 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| OFF-P(C) | 5.5 | 2 | 2.36 | 2.3 | 0.9 |
| OFF-P(D) | 47.3 | 18 | 20.35 | 2.3 | 0.9 |
| OFF-P(E) | 14.2 | 6 | 6.11 | 2.3 | 0.9 |
| ***TOTAL*** | ***67.0*** | ***26*** | ***28.83*** | | |

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- (ID) — CONCENTRATION POINT ID
- FLOW DIRECTION
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- FUTURE DRAINAGE FACILITY


**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. DATE | APP. |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

# CENTURY COMMUNITIES OF NEVADA, LLC.

## SOLDO MEMORIAL PARK AT SKYE CANYON

## PROPOSED CONDITION DRAINAGE MAP

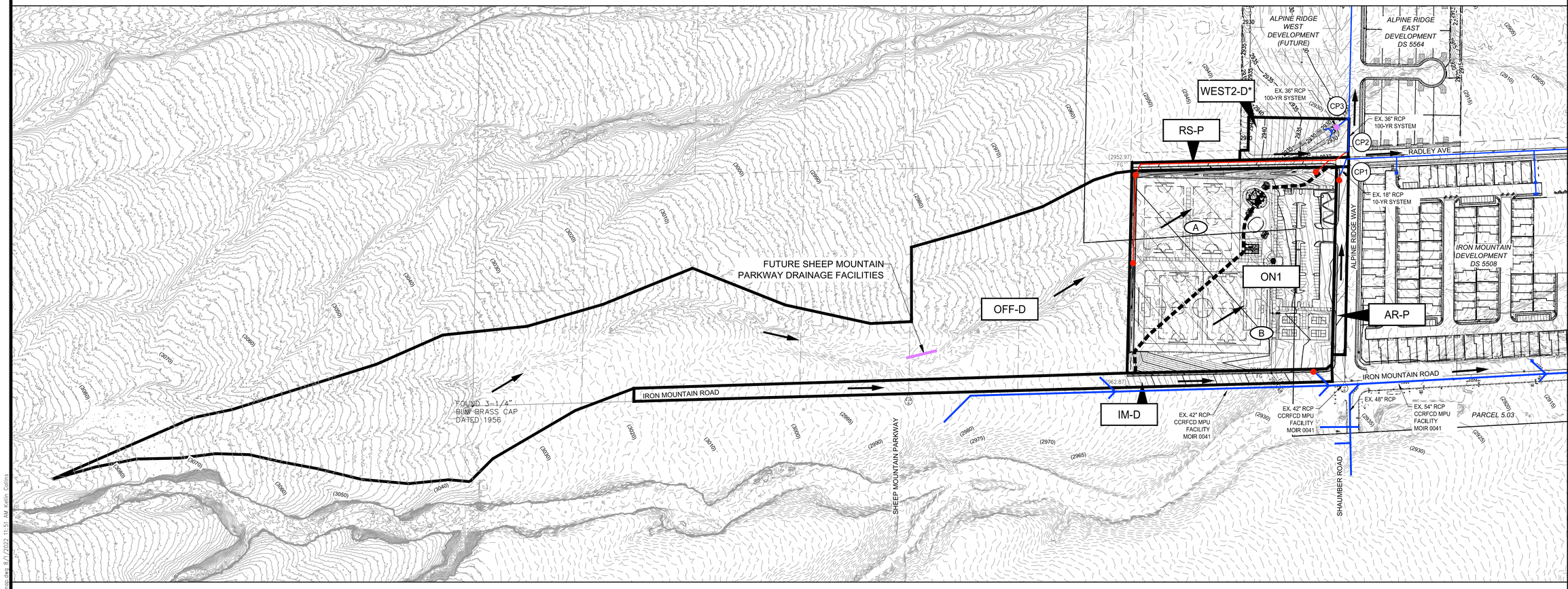
S 1 T 19S R 59E

DATE: JULY 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC

PROJECT NO.
**CEN2201.000**

**EXHIBIT E**
SHEET 1 OF 1

J:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201 tds exh e proposed condition drainage map.dwg 8/1/2022 10:46 AM Kellin Collins




**Developed Condition Flow Rate Summary**

| Basin/Concentration Point ID | Area (ac) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| OFF-D | 23.12 | 61 | 26 |
| ON1 | 9.03 | 18 | 6 |
| RS-P | 0.41 | 1 | 1 |
| IM-D | 2.08 | 7 | 3 |
| AR-P | 0.51 | 2 | 1 |
| WEST2-D* | 0.91 | 3 | 1 |
| CP1<br>Q = ON1(B) + AR-P | N/A | 13 | 5 |
| CP2<br>Q = OFF-D + ON1(A) + RS-P | N/A | 69 | 29 |
| CP3<br>Q = CP1 Bypass + CP2 + WEST2-D* | N/A | 80 | 30 |

*Referenced from the AR East Study (DS5564)

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| ON1 | 18 | 6 | 9.03 | 2.0 | 0.7 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| ON1(A) | 7 | 2 | 3.66 | 2.0 | 0.7 |
| ON1(B) | 11 | 4 | 5.37 | 2.0 | 0.7 |
| ***TOTAL*** | ***18*** | ***6*** | ***9.03*** | | |

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- FUTURE DRAINAGE FACILITY


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


| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|---|---|---|---|---|---|

**CENTURY COMMUNITIES OF NEVADA, LLC.**
CITY OF NORTH LAS VEGAS, NV

**SOLDO MEMORIAL PARK AT SKYE CANYON**
**DEVELOPED CONDITION DRAINAGE MAP**

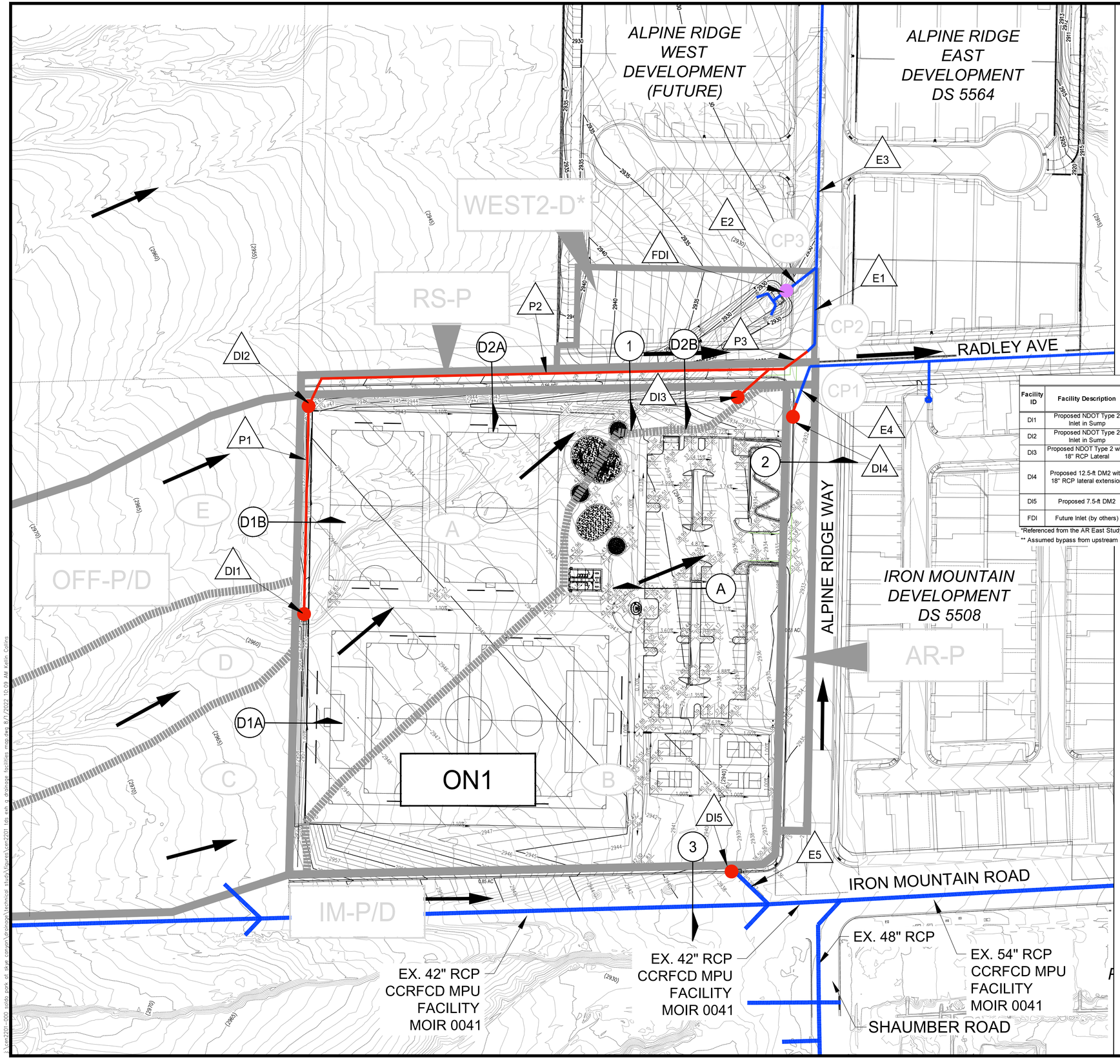
S 1
T 19S
R 59E

DATE: JULY 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC

PROJECT NO.
**CEN2201.000**

**EXHIBIT F**
SHEET 1 OF 1


L:\cen2201.000 - soldo park at skye canyon\Drainage\Technical study\Figures\cen2201 fds.aprx\ developed condition drainage map.dwg 8/1/2022 11:51 AM Kellin Collins




**Developed Condition 100-Year Street Flow Summary**

| Section ID | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV | Notes |
|---|---|---|---|---|---|---|
| 1 | 1 | 3.28 | 0.23 | 3.06 | 0.7 | |
| Q = RS-P | | 3.50 | 0.23 | 3.15 | 0.7 | |
| 2 | 13 | 0.50 | 0.61 | 2.16 | 1.3 | |
| Q = AR-P + ON1(B) | | 1.50 | 0.51 | 3.60 | 1.8 | |
| 3 | 3.5 | 2.00 | 0.34 | 3.02 | 1.0 | |
| Q = (1/3 * IM-D) + 1 cfs** | | 5.21 | 0.30 | 4.39 | 1.3 | |
| A | 11 | 0.56 | 0.58 | 2.96 | 1.7 | |
| Q = ON1(B) | | | | | | |

*Referenced from the AR East Study (DS5564)
** Assumed bypass from upstream inlet

**Proposed Condition Onsite Hydraulic Section Summary**

| Section ID | $Q_{100}$ (cfs) | Section Description | Slope (%) | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|
| Section D1A<br>Q = OFF-P(C) | 5.5 | Earthen Trap Channel, 1.5' bottom width, 2:1 SS | 1.42 | 0.57 | 3.66 |
| Section D1B<br>Q = OFF-P(E) | 14.2 | Earthen Trap Channel, 1.5' bottom width, 2:1 SS | 1.66 | 0.88 | 4.99 |
| Section D2A<br>Q = ON1(A) | 7.0 | Earthen Trap Channel, 4.0' bottom width, 3:1 SS | 2.00 | 0.37 | 3.74 |
| Section D2B<br>Q = ON1(A) | 7.0 | Earthen Trap Channel, 4.0' bottom width, 3:1 SS | 3.00 | 0.33 | 4.29 |

**Recommended Flood Control Facility (Inlets) Summary**

| Facility ID | Facility Description | Source of Flows | Approaching Flow (cfs) $Q_{100}/Q_{10}$ | Facility Flow (cfs) $Q_{100}/Q_{10}$ | Surface/Bypass Flow (cfs) $Q_{100}/Q_{10}$ | Notes |
|---|---|---|---|---|---|---|
| DI1 | Proposed NDOT Type 2 Inlet in Sump | OFF-P(C) + OFF-P(D) | 52.8/- | 52.8/- | 0/0 | Proposed Condition Q is greater than Developed Condition Q |
| DI2 | Proposed NDOT Type 2 Inlet in Sump | OFF-P(E) | 14.2/- | 14.2/- | 0/0 | Proposed Condition Q is greater than Developed Condition Q |
| DI3 | Proposed NDOT Type 2 with 18" RCP Lateral | ON1(A) | 7/2 | 7/2 | 0/0 | Proposed and Developed Condition Q are the same |
| DI4 | Proposed 12.5-ft DM2 with 18" RCP lateral extension | AR-P + ON1(B) | 13/5 | 5/5 | 8/0 | Proposed and Developed Condition Q are the same. Inlet is to a 10-yr System. 100-yr interception is assumed to match 10-yr interception |
| DI5 | Proposed 7.5-ft DM2 | (1/3 * IM-D) + 1 cfs** | 3.5/- | 2.5/- | 1/- | Developed Condition Q is greater than Proposed Condition Q |
| FDI | Future Inlet (by others) | [(DI#3 + DI#4) Bypass] + WEST-D* | 12/1 | 11/1 | 1/0 | Assuming Alpine Ridge West Constructed with it's associated inlet in Alpine Ridge Way |

*Referenced from the AR East Study (DS5564)
** Assumed bypass from upstream inlet

**Recommended Flood Control Facilities (Closed Conduit) Summary**

| Facility ID | Facility Description | Source of Flows | $Q_{design}$ (cfs) | Notes |
|---|---|---|---|---|
| **System 1** | | | | |
| P1 | 36" RCP | DI#1 | 52.8 | |
| P2 | 36" RCP | DI#1 + DI#2 | 67 | |
| P3 | 36" RCP | DI#1 + DI#2 + DI#3 | 74 | |
| E1 | 36" RCP | DI#1 + DI#2 + DI#3 | 74 | |
| E2 | 36" RCP | FDI | 11 | |
| E3 | 36" RCP | DI#1 + DI#2 + DI#3 + FDI | 85 | |
| **System 2** | | | | |
| E4 | 18" RCP | DI#4 | 5 | |
| **System 3** | | | | |
| E5 | 18" RCP | DI#5 | 6 | |

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- FUTURE DRAINAGE FACILITY


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. | APP. DATE |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

# CENTURY COMMUNITIES OF NEVADA, LLC.

## SOLDO MEMORIAL PARK AT SKYE CANYON

## DRAINAGE FACILITIES MAP

S 1 T 19S R 59E

DATE: JULY 2022
DRAFTER: CW
DESIGNER: CW
CHECKED: KC

PROJECT NO.
**CEN2201.000**

**EXHIBIT G**
SHEET 1 OF 1

J:\cen2201-000 soldo park at skye canyon\drainage\technical study\figures\cen2201 tds exh g drainage facilities map.dwg 8/1/2022 10:09 AM Kelin Collins

# APPENDIX B

Hydrologic Analyses

Precipitation Data

Westwood

# Rainfall and Precipitation Computation

**Project Name:** Soldo Park at Skye Canyon
**Date:** 7/5/2022
**File Name:** CEN2201 Precipitation Calcs v211019.xlsm
**By:** CRW

## Data:

**Reference:**

Project is located in: Township: 19 S. Range: 59 E. Section: 1 — APN Map

**Site is NOT located in the McCarran Airport Rainfall Area** — Figure 513*

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.30 inches — Figure 503*

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 2.10 inches — Figure 506*

Precipitation Adjustment Ratios:

10-Year: 1.24 — Table 501*
100-Year: 1.43 — Table 501*

## Calculations:

$P_{10}$ = 1.61 — 10-Year Precipitation (in)
$P_{100}$ = 3.00 — 100-Year Precipitation (in)

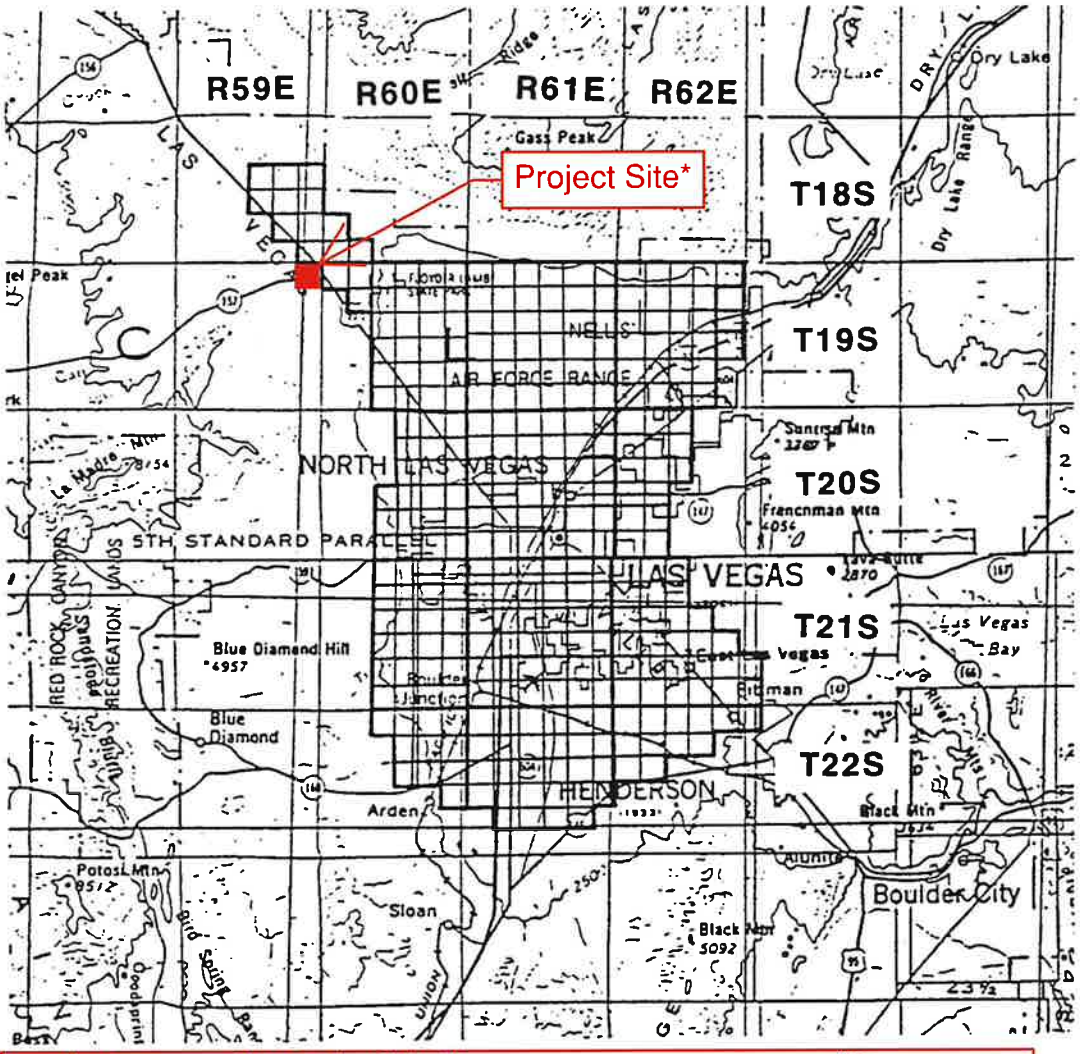
P10/P100= 0.54 — HEC-1 Multiple Ratio Value

## Equations:

P=(Rainfall)*(Precipitation Adjustment Ratio)

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

# McCARRAN AIRPORT RAINFALL AREA




*Project site not located within the McCarran Rainfall area (T19-R59-S1)

| TOWNSHIP | RANGE | SECTIONS | TOWNSHIP | RANGE | SECTIONS |
|---|---|---|---|---|---|
| 18 South | 59 East | 13-15,22-26,36 | 20 South | 62 East | 4-9,16-20,29-32 |
| 18 South | 60 East | 30-32 | 21 South | 60 East | 1-4,9-16,21-28,33-36 |
| 19 South | 60 East | 1-6,8-16,21-28,33-36 | 21 South | 61 East | ALL SECTIONS |
| 19 South | 61 East | ALL SECTIONS | 21 South | 62 East | 4-9,15-23, 25-36 |
| 19 South | 62 East | 2-11,14-23,27-34 | 22 South | 60 East | 1-4,10-15,24 |
| 20 South | 60 East | 1-3,10-15,21-28,33-36 | 22 South | 61 East | 1-24,26-29 |
| 20 South | 61 East | ALL SECTIONS | 22 South | 62 East | 1-10,17-18 |

Notes:
1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

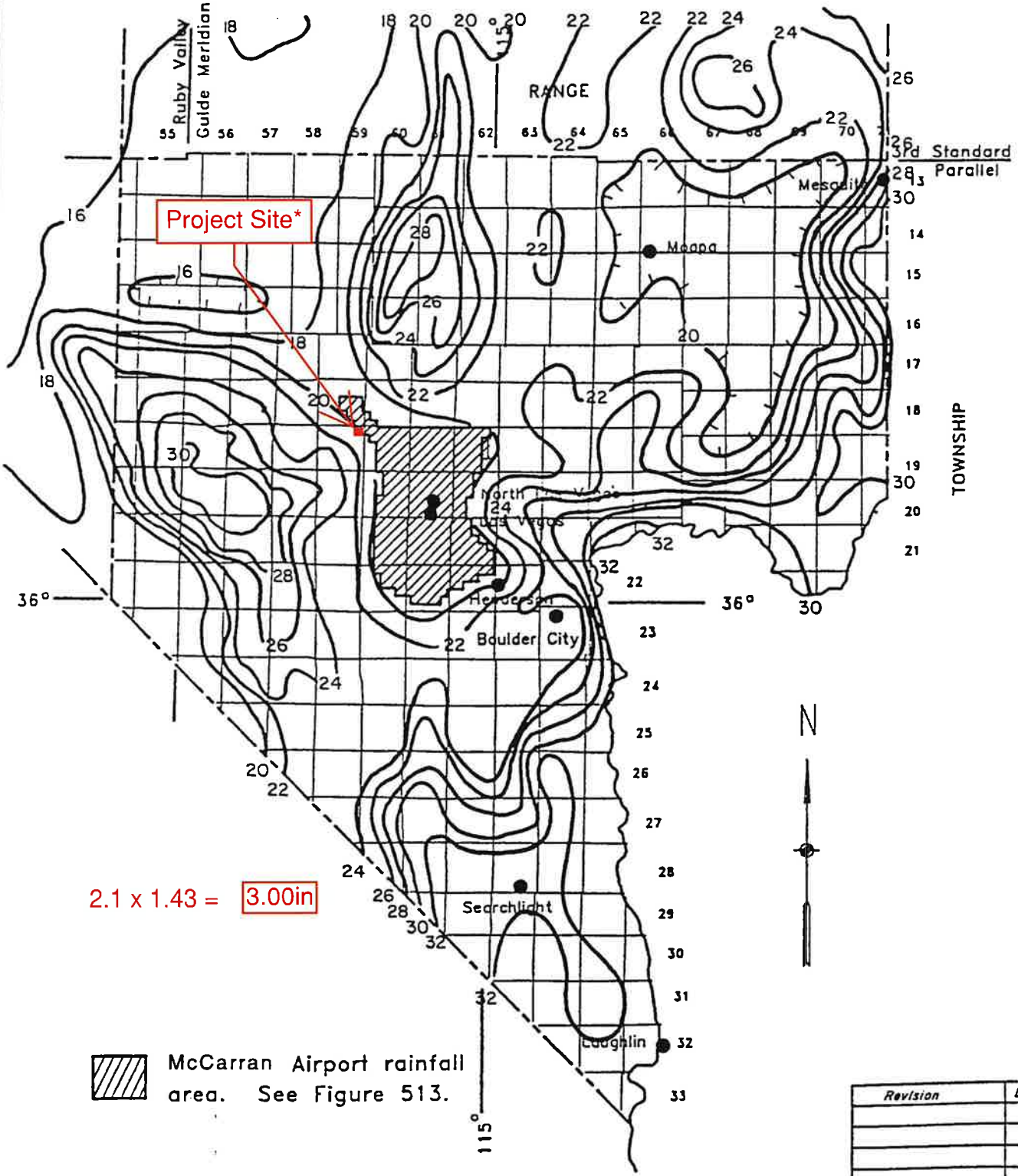
# PRECIPITATION ADJUSTMENT RATIOS

| Recurrence Interval | Ratio to NOAA Atlas 2 |
|---|---|
| 2-year | 1.00 |
| 5-year | 1.16 |
| 10-year | 1.24 |
| 25-year | 1.33 |
| 50-year | 1.39 |
| 100-year | 1.43 |

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

# RAINFALL DEPTH-DURATION-FREQUENCY
# 100-YEAR, 6-HOUR
## (DEPTHS IN TENTHS OF INCHES)



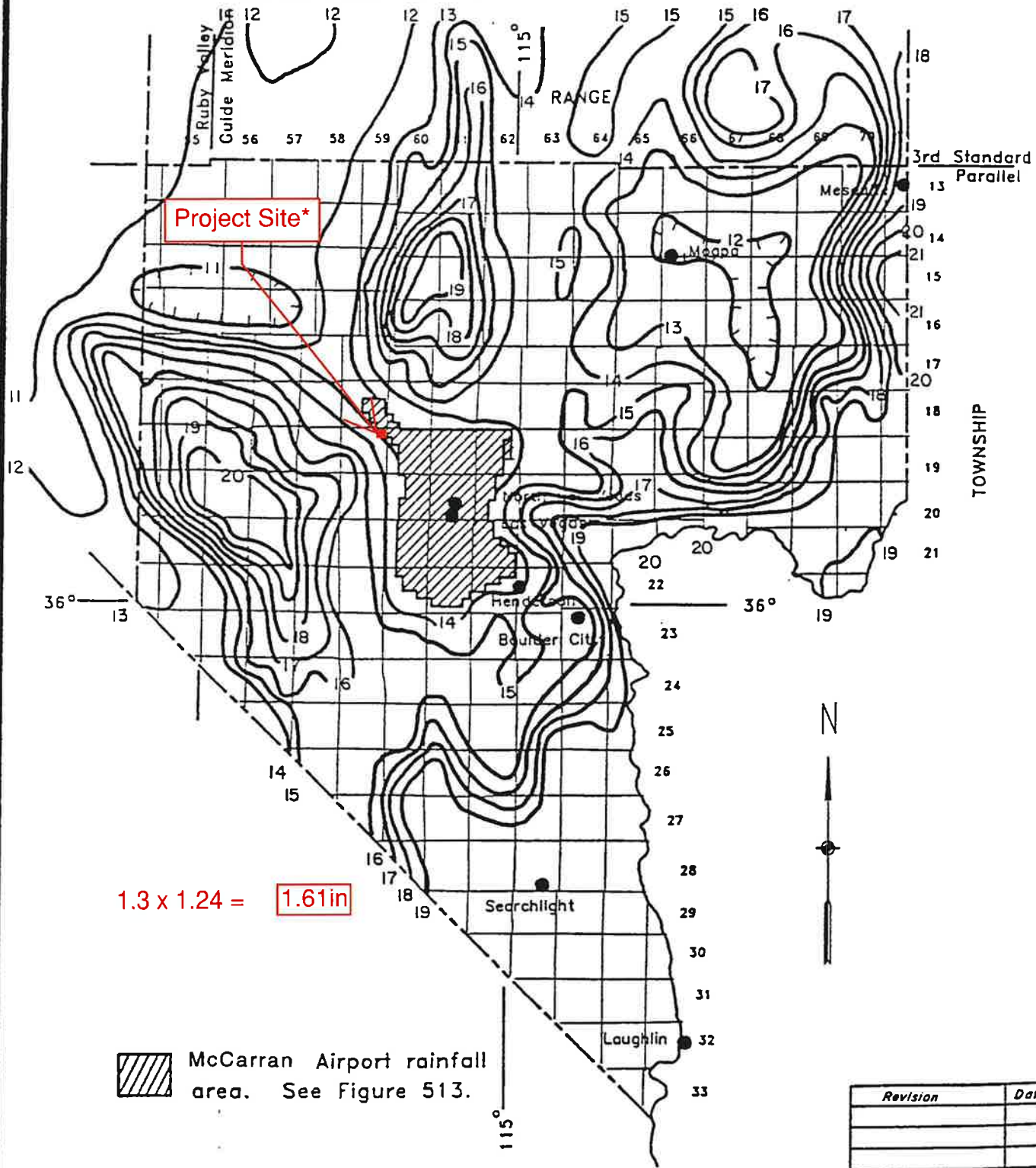

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

# RAINFALL DEPTH-DURATION-FREQUENCY
# 10-YEAR, 6-HOUR
## (DEPTHS IN TENTHS OF INCHES)




| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

# SIX HOUR DEPTH-AREA REDUCTION FACTORS

| Drainage Area (Square Miles) | Six-Hour Depth-Area Reduction Factor |
|---|---|
| 0.0 | 1.00 |
| 0.5 | 0.98 |
| 1.0 | 0.97 |
| 2.0 | 0.93 |
| 4.0 | 0.91 |
| 6.0 | 0.90 |
| 8.0 | 0.88 |
| 10.0 | 0.86 |
| 20.0 | 0.79 |
| 30.0 | 0.74 |
| 50.0 | 0.68 |
| 100.0 | 0.60 |
| 150.0 | 0.55 |
| 200.0 | 0.51 |
| 300.0 | 0.46 |
| 400.0 | 0.42 |
| 500.0 | 0.39 |

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

# SIX-HOUR STORM DISTRIBUTIONS

| Storm Time (In Minutes) | Percent of Total Storm Depth SDN3 | SDN4 | SDN5 | Storm Time (In Minutes) | Percent of Total Storm Depth SDN3 | SDN4 | SDN5 |
|---|---|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 | 0.0 | 185 | 32.2 | 37.6 | 43.0 |
| 5 | 2.0 | 2.0 | 2.0 | 190 | 35.2 | 41.5 | 47.7 |
| 10 | 5.7 | 5.8 | 5.9 | 195 | 40.9 | 46.2 | 51.4 |
| 15 | 7.0 | 7.5 | 8.0 | 200 | 49.9 | 53.0 | 56.1 |
| 20 | 8.7 | 9.9 | 11.0 | 205 | 59.0 | 61.0 | 63.0 |
| 25 | 10.8 | 12.6 | 14.4 | 210 | 71.0 | 71.0 | 71.0 |
| 30 | 12.4 | 13.7 | 15.0 | 215 | 74.4 | 73.2 | 72.0 |
| 35 | 13.0 | 14.5 | 16.0 | 220 | 78.1 | 75.6 | 73.1 |
| 40 | 13.0 | 14.9 | 16.8 | 225 | 81.2 | 78.2 | 75.2 |
| 45 | 13.0 | 15.1 | 17.1 | 230 | 81.9 | 79.9 | 77.9 |
| 50 | 13.0 | 15.5 | 18.0 | 235 | 83.5 | 81.3 | 79.0 |
| 55 | 13.0 | 15.6 | 18.2 | 240 | 85.1 | 82.3 | 79.5 |
| 60 | 13.0 | 15.9 | 18.7 | 245 | 85.6 | 83.0 | 80.4 |
| 65 | 13.3 | 16.2 | 19.0 | 250 | 86.0 | 83.5 | 81.0 |
| 70 | 14.0 | 16.9 | 19.7 | 255 | 86.8 | 84.4 | 82.0 |
| 75 | 14.2 | 17.2 | 20.2 | 260 | 87.6 | 85.1 | 82.6 |
| 80 | 14.8 | 17.9 | 21.0 | 265 | 88.8 | 86.4 | 84.0 |
| 85 | 15.8 | 18.9 | 22.0 | 270 | 91.0 | 88.5 | 85.9 |
| 90 | 17.2 | 20.1 | 23.0 | 275 | 92.6 | 90.8 | 88.9 |
| 95 | 18.1 | 21.1 | 24.1 | 280 | 93.7 | 92.4 | 91.0 |
| 100 | 19.0 | 22.0 | 25.0 | 285 | 95.0 | 94.4 | 93.8 |
| 105 | 19.7 | 22.8 | 25.9 | 290 | 97.0 | 96.8 | 96.6 |
| 110 | 19.9 | 23.2 | 26.5 | 295 | 97.6 | 97.3 | 97.0 |
| 115 | 20.0 | 24.0 | 28.0 | 300 | 98.2 | 97.8 | 97.4 |
| 120 | 20.1 | 24.6 | 29.0 | 305 | 98.5 | 98.2 | 97.9 |
| 125 | 20.4 | 25.2 | 30.0 | 310 | 98.7 | 98.4 | 98.1 |
| 130 | 21.4 | 26.0 | 30.5 | 315 | 98.9 | 98.6 | 98.3 |
| 135 | 22.9 | 26.9 | 30.9 | 320 | 99.0 | 98.8 | 98.5 |
| 140 | 24.1 | 27.6 | 31.0 | 325 | 99.3 | 99.1 | 98.9 |
| 145 | 24.9 | 28.3 | 31.7 | 330 | 99.3 | 99.2 | 99.0 |
| 150 | 25.1 | 28.6 | 32.1 | 335 | 99.4 | 99.3 | 99.2 |
| 155 | 25.6 | 29.2 | 32.7 | 340 | 99.5 | 99.4 | 99.3 |
| 160 | 27.0 | 30.2 | 33.3 | 345 | 99.8 | 99.7 | 99.6 |
| 165 | 27.8 | 31.2 | 34.6 | 350 | 99.8 | 99.8 | 99.7 |
| 170 | 28.1 | 32.1 | 36.1 | 355 | 99.9 | 99.9 | 99.9 |
| 175 | 28.3 | 33.2 | 38.1 | 360 | 100.0 | 100.0 | 100.0 |
| 180 | 29.5 | 35.2 | 40.8 | | | | |

Notes:
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values is presented on **Figure 515**.

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

REFERENCE:

TABLE 503

# CN Computation, Soils & Land Use Data

Westwood

# Soil Data & Curve Number Computation

**Project Name & Number:** Soldo Memorial Park at Skye Canyon, CEN2201
**By:** CW
**Date:** 7/18/2022

**Data:**

**Reference:**
2018 MPU
NRCS Soil Data

| Soil Type - Soil Survey Area & Version, Soil Description | | | | A | B | C | D |
|---|---|---|---|---|---|---|---|
| LV | 155 | Las Vegas Valley (NV788) | Cave gravelly fine sandy loam, 4 to 15 percent slopes | 0% | 0% | 0% | 100% |
| LV | 400 | Las Vegas Valley (NV788) | Tencee very gravelly fine sandy loam, 2 to 8 percent slopes | 0% | 0% | 0% | 100% |

| Land Use | A | B | C | D |
|---|---|---|---|---|
| 1 Undeveloped Land, Open Desert | 63 | 77 | 85 | 88 |
| 2 Parks, Golf Courses | 47 | 66 | 77 | 83 |
| 6 High-Den Res, 4-8 units/acre | 74 | 83 | 88 | 91 |
| 7 Public Facility/Res, 8-12 units/acre | 84 | 89 | 92 | 94 |

*Commercial land use per Note 3

## PROPOSED CONDITION

| BASIN ID | OFF-P | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 28.84 | 88.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 87.8% | 1 Undeveloped Land, Open Desert | 0% | 0% | 0% | 100% | 63 | 77 | 85 | 88 | 25.33 | 77.29 |
| LV | 155 | 12.2% | 1 Undeveloped Land, Open Desert | 0% | 0% | 0% | 100% | 63 | 77 | 85 | 88 | 3.51 | 10.71 |
| TOTAL | | 12.2% | | | | | | | | | | | |

| BASIN ID | ON1 | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 9.03 | 83.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 63.5% | 2 Parks, Golf Courses | 0% | 0% | 0% | 100% | 47 | 66 | 77 | 83 | 5.73 | 52.67 |
| LV | 155 | 36.5% | 2 Parks, Golf Courses | 0% | 0% | 0% | 100% | 47 | 66 | 77 | 83 | 3.30 | 30.33 |
| TOTAL | | 100.0% | | | | | | | | | | | |

| BASIN ID | RS-P | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 0.41 | 94.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 155 | 100.0% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.41 | 94.00 |
| TOTAL | | 100.0% | | | | | | | | | | | |

| BASIN ID | IM-P | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 0.71 | 94.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 15.5% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.11 | 14.56 |
| LV | 155 | 84.5% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.60 | 79.44 |
| TOTAL | | 100.0% | | | | | | | | | | | |

| BASIN ID | AR-P | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 0.51 | 94.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 41.2% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.21 | 38.71 |
| LV | 155 | 58.8% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.30 | 55.29 |
| TOTAL | | 100.0% | | | | | | | | | | | |

## DEVELOPED CONDITION

| BASIN ID | OFF-D | | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | | | | 23.12 | 90.7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 19.2% | 1 Undeveloped Land, Open Desert | 0% | 0% | 0% | 100% | 63 | 77 | 85 | 88 | 4.43 | 16.86 |
| LV | 400 | 8.8% | 6 High-Den Res, 4-8 units/acre | 0% | 0% | 0% | 100% | 74 | 83 | 88 | 91 | 2.03 | 7.99 |
| LV | 155 | 62.0% | 6 High-Den Res, 4-8 units/acre | 0% | 0% | 0% | 100% | 74 | 83 | 88 | 91 | 14.34 | 56.44 |
| LV | 400 | 8.6% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 1.98 | 8.05 |
| LV | 155 | 1.5% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.34 | 1.38 |
| TOTAL | | 100.0% | | | | | | | | | | | |

| BASIN ID | IM-D | | TOTAL AREA & COMPOSITE CURVE NUMBER: | | | | | 2.08 | 94.0 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SURVEY AREA | SOIL TYPE | SUBAREA PERCENT | LAND USE | HYDROLOGIC SOIL | | | | LAND USE CN | | | | SUBAREA ACRES | CURVE NUMBER |
| | | | | A | B | C | D | A | B | C | D | | |
| LV | 400 | 57.7% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 1.20 | 54.23 |
| LV | 155 | 42.3% | 7 Public Facility/Res, 8-12 units/acre | 0% | 0% | 0% | 100% | 84 | 89 | 92 | 94 | 0.88 | 39.77 |
| TOTAL | | 100.0% | | | | | | | | | | | |

industrial, heavy industrial and commercial areas (land use categories 8 through 11) are assumed 100% fair condition desert shrub for the open space distribution. Parks/golf courses and schools (land use categories 2 and 12) are assumed 70% open landscaping (grass) in good condition and 30% fair condition desert shrub for the open space distribution. This 70%-30% split was determined after reviewing the Spring 2016 aerial imagery.

4. All designated right-of-way areas were categorized as public facility (land use category 7) to be consistent throughout the Las Vegas Valley.

It should be noted that undeveloped land, open desert (land use category 1) will continue to use 100% poor condition desert shrub (<30% ground cover).

The directly connected impervious area percentages and corresponding open space distribution of each land use category is presented in **Table 2-2**:

**Table 2-2 - Land Use Categories**

| Land Use Index | Land Use Description | Impervious* (%) | Open Landscape Good Condition Grass (%) | Open Desert Shrub Fair Condition Natural Desert Landscaping (%) |
|---|---|---|---|---|
| 1 | Undeveloped Land, Open Desert | 0 | 0 | 100** |
| 2 | Parks, Golf Courses | 5 | 66.5 | 28.5 |
| 3 | Rural, 0.5-1 units per acre (uses 1 unit/acre) | 20 | 40 | 40 |
| 4 | Low-Density Residential, 1-2 units per acre (uses 2 units/acre) | 25 | 37.5 | 37.5 |
| 5 | Medium-Density Residential, 2-4 units per acre (uses 3 units/acre) | 30 | 35 | 35 |
| 6 | High-Density residential, 4-8 units per acre (uses 6 units/acre) | 52 | 24 | 24 |
| 7 | Public Facility and Residential, 8-12 units/acre | 72 | 14 | 14 |
| 8 | Very High-Density Residential, 12 units/acre or more | 80 | 0 | 20 |
| 9 | Commercial, Retail, Casino, High Rise Condominiums | 85 | 0 | 15 |
| 10 | Light Industrial | 72 | 0 | 28 |
| 11 | Heavy Industrial | 85 | 0 | 15 |
| 12 | Schools | 50 | 35 | 15 |
| 13 | Lakes | 0 | 0 | 0 |

* Impervious areas are directly connected to the drainage system
** Open Desert Shrub Poor Condition is applied for Undeveloped Land, Open Desert (Land Use Index Number 1)

The land use data used with the 2018 MPU is shown on the W-Maps. **Figure 2-1** shows the geographic comparison between the 2018 and 2008 MPU land use coverages in terms of percent imperviousness. The increase or decrease in impervious area represents an increase or decrease, respectively, in the runoff potential for a given area.

# Curve Number Matrix

| SOIL MAP UNIT | HYDROLOGIC SOIL GROUP | | | | | LAND USE CATEGORY INDEX NUMBER | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | ROCK OUTCROP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| | CN ---> | | | | | 63 | 47 | 57 | 60 | 62 | 74 | 84 | 89 | 92 | 86 | 92 | 71 | 30 |
| | | CN ---> | | | | 77 | 66 | 73 | 74 | 76 | 83 | 89 | 93 | 94 | 91 | 94 | 81 | 30 |
| | | | CN ---> | | | 85 | 77 | 82 | 83 | 84 | 88 | 92 | 95 | 95 | 93 | 95 | 87 | 30 |
| | | | | CN ---> | | 88 | 83 | 86 | 87 | 88 | 91 | 94 | 96 | 96 | 95 | 96 | 90 | 30 |
| | | | | | CN ---> | 90 | 90 | 92 | 92 | 92 | 94 | 96 | 96 | 97 | 96 | 97 | 94 | 30 |
| | % | % | % | % | % | SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY | | | | | | | | | | | | |
| 1100 | 6 | 0 | 0 | 59 | 35 | 87.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |
| 1105 | 55 | 40 | 0 | 5 | 0 | 70.0 | 56.0 | 65.0 | 67.0 | 69.0 | 78.0 | 86.0 | 91.0 | 93.0 | 88.0 | 93.0 | 76.0 | 30.0 |
| 1107 | 0 | 100 | 0 | 0 | 0 | 77.0 | 66.0 | 73.0 | 74.0 | 76.0 | 83.0 | 89.0 | 93.0 | 94.0 | 91.0 | 94.0 | 81.0 | 30.0 |
| 1112 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1113 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1117 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1120 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1127 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1129 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1130 | 65 | 0 | 25 | 10 | 0 | 71.0 | 58.0 | 66.0 | 68.0 | 70.0 | 79.0 | 87.0 | 91.0 | 93.0 | 89.0 | 93.0 | 77.0 | 30.0 |
| 1132 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1133 | 70 | 0 | 10 | 0 | 20 | 71.0 | 58.0 | 67.0 | 68.0 | 70.0 | 79.0 | 87.0 | 91.0 | 93.0 | 89.0 | 93.0 | 77.0 | 30.0 |
| 1134 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1135 | 84 | 0 | 0 | 16 | 0 | 67.0 | 52.0 | 62.0 | 64.0 | 66.0 | 76.0 | 85.0 | 90.0 | 92.0 | 87.0 | 92.0 | 74.0 | 30.0 |
| 1140 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1141 | 8 | 0 | 2 | 70 | 20 | 86.0 | 81.0 | 85.0 | 86.0 | 86.0 | 90.0 | 93.0 | 95.0 | 96.0 | 94.0 | 96.0 | 89.0 | 30.0 |
| 1150 | 0 | 0 | 0 | 100 | 0 | 88.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |
| 1151 | 41 | 0 | 0 | 59 | 0 | 78.0 | 68.0 | 74.0 | 76.0 | 77.0 | 84.0 | 90.0 | 93.0 | 94.0 | 91.0 | 94.0 | 82.0 | 30.0 |
| 1152 | 0 | 0 | 0 | 100 | 0 | 88.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |
| 1155 | 0 | 0 | 0 | 100 | 0 | 88.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |
| 1156 | 1 | 10 | 0 | 89 | 0 | 87.0 | 81.0 | 84.0 | 85.0 | 86.0 | 90.0 | 93.0 | 95.0 | 96.0 | 94.0 | 96.0 | 89.0 | 30.0 |
| 1160 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1160dn | 46 | 1 | 0 | 53 | 0 | 76.0 | 66.0 | 73.0 | 74.0 | 76.0 | 83.0 | 89.0 | 93.0 | 94.0 | 91.0 | 94.0 | 81.0 | 30.0 |
| 1165 | 32 | 40 | 15 | 13 | 0 | 75.0 | 64.0 | 71.0 | 73.0 | 74.0 | 82.0 | 88.0 | 92.0 | 94.0 | 90.0 | 94.0 | 80.0 | 30.0 |
| 1181 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1182 | 95 | 0 | 5 | 0 | 0 | 64.0 | 48.0 | 58.0 | 61.0 | 63.0 | 74.0 | 84.0 | 90.0 | 92.0 | 86.0 | 92.0 | 72.0 | 30.0 |
| 1183 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1184 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1187 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1190 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1191 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1192 | 55 | 35 | 0 | 10 | 0 | 70.0 | 57.0 | 66.0 | 68.0 | 70.0 | 79.0 | 87.0 | 91.0 | 93.0 | 88.0 | 93.0 | 76.0 | 30.0 |
| 1200 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1206 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1207 | 3 | 85 | 5 | 7 | 0 | 78.0 | 67.0 | 74.0 | 75.0 | 77.0 | 83.0 | 89.0 | 93.0 | 94.0 | 91.0 | 94.0 | 82.0 | 30.0 |
| 1222 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1225 | 9 | 20 | 50 | 21 | 0 | 82.0 | 73.0 | 79.0 | 80.0 | 81.0 | 86.0 | 91.0 | 94.0 | 95.0 | 92.0 | 95.0 | 85.0 | 30.0 |
| 1230 | 54 | 0 | 0 | 46 | 0 | 75.0 | 63.0 | 70.0 | 72.0 | 74.0 | 81.0 | 88.0 | 92.0 | 94.0 | 90.0 | 94.0 | 80.0 | 30.0 |
| 1235 | 66 | 25 | 0 | 9 | 0 | 69.0 | 55.0 | 64.0 | 66.0 | 68.0 | 77.0 | 86.0 | 91.0 | 93.0 | 88.0 | 93.0 | 75.0 | 30.0 |
| 1236 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1237 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1240 | 0 | 0 | 0 | 100 | 0 | 88.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |
| 1252 | 0 | 100 | 0 | 0 | 0 | 77.0 | 66.0 | 73.0 | 74.0 | 76.0 | 83.0 | 89.0 | 93.0 | 94.0 | 91.0 | 94.0 | 81.0 | 30.0 |
| 1255 | 0 | 100 | 0 | 0 | 0 | 77.0 | 66.0 | 73.0 | 74.0 | 76.0 | 83.0 | 89.0 | 93.0 | 94.0 | 91.0 | 94.0 | 81.0 | 30.0 |
| 1260 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1262 | 75 | 0 | 0 | 25 | 0 | 69.0 | 56.0 | 64.0 | 67.0 | 69.0 | 78.0 | 86.0 | 91.0 | 93.0 | 88.0 | 93.0 | 76.0 | 30.0 |
| 1263 | 95 | 0 | 0 | 5 | 0 | 64.0 | 48.0 | 59.0 | 61.0 | 64.0 | 74.0 | 84.0 | 90.0 | 92.0 | 86.0 | 92.0 | 72.0 | 30.0 |
| 1264 | 100 | 0 | 0 | 0 | 0 | 63.0 | 47.0 | 57.0 | 60.0 | 62.0 | 74.0 | 84.0 | 89.0 | 92.0 | 86.0 | 92.0 | 71.0 | 30.0 |
| 1270 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1278 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1282 | 0 | 0 | 100 | 0 | 0 | 85.0 | 77.0 | 82.0 | 83.0 | 84.0 | 88.0 | 92.0 | 95.0 | 95.0 | 93.0 | 95.0 | 87.0 | 30.0 |
| 1300 | 0 | 0 | 0 | 100 | 0 | 88.0 | 83.0 | 86.0 | 87.0 | 88.0 | 91.0 | 94.0 | 96.0 | 96.0 | 95.0 | 96.0 | 90.0 | 30.0 |

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County




September 25, 2021

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

**Preface** ..... 2
**How Soil Surveys Are Made** ..... 5
**Soil Map** ..... 8
Soil Map ..... 9
Legend ..... 10
Map Unit Legend ..... 12
Map Unit Descriptions ..... 12
Las Vegas Valley Area, Nevada, Part of Clark County ..... 14
155—Cave gravelly fine sandy loam, 4 to 15 percent slopes ..... 14
314—Weiser-Wechech association ..... 15
400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes ..... 17
**Soil Information for All Uses** ..... 19
Soil Reports ..... 19
Water Features ..... 19
Hydrologic Soil Group and Surface Runoff ..... 19
**References** ..... 21

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

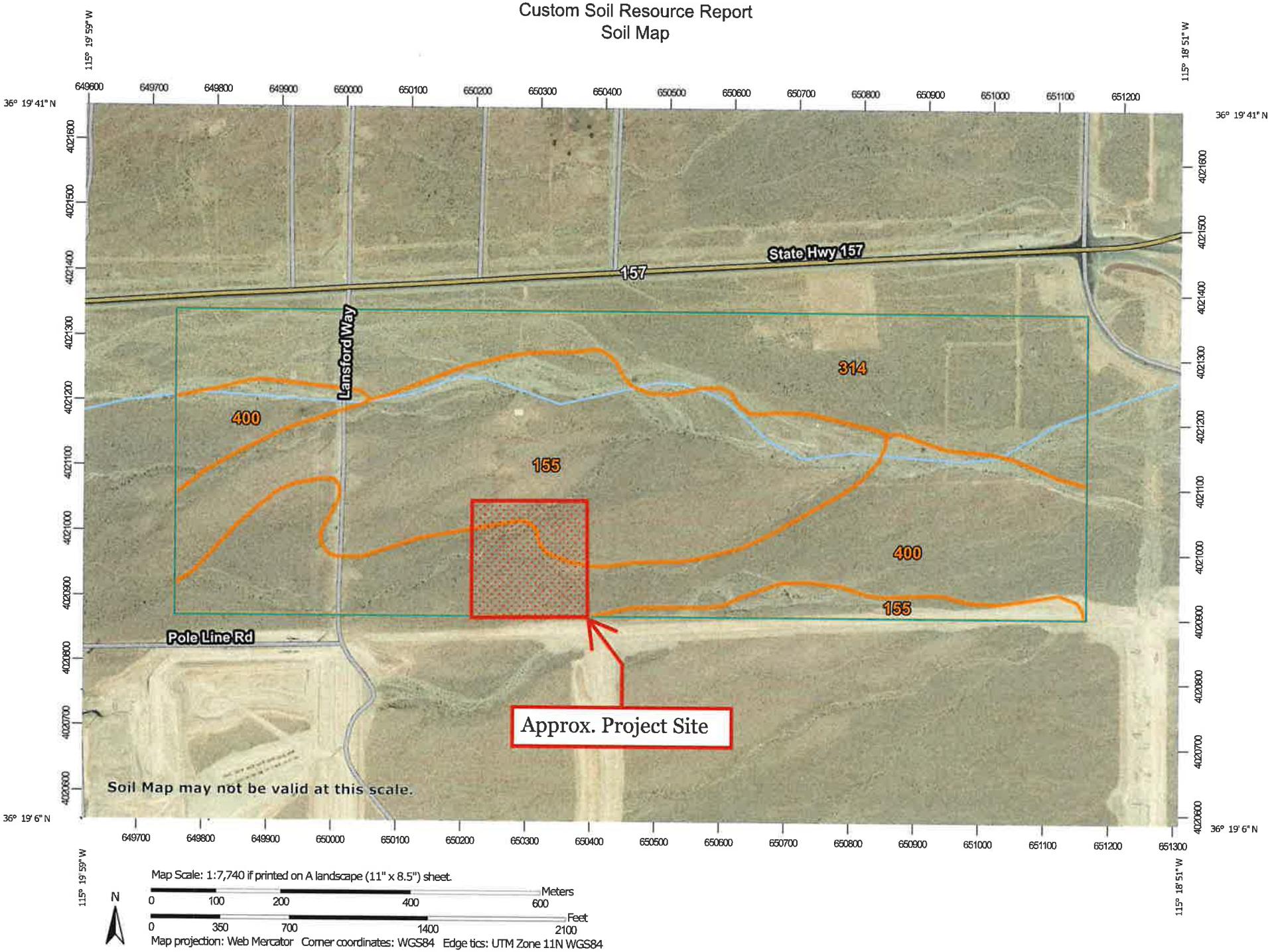
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map



## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 16, Aug 26, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 3, 2019—May 14, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

| MAP LEGEND | MAP INFORMATION |
| --- | --- |
| | imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. |

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 155 | Cave gravelly fine sandy loam, 4 to 15 percent slopes | 61.3 | 37.4% |
| 314 | Weiser-Wechech association | 48.4 | 29.5% |
| 400 | Tencee very gravelly fine sandy loam, 2 to 8 percent slopes | 54.2 | 33.1% |
| **Totals for Area of Interest** | | **164.0** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Las Vegas Valley Area, Nevada, Part of Clark County

## 155—Cave gravelly fine sandy loam, 4 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hr9w
*Elevation:* 2,000 to 4,800 feet
*Mean annual precipitation:* 4 to 12 inches
*Mean annual air temperature:* 57 to 70 degrees F
*Frost-free period:* 180 to 280 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Cave and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Cave

#### Setting

*Landform:* Fan remnants
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Parent material:* Mixed alluvium

#### Typical profile

*H1 - 0 to 15 inches:* gravelly fine sandy loam
*H2 - 15 to 60 inches:* indurated

#### Properties and qualities

*Slope:* 4 to 15 percent
*Depth to restrictive feature:* 4 to 20 inches to petrocalcic
*Drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 40 percent
*Maximum salinity:* Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
*Available water supply, 0 to 60 inches:* Very low (about 1.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* D
*Other vegetative classification:* LIMY 3-5" P.Z. (030XB019NV_3)
*Hydric soil rating:* No

## 314—Weiser-Wechech association

### Map Unit Setting

*National map unit symbol:* 1tf6l
*Elevation:* 1,610 to 4,850 feet
*Mean annual precipitation:* 5 to 7 inches
*Mean annual air temperature:* 57 to 70 degrees F
*Frost-free period:* 180 to 300 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Weiser, very rarely flooded, and similar soils:* 70 percent
*Wechech and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Weiser, Very Rarely Flooded

#### Setting

*Landform:* Fan remnants
*Landform position (two-dimensional):* Summit
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from limestone and dolomite

#### Typical profile

*H1 - 0 to 6 inches:* extremely gravelly fine sandy loam
*H2 - 6 to 60 inches:* extremely gravelly sandy loam

#### Properties and qualities

*Slope:* 2 to 8 percent
*Surface area covered with cobbles, stones or boulders:* 5.0 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Very rare
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 40 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 5.0
*Available water supply, 0 to 60 inches:* Very low (about 2.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* A
*Ecological site:* R030XB005NV - Arid Active Alluvial Fans
*Hydric soil rating:* No

## Description of Wechech

### Setting

*Landform:* Fan remnants
*Landform position (two-dimensional):* Summit
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from limestone and dolomite

### Typical profile

*H1 - 0 to 2 inches:* very gravelly sandy loam
*H2 - 2 to 7 inches:* very gravelly sandy loam
*H3 - 7 to 13 inches:* very gravelly sandy loam
*H4 - 13 to 60 inches:* cemented material

### Properties and qualities

*Slope:* 2 to 8 percent
*Depth to restrictive feature:* 8 to 14 inches to petrocalcic
*Drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 50 percent
*Maximum salinity:* Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 5.0
*Available water supply, 0 to 60 inches:* Very low (about 0.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* D
*Ecological site:* R030XB005NV - Arid Active Alluvial Fans
*Hydric soil rating:* No

## Minor Components

### Threelakes

*Percent of map unit:* 6 percent
*Landform:* Fan remnants
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Ecological site:* R030XA066NV - CALCAREOUS LOAM 5-7 P.Z.
*Hydric soil rating:* No

### Weiser, very rarely flooded

*Percent of map unit:* 5 percent
*Landform:* Fan remnants
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Ecological site:* R030XB075NV - GRAVELLY FAN 5-7 P.Z.
*Hydric soil rating:* No

### Typic torriorthents, sandy-skeletal, occasionally flooded

*Percent of map unit:* 4 percent

*Landform:* Drainageways
*Down-slope shape:* Linear
*Across-slope shape:* Concave
*Ecological site:* R030XB028NV - VALLEY WASH
*Hydric soil rating:* No

## 400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* hrc1
*Elevation:* 2,400 to 5,700 feet
*Mean annual precipitation:* 4 to 10 inches
*Mean annual air temperature:* 57 to 64 degrees F
*Frost-free period:* 180 to 250 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Tencee and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tencee

#### Setting

*Landform:* Fan remnants
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from limestone and dolomite

#### Typical profile

*H1 - 0 to 9 inches:* very gravelly fine sandy loam
*H2 - 9 to 15 inches:* very gravelly sandy loam
*H3 - 15 to 19 inches:* indurated

#### Properties and qualities

*Slope:* 2 to 8 percent
*Depth to restrictive feature:* 7 to 20 inches to petrocalcic
*Drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 40 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 2.0
*Available water supply, 0 to 60 inches:* Very low (about 1.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* D
*Hydric soil rating:* No

# Soil Information for All Uses

## Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

## Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

### Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or

soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

*Surface runoff* refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

## Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

| Hydrologic Soil Group and Surface Runoff–Las Vegas Valley Area, Nevada, Part of Clark County | | | |
|---|---|---|---|
| **Map symbol and soil name** | **Pct. of map unit** | **Surface Runoff** | **Hydrologic Soil Group** |
| 155—Cave gravelly fine sandy loam, 4 to 15 percent slopes | | | |
| Cave | 100 | Very high | D |
| 314—Weiser-Wechech association | | | |
| Weiser, very rarely flooded | 70 | Low | A |
| Wechech | 15 | Very high | D |
| Threelakes | 6 | Low | A |
| Weiser, very rarely flooded | 5 | Low | B |
| Typic torriorthents, sandy-skeletal, occasionally flooded | 4 | Very low | A |
| 400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes | | | |
| Tencee | 100 | Very high | D |

# References


American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

# Lag Time Computations (Standard Form 4)

Westwood

# Time of Concentration (Standard Form 4)

**Project Name & Number:** Soldo Memorial Park at Skye Canyon, CEN2201
**By:** CW
**Date:** 7/18/2022

| BASIN DATA | | | | | | INITIAL / OVERLAND TIME (Ti) | | | TRAVEL TIME (Tt) | | | | | Tc | Tc Check Urbanized Basins | | Tlag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DESIG: | DEV./EX. (D or E) | CN | K [1] | AREA Ac | AREA Mi^2 [2] | INITIAL LENGTH Feet | SLOPE % | Ti Min [3] | TRAVEL LENGTH Feet | SLOPE % | V1 VELOCITY FPS [4] | V2 VELOCITY FPS [5] | Tt Min [6] | Tc Calc. [7] | Total Length Feet [8] | Tc Check [9] | Tlag Hours [10] |
| PROPOSED CONDITION | | | | | | | | | | | | | | | | | |
| OFF-P | E | 88.0 | 0.772 | 28.84 | 0.0451 | 170 | 2.94 | 5.38 | 3280 | 4.02 | 2.97 | 5.90 | 10.66 | 16.04 | | | 0.160 |
| ON1 | D | 83.0 | 0.706 | 9.03 | 0.0141 | 500 | 1.00 | 15.87 | 220 | 3.01 | 3.51 | 5.31 | 1.05 | 16.92 | 720 | 14.000 | 0.140 |
| RS-P | D | 94.0 | 0.851 | 0.41 | 0.0006 | 30 | 2.00 | 1.95 | 675 | 3.08 | 3.55 | 5.37 | 2.89 | 4.84 | 705 | 13.917 | 0.050 |
| IM-P | D | 94.0 | 0.851 | 0.71 | 0.0011 | 40 | 2.00 | 2.25 | 675 | 4.44 | 4.26 | 6.45 | 2.41 | 4.66 | 715 | 13.972 | 0.050 |
| AR-P | D | 94.0 | 0.851 | 0.51 | 0.0008 | 40 | 2.00 | 2.25 | 580 | 0.86 | 1.88 | 2.84 | 4.91 | 7.16 | 620 | 13.444 | 0.072 |
| DEVELOPED CONDITION | | | | | | | | | | | | | | | | | |
| OFF-D | D | 90.7 | 0.808 | 23.12 | 0.0361 | 170 | 2.94 | 4.79 | 3280 | 4.02 | 4.05 | 6.14 | 9.60 | 14.39 | 3450 | 29.167 | 0.144 |
| IM-D | D | 94.0 | 0.851 | 2.08 | 0.0033 | 40 | 2.00 | 2.25 | 2150 | 3.86 | 3.97 | 6.01 | 6.67 | 8.93 | 2190 | 22.167 | 0.089 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05
Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

# Proposed Condition HEC-1 Model

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   11JUL22  TIME  11:02:38   *
*                                       *
*****************************************
```

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

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

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

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



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

 *** FREE ***
                        *DIAGRAM
              1         ID     WESTWOOD PROFESSIONAL SERVICES
              2         ID     SOLDO MEMORIAL PARK AT SKYE CANYON
              3         ID     PROPOSED DRAINAGE CONDITION
              4         ID
              5         ID     RETURN PERIOD ------- 10-YR & 100-YR
              6         ID     DISTRIBUTION -------- 6-HOUR SDN3
              7         ID     PROJECT NO. --------- CEN2201
              8         ID     FILENAME ------------ PRO.H1
              9         ID     DATE ---------------- JULY 2022
             10         ID     MODELED BY ---------- KC/CW
             11         ID
             12         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
             13         ID        DRAINAGE AREA (MI^2)    DARF
             14         ID        100-YR                  1.00
             15         ID        10-YR                   0.54
             16         ID
             17         IT       5       0       0     300
             18         IO       5       0       0
             19         IN       5       0       0
             20         JR    PREC    1.00    0.54
                        *

             21         KK   OFF-P
             22         BA  0.0451
             23         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             24         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             25         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             26         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             27         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             28         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             29         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             30         PC   0.998   0.999   1.000
             31         PB    3.00
             32         LS       0    88.0
             33         UD   0.160
                        *

             34         KK     ON1
             35         BA  0.0141
             36         LS       0    83.0
             37         UD   0.140
                        *

             38         KK    RS-P
             39         BA  0.0006
             40         LS       0    94.0
             41         UD   0.050
                        *
```



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

             42         KK    IM-P
             43         BA  0.0011
             44         LS       0    94.0
```

```
            45          UD   0.050
                        *

            46          KK    AR-P
            47          BA  0.0008
            48          LS       0    94.0
            49          UD   0.072
                        *
            50          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    21      OFF-P
                .
                .
    34          .         ON1
                .           .
                .           .
    38          .           .       RS-P
                .           .         .
                .           .         .
    42          .           .         .       IM-P
                .           .         .         .
                .           .         .         .
    46          .           .         .         .       AR-P

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN   1998             *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   11JUL22  TIME  11:02:38  *
*                                      *
****************************************

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

                        WESTWOOD PROFESSIONAL SERVICES
                        SOLDO MEMORIAL PARK AT SKYE CANYON
                        PROPOSED DRAINAGE CONDITION

                        RETURN PERIOD ------- 10-YR & 100-YR
                        DISTRIBUTION -------- 6-HOUR SDN3
                        PROJECT NO. --------- CEN2201
                        FILENAME ------------ PRO.H1
                        DATE ---------------- JULY 2022
                        MODELED BY ---------- KC/CW

                           SIX HOUR DEPTH-AREA REDUCTION FACTORS
                           DRAINAGE AREA (MI^2)    DARF
                           100-YR                  1.00
                           10-YR                   0.54


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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00       .54
1
```

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

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 | RATIO 2 |
|---|---|---|---|---|---|---|
| | | | | | 1.00 | .54 |
| HYDROGRAPH AT | | | | | | |
| + | OFF-P | .05 | 1 | FLOW | 67. | 26. |
| | | | | TIME | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | |
| + | ON1 | .01 | 1 | FLOW | 18. | 6. |
| | | | | TIME | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | |
| + | RS-P | .00 | 1 | FLOW | 1. | 1. |
| | | | | TIME | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | |
| + | IM-P | .00 | 1 | FLOW | 3. | 1. |
| | | | | TIME | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | |
| + | AR-P | .00 | 1 | FLOW | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 |

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

# Developed Condition HEC-1 Model

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   11JUL22  TIME  11:13:06   *
*                                       *
*****************************************
```

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

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

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

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



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

 *** FREE ***
                        *DIAGRAM
              1         ID     WESTWOOD PROFESSIONAL SERVICES
              2         ID     SOLDO MEMORIAL PARK AT SKYE CANYON
              3         ID     DEVELOPED DRAINAGE CONDITION
              4         ID
              5         ID     RETURN PERIOD ------- 10-YR & 100-YR
              6         ID     DISTRIBUTION -------- 6-HOUR SDN3
              7         ID     PROJECT NO. --------- CEN2201
              8         ID     FILENAME ------------ DEV.H1
              9         ID     DATE ---------------- JULY 2022
             10         ID     MODELED BY ---------- KC/CW
             11         ID
             12         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
             13         ID        DRAINAGE AREA (MI^2)    DARF
             14         ID        100-YR                  1.00
             15         ID        10-YR                   0.54
             16         ID
             17         IT       5       0       0     300
             18         IO       5       0       0
             19         IN       5       0       0
             20         JR     PREC    1.00    0.54
                        *

             21         KK   OFF-D
             22         BA  0.0361
             23         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
             24         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
             25         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
             26         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             27         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             28         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
             29         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
             30         PC   0.998   0.999   1.000
             31         PB    3.00
             32         LS       0    90.7
             33         UD   0.144
                        *

             34         KK     ON1
             35         BA  0.0141
             36         LS       0    83.0
             37         UD   0.140
                        *

             38         KK    RS-P
             39         BA  0.0006
             40         LS       0    94.0
             41         UD   0.050
                        *
```



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

             42         KK    IM-D
             43         BA  0.0033
             44         LS       0    94.0
```

```
            45          UD   0.089
                        *

            46          KK    AR-P
            47          BA  0.0008
            48          LS       0    94.0
            49          UD   0.072
                        *
            50          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    21       OFF-D
                .
                .
    34          .         ON1
                .           .
                .           .
    38          .           .        RS-P
                .           .          .
                .           .          .
    42          .           .          .        IM-D
                .           .          .          .
                .           .          .          .
    46          .           .          .          .        AR-P

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   11JUL22  TIME  11:13:06   *
 *                                       *
 *****************************************

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

                        WESTWOOD PROFESSIONAL SERVICES
                        SOLDO MEMORIAL PARK AT SKYE CANYON
                        DEVELOPED DRAINAGE CONDITION

                        RETURN PERIOD ------- 10-YR & 100-YR
                        DISTRIBUTION -------- 6-HOUR SDN3
                        PROJECT NO. --------- CEN2201
                        FILENAME ------------ DEV.H1
                        DATE ---------------- JULY 2022
                        MODELED BY ---------- KC/CW

                           SIX HOUR DEPTH-AREA REDUCTION FACTORS
                           DRAINAGE AREA (MI^2)    DARF
                           100-YR                  1.00
                           10-YR                   0.54


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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                     1.00       .54
1
```

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

| | | | | | RATIOS APPLIED TO PRECIPITATION | |
|---|---|---|---|---|---|---|
| OPERATION | STATION | AREA | PLAN | | RATIO 1 | RATIO 2 |
| | | | | | 1.00 | .54 |
| HYDROGRAPH AT | | | | | | |
| + | OFF-D | .04 | 1 | FLOW | 61. | 26. |
| | | | | TIME | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | |
| + | ON1 | .01 | 1 | FLOW | 18. | 6. |
| | | | | TIME | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | |
| + | RS-P | .00 | 1 | FLOW | 1. | 1. |
| | | | | TIME | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | |
| + | IM-D | .00 | 1 | FLOW | 7. | 3. |
| | | | | TIME | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | |
| + | AR-P | .00 | 1 | FLOW | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 |

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

# APPENDIX C

Street & Hydraulic Sections

Perimeter Street Flow Computations – 100-Yr

# Worksheet for 1 Min

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 3.28 % |
| Discharge | 1.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.70 |
| 0+05.00 | 0.60 |
| 0+10.00 | 0.50 |
| 0+10.50 | 0.48 |
| 0+10.50 | 0.00 |
| 0+12.00 | 0.13 |
| 0+12.00 | 0.17 |
| 0+30.00 | 0.53 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.70) | (0+05.00, 0.60) | 0.013 |
| (0+05.00, 0.60) | (0+10.00, 0.50) | 0.025 |
| (0+10.00, 0.50) | (0+12.00, 0.13) | 0.013 |
| (0+12.00, 0.13) | (0+30.00, 0.53) | 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 | 0.23 ft |
| Roughness Coefficient | 0.015 |
| Elevation | 0.23 ft |
| Elevation Range | 0.00 to 0.70 ft |
| Flow Area | 0.3 ft² |
| Wetted Perimeter | 4.65 ft |
| Hydraulic Radius | 0.07 ft |
| Top Width | 4.38 ft |
| Normal Depth | 0.23 ft |
| Critical Depth | 0.28 ft |

# Worksheet for 1 Min

| Results | |
|---|---|
| Critical Slope | 0.78 % |
| Velocity | 3.06 ft/s |
| Velocity Head | 0.15 ft |
| Specific Energy | 0.37 ft |
| Froude Number | 1.977 |
| Flow Type | Supercritical |

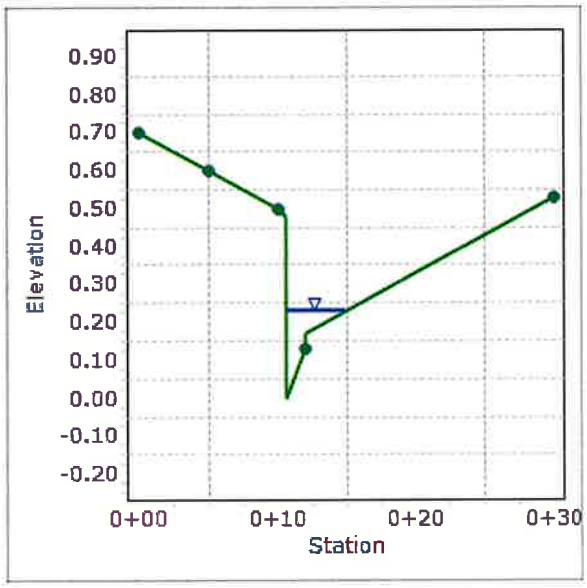
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.23 ft |
| Critical Depth | 0.28 ft |
| Channel Slope | 3.28 % |
| Critical Slope | 0.78 % |

# Cross Section for 1 Min

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 3.28 % |
| Normal Depth | 0.23 ft |
| Discharge | 1.0 cfs |



# Worksheet for 1 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 3.50 % |
| Discharge | 1.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.70 |
| 0+05.00 | 0.60 |
| 0+10.00 | 0.50 |
| 0+10.50 | 0.48 |
| 0+10.50 | 0.00 |
| 0+12.00 | 0.13 |
| 0+12.00 | 0.17 |
| 0+30.00 | 0.53 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.70) | (0+05.00, 0.60) | 0.013 |
| (0+05.00, 0.60) | (0+10.00, 0.50) | 0.025 |
| (0+10.00, 0.50) | (0+12.00, 0.13) | 0.013 |
| (0+12.00, 0.13) | (0+30.00, 0.53) | 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 | 0.23 ft |
| Roughness Coefficient | 0.015 |
| Elevation | 0.23 ft |
| Elevation Range | 0.00 to 0.70 ft |
| Flow Area | 0.3 $ft^2$ |
| Wetted Perimeter | 4.54 ft |
| Hydraulic Radius | 0.07 ft |
| Top Width | 4.27 ft |
| Normal Depth | 0.23 ft |
| Critical Depth | 0.28 ft |

# Worksheet for 1 Max

| Results | |
|---|---|
| Critical Slope | 0.78 % |
| Velocity | 3.15 ft/s |
| Velocity Head | 0.15 ft |
| Specific Energy | 0.38 ft |
| Froude Number | 2.039 |
| Flow Type | Supercritical |

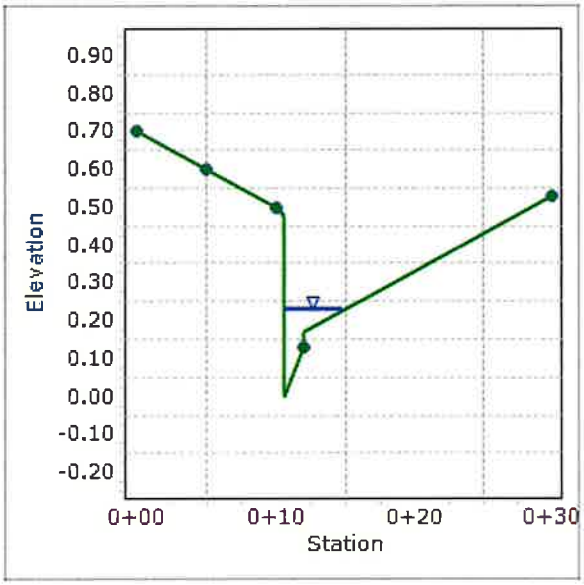
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.23 ft |
| Critical Depth | 0.28 ft |
| Channel Slope | 3.50 % |
| Critical Slope | 0.78 % |

# Cross Section for 1 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 3.50 % |
| Normal Depth | 0.23 ft |
| Discharge | 1.0 cfs |



# Worksheet for 2 Min

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | |
|---|---|
| Channel Slope | 0.50 % |
| Discharge | 13.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.48 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+40.00 | 0.77 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.013 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.025 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.013 |
| (0+10.00, 0.13) | (0+40.00, 0.77) | 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 | 0.61 ft |
| Roughness Coefficient | 0.017 |
| Elevation | 0.61 ft |
| Elevation Range | 0.00 to 0.77 ft |
| Flow Area | 6.0 ft² |
| Wetted Perimeter | 30.05 ft |
| Hydraulic Radius | 0.20 ft |
| Top Width | 29.52 ft |
| Normal Depth | 0.61 ft |
| Critical Depth | 0.58 ft |

# Worksheet for 2 Min

| Results | |
|---|---|
| Critical Slope | 0.72 % |
| Velocity | 2.16 ft/s |
| Velocity Head | 0.07 ft |
| Specific Energy | 0.68 ft |
| Froude Number | 0.842 |
| Flow Type | Subcritical |

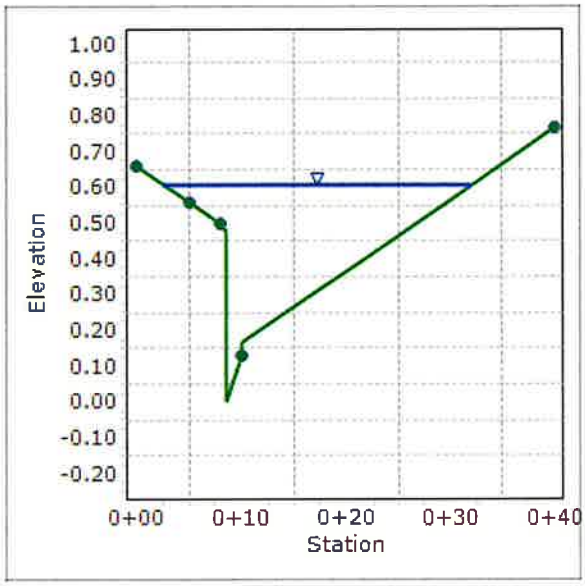
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| GVF Output Data | |
|---|---|
| Upstream Depth | 0.00 ft |
| Profile Description | |
| Profile Headloss | 0.00 ft |
| Downstream Velocity | Infinity ft/s |
| Upstream Velocity | Infinity ft/s |
| Normal Depth | 0.61 ft |
| Critical Depth | 0.58 ft |
| Channel Slope | 0.50 % |
| Critical Slope | 0.72 % |

# Cross Section for 2 Min

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 0.50 % |
| Normal Depth | 0.61 ft |
| Discharge | 13.0 cfs |



# Worksheet for 2 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 1.50 % |
| Discharge | 13.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.48 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+40.00 | 0.77 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.013 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.025 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.013 |
| (0+10.00, 0.13) | (0+40.00, 0.77) | 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 | 0.51 ft |
| Roughness Coefficient | 0.016 |
| Elevation | 0.51 ft |
| Elevation Range | 0.00 to 0.77 ft |
| Flow Area | 3.6 $ft^2$ |
| Wetted Perimeter | 20.22 ft |
| Hydraulic Radius | 0.18 ft |
| Top Width | 19.69 ft |
| Normal Depth | 0.51 ft |
| Critical Depth | 0.58 ft |

# Worksheet for 2 Max

| Results | |
|---|---|
| Critical Slope | 0.66 % |
| Velocity | 3.60 ft/s |
| Velocity Head | 0.20 ft |
| Specific Energy | 0.71 ft |
| Froude Number | 1.484 |
| Flow Type | Supercritical |

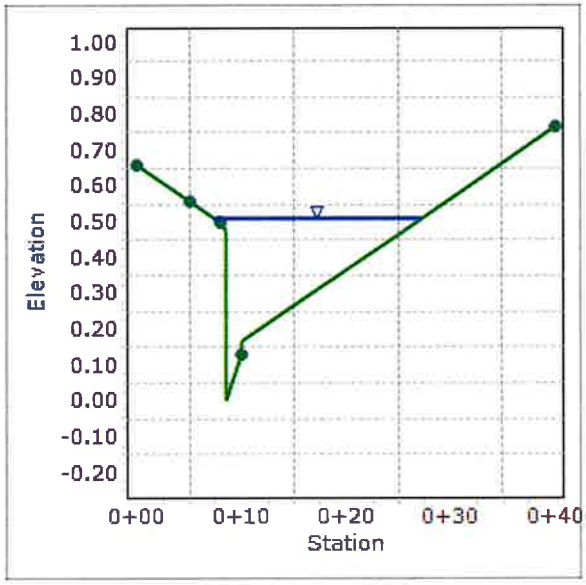
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.51 ft |
| Critical Depth | 0.58 ft |
| Channel Slope | 1.50 % |
| Critical Slope | 0.66 % |

# Cross Section for 2 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 1.50 % |
| Normal Depth | 0.51 ft |
| Discharge | 13.0 cfs |



# Worksheet for 3 Min

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 2.00 % |
| Discharge | 3.5 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.48 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+41.50 | 0.80 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.016 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.016 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.016 |
| (0+10.00, 0.13) | (0+41.50, 0.80) | 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 | 0.34 ft |
| Roughness Coefficient | 0.016 |
| Elevation | 0.34 ft |
| Elevation Range | 0.00 to 0.80 ft |
| Flow Area | 1.2 ft² |
| Wetted Perimeter | 10.50 ft |
| Hydraulic Radius | 0.11 ft |
| Top Width | 10.11 ft |
| Normal Depth | 0.34 ft |
| Critical Depth | 0.39 ft |

# Worksheet for 3 Min

| Results | |
|---|---|
| Critical Slope | 0.76 % |
| Velocity | 3.02 ft/s |
| Velocity Head | 0.14 ft |
| Specific Energy | 0.48 ft |
| Froude Number | 1.576 |
| Flow Type | Supercritical |

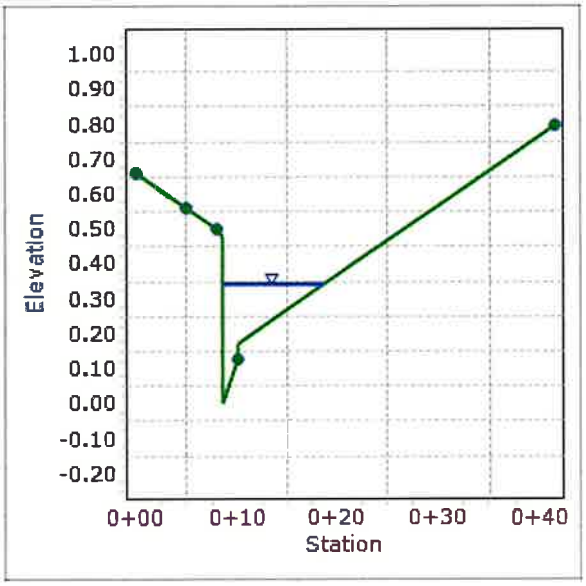
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.34 ft |
| Critical Depth | 0.39 ft |
| Channel Slope | 2.00 % |
| Critical Slope | 0.76 % |

# Cross Section for 3 Min

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 2.00 % |
| Normal Depth | 0.34 ft |
| Discharge | 3.5 cfs |



# Worksheet for 3 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 5.21 % |
| Discharge | 3.5 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.48 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+41.50 | 0.80 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.016 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.016 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.016 |
| (0+10.00, 0.13) | (0+41.50, 0.80) | 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 | 0.30 ft |
| Roughness Coefficient | 0.016 |
| Elevation | 0.30 ft |
| Elevation Range | 0.00 to 0.80 ft |
| Flow Area | 0.8 ft² |
| Wetted Perimeter | 8.48 ft |
| Hydraulic Radius | 0.09 ft |
| Top Width | 8.13 ft |
| Normal Depth | 0.30 ft |
| Critical Depth | 0.39 ft |

# Worksheet for 3 Max

| Results | |
|---|---|
| Critical Slope | 0.76 % |
| Velocity | 4.39 ft/s |
| Velocity Head | 0.30 ft |
| Specific Energy | 0.60 ft |
| Froude Number | 2.475 |
| Flow Type | Supercritical |

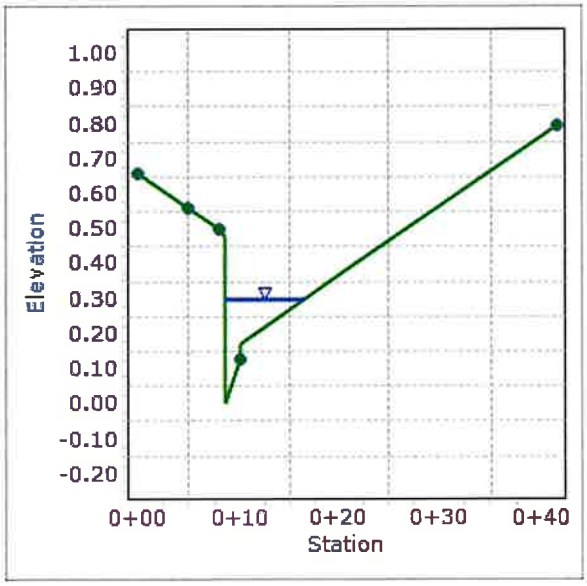
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.30 ft |
| Critical Depth | 0.39 ft |
| Channel Slope | 5.21 % |
| Critical Slope | 0.76 % |

# Cross Section for 3 Max

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 5.21 % |
| Normal Depth | 0.30 ft |
| Discharge | 3.5 cfs |



# Interior Drive Isle Flow Computations – 100-Yr

# Worksheet for A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 0.56 % |
| Discharge | 11.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 1.09 |
| 0+24.00 | 0.00 |
| 0+24.00 | 1.00 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 1.09) | (0+24.00, 1.00) | 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 | 0.58 ft |
| Roughness Coefficient | 0.016 |
| Elevation | 0.58 ft |
| Elevation Range | 0.00 to 1.09 ft |
| Flow Area | 3.7 ft² |
| Wetted Perimeter | 13.39 ft |
| Hydraulic Radius | 0.28 ft |
| Top Width | 12.80 ft |
| Normal Depth | 0.58 ft |
| Critical Depth | 0.57 ft |
| Critical Slope | 0.60 % |
| Velocity | 2.96 ft/s |
| Velocity Head | 0.14 ft |
| Specific Energy | 0.72 ft |
| Froude Number | 0.967 |
| Flow Type | Subcritical |

GVF Input Data

# Worksheet for A

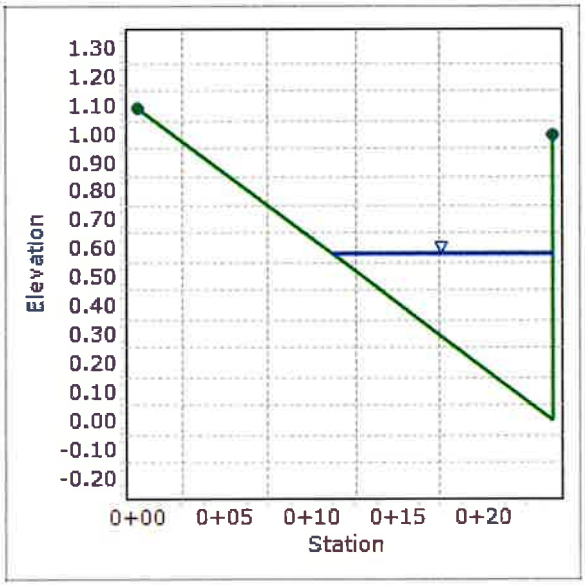
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| GVF Output Data | |
|---|---|
| Upstream Depth | 0.00 ft |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 0.58 ft |
| Critical Depth | 0.57 ft |
| Channel Slope | 0.56 % |
| Critical Slope | 0.60 % |

# Cross Section for A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 0.56 % |
| Normal Depth | 0.58 ft |
| Discharge | 11.0 cfs |



# Ditch Sizing Computations

# Worksheet for D1A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 1.420 % |
| Left Side Slope | 2.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.50 ft |
| Discharge | 5.50 cfs |

| Results | |
|---|---|
| Normal Depth | 0.57 ft |
| Flow Area | 1.5 ft² |
| Wetted Perimeter | 4.05 ft |
| Hydraulic Radius | 0.37 ft |
| Top Width | 3.78 ft |
| Critical Depth | 0.58 ft |
| Critical Slope | 1.353 % |
| Velocity | 3.66 ft/s |
| Velocity Head | 0.21 ft |
| Specific Energy | 0.78 ft |
| Froude Number | 1.023 |
| Flow Type | Supercritical |

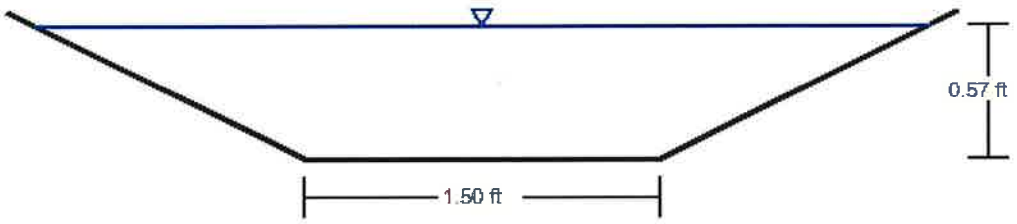
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

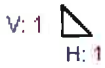
| GVF Output Data | |
|---|---|
| Upstream Depth | 0.00 ft |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Downstream Velocity | Infinity ft/s |
| Upstream Velocity | Infinity ft/s |
| Normal Depth | 0.57 ft |
| Critical Depth | 0.58 ft |
| Channel Slope | 1.420 % |
| Critical Slope | 1.353 % |

# Cross Section for D1A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 1.420 % |
| Normal Depth | 0.57 ft |
| Left Side Slope | 2.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.50 ft |
| Discharge | 5.50 cfs |



# Worksheet for D1B

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 1.660 % |
| Left Side Slope | 2.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.50 ft |
| Discharge | 14.20 cfs |

| Results | |
|---|---|
| Normal Depth | 0.88 ft |
| Flow Area | 2.8 ft² |
| Wetted Perimeter | 5.42 ft |
| Hydraulic Radius | 0.53 ft |
| Top Width | 5.00 ft |
| Critical Depth | 0.95 ft |
| Critical Slope | 1.198 % |
| Velocity | 4.99 ft/s |
| Velocity Head | 0.39 ft |
| Specific Energy | 1.26 ft |
| Froude Number | 1.165 |
| Flow Type | Supercritical |

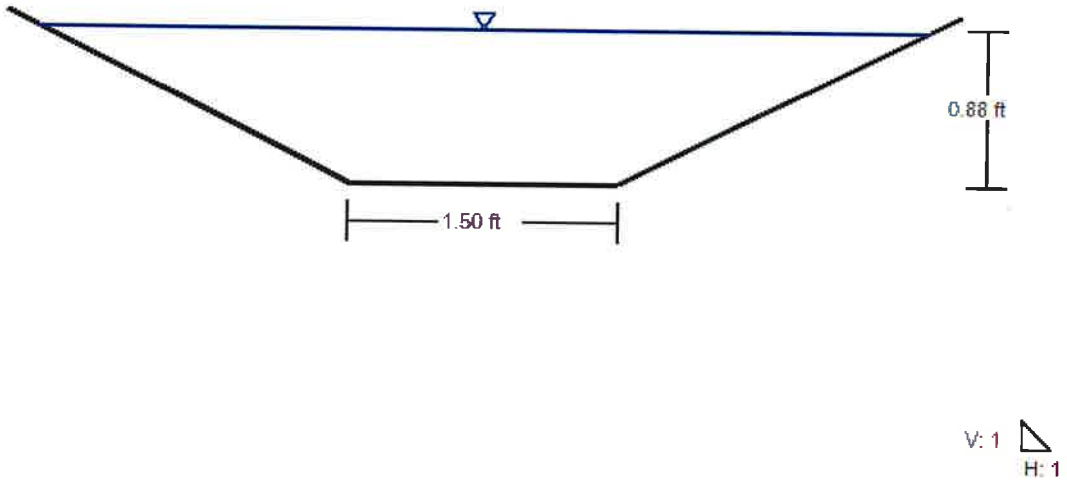
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.88 ft |
| Critical Depth | 0.95 ft |
| Channel Slope | 1.660 % |
| Critical Slope | 1.198 % |

# Cross Section for D1B

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 1.660 % |
| Normal Depth | 0.88 ft |
| Left Side Slope | 2.000 H:V |
| Right Side Slope | 2.000 H:V |
| Bottom Width | 1.50 ft |
| Discharge | 14.20 cfs |



# Worksheet for D2A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 2.000 % |
| Left Side Slope | 3.000 H:V |
| Right Side Slope | 3.000 H:V |
| Bottom Width | 4.00 ft |
| Discharge | 7.00 cfs |

| Results | |
|---|---|
| Normal Depth | 0.37 ft |
| Flow Area | 1.9 $ft^2$ |
| Wetted Perimeter | 6.32 ft |
| Hydraulic Radius | 0.30 ft |
| Top Width | 6.20 ft |
| Critical Depth | 0.41 ft |
| Critical Slope | 1.352 % |
| Velocity | 3.74 ft/s |
| Velocity Head | 0.22 ft |
| Specific Energy | 0.58 ft |
| Froude Number | 1.199 |
| Flow Type | Supercritical |

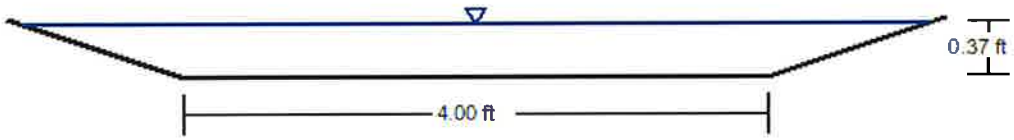
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.37 ft |
| Critical Depth | 0.41 ft |
| Channel Slope | 2.000 % |
| Critical Slope | 1.352 % |

# Cross Section for D2A

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 2.000 % |
| Normal Depth | 0.37 ft |
| Left Side Slope | 3.000 H:V |
| Right Side Slope | 3.000 H:V |
| Bottom Width | 4.00 ft |
| Discharge | 7.00 cfs |






# Worksheet for D2B

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 3.000 % |
| Left Side Slope | 3.000 H:V |
| Right Side Slope | 3.000 H:V |
| Bottom Width | 4.00 ft |
| Discharge | 7.00 cfs |

| Results | |
|---|---|
| Normal Depth | 0.33 ft |
| Flow Area | 1.6 $ft^2$ |
| Wetted Perimeter | 6.07 ft |
| Hydraulic Radius | 0.27 ft |
| Top Width | 5.97 ft |
| Critical Depth | 0.41 ft |
| Critical Slope | 1.352 % |
| Velocity | 4.29 ft/s |
| Velocity Head | 0.29 ft |
| Specific Energy | 0.61 ft |
| Froude Number | 1.445 |
| Flow Type | Supercritical |

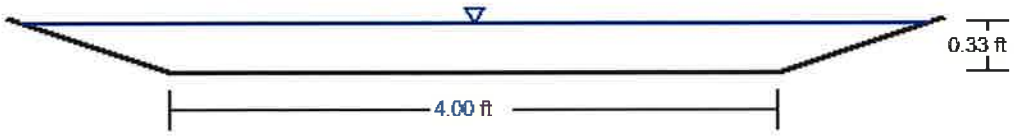
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.33 ft |
| Critical Depth | 0.41 ft |
| Channel Slope | 3.000 % |
| Critical Slope | 1.352 % |

# Cross Section for D2B

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.025 |
| Channel Slope | 3.000 % |
| Normal Depth | 0.33 ft |
| Left Side Slope | 3.000 H:V |
| Right Side Slope | 3.000 H:V |
| Bottom Width | 4.00 ft |
| Discharge | 7.00 cfs |






# Water Quality Swale Assessment

# Worksheet for Water Quality Swale

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.031 |
| Channel Slope | 1.000 % |
| Left Side Slope | 4.000 H:V |
| Right Side Slope | 4.000 H:V |
| Discharge | 1.33 cfs |

| Results | |
|---|---|
| Normal Depth | 0.44 ft |
| Flow Area | 0.8 ft² |
| Wetted Perimeter | 3.63 ft |
| Hydraulic Radius | 0.21 ft |
| Top Width | 3.52 ft |
| Critical Depth | 0.37 ft |
| Critical Slope | 2.561 % |
| Velocity | 1.71 ft/s |
| Velocity Head | 0.05 ft |
| Specific Energy | 0.49 ft |
| Froude Number | 0.644 |
| Flow Type | Subcritical |

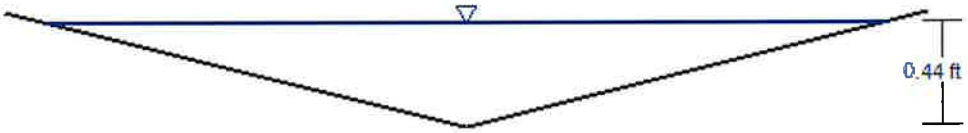
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

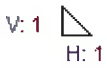
| GVF Output Data | |
|---|---|
| Upstream Depth | 0.00 ft |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 0.44 ft |
| Critical Depth | 0.37 ft |
| Channel Slope | 1.000 % |
| Critical Slope | 2.561 % |

# Cross Section for Water Quality Swale

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Roughness Coefficient | 0.031 |
| Channel Slope | 1.000 % |
| Normal Depth | 0.44 ft |
| Left Side Slope | 4.000 H:V |
| Right Side Slope | 4.000 H:V |
| Discharge | 1.33 cfs |



# APPENDIX D

Storm Drain Analyses

# Inlet Sizing Computations

# Grate Inlet Sizing Computation

**Project Name & Number:** Soldo Memorial Park
**Date:** 7/15/2022
**By:** PK

Westwood

**Notes:**

| | |
|---|---|
| Facility ID: | SDDI#1 |
| Drainage Condition: | Proposed |
| Source of Flow: | Q100= Basin OFF-P(C) + OFF-P(D) |
| Inlet Type: | NDOT Type 2 |
| Inlet Size: | 5'x6' |

**Known Information:**

| | | |
|---|---|---|
| Q = | Flow (cfs) | 52.8 |
| 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:**

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

| | | |
|---|---|---|
| Cw = | Weir Coefficient | 3.00 |
| P = | Perimeter of grate (ft) | 22.0 |
| Pc = | Perimeter (w/clogging) (ft) | 11.0 |
| HW = | Headwater depth (ft) | 1.37 |

**Orifice Conditions:**

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

| | | |
|---|---|---|
| Co = | Orifice Coefficient | 0.65 |
| Ag = | Grate Area ($ft^2$) | 30.00 |
| Gf = | Grate Opening Factor | 0.60 |
| Ac = | Grate Open Area (w/ clogging) ($ft^2$) | 9.00 |
| g = | Gravity (fps) | 32.20 |
| HW = | Headwater depth (ft) | 1.26 |

**Output:**

**Worst Case Scenario Occurs Under Weir Conditions**

**Headwater Depth = 1.37 ft with grate**

# Grate Inlet Sizing Computation

**Project Name & Number:** Soldo Memorial Park
**Date:** 7/15/2022
**By:** PK

Westwood

**Notes:**

| | |
|---|---|
| Facility ID: | SDDI #2 |
| Drainage Condition: | Proposed |
| Source of Flow: | Q100= Basin OFF-P(E) |
| Inlet Type: | NDOT Type 2 |
| Inlet Size: | 5'x2' |

**Known Information:**

| | | |
|---|---|---|
| Q = | Flow (cfs) | 14.2 |
| W = | Width of Grate (ft) | 5.00 |
| 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) | 14.0 |
| Pc = | Perimeter (w/clogging) (ft) | 7.0 |
| HW = | Headwater depth (ft) | 0.77 |

**Orifice Conditions:**

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

| | | |
|---|---|---|
| Co = | Orifice Coefficient | 0.65 |
| Ag = | Grate Area ($ft^2$) | 10.00 |
| Gf = | Grate Opening Factor | 0.60 |
| Ac = | Grate Open Area (w/ clogging) ($ft^2$) | 3.00 |
| g = | Gravity (fps) | 32.20 |
| HW = | Headwater depth (ft) | 0.82 |

**Output:**

**Worst Case Scenario Occurs Under Orifice Conditions**

**Headwater Depth = 0.82 ft with grate**

# Grate Inlet Sizing Computation

**Project Name & Number:** Soldo Memorial Park
**Date:** 7/15/2022
**By:** PK

Westwood

**Notes:**

| | |
|---|---|
| Facility ID: | SDDI#3 |
| Drainage Condition: | Proposed/Developed |
| Source of Flow: | Q100= Basin ON1(A) |
| Inlet Type: | NDOT Type 2 |
| Inlet Size: | 4'x4' |

**Known Information:**

| | | |
|---|---|---|
| Q = | Flow (cfs) | 7.0 |
| W = | Width of Grate (ft) | 4.00 |
| L = | Length of Grate (ft) | 4.00 |
| 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) | 16.0 |
| Pc = | Perimeter (w/clogging) (ft) | 8.0 |
| HW = | Headwater depth (ft) | 0.44 |

**Orifice Conditions:**

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

| | | |
|---|---|---|
| Co = | Orifice Coefficient | 0.65 |
| Ag = | Grate Area ($ft^2$) | 16.00 |
| Gf = | Grate Opening Factor | 0.60 |
| Ac = | Grate Open Area (w/ clogging) ($ft^2$) | 4.80 |
| g = | Gravity (fps) | 32.20 |
| HW = | Headwater depth (ft) | 0.08 |

**Output:**

**Worst Case Scenario Occurs Under Weir Conditions**

**Headwater Depth = 0.44 ft with grate**

# Curb Inlet Sizing Computation

| | |
|---|---|
| **Project Name & Number:** | **CEN2201.000 Soldo Memorial Park at Skye Canyon** |
| **Date:** | **7/14/2022** |
| **By:** | **CRW** |

Westwood

**Notes:**

| | |
|---|---|
| Facility ID: | SDDI#4 |
| Drainage Condition: | Proposed/Developed |
| Source of Flow: | Q10 = AR-P + ON1(B) |
| Inlet Type: | Type DM2 (Continuous Grade) |
| Inlet Length: | 12.5-ft |
| Number of Grates | 4 |

| **Input:** | **Variable:** | **Input:** |
|---|---|---|
| Street Flow (cfs) | Q | 5.0 |
| Longitudinal Slope (ft/ft) | $S_o$ | 0.0050 |
| Manning's Coefficient | n | 0.016 |
| Street Flow Velocity (fps) | V | 1.96 |
| Street Flow Depth (ft) | D | 0.45 |
| Street Cross Slope (ft/ft) | $S_x$ | 0.02 |
| Grate Width (ft) | W | 1.5 |
| Grate Depression (in) | $D_g$ | 2.0 |
| Length of Grate (ft) | $L_g$ | 9.75 |
| Length of Curb Opening (ft) | $L_c$ | 12.00 |
| Clogging Factor - Grate (%) | $CF_g$ | 50% |
| Clogging Factor - Curb (%) | $CF_c$ | 50% |
| Effective Grate Length (ft) | $L_{ge}$ | 4.9 |
| Effective Curb Opening Length (ft) | $L_{ce}$ | 6.00 |

| **Output (Grate):** | **Equation:** | **Output (Grate):** |
|---|---|---|
| [1] $R_f$ - Frontal Flow Factor | 1-0.09*(V-$V_x$) if V>$V_x$; else Frontal Flow Factor=1 | 1.00 |
| [2] $V_o$ - Splash Over Velocity (fps) | $V_x$=p+q*Lg-r*$L_{ge}$^2+sy*$L_{ge}$^3 ; where | 10.19 |
| | p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate) | |
| [1] E - Grate Flow Ratio | Frontal Flow/Side Flow | 0.26 |
| [2] $Q_w$ - Frontal Flow (cfs) | $Q_w = Q[1-(1-(W/T))^{2.67}]$ | 1.29 |
| [1] $Q_s$ - Side Flow (cfs) | $Q_s$ = Q-Qw | 3.7 |
| T - Side Flow Spread (ft) | $(D-D_g)/S_x$ | 14.17 |
| [1] $R_s$ - Side Flow Factor | $1/(1+(0.15*V^{1.8})/(S_x*L_{ge}^{2.3}))$ | 0.60 |
| [1] $Q_{gi}$ - Intercepted Flow (cfs) | $(R_f*E+R_s*(1-E))*Q$ | 3.5 |

| **Output (Curb):** | **Equation:** | **Output (Curb):** |
|---|---|---|
| [1] $S_e$ - Equivalent Cross Slope (ft/ft) | $S_x+S_g*E$ | 0.049 |
| $Q_{sx}$ - Remaining Flow After Grate Interception (cfs) | $Q-Q_{gi}$ | 1.473 |
| $S_g$ - Gutter Cross Slope (ft/ft) | $D_g/W$ | 0.111 |
| [1] $L_t$ - Effective Interception Length (ft) | $0.60*Q_{sx}^{0.42}*S_o^{0.30}*(1/n*S_e)^{0.6}$ | 10.56 |
| [1] $Q_{ci}$ - Intercepted Flow (cfs) | $(1-(1-L_{ce}/L_t)^{1.8})*Q_{sx}$ | 1.1 |
| | or $Q_{sx}$ if $L_t$ is less than $L_{ce}$ | |

| **Output (Combination):** | **Equation:** | **Output (Combination):** |
|---|---|---|
| Total Intercepted Flow (cfs) | Intercepted (Grate) + Intercepted (Curb) | **5** |
| Bypass Flow (cfs) | Street Flow - Total Intercepted Flow | **0** |

[1] Formula referenced from the CCRFCD Manual

[2] Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

# Worksheet for DI4 10 yr

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | |
|---|---|
| Channel Slope | 0.50 % |
| Discharge | 5.0 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.50 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+40.00 | 0.77 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.013 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.025 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.013 |
| (0+10.00, 0.13) | (0+40.00, 0.77) | 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 | 0.45 ft |
| Roughness Coefficient | 0.016 |
| Elevation | 0.45 ft |
| Elevation Range | 0.00 to 0.77 ft |
| Flow Area | 2.5 ft² |
| Wetted Perimeter | 16.03 ft |
| Hydraulic Radius | 0.16 ft |
| Top Width | 15.53 ft |
| Normal Depth | 0.45 ft |
| Critical Depth | 0.43 ft |

# Worksheet for DI4 10 yr

| Results | |
|---|---|
| Critical Slope | 0.70 % |
| Velocity | 1.96 ft/s |
| Velocity Head | 0.06 ft |
| Specific Energy | 0.51 ft |
| Froude Number | 0.855 |
| Flow Type | Subcritical |

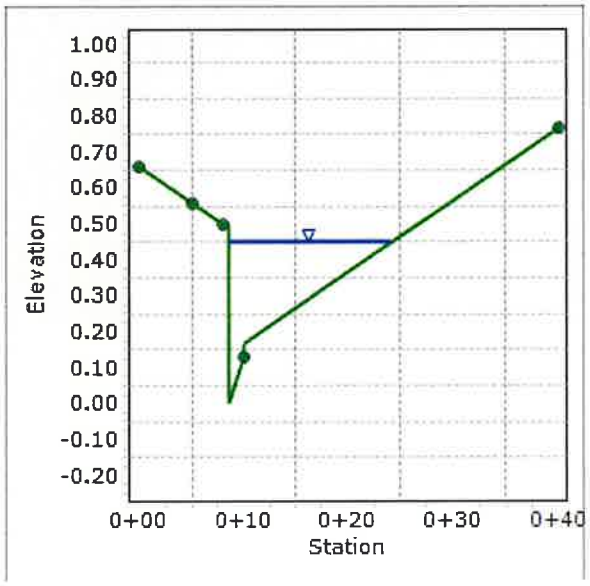
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| GVF Output Data | |
|---|---|
| Upstream Depth | 0.00 ft |
| Profile Description | N/A |
| Profile Headloss | 0.00 ft |
| Downstream Velocity | 0.00 ft/s |
| Upstream Velocity | 0.00 ft/s |
| Normal Depth | 0.45 ft |
| Critical Depth | 0.43 ft |
| Channel Slope | 0.50 % |
| Critical Slope | 0.70 % |

# Cross Section for DI4 10 yr

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

| Input Data | |
|---|---|
| Channel Slope | 0.50 % |
| Normal Depth | 0.45 ft |
| Discharge | 5.0 cfs |



# Curb Inlet Sizing Computation

| | |
|---|---|
| **Project Name & Number:** | **CEN2201.000 Soldo Memorial Park at Skye Canyon** |
| **Date:** | **7/14/2022** |
| **By:** | **CRW** |

**Westwood**

| | |
|---|---|
| **Notes:** | |
| Facility ID: | SDDI#5 |
| Drainage Condition: | Developed |
| Source of Flow: | Q100 = IM-D |
| Inlet Type: | Type DM2 (Continuous Grade) |
| Inlet Length: | 7.5-ft |
| Number of Grates | 2 |

| **Input:** | **Variable:** | **Input:** |
|---|---|---|
| Street Flow (cfs) | Q | 3.5 |
| Longitudinal Slope (ft/ft) | $S_o$ | 0.0320 |
| Manning's Coefficient | n | 0.016 |
| Street Flow Velocity (fps) | V | 3.72 |
| Street Flow Depth (ft) | D | 0.32 |
| Street Cross Slope (ft/ft) | $S_x$ | 0.02 |
| Grate Width (ft) | W | 1.5 |
| Grate Depression (in) | $D_g$ | 2.0 |
| Length of Grate (ft) | $L_g$ | 4.75 |
| Length of Curb Opening (ft) | $L_c$ | 7.00 |
| Clogging Factor - Grate (%) | $CF_g$ | 50% |
| Clogging Factor - Curb (%) | $CF_c$ | 50% |
| Effective Grate Length (ft) | $L_{ge}$ | 2.4 |
| Effective Curb Opening Length (ft) | $L_{ce}$ | 3.50 |

| **Output (Grate):** | **Equation:** | **Output (Grate):** |
|---|---|---|
| [1] $R_f$ - Frontal Flow Factor | 1-0.09*(V-$V_x$) if V>$V_x$; else Frontal Flow Factor=1 | 1.00 |
| [2] $V_o$ - Splash Over Velocity (fps) | $V_x$=p+q*Lg-r*$L_{ge}$^2+sy*$L_{ge}$^3 ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate) | 6.44 |
| [1] E - Grate Flow Ratio | Frontal Flow/Side Flow | 0.44 |
| [2] $Q_w$ - Frontal Flow (cfs) | $Q_w = Q[1-(1-(W/T))^{2.67}]$ | 1.54 |
| [1] $Q_s$ - Side Flow (cfs) | $Q_s$ = Q-Qw | 2.0 |
| T - Side Flow Spread (ft) | $(D-D_g)/S_x$ | 7.67 |
| [1] $R_s$ - Side Flow Factor | $1/(1+(0.15*V^{1.8})/(S_x*L_{ge}^{2.3}))$ | 0.08 |
| [1] $Q_{gi}$ - Intercepted Flow (cfs) | $(R_f*E+R_s*(1-E))*Q$ | 1.7 |

| **Output (Curb):** | **Equation:** | **Output (Curb):** |
|---|---|---|
| [1] $S_e$ - Equivalent Cross Slope (ft/ft) | $S_x+S_g*E$ | 0.069 |
| $Q_{sx}$ - Remaining Flow After Grate Interception (cfs) | $Q-Q_{gi}$ | 1.793 |
| $S_g$ - Gutter Cross Slope (ft/ft) | $D_g/W$ | 0.111 |
| [1] $L_t$ - Effective Interception Length (ft) | $0.60*Q_{sx}^{0.42}*S_o^{0.30}*(1/n*S_e)^{0.6}$ | 16.24 |
| [1] $Q_{ci}$ - Intercepted Flow (cfs) | $(1-(1-L_{ce}/L_t)^{1.8})*Q_{sx}$ or $Q_{sx}$ if $L_t$ is less than $L_{ce}$ | 0.6 |

| **Output (Combination):** | **Equation:** | **Output (Combination):** |
|---|---|---|
| Total Intercepted Flow (cfs) | Intercepted (Grate) + Intercepted (Curb) | **2.3** |
| Bypass Flow (cfs) | Street Flow - Total Intercepted Flow | **1.2** |

[1] Formula referenced from the CCRFCD Manual

[2] Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

# Worksheet for DI5 100 yr

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | |
|---|---|
| Channel Slope | 3.20 % |
| Discharge | 3.5 cfs |

## Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00.00 | 0.66 |
| 0+05.00 | 0.56 |
| 0+08.00 | 0.50 |
| 0+08.50 | 0.50 |
| 0+08.50 | 0.00 |
| 0+10.00 | 0.13 |
| 0+10.00 | 0.17 |
| 0+40.00 | 0.77 |

## Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00.00, 0.66) | (0+05.00, 0.56) | 0.013 |
| (0+05.00, 0.56) | (0+08.00, 0.50) | 0.025 |
| (0+08.00, 0.50) | (0+10.00, 0.13) | 0.013 |
| (0+10.00, 0.13) | (0+40.00, 0.77) | 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 | 0.32 ft |
| Roughness Coefficient | 0.015 |
| Elevation | 0.32 ft |
| Elevation Range | 0.00 to 0.77 ft |
| Flow Area | 0.9 ft² |
| Wetted Perimeter | 9.35 ft |
| Hydraulic Radius | 0.10 ft |
| Top Width | 8.98 ft |
| Normal Depth | 0.32 ft |
| Critical Depth | 0.39 ft |

# Worksheet for DI5 100 yr

| Results | |
|---|---|
| Critical Slope | 0.71 % |
| Velocity | 3.72 ft/s |
| Velocity Head | 0.21 ft |
| Specific Energy | 0.53 ft |
| Froude Number | 2.024 |
| Flow Type | Supercritical |

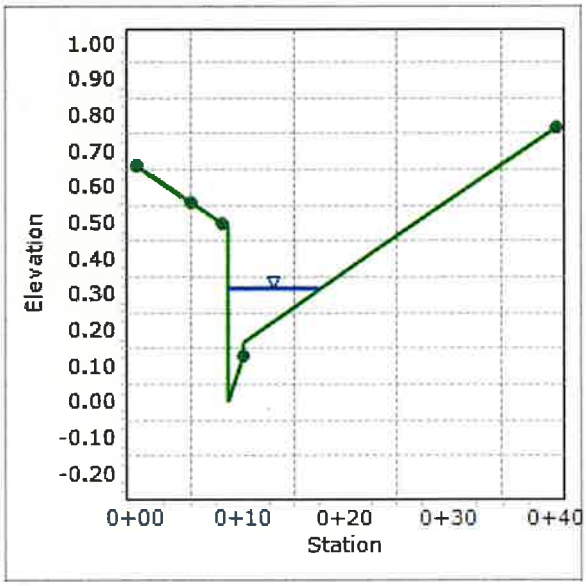
| GVF Input Data | |
|---|---|
| Downstream Depth | 0.00 ft |
| Length | 0.00 ft |
| Number Of Steps | 0 |

| 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 | 0.32 ft |
| Critical Depth | 0.39 ft |
| Channel Slope | 3.20 % |
| Critical Slope | 0.71 % |

# Cross Section for DI5 100 yr

| Project Description | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

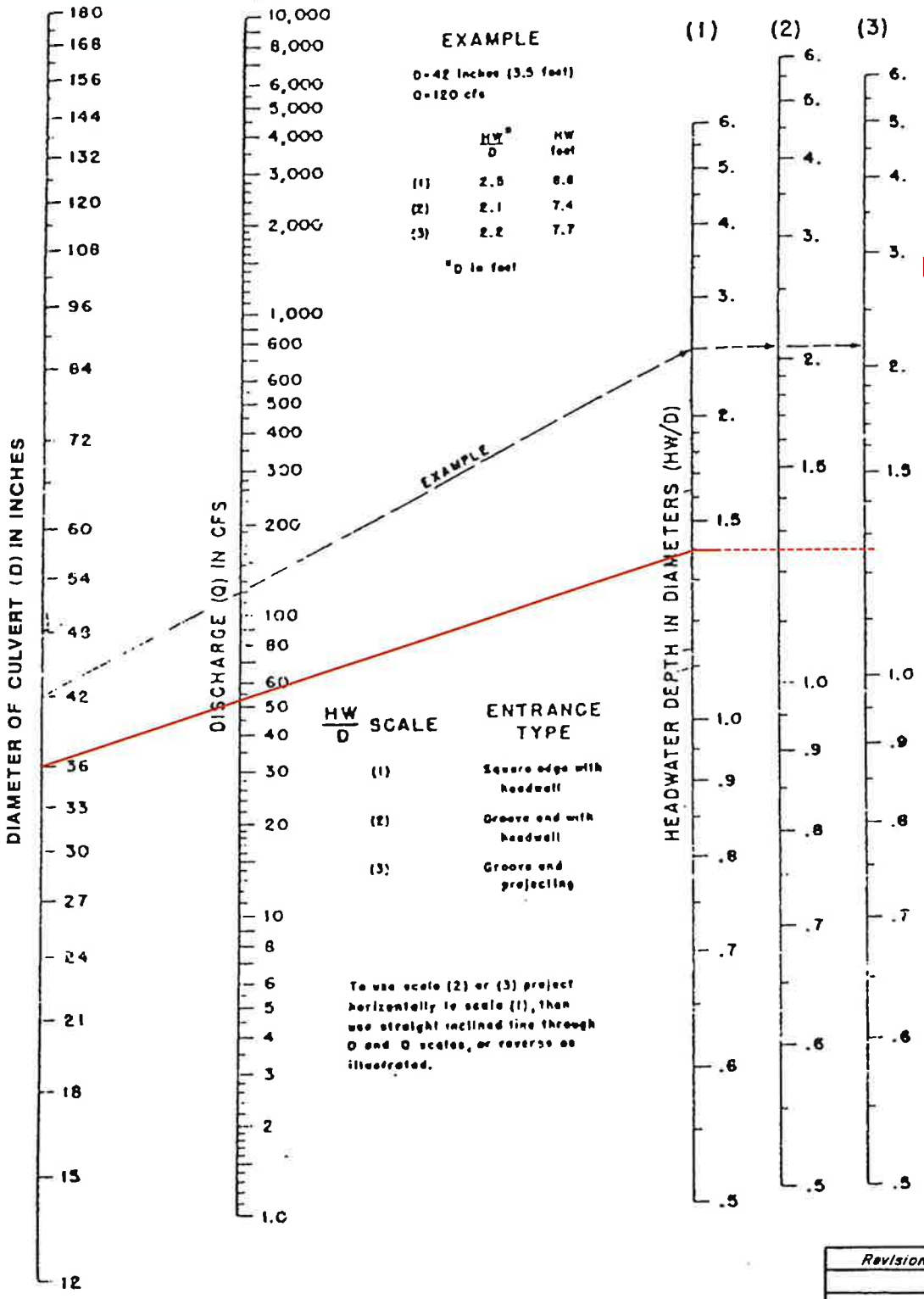
| Input Data | |
|---|---|
| Channel Slope | 3.20 % |
| Normal Depth | 0.32 ft |
| Discharge | 3.5 cfs |



# Inlet Control Nomographs

# NOMOGRAPH – INLET CONTROL RCP

DI#1: Q=52.8 CFS




HW/D 1.4

D 36

HW 4.2

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

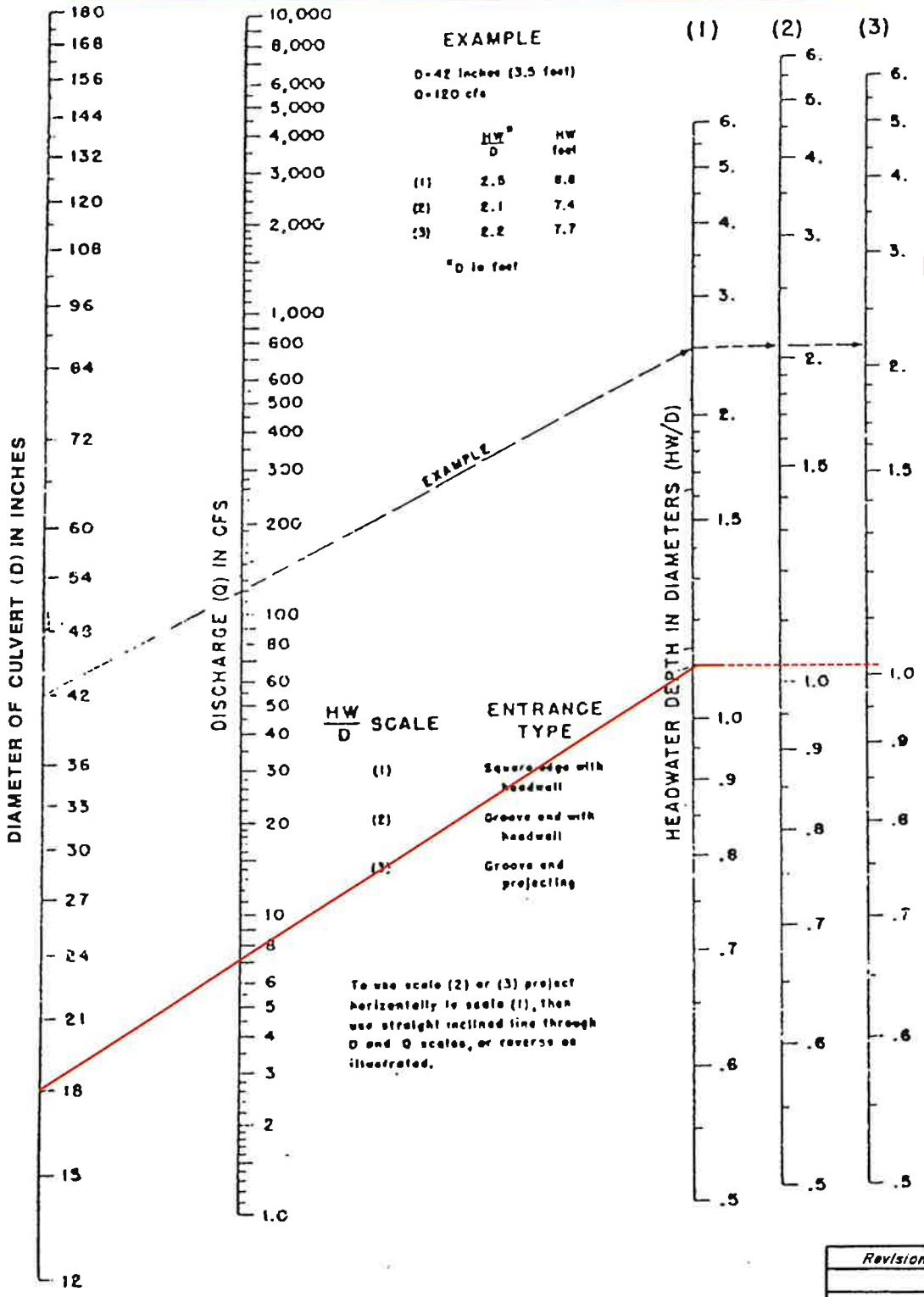
WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

# NOMOGRAPH – INLET CONTROL RCP

DI#3: Q=7 CFS




HW/D 1.1

D 18

HW 1.7

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

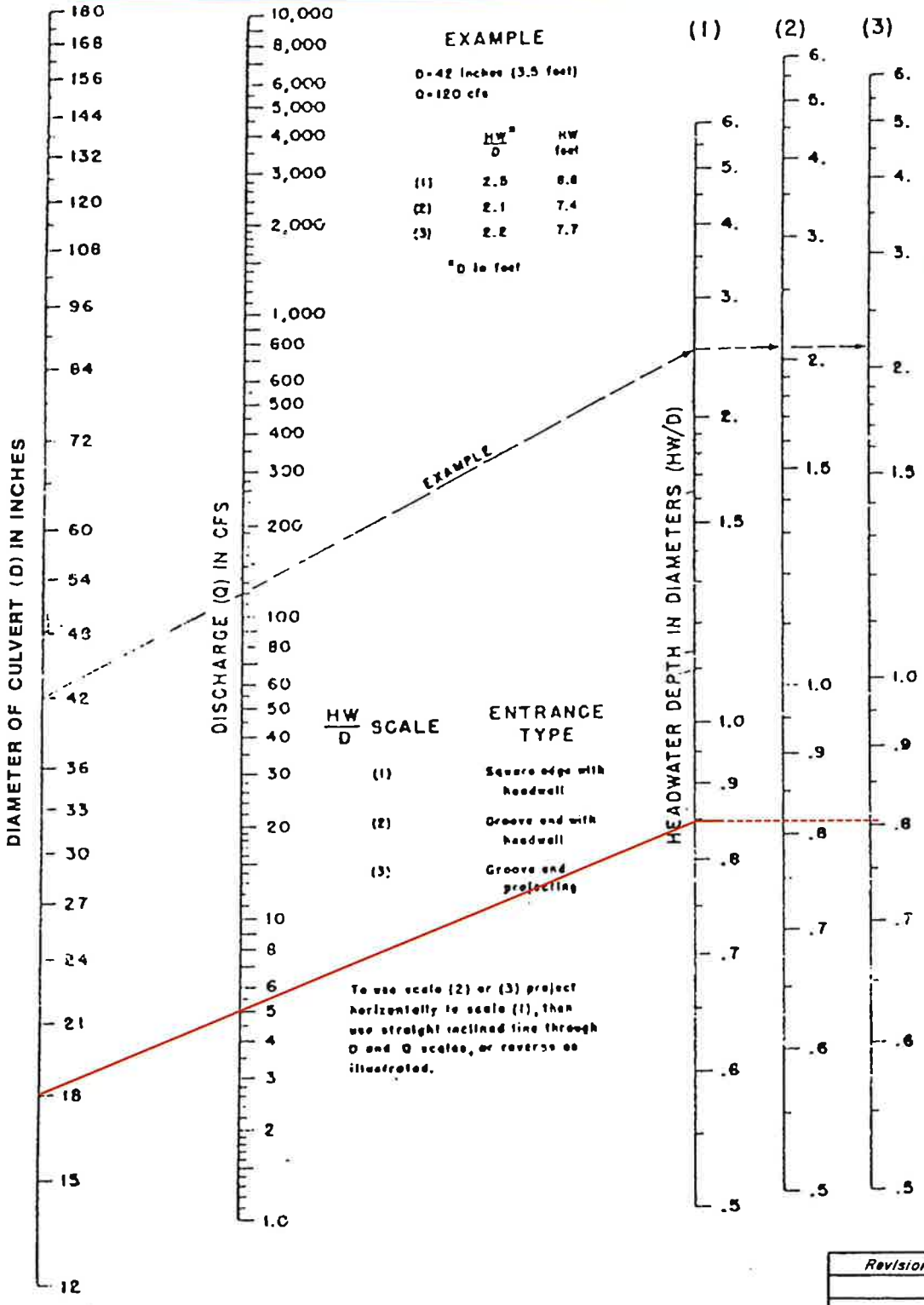
WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

# NOMOGRAPH – INLET CONTROL RCP

DI#4: Q=5 CFS




| | |
|---|---|
| HW/D | .85 |
| D | 18 |
| HW | 1.3 |

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

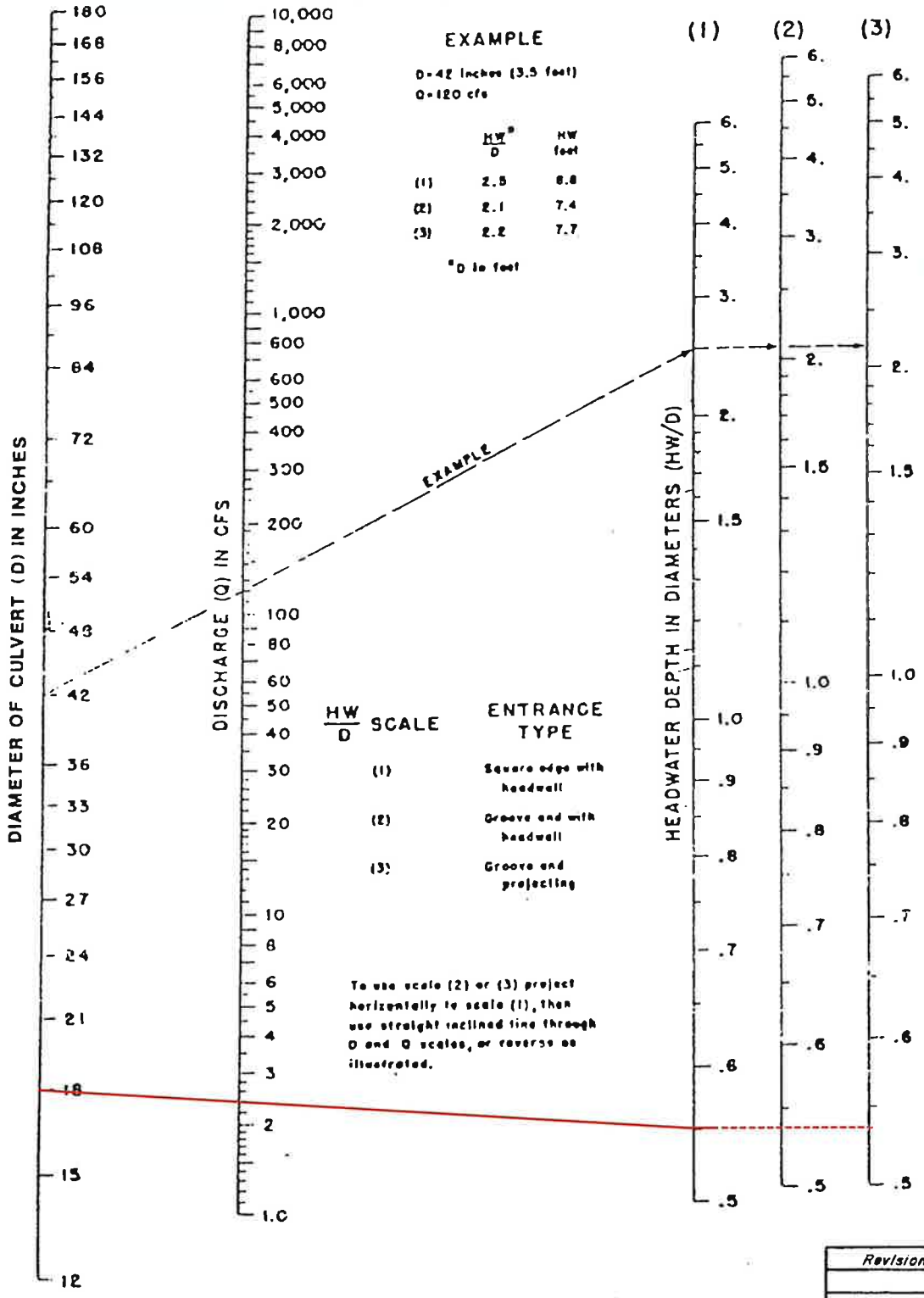
WRC ENGINEERING

REFERENCE: USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

# NOMOGRAPH – INLET CONTROL RCP

DI#5: Q=2.5 CFS




| | |
|---|---|
| HW/D | .55 |
| D | 18 |
| HW | 0.8 |

| Revision | Date |
|---|---|
| | |
| | |
| | |
| | |

WRC ENGINEERING

REFERENCE:
USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

# WSPG Model

## Developed Condition WSPG Summary
### West perimeter offsite flow interception system

| WSPG Station | Storm Drain Dimension | Invert Elevation (ft) | $Q_{100}$ (cfs) | WSE (ft) | Velocity (ft/s) | FG Elevation | Facility Description | HGL Check[1] |
|---|---|---|---|---|---|---|---|---|
| 532.79 | 36" RCP | 2913.52 | 85.00 | 2915.90 | 14.11 | 2925.16 | Ex SDMH | OK |
| 889.97 | 36" RCP | 2919.67 | 85.00 | 2922.48 | 12.35 | 2930.26 | Ex SDMH with Ex Lateral | OK |
| 889.98 | 36" RCP | 2919.87 | 74.00 | 2923.66 | 10.47 | 2930.26 | | OK |
| 980.18 | 36" RCP | 2920.72 | 74.00 | 2924.77 | 10.47 | 2929.70 | Ex SDMH | OK |
| 980.19 | 36" RCP | 2920.73 | 74.00 | 2924.86 | 10.47 | 2929.70 | | OK |
| 980.20 | 36" RCP | 2920.79 | 74.00 | 2924.94 | 10.47 | 2929.70 | | OK |
| 980.21 | | 2920.84 | 74.00 | 2925.03 | 10.47 | 2929.70 | | OK |
| 980.22 | 36" RCP | 2920.88 | 74.00 | 2925.11 | 10.47 | 2929.70 | | OK |
| 980.23 | 36" RCP | 2920.93 | 74.00 | 2925.19 | 10.47 | 2929.70 | | OK |
| 1000.00 | 36" RCP | 2921.06 | 74.00 | 2925.43 | 10.47 | 2929.70 | Point of Connection | OK |
| 1062.76 | 36" RCP | 2921.48 | 74.00 | 2926.21 | 10.47 | 2932.35 | SDMH #3 with Proposed Lateral | OK |
| 1062.77 | 36" RCP | 2921.49 | 67.00 | 2926.79 | 9.48 | 2932.35 | | OK |
| 1062.78 | 36" RCP | 2921.50 | 67.00 | 2926.86 | 9.48 | 2932.35 | | OK |
| 1062.79 | 36" RCP | 2921.51 | 67.00 | 2926.92 | 9.48 | 2932.35 | | OK |
| 1356.09 | 36" RCP | 2930.28 | 67.00 | 2931.81 | 18.46 | 2942.53 | SDMH #2 | OK |
| 1356.10 | 36" RCP | 2930.29 | 67.00 | 2931.83 | 18.43 | 2942.53 | | OK |
| 1356.11 | 36" RCP | 2930.30 | 67.00 | 2931.83 | 18.43 | 2942.53 | | OK |
| 1649.42 | 36" RCP | 2941.52 | 67.00 | 2943.62 | 12.71 | 2952.22 | SDMH #1 | OK |
| 1649.43 | 36" RCP | 2941.53 | 67.00 | 2943.65 | 12.63 | 2952.22 | | OK |
| 1649.44 | 36" RCP | 2941.54 | 67.00 | 2943.65 | 12.63 | 2952.22 | | OK |
| 1649.45 | 36" RCP | 2941.55 | 67.00 | 2943.66 | 12.59 | 2952.22 | | OK |
| 1649.46 | 36" RCP | 2941.56 | 67.00 | 2943.68 | 12.55 | 2952.22 | | OK |
| 1649.47 | 36" RCP | 2941.57 | 67.00 | 2943.70 | 12.50 | 2952.22 | | OK |
| 1649.48 | 36" RCP | 2941.58 | 67.00 | 2943.71 | 12.46 | 2952.22 | | OK |
| 1694.28 | 36" RCP | 2942.42 | 67.00 | 2945.04 | 10.25 | 2948.20 | SDDI #2 | OK |
| 1694.29 | 36" RCP | 2942.43 | 52.80 | 2946.37 | 7.47 | 2948.20 | | OK |
| 1694.30 | 36" RCP | 2942.44 | 52.80 | 2946.41 | 7.47 | 2948.20 | | OK |
| 1972.58 | 36" RCP | 2948.00 | 52.80 | 2950.36 | 8.85 | 2953.60 | SDDI #1 | OK |

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

```
T1 CEN2201 Soldo Memorial Park
T2 '36Soldo'
T3 Perimeter 36" Interception system
SO    532.79 2913.52  36      .013               2915.84
R     889.97 2919.67  36      .013
JX    889.98 2919.87  36 36   .013   11.0          2919.87        -56.0
R     980.18 2920.72  36      .013
R     980.19 2920.73  36      .013                                          1
R     980.20 2920.79  36      .013                                  15.0
R     980.21 2920.84  36      .013                                  15.0
R     980.22 2920.88  36      .013                                  15.0
R     980.23 2920.93  36      .013                                  14.0
R    1000.00 2921.06  36      .013
R    1062.76 2921.48  36      .013
JX   1062.77 2921.49  36 36   .013    7.0           2921.490         18.0
R    1062.78 2921.50  36      .013                                  15.0
R    1062.79 2921.51  36      .013                                  12.0
R    1356.09 2930.28  36      .013
R    1356.10 2930.29  36      .013                                          1
R    1356.11 2930.30  36      .013
R    1649.42 2941.520 36      .013
R    1649.43 2941.530 36      .013                                          1
R    1649.44 2941.540 36      .013                                  15.0
R    1649.45 2941.550 36      .013                                  15.0
R    1649.46 2941.560 36      .013                                  15.0
R    1649.47 2941.570 36      .013                                  15.0
R    1649.48 2941.580 36      .013                                  12.0
R    1694.28 2942.420 36      .013
JX   1694.29 2942.430 36 36   .013   14.2           2942.430         90.0
R    1694.30 2942.440 36      .013                                  15.0
R    1972.58 2948.000 36      .013
SH   1972.58 2948.000 36
CD  24  4   1   0.000   2.000    0.000 0.000 0.000  0.0000.00  0.00
CD  36  4   1   0.000   3.000    0.000 0.000 0.000  0.0000.00  0.00
Q           52.800
```

FILE: 36Soldo.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 7-18-2022 Time:10:31:42

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 24 | 4 | 1 | | 2.000 | | | | | | | | | | | | | | |
| CD | 36 | 4 | 1 | | 3.000 | | | | | | | | | | | | | | |

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CEN2201 Soldo Memorial Park

HEADING LINE NO 2 IS -

'36Soldo'

HEADING LINE NO 3 IS -

Perimeter 36" Interception system

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 532.790 | 2913.520 | 36 | 2915.840 |

ELEMENT NO 2 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 889.970 | 2919.670 | 36 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 3 IS A JUNCTION * * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 889.980 | 2919.870 | 36 | 36 | 0 | .013 | 11.000 | .000 | 2919.870 | .000 | 56.000 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 4 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.180 | 2920.720 | 36 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 5 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.190 | 2920.730 | 36 | .013 | .000 | .000 | .000 | 1 |

ELEMENT NO 6 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.200 | 2920.790 | 36 | .013 | .000 | .000 | 15.000 | 0 |

ELEMENT NO 7 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.210 | 2920.840 | 36 | .013 | .000 | .000 | 15.000 | 0 |

ELEMENT NO 8 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.220 | 2920.880 | 36 | .013 | .000 | .000 | 15.000 | 0 |

ELEMENT NO 9 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 980.230 | 2920.930 | 36 | .013 | .000 | .000 | 14.000 | 0 |

ELEMENT NO 10 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1000.000 | 2921.060 | 36 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 11 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|

```
                          1062.760 2921.480   36              .013                          .000      .000      .000     0
ELEMENT NO  12 IS A JUNCTION        *        *     *     *                 *                  *                  *
                  U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          1062.770 2921.490   36    36     0   .013     7.000      .000  2921.490      .000  18.000     .000
                                                                                        RADIUS    ANGLE
                                                                                          .000     .000
                                                W S P G W                                                      PAGE NO   3
                                WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  13 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1062.780 2921.500   36              .013                           .000     .000    15.000     0
ELEMENT NO  14 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1062.790 2921.510   36              .013                           .000     .000    12.000     0
ELEMENT NO  15 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1356.090 2930.280   36              .013                           .000     .000      .000     0
ELEMENT NO  16 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1356.100 2930.290   36              .013                           .000     .000      .000     1
ELEMENT NO  17 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1356.110 2930.300   36              .013                           .000     .000      .000     0
ELEMENT NO  18 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.420 2941.520   36              .013                           .000     .000      .000     0
ELEMENT NO  19 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.430 2941.530   36              .013                           .000     .000      .000     1
ELEMENT NO  20 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.440 2941.540   36              .013                           .000     .000    15.000     0
ELEMENT NO  21 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.450 2941.550   36              .013                           .000     .000    15.000     0
ELEMENT NO  22 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.460 2941.560   36              .013                           .000     .000    15.000     0
ELEMENT NO  23 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.470 2941.570   36              .013                           .000     .000    15.000     0
ELEMENT NO  24 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1649.480 2941.580   36              .013                           .000     .000    12.000     0
ELEMENT NO  25 IS A REACH           *        *     *
                  U/S DATA  STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                          1694.280 2942.420   36              .013                           .000     .000      .000     0
ELEMENT NO  26 IS A JUNCTION        *        *     *     *                 *                  *                  *
                  U/S DATA  STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          1694.290 2942.430   36    36     0   .013    14.200      .000  2942.430      .000  90.000     .000
                                                                                        RADIUS    ANGLE
```

.000 .000

W S P G W PAGE NO 4

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 27 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1694.300 | 2942.440 | 36 | .013 | .000 | .000 | 15.000 | 0 |

ELEMENT NO 28 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1972.580 | 2948.000 | 36 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 29 IS A SYSTEM HEADWORKS * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 1972.580 | 2948.000 | 36 | .000 |

WATER SURFACE PROFILE LISTING Date: 7-18-2022 Time:10:31:45

CEN2201 Soldo Memorial Park
'36Soldo'
Perimeter 36" Interception system

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 532.790 | 2913.520 | 2.385 | 2915.904 | 85.00 | 14.11 | 3.09 | 2919.00 | .00 | 2.81 | 2.42 | 3.000 | .000 | .00 | 1 .0 |
| 76.040 | .0172 | | | | | .0172 | 1.31 | 2.38 | 1.58 | 2.38 | .013 | .00 | .00 | PIPE |
| 608.829 | 2914.829 | 2.385 | 2917.214 | 85.00 | 14.11 | 3.09 | 2920.30 | .00 | 2.81 | 2.42 | 3.000 | .000 | .00 | 1 .0 |
| 200.562 | .0172 | | | | | .0166 | 3.33 | 2.38 | 1.58 | 2.38 | .013 | .00 | .00 | PIPE |
| 809.392 | 2918.282 | 2.483 | 2920.766 | 85.00 | 13.59 | 2.87 | 2923.63 | .00 | 2.81 | 2.27 | 3.000 | .000 | .00 | 1 .0 |
| 62.086 | .0172 | | | | | .0153 | .95 | 2.48 | 1.44 | 2.38 | .013 | .00 | .00 | PIPE |
| 871.478 | 2919.352 | 2.627 | 2921.978 | 85.00 | 12.95 | 2.61 | 2924.58 | .00 | 2.81 | 1.98 | 3.000 | .000 | .00 | 1 .0 |
| 18.492 | .0172 | | | | | .0144 | .27 | 2.63 | 1.25 | 2.38 | .013 | .00 | .00 | PIPE |
| 889.970 | 2919.670 | 2.812 | 2922.482 | 85.00 | 12.35 | 2.37 | 2924.85 | .00 | 2.81 | 1.46 | 3.000 | .000 | .00 | 1 .0 |
| JUNCT STR 20.0000 | | | | | | .0132 | .00 | 2.81 | 1.00 | | .013 | .00 | .00 | PIPE |
| 889.980 | 2919.870 | 3.793 | 2923.663 | 74.00 | 10.47 | 1.70 | 2925.36 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 90.200 | .0094 | | | | | .0123 | 1.11 | 3.79 | .00 | 3.00 | .013 | .00 | .00 | PIPE |
| 980.180 | 2920.720 | 4.053 | 2924.773 | 74.00 | 10.47 | 1.70 | 2926.48 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0123 | .00 | 4.05 | .00 | .67 | .013 | .00 | .00 | PIPE |
| 980.190 | 2920.730 | 4.129 | 2924.859 | 74.00 | 10.47 | 1.70 | 2926.56 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 6.0000 | | | | | .0123 | .00 | 4.13 | .00 | .43 | .013 | .00 | .00 | PIPE |
| 980.200 | 2920.790 | 4.153 | 2924.943 | 74.00 | 10.47 | 1.70 | 2926.64 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 5.0000 | | | | | .0123 | .00 | 4.15 | .00 | .45 | .013 | .00 | .00 | PIPE |

CEN2201 Soldo Memorial Park
'36Soldo'
Perimeter 36" Interception system

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 980.210 | 2920.840 | 4.187 | 2925.028 | 74.00 | 10.47 | 1.70 | 2926.73 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 980.220 | 2920.880 | 4.232 | 2925.112 | 74.00 | 10.47 | 1.70 | 2926.81 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 5.0000 | | | | | .0123 | .00 | 4.23 | .00 | .45 | .013 | .00 | .00 | PIPE |
| 980.230 | 2920.930 | 4.261 | 2925.191 | 74.00 | 10.47 | 1.70 | 2926.89 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 19.770 | .0066 | | | | | .0123 | .24 | 4.26 | .00 | 3.00 | .013 | .00 | .00 | PIPE |
| 1000.000 | 2921.060 | 4.374 | 2925.434 | 74.00 | 10.47 | 1.70 | 2927.14 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 62.760 | .0067 | | | | | .0123 | .77 | 4.37 | .00 | 3.00 | .013 | .00 | .00 | PIPE |
| 1062.760 | 2921.480 | 4.727 | 2926.207 | 74.00 | 10.47 | 1.70 | 2927.91 | .00 | 2.71 | .00 | 3.000 | .000 | .00 | 1 .0 |
| JUNCT STR | 1.0000 | | | | | .0112 | .00 | 4.73 | .00 | | .013 | .00 | .00 | PIPE |
| 1062.770 | 2921.490 | 5.301 | 2926.792 | 67.00 | 9.48 | 1.40 | 2928.19 | .00 | 2.62 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0101 | .00 | 5.30 | .00 | .64 | .013 | .00 | .00 | PIPE |
| 1062.780 | 2921.500 | 5.361 | 2926.861 | 67.00 | 9.48 | 1.40 | 2928.26 | .00 | 2.62 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0101 | .00 | 5.36 | .00 | .64 | .013 | .00 | .00 | PIPE |
| 1062.790 | 2921.510 | 5.406 | 2926.916 | 67.00 | 9.48 | 1.40 | 2928.31 | .00 | 2.62 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 64.831 | .0299 | | | | | .0101 | .65 | 5.41 | .00 | 1.64 | .013 | .00 | .00 | PIPE |
| 1127.621 | 2923.448 | 4.121 | 2927.570 | 67.00 | 9.48 | 1.40 | 2928.97 | .00 | 2.62 | .00 | 3.000 | .000 | .00 | 1 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1127.621 | 2923.448 | 1.627 | 2925.075 | 67.00 | 17.12 | 4.55 | 2929.62 | .00 | 2.62 | 2.99 | 3.000 | .000 | .00 | 1 | .0 |
| 151.279 | .0299 | | | | | .0320 | 4.84 | 1.63 | 2.64 | 1.64 | .013 | .00 | .00 | PIPE | |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7-18-2022 Time:10:31:45

CEN2201 Soldo Memorial Park

'36Soldo'

Perimeter 36" Interception system

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1278.900 | 2927.972 | 1.591 | 2929.563 | 67.00 | 17.60 | 4.81 | 2934.37 | .00 | 2.62 | 2.99 | 3.000 | .000 | .00 | 1 | .0 |
| 77.190 | .0299 | | | | | .0354 | 2.73 | 1.59 | 2.75 | 1.64 | .013 | .00 | .00 | PIPE | |
| 1356.090 | 2930.280 | 1.532 | 2931.812 | 67.00 | 18.46 | 5.29 | 2937.10 | .00 | 2.62 | 3.00 | 3.000 | .000 | .00 | 1 | .0 |
| .010 | 1.0000 | | | | | .0376 | .00 | 1.53 | 2.96 | .64 | .013 | .00 | .00 | PIPE | |
| 1356.110 | 2930.300 | 1.534 | 2931.833 | 67.00 | 18.43 | 5.27 | 2937.11 | .00 | 2.62 | 3.00 | 3.000 | .000 | .00 | 1 | .0 |
| 133.357 | .0383 | | | | | .0356 | 4.75 | 1.53 | 2.95 | 1.52 | .013 | .00 | .00 | PIPE | |
| 1489.467 | 2935.401 | 1.581 | 2936.982 | 67.00 | 17.74 | 4.89 | 2941.87 | .00 | 2.62 | 3.00 | 3.000 | .000 | .00 | 1 | .0 |
| 59.800 | .0383 | | | | | .0319 | 1.90 | 1.58 | 2.78 | 1.52 | .013 | .00 | .00 | PIPE | |
| 1549.267 | 2937.689 | 1.642 | 2939.331 | 67.00 | 16.92 | 4.44 | 2943.77 | .00 | 2.62 | 2.99 | 3.000 | .000 | .00 | 1 | .0 |
| 33.427 | .0383 | | | | | .0281 | .94 | 1.64 | 2.59 | 1.52 | .013 | .00 | .00 | PIPE | |
| 1582.694 | 2938.967 | 1.707 | 2940.675 | 67.00 | 16.13 | 4.04 | 2944.71 | .00 | 2.62 | 2.97 | 3.000 | .000 | .00 | 1 | .0 |
| 22.263 | .0383 | | | | | .0248 | .55 | 1.71 | 2.40 | 1.52 | .013 | .00 | .00 | PIPE | |
| 1604.957 | 2939.819 | 1.776 | 2941.594 | 67.00 | 15.38 | 3.67 | 2945.27 | .00 | 2.62 | 2.95 | 3.000 | .000 | .00 | 1 | .0 |
| 16.049 | .0383 | | | | | .0220 | .35 | 1.78 | 2.23 | 1.52 | .013 | .00 | .00 | PIPE | |
| 1621.006 | 2940.433 | 1.848 | 2942.281 | 67.00 | 14.66 | 3.34 | 2945.62 | .00 | 2.62 | 2.92 | 3.000 | .000 | .00 | 1 | .0 |
| 12.060 | .0383 | | | | | .0195 | .23 | 1.85 | 2.06 | 1.52 | .013 | .00 | .00 | PIPE | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1633.066 | 2940.894 | 1.925 | 2942.819 | 67.00 | 13.98 | 3.03 | 2945.85 | .00 | 2.62 | 2.88 | 3.000 | .000 | .00 | 1 .0 |
| 9.239 | .0383 | | | | | .0173 | .16 | 1.93 | 1.91 | 1.52 | .013 | .00 | .00 | PIPE |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7-18-2022 Time:10:31:45

CEN2201 Soldo Memorial Park

'36Soldo'

Perimeter 36" Interception system

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1642.305 | 2941.248 | 2.007 | 2943.255 | 67.00 | 13.33 | 2.76 | 2946.01 | .00 | 2.62 | 2.82 | 3.000 | .000 | .00 | 1 .0 |
| 7.115 | .0383 | | | | | .0154 | .11 | 2.01 | 1.76 | 1.52 | .013 | .00 | .00 | PIPE |
| 1649.420 | 2941.520 | 2.095 | 2943.615 | 67.00 | 12.71 | 2.51 | 2946.12 | .00 | 2.62 | 2.75 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0144 | .00 | 2.10 | 1.62 | .64 | .013 | .00 | .00 | PIPE |
| 1649.440 | 2941.540 | 2.107 | 2943.647 | 67.00 | 12.63 | 2.48 | 2946.12 | .00 | 2.62 | 2.74 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0142 | .00 | 2.11 | 1.60 | .64 | .013 | .00 | .00 | PIPE |
| 1649.450 | 2941.550 | 2.114 | 2943.664 | 67.00 | 12.59 | 2.46 | 2946.12 | .00 | 2.62 | 2.74 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0141 | .00 | 2.11 | 1.59 | .64 | .013 | .00 | .00 | PIPE |
| 1649.460 | 2941.560 | 2.120 | 2943.680 | 67.00 | 12.55 | 2.44 | 2946.12 | .00 | 2.62 | 2.73 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0140 | .00 | 2.12 | 1.58 | .64 | .013 | .00 | .00 | PIPE |
| 1649.470 | 2941.570 | 2.127 | 2943.697 | 67.00 | 12.50 | 2.43 | 2946.12 | .00 | 2.62 | 2.73 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0139 | .00 | 2.13 | 1.57 | .64 | .013 | .00 | .00 | PIPE |
| 1649.480 | 2941.580 | 2.134 | 2943.714 | 67.00 | 12.46 | 2.41 | 2946.12 | .00 | 2.62 | 2.72 | 3.000 | .000 | .00 | 1 .0 |
| 2.656 | .0187 | | | | | .0137 | .04 | 2.13 | 1.56 | 1.91 | .013 | .00 | .00 | PIPE |
| 1652.136 | 2941.630 | 2.143 | 2943.773 | 67.00 | 12.40 | 2.39 | 2946.16 | .00 | 2.62 | 2.71 | 3.000 | .000 | .00 | 1 .0 |
| 20.358 | .0187 | | | | | .0129 | .26 | 2.14 | 1.55 | 1.91 | .013 | .00 | .00 | PIPE |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1672.493 | 2942.011 | 2.242 | 2944.253 | 67.00 | 11.82 | 2.17 | 2946.42 | .00 | 2.62 | 2.61 | 3.000 | .000 | .00 | 1 .0 |
| 12.423 | .0187 | | | | | .0116 | .14 | 2.24 | 1.41 | 1.91 | .013 | .00 | .00 | PIPE |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7-18-2022 Time:10:31:45

CEN2201 Soldo Memorial Park

'36Soldo'

Perimeter 36" Interception system

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1684.917 | 2942.244 | 2.351 | 2944.595 | 67.00 | 11.27 | 1.97 | 2946.57 | .00 | 2.62 | 2.47 | 3.000 | .000 | .00 | 1 .0 |
| 6.991 | .0187 | | | | | .0105 | .07 | 2.35 | 1.28 | 1.91 | .013 | .00 | .00 | PIPE |
| 1691.908 | 2942.375 | 2.473 | 2944.848 | 67.00 | 10.75 | 1.79 | 2946.64 | .00 | 2.62 | 2.28 | 3.000 | .000 | .00 | 1 .0 |
| 2.372 | .0187 | | | | | .0096 | .02 | 2.47 | 1.15 | 1.91 | .013 | .00 | .00 | PIPE |
| 1694.280 | 2942.420 | 2.615 | 2945.035 | 67.00 | 10.25 | 1.63 | 2946.67 | .00 | 2.62 | 2.01 | 3.000 | .000 | .00 | 1 .0 |
| JUNCT STR | 1.0000 | | | | | .0077 | .00 | 2.62 | 1.00 | | .013 | .00 | .00 | PIPE |
| 1694.290 | 2942.430 | 3.939 | 2946.368 | 52.80 | 7.47 | .87 | 2947.23 | .00 | 2.36 | .00 | 3.000 | .000 | .00 | 1 .0 |
| .010 | 1.0000 | | | | | .0063 | .00 | 3.94 | .00 | .57 | .013 | .00 | .00 | PIPE |
| 1694.300 | 2942.440 | 3.971 | 2946.411 | 52.80 | 7.47 | .87 | 2947.28 | .00 | 2.36 | .00 | 3.000 | .000 | .00 | 1 .0 |
| 49.495 | .0200 | | | | | .0063 | .31 | 3.97 | .00 | 1.61 | .013 | .00 | .00 | PIPE |
| 1743.795 | 2943.429 | 3.292 | 2946.721 | 52.80 | 7.47 | .87 | 2947.59 | .00 | 2.36 | .00 | 3.000 | .000 | .00 | 1 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 1743.795 | 2943.429 | 1.617 | 2945.046 | 52.80 | 13.59 | 2.87 | 2947.91 | .00 | 2.36 | 2.99 | 3.000 | .000 | .00 | 1 .0 |
| 113.952 | .0200 | | | | | .0184 | 2.09 | 1.62 | 2.10 | 1.61 | .013 | .00 | .00 | PIPE |
| 1857.746 | 2945.706 | 1.681 | 2947.386 | 52.80 | 12.96 | 2.61 | 2949.99 | .00 | 2.36 | 2.98 | 3.000 | .000 | .00 | 1 .0 |
| 45.061 | .0200 | | | | | .0162 | .73 | 1.68 | 1.95 | 1.61 | .013 | .00 | .00 | PIPE |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1902.807 | 2946.606 | 1.748 | 2948.354 | 52.80 | 12.35 | 2.37 | 2950.72 | .00 | 2.36 | 2.96 | 3.000 | .000 | .00 | 1 | .0 |
| 25.597 | .0200 | | | | | .0143 | .37 | 1.75 | 1.81 | 1.61 | .013 | .00 | .00 | PIPE | |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 7-18-2022 Time:10:31:45

CEN2201 Soldo Memorial Park

'36Soldo'

Perimeter 36" Interception system

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1928.405 | 2947.117 | 1.819 | 2948.936 | 52.80 | 11.78 | 2.15 | 2951.09 | .00 | 2.36 | 2.93 | 3.000 | .000 | .00 | 1 | .0 |
| 16.557 | .0200 | | | | | .0127 | .21 | 1.82 | 1.68 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1944.961 | 2947.448 | 1.894 | 2949.342 | 52.80 | 11.23 | 1.96 | 2951.30 | .00 | 2.36 | 2.89 | 3.000 | .000 | .00 | 1 | .0 |
| 11.244 | .0200 | | | | | .0113 | .13 | 1.89 | 1.55 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1956.205 | 2947.673 | 1.974 | 2949.646 | 52.80 | 10.71 | 1.78 | 2951.43 | .00 | 2.36 | 2.85 | 3.000 | .000 | .00 | 1 | .0 |
| 7.650 | .0200 | | | | | .0100 | .08 | 1.97 | 1.43 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1963.855 | 2947.826 | 2.059 | 2949.885 | 52.80 | 10.21 | 1.62 | 2951.50 | .00 | 2.36 | 2.78 | 3.000 | .000 | .00 | 1 | .0 |
| 4.989 | .0200 | | | | | .0089 | .04 | 2.06 | 1.32 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1968.844 | 2947.925 | 2.151 | 2950.076 | 52.80 | 9.73 | 1.47 | 2951.55 | .00 | 2.36 | 2.70 | 3.000 | .000 | .00 | 1 | .0 |
| 2.818 | .0200 | | | | | .0080 | .02 | 2.15 | 1.21 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1971.662 | 2947.982 | 2.251 | 2950.233 | 52.80 | 9.28 | 1.34 | 2951.57 | .00 | 2.36 | 2.60 | 3.000 | .000 | .00 | 1 | .0 |
| .918 | .0200 | | | | | .0072 | .01 | 2.25 | 1.11 | 1.61 | .013 | .00 | .00 | PIPE | |
| 1972.580 | 2948.000 | 2.362 | 2950.362 | 52.80 | 8.85 | 1.21 | 2951.58 | .00 | 2.36 | 2.46 | 3.000 | .000 | .00 | 1 | .0 |

# Lateral Sizing Computations

| | |
|---|---|
| **Project Name:** | Soldo Memorial Park |
| **Project Number:** | CEN2201.000 |
| **Date:** | July 2022 |
| **By:** | KC |

Westwood

## STORM DRAIN HYDRAULIC CALCULATIONS

| CONDUIT DATA | | | | | | | FLOW DATA | | | | | | | LOSS | HGL | | COMMENTS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STATION | | SIZE / TYPE | n Manning's Roughness | INVERTS | | LENGTH | A | R | Φ | Q | V | $H_V$ = | $S_f$ | PIPE | PIPE | | PRESS. FLOW? | OTHER |
| FROM | TO | | | D / S ELEV. | U / S ELEV. | | ($FT^2$) | (FT) | | (CFS) | (FPS) | $V^2/2g$ (FT) | (FT/FT) | $H_f$ (FT) | D/S HGL ELEV. | U/S HGL ELEV. | | |
| 1000 | 1060.89 | ROUND 18" RCP | 0.013 | 2922.99 | 2924.996 | 60.89 | 1.767146 | 0.375 | 0.004925 | 7 | 3.96119 | 0.243649 | 0.004422666 | 0.269 | 2926.92 | 2927.189 | Yes | Lateral from DI #3 |
| 1000 | 1083.50 | ROUND 18" RCP | 0.013 | 2926.42 | 2926.83 | 83.50 | 1.767146 | 0.375 | 0.004925 | 5 | 2.829421 | 0.124311 | 0.002256462 | 0.188 | 2927.92 | 2928.108 | No | Lateral from DI #4 |
| 1000 | 1060.39 | ROUND 18" RCP | 0.013 | 2927.64 | 2932.17 | 60.39 | 1.767146 | 0.375 | 0.004925 | 6 | 3.395306 | 0.179008 | 0.003249306 | 0.196 | 2934.60 | 2934.796 | Yes | Lateral from DI #5 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

$Sf = \Phi\ Hv / R^{1.33}$

$\Phi = 2g\ (n^2) / 2.21$

1 - Where pipes are not under pressure, assume U/S HGL is at top of pipe

# APPENDIX E

Finished Floor Analysis

## SOLDO MEMORIAL PARK AT SKYE CANYON
## FINISHED FLOOR - CITY OF LAS VEGAS JURISDICTION

| INPUT INFORMATION | | | | | FINISHED FLOORS | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| Lot Number | Hydraulic Section Utilized | T/C[1] (ft) | F/L[2] (ft) | $D_{100}$ (ft) | Flowline $F.F._{min}$[3] (ft) | T/C + 6" $F.F._{min}$[4] (ft) | $F.F._{Design}$ (ft) | Flowline Check | T/C + 6" Check | See References on Last Sheet |
| Restrooms | A | 3939.82 | 3939.32 | 0.58 | 3940.48 | 3940.32 | 3943.3 | OK | OK | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Where:**

1: Top of Curb at High Side of Lot

2: TC-0.38 ( For Roll Curb), TC-0.5 (For L Curb)

3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = ( 2 x $D_{100}$) + F/L

4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches

5: These lots have an adjacent solid grouted wall that protects the FF.

**City of Las Vegas Finished Floor Criteria:**

*-The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street. Per HCDDM, Section 304.4.*

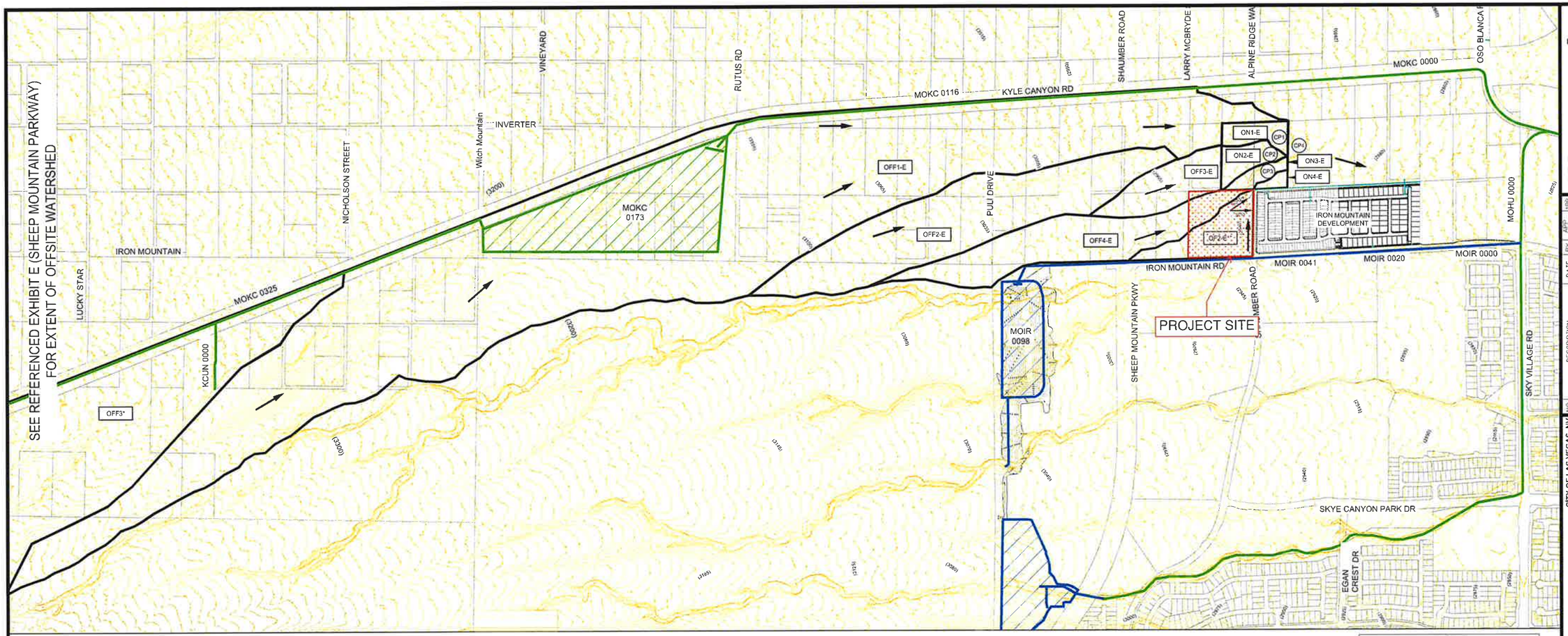
*-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb. Per HCDDM, Section 1602.*

# APPENDIX F

Reference Material
Technical Drainage Study for Alpine Ridge East
(DS 5564)

Referenced Drainage Exhibits

SEE REFERENCED EXHIBIT E (SHEEP MOUNTAIN PARKWAY) FOR EXTENT OF OFFSITE WATERSHED




| Existing Condition Flow Rate Summary | | | | |
|---|---|---|---|---|
| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
| OFF1-E | 302.5 | 0.47 | 325 | 98 |
| OFF2-E | 52.7 | 0.08 | 103 | 39 |
| OFF3-E | 11.7 | 0.02 | 29 | 11 |
| OFF4-E | 28.7 | 0.04 | 65 | 24 |
| ON1-E | 3.8 | 0.01 | 7 | 2 |
| ON2-E | 3.9 | 0.01 | 10 | 4 |
| ON3-E | 2.2 | 0.00 | 6 | 2 |
| ON4-E | 0.9 | 0.00 | 2 | 1 |
| OFF3* | 1013.8 | 1.58 | 756 | 229 |
| OF2-E** | 9.5 | 0.01 | 23 | 9 |
| SD10 (SD Collection from OF2-E**) | N/A | 0.01 | 9 | 9 |
| NORTH (Surface Flow from OF2-E**) | N/A | 0.01 | 14 | 0 |
| CP1 Q = OFF3* + OFF1-E + OFF2-E + ON1-E | N/A | 2.14 | 863 | 282 |
| CP2 Q = OFF3-E + ON2-E | N/A | 0.02 | 39 | 15 |
| CP3 Q = OFF4-E + ON3-E + NORTH | N/A | 0.06 | 84 | 26 |
| CP4 Q = CP1 + CP2 + CP3 | N/A | 2.23 | 876 | 291 |

* REFERENCED FROM SMP REPORT
** REFERENCED FROM IRON MOUNTAIN STUDY (DS-5508)

NOTES:
FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.

N

0 500 1000
SCALE = 1"=500' FEET

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- (ID) — FLOWMASTER SECTION
- ID — FACILITY ID
- MPU EXISTING FACILITY
- MPU CATEGORY A PROPOSED FACILITY
- MPU CATEGORY B PROPOSED FACILITY
- EXISTING LOCAL DRAINAGE FACILITY
- PROPOSED LOCAL DRAINAGE FACILITY
- FUTURE LOCAL (BY OTHERS) DRAINAGE FACILITY
- Q= CFS — FLOW SPLIT


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 DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

ALPINE RIDGE EAST

EXISTING CONDITION DRAINAGE MAP

S:01 T:19S R:59E

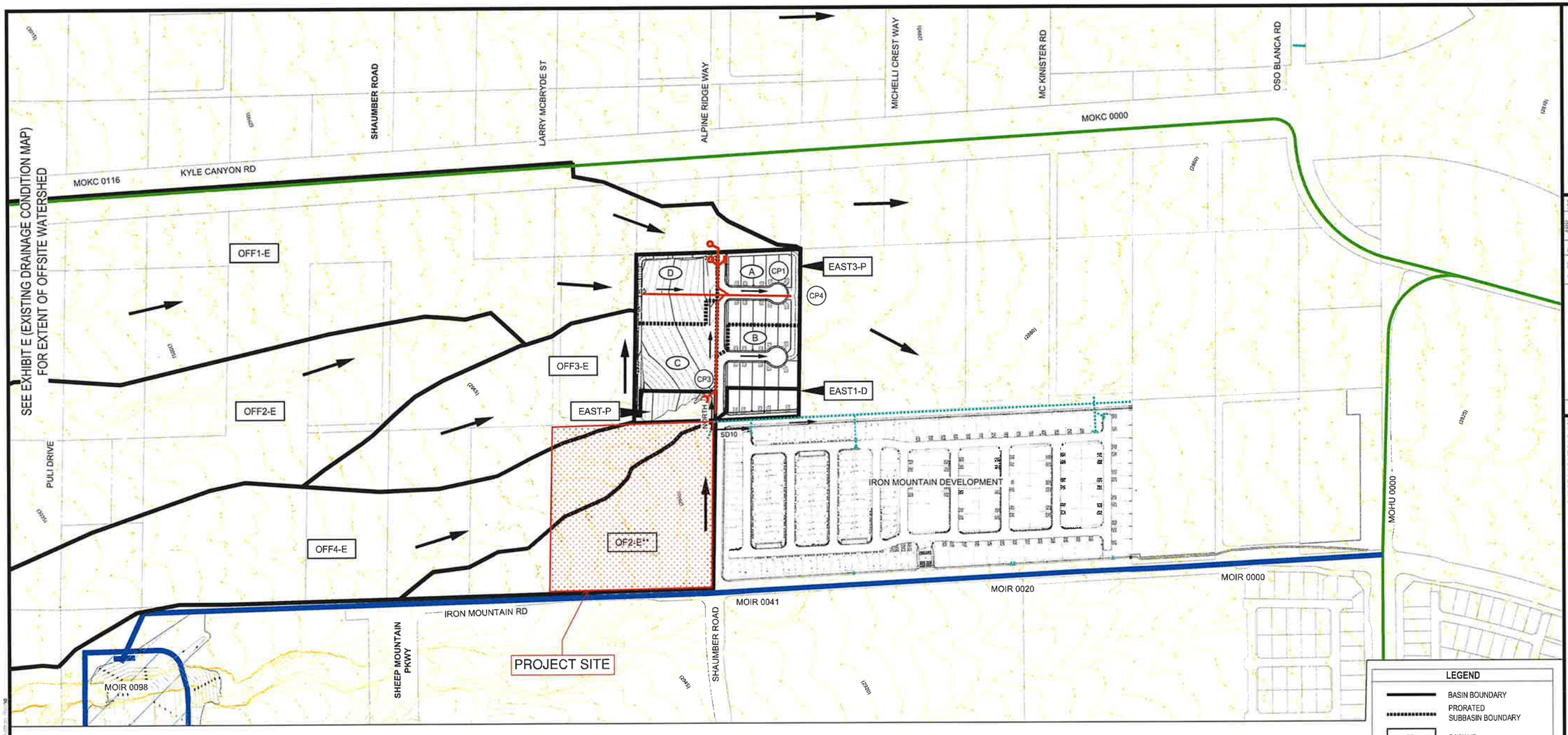
DATE: APRIL 2022
DRAFTER: JSR
DESIGNER: JSR
CHECKED: KC
PROJECT NO.
TRI2104.000

EXHIBIT E
SHEET 1 OF 1

REFERENCED FROM DS XXXX (ALPINE RIDGE EAST STUDY) TDS

X:\tri2104-000 alpine ridge east\drainage\technical study\figures-res\tri2104 - exhibit e (existing condition drainage map).dwg, 4/19/2022 11:31 AM, Jordan Rose

SEE EXHIBIT E (EXISTING DRAINAGE CONDITION MAP) FOR EXTENT OF OFFSITE WATERSHED




**AR East Condition Flow Rate Summary**

| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|---|
| OFF1-E | 302.5 | 0.47 | 325 | 98 |
| OFF2-E | 52.7 | 0.08 | 103 | 39 |
| OFF3-E | 11.7 | 0.02 | 29 | 11 |
| OFF4-E | 28.7 | 0.04 | 65 | 24 |
| EAST1-D | 0.9 | <0.01 | 3 | 1 |
| EAST2-P | 0.9 | <0.01 | 3 | 1 |
| EAST3-P | 9.1 | 0.01 | 20 | 7 |
| OFF3* | 1013.8 | 1.58 | 755 | 225 |
| OF2-E** | 9.5 | 0.01 | 23 | 9 |
| SD10 (SD Collection from OF2-E**) | N/A | 0.01 | 9 | 9 |
| NORTH (Surface Flow from OF2-E**) | N/A | 0.01 | 14 | 0 |
| CP1 Q = OFF3* + OFF1-E + OFF2-E + OFF3-E + EAST3-P | N/A | 2.14 | 867 | 285 |
| CP3 Q = OFF4-E + EAST2-P + NORTH | N/A | 0.05 | 80 | 25 |
| CP4 Q = CP1 + CP3 | N/A | 2.23 | 876 | 291 |

* REFERENCED FROM SMP REPORT
** REFERENCED FROM IRON MOUNTAIN STUDY (DS-5508)

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| EAST3-P | 20 | 7 | 9.1 | 2.2 | 0.8 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| EAST3-P(A) | 5.5 | 2.0 | 2.5 | 2.2 | 0.8 |
| EAST3-P(B) | 4.5 | 1.6 | 2.1 | 2.2 | 0.8 |
| EAST3-P(C) | 5.1 | 1.8 | 2.3 | 2.2 | 0.8 |
| EAST3-P(D) | 4.7 | 1.6 | 2.1 | 2.2 | 0.8 |
| ***TOTAL*** | ***20*** | ***7*** | ***9.1*** | | |

NOTES:
FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.




**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- (ID) — CONCENTRATION POINT ID
- FLOW DIRECTION
- (ID) — FLOWMASTER SECTION
- ID — FACILITY ID
- MPU EXISTING FACILITY
- MPU CATEGORY A PROPOSED FACILITY
- MPU CATEGORY B PROPOSED FACILITY
- EXISTING LOCAL DRAINAGE FACILITY
- PROPOSED LOCAL DRAINAGE FACILITY
- FUTURE LOCAL (BY OTHERS) DRAINAGE FACILITY
- Q= CFS / Q= CFS — FLOW SPLIT


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


| NO | DESCRIPTION | DATE | BY | APP DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

# TRI POINTE HOMES
## ALPINE RIDGE EAST
## AR EAST CONDITION DRAINAGE MAP

S 5TH
T 19S
R 59E

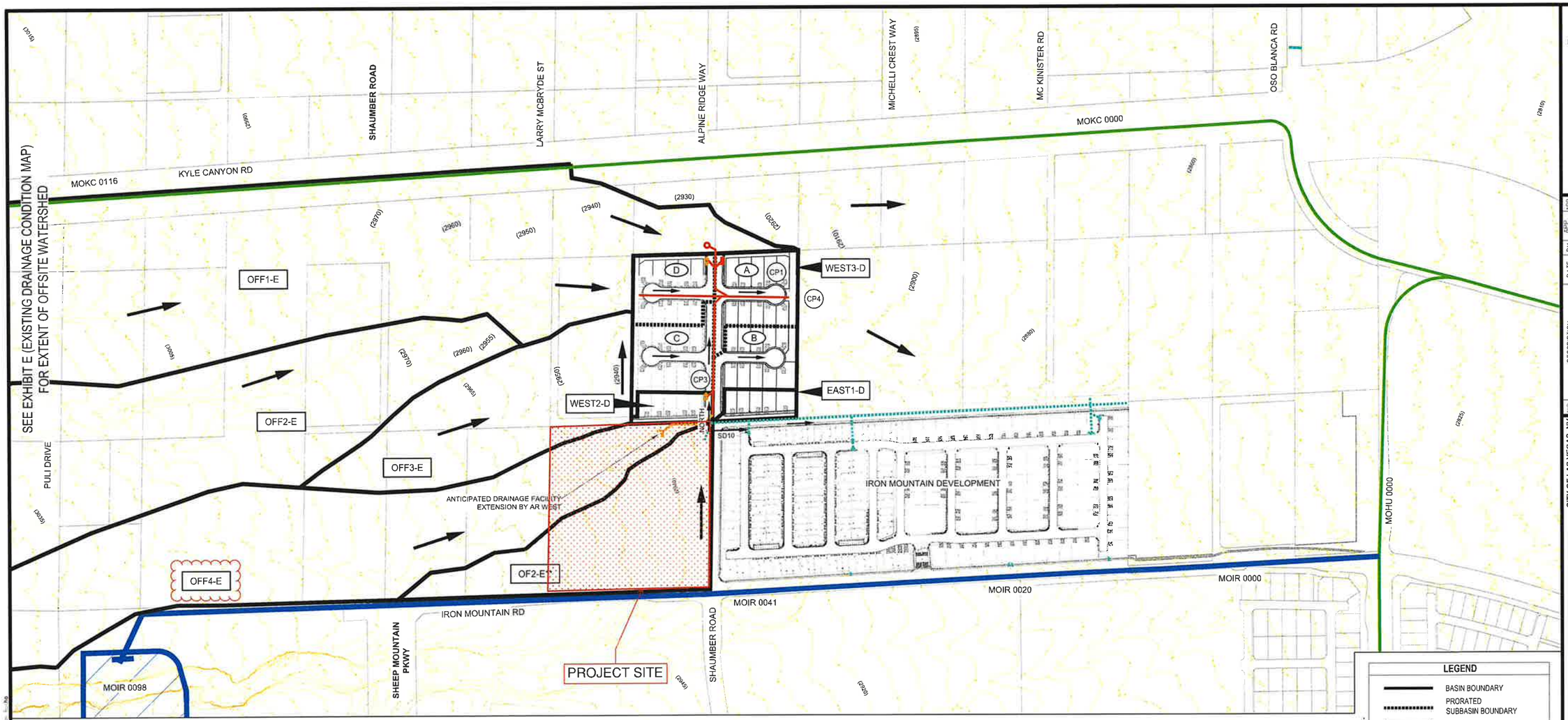
DATE: APRIL 2022
DRAFTER: JSR
DESIGNER: JSR
CHECKED: KC

PROJECT NO.
TRI2104.000

**EXHIBIT F**
SHEET 1 OF 1

REFERENCED FROM DS XXXX (ALPINE RIDGE EAST STUDY) TDS


X:\2104-000 alpine ridge east\Civil\Drainage\Exhibits\Exhibit F.dwg, 4/26/2022 2:27:24 PM, jsr




**AR West Condition Flow Rate Summary**

| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|---|
| OFF1-E | 302.5 | 0.47 | 325 | 98 |
| OFF2-E | 52.7 | 0.08 | 103 | 39 |
| OFF3-E | 11.7 | 0.02 | 29 | 11 |
| OFF4-E | 28.7 | 0.04 | 65 | 24 |
| EAST1-D | 0.9 | <0.01 | 3 | 1 |
| WEST2-D | 0.9 | <0.01 | 3 | 1 |
| WEST3-D | 9.1 | 0.01 | 24 | 10 |
| OFF3* | 1013.8 | 1.58 | 755 | 225 |
| OF2-E** | 9.5 | 0.01 | 23 | 9 |
| SD10 (SD Collection from OF2-E**) | N/A | 0.01 | 9 | 9 |
| NORTH (Surface Flow from OF2-E**) | N/A | 0.01 | 14 | 0 |
| CP1 Q = OFF3* + OFF1-E + OFF2-E +OFF3-E + WEST3-D | N/A | 2.14 | 867 | 286 |
| CP3 Q = OFF4-E + WEST2-D + NORTH | N/A | 0.05 | 81 | 25 |
| CP4 Q = CP1 + CP3 | N/A | 2.23 | 876 | 292 |

* REFERENCED FROM SMP REPORT
** REFERENCED FROM IRON MOUNTAIN STUDY (DS-5508)

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| WEST3-D | 24 | 10 | 9.1 | 2.7 | 1.1 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| WEST3-D(A) | 7 | 3 | 2.5 | 2.7 | 1.1 |
| WEST3-D(B) | 5 | 2 | 2.1 | 2.7 | 1.1 |
| WEST3-D(C) | 6 | 3 | 2.3 | 2.7 | 1.1 |
| WEST3-D(D) | 6 | 2 | 2.1 | 2.7 | 1.1 |
| ***TOTAL*** | ***24*** | ***10*** | ***9.1*** | | |

NOTES:
FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID
- MPU EXISTING FACILITY
- MPU CATEGORY A PROPOSED FACILITY
- MPU CATEGORY B PROPOSED FACILITY
- EXISTING LOCAL DRAINAGE FACILITY
- PROPOSED LOCAL DRAINAGE FACILITY
- FUTURE LOCAL (BY OTHERS) DRAINAGE FACILITY
- Q= CFS / Q= CFS — FLOW SPLIT

0 200 400
SCALE — 1"=200' FEET


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 | ACCP DATE | APP |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

ALPINE RIDGE EAST

AR WEST CONDITION DRAINAGE MAP

S 01
T 19S
R 59E

DATE: APRIL 2022
DRAFTER: JSR
DESIGNER: JSR
CHECKED: KC
PROJECT NO.
TRI2104.000

**EXHIBIT G**
SHEET 1 OF 1

REFERENCED FROM DS XXXX (ALPINE RIDGE EAST STUDY) TDS

SEE EXHIBIT E (EXISTING DRAINAGE CONDITION MAP) FOR EXTENT OF OFFSITE WATERSHED

MOKC 0116 KYLE CANYON RD

SHAUMBER ROAD

LARRY MCBRYDE ST

ALPINE RIDGE WAY

MICHELLI CREST WAY

MC KINISTER RD

OSO BLANCA RD

MOKC 0000

OFF1-D

FUTURE SHEEP MOUNTAIN PARKWAY DRAINAGE FACILITIES

OFF7-D

AR1-U

OFF8-D

WEST3-D

CP1 CP2 CP3 CP4 CP5 CP6

A B C D

OFF5-D

WEST2-D

EAST1-D

NORTH

SD10

OFF2-D

OFF6-D

PULI DRIVE

FUTURE SHEEP MOUNTAIN PARKWAY DRAINAGE FACILITIES

ANTICIPATED DRAINAGE FACILITY EXTENSION BY AR WEST

OFF3-D

IRON MOUNTAIN DEVELOPMENT

MOHU 0000

OFF4-D

MOIR 0000

MOIR 0020

MOIR 0041

IRON MOUNTAIN RD

SHEEP MOUNTAIN PKWY

SHAUMBER ROAD

MOIR 0098

PROJECT SITE

**Potential Condition Flow Rate Summary**

| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|---|
| OFF1-D | 288.5 | 0.45 | 409 | 149 |
| OFF2-D | 55.1 | 0.09 | 136 | 57 |
| OFF3-D | 9.6 | 0.01 | 20 | 7 |
| OFF4-D | 24.5 | 0.04 | 59 | 24 |
| OFF5-D | 19.3 | 0.03 | 25 | 10 |
| OFF6-D | 10.5 | 0.02 | 31 | 13 |
| OFF7-D | 11.3 | 0.02 | 20 | 6 |
| OFF8-D | 0.4 | <0.01 | 1 | 0 |
| EAST1-D | 0.9 | <0.01 | 3 | 1 |
| WEST2-D | 0.9 | <0.01 | 3 | 1 |
| WEST3-D | 9.1 | 0.01 | 24 | 10 |
| AR1-U | 0.8 | <0.01 | 2 | 1 |
| OFF3* | 1013.8 | 1.58 | 755 | 225 |
| SD10 (SD Collection from OFF3-D + OFF4-D) | N/A | 0.01 | 9 | 9 |
| NORTH (Surface Flow from OFF3-D + OFF4-D) | N/A | 0.01 | 70 | 21 |
| CP1 Q = OFF3* + OFF1-D + OFF2-D | N/A | 2.12 | 852 | 290 |
| CP2 Q = CP1 + OFF5-D + OFF6-D + WEST3-D | N/A | 2.17 | 864 | 296 |
| CP3 Q = OFF7-D + AR1-U | N/A | 0.02 | 22 | 6 |
| CP4 Q = NORTH + WEST2-D | N/A | 0.05 | 72 | 22 |
| CP5 Q = CP2 + CP3 + CP4 | N/A | 2.26 | 872 | 298 |
| CP6 Q = CP5 + OFF8-D | N/A | 2.26 | 872 | 298 |

* REFERENCED FROM SMP REPORT

** REFERENCED FROM IRON MOUNTAIN STUDY (DS-5508)

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| OFF4-D | 59 | 24 | 24.5 | 2.4 | 1.0 |
| WEST3-D | 24 | 10 | 9.1 | 2.7 | 1.1 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| OFF4-D(A) | 39 | 16 | 16.1 | 2.4 | 1.0 |
| OFF4-D(B) | 20 | 8 | 8.4 | 2.4 | 1.0 |
| ***TOTAL*** | ***59*** | ***24*** | ***24.5*** | | |
| WEST3-D(A) | 7 | 3 | 2.5 | 2.7 | 1.1 |
| WEST3-D(B) | 5 | 2 | 2.1 | 2.7 | 1.1 |
| WEST3-D(C) | 6 | 3 | 2.3 | 2.7 | 1.1 |
| WEST3-D(D) | 6 | 2 | 2.1 | 2.7 | 1.1 |
| ***TOTAL*** | ***24*** | ***10*** | ***9.1*** | | |

NOTES:

FUTURE PLANNED MPU FACILITIES ARE NOT CONSIDERED COMPLETE DURING THE DRAINAGE CONDITION PRESENTED ON THIS EXHIBIT. THEY ARE DISPLAYED ONLY FOR SPATIAL REFERENCE FOR WATERSHED COMPARISON WITH THE OTHER DRAINAGE CONDITIONS.

N

0 200 400

SCALE - 1"=200' FEET

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- (ID) — PRORATED SUBBASIN ID
- (ID) — CONCENTRATION POINT ID
- FLOW DIRECTION
- (ID) — FLOWMASTER SECTION
- ID — FACILITY ID
- MPU EXISTING FACILITY
- MPU CATEGORY A PROPOSED FACILITY
- MPU CATEGORY B PROPOSED FACILITY
- EXISTING LOCAL DRAINAGE FACILITY
- PROPOSED LOCAL DRAINAGE FACILITY
- FUTURE LOCAL (BY OTHERS) DRAINAGE FACILITY
- Q= CFS / Q= CFS — FLOW SPLIT


Westwood

Phone (702) 284-5300
Fax (702) 284-5399

5725 W. Badura Ave
Suite 100
Las Vegas, NV 89118
westwoodps.com

Westwood Professional Services, Inc.


| NO | DESCRIPTION | DATE | BY | APP. DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

ALPINE RIDGE EAST

POTENTIAL CONDITION DRAINAGE MAP

S 01
T 19S
R 59E

DATE: APRIL 2022

DRAFTER: JSR

DESIGNER: JSR

CHECKED: KC

PROJECT NO.
TRI2104.000

**EXHIBIT H**

SHEET 1 OF 1

REFERENCED FROM DS XXXX (ALPINE RIDGE EAST STUDY) TDS




**Recommended Flood Control Facilities Summary**

| Facility ID | Facility Description | AR East Condition | | | AR West Condition | | | Potential Condition | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Source of Flow | $Q_{100}$ (cfs) | Notes | Source of Flow | $Q_{100}$ (cfs) | Notes | Source of Flow | $Q_{100}$ (cfs) | Notes |
| **MAIN System*** | | | | | | | | | | |
| P1A | Proposed 16' X 5' RCB | CP4 | 876 | Improved inlet to reduce headwater depth | CP4 | 876 | Improved inlet to reduce headwater depth | CP6 | 872 | Improved inlet to reduce headwater depth |
| P1B | Proposed RCB transition | CP4 | 876 | | CP4 | 876 | | CP6 | 872 | |
| P1 | Proposed 12' X 5' RCB | CP4 | 876 | | CP4 | 876 | | CP6 | 872 | |
| P2 | Proposed 12' X 5' RCB | CP4 | 876 | | CP4 | 876 | | CP6 | 872 | |
| P3 | Proposed 12' X 5' RCB | CP4 | 876 | | CP4 | 876 | | CP6 | 872 | |
| P4 | Proposed 12' X 5' RCB | CP4 | 876 | | CP4 | 876 | | CP6 | 872 | |
| **NORTH System** | | | | | | | | | | |
| P5A | Proposed 60" RCP | North PL (RAS 2D Section) | 243 | Temporary open sump inlet | North PL (RAS 2D Section) | 243 | Temporary open sump inlet | CP3 | 22 | To be extended as future SD system (by others) |
| P5C | Proposed 18" RCP | EAST3-P(C + D) | 5 | Temporary open sump inlet | Temporary open sump is replaced by future curb inlet by AR West (See DI#2) | | | Temporary open sump is replaced by future curb inlet by AR West (See DI#2) | | |
| P5B | Proposed 60" RCP | P5A + P5C + DI#3 | 250 | | P5A + DI#2 + DI#3 | 258 | | P5A + DI#2 + DI#3 | 37 | |
| **SOUTH System** | | | | | | | | | | |
| F1 | Future 36" RCP (by others) | Not yet Constructed | | | CP3 - WEST2-D | 78 | | CP4 - WEST2-D | 69 | |
| P6B | Proposed 36" RCP | CP3 | 80 | Temporary open sump inlet | Temporary open sump is replaced by future curb inlet by AR West (See DI#1) | | | Temporary open sump is replaced by future curb inlet by AR West (See DI#1) | | |
| P6 | Proposed 36" RCP | N/A | - | Capped in AR East Condition | CP3 - WEST2-D | 78 | | CP4 - WEST2-D | 69 | |
| P7 | Proposed 36" RCP | CP3 | 80 | | P6 + DI#1 | 80 | | P6 + DI#1 | 71 | |

* MAIN system conservatively assumes the entire CP flow without breakout flows to the NORTH System

**Proposed AR West Condition**
**100-Year Street Flow Summary**

| Section ID | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|
| 1<br>Q = WEST3-D(A) | 7 | 1.00 | 0.38 | 2.27 | 0.9 |
| 2<br>Q = WEST3-D(B) | 5 | 2.00 | 0.32 | 2.76 | 0.9 |
| 5<br>Q = WEST2-D | 3 | 1.52 | 0.34 | 2.62 | 0.9 |
| 6<br>Q = DI#1 Bypass + WEST3-D(C) | 7 | 1.39 | 0.43 | 3.09 | 1.3 |
| 7<br>Q = DI#1 Bypass + WEST3-D(C+D) | 13 | 1.39 | 0.53 | 3.35 | 1.8 |
| 8<br>Q = WEST3-D(B) | 5 | 1.52 | 0.39 | 2.95 | 1.2 |
| 9<br>Q = WEST3-D(A) | 7 | 1.39 | 0.43 | 3.09 | 1.3 |
| RA<br>Q = EAST1-D | 3 | 3.73 | 0.31 | 3.67 | 1.1 |

Section 3 & Section 4 are not utilized

REFERENCED FOR PROJECT SITE EXISTING CONDITION

**Proposed AR-West Condition**
**10-Year Street Flow Summary**

| Section ID | $Q_{10}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV | Dry Lane (ft) |
|---|---|---|---|---|---|---|
| 5<br>Q = WEST2-D | 1 | 1.52 | 0.26 | 2.08 | 0.5 | 25.5 |
| 6<br>Q= WEST3-D(C) + Bypass DI#1 | 3 | 1.39 | 0.34 | 2.54 | 0.9 | 21.5 |
| 7<br>Q = WEST3-D(C+D) + Bypass DI#1 | 5 | 1.39 | 0.39 | 2.85 | 1.1 | 19.0 |
| 8<br>Q = WEST3-D(B) | 3 | 1.52 | 0.34 | 2.62 | 0.9 | 21.5 |
| 9<br>Q = WEST3-D(A) | 3 | 1.39 | 0.34 | 2.54 | 0.9 | 21.5 |

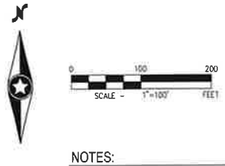
REFERENCED FOR PROJECT SITE POST-PROJECT

**Recommended Flood Control Facility Summary**

| Facility ID | Facility Description | Drainage Condition | Source of Flow | Total/Approaching Flow (cfs) $Q_{100}/Q_{10}$ | Facility Flow (cfs) $Q_{100}/Q_{10}$ | Surface/Bypass Flow (cfs) Q100/Q10 |
|---|---|---|---|---|---|---|
| DI#1 | Future 5.0-ft Inlet with Proposed 36" RCP Lateral | AR West | WEST2-D | 3/1 | 2/1 | 1/0 |
| DI#2 | Future 7.5-ft Inlet with Proposed 18" RCP Lateral | AR West | WEST3-D(C+D) + Bypass DI#1 | 13/5 | 13/5 | 0/0 |
| DI#3 | 5.0-ft Type CM2 Inlet with Proposed 18" RCP Lateral | Potential | AR1-U | 2/1 | 2/1 | 0/0 |
| DI#4 | 5.0-ft Type CM2 Inlet with Proposed 18" RCP Lateral | AR East | WEST3-D(A) | 7/3 | 7/3 | 0/0 |

**Drainage Easement Hydraulic Summary**

| Section ID | Drainage Condition | $Q_{100}$ (cfs) | Width (ft) | Slope (%) | Type of Analysis | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|---|---|
| E1<br>Q = WEST3-D(B) | AR West | 5 | 32 | 7.15 | Normal Depth | 0.05 | 3.27 |
| | | | | | Weir | 0.14 | N/A |
| E2 (Emergency Overflow)<br>Q = OFF8-D + DI(#2 + #3) | Potential | 16 | 20 | 2.29 | Normal Depth | 0.29 | 5.72 |
| | | | | | Weir | 0.41 | N/A |
| E3<br>Q = OFF8-D | Potential | 31 | 25 | 0.50 | Normal Depth | 0.60 | 4.47 |




NOTES:

1. HYDRAULIC ANALYSIS HAVE BEEN ANALYZED WITH WORST-CASE CONDITION FLOWRATES OBTAINED FROM AR EAST, AR WEST AND POTENTIAL CONDITIONS. REFER TO EXHIBITS E, F, AND G, RESPECTIVELY FOR SUMMARY TABLES OF BASIN AND CONCENTRATION POINTS.
2. BASINS SHOWN ON THIS EXHIBIT ARE FROM AR-WEST CONDITION, WITH AR-EAST FOR ONSITE BASINS UNDERNEATH, WHERE APPLICABLE.

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID
- MPU EXISTING FACILITY
- MPU CATEGORY A PROPOSED FACILITY
- MPU CATEGORY B PROPOSED FACILITY
- EXISTING LOCAL DRAINAGE FACILITY
- PROPOSED LOCAL DRAINAGE FACILITY
- FUTURE LOCAL (BY OTHERS) DRAINAGE FACILITY
- FUTURE REMOVED/REPLACED DRAINAGE FACILITY
- Q= CFS — FLOW SPLIT (Q= CFS)


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. DATE | APP. |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

ALPINE RIDGE EAST

ONSITE FACILITIES & CROSS SECTION MAP

S01 R59E

DATE: APRIL 2022
DRAFTER: JSR
DESIGNER: JSR
CHECKED: KC
PROJECT NO.
TRI2104.000

**EXHIBIT I**
SHEET 1 OF 1

DS XXXX TDS MAPS - REFERENCED FOR DOWNSTREAM DRAINAGE FACILITIES

J:\Tri2104-000 alpine ridge east\drainage\technical study\figures-ras\tri2104 drwg 104 facilities sections mpp.dwg 4/25/2022 3:47 PM Jonathon Richa

# Referenced Hydrology

Referenced from TDS

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   16MAR22  TIME  11:49:56   *
*                                       *
*****************************************
```


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


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

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***
                    *DIAGRAM
               1    ID     WESTWOOD PROFESSIONAL SERVICES
               2    ID     ALPINE RIDGE EAST
               3    ID     AR EAST DRAINAGE CONDITION
               4    ID
               5    ID     RETURN PERIOD ------- 100-YR
               6    ID     DISTRIBUTION -------- 6-HOUR SDN3
               7    ID     PROJECT NO. --------- TRI2104
               8    ID     FILENAME ------------ AR-EAST.H1
               9    ID     DATE ---------------- APRIL 2022
              10    ID     MODELED BY ---------- JR/PK
              11    ID
              12    ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
              13    ID        DRAINAGE AREA (MI^2)    DARF
              14    ID        0.0-0.49                1.00
              15    ID        0.5-0.99                0.98
              16    ID        1.0-1.99                0.97
              17    ID        2.0-3.99                0.93
              18    ID        10-YR                   0.54
              19    ID
              20    IT       5       0       0     300
              21    IO       5       0       0
              22    IN       5       0       0
              23    JR    PREC    1.00    0.98    0.97    0.93    0.54
                    *

              24    KK    OFF3
              25    BA   1.584
              26    PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              27    PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              28    PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              29    PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              30    PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              31    PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              32    PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              33    PC   0.998   0.999   1.000
              34    PB    3.43
              35    LS       0    79.3
              36    UD   0.938
                    *

              37    KK   ROFF3
              38    KM   ROUTE OFF3 TO CP1
              39    KM   NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
              40    RD    8500   0.034   0.025       0    TRAP      32       3
                    *
```

```
   41          KK  OFF1-E
   42          BA  0.4726
   43          PB    3.00
   44          LS       0    82.5
   45          UD   0.512
               *
```



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

   46          KK EAST3-P
   47          BA  0.0141
   48          PB    3.00
   49          LS       0    85.6
   50          UD   0.105
               *

   51          KK  DUMMY1
   52          HC       3
               *

   53          KK  OFF2-E
   54          BA  0.0823
   55          PB    3.00
   56          LS       0    88.0
   57          UD   0.248
               *

   58          KK  OFF3-E
   59          BA  0.0182
   60          PB    3.00
   61          LS       0    88.0
   62          UD   0.108
               *

   63          KK     CP1
   64          HC       3
               *

   65          KK  OFF4-E
   66          BA  0.0448
   67          PB    3.00
   68          LS       0    88.0
   69          UD   0.174
               *

   70          KK EAST2-P
   71          BA  0.0013
   72          PB    3.00
   73          LS       0    94.0
   74          UD   0.050
               *

   75          KK  OF2-E*
   76          KM   REFERENCED FROM IRON MOUNTAIN DEVELOPMENT
   77          BA  0.0148
   78          PB    3.00
   79          LS       0    88.0
   80          UD   0.123
               *
```



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

   81          KK   NORTH
   82          KM   ONLY 10-YR STORM DRAIN TO DRAIN EAST IN RADLEY AVE
   83          KM   LEFTOVER 100-YR FLOW TO DRAIN NORTH IN ALPINE RIDGE WAY
   84          DT    SD10
   85          DI       0       9      30
   86          DQ       0       9       9
               *

   87          KK     CP3
   88          HC       3
               *

   89          KK     CP4
   90          HC       2
               *

   91          KK EAST1-D
   92          BA  0.0013
   93          PB    3.00
   94          LS       0    91.0
```

```
          95          UD   0.065
                      *
          96          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    24        OFF3
                V
                V
    37        ROFF3
                .
                .
    41          .      OFF1-E
                .          .
                .          .
    46          .      .     EAST3-P
                .      .          .
                .      .          .
    51        DUMMY1.....................
                .
                .
    53          .      OFF2-E
                .          .
                .          .
    58          .      .      OFF3-E
                .      .          .
                .      .          .
    63          CP1.....................
                .
                .
    65          .   OFF4-E
                .      .
                .      .
    70          .      .      EAST2-P
                .      .          .
                .      .          .
    75          .      .      .      OF2-E*
                .      .      .          .
                .      .      .          .
    84          .      .      .          .-------->    SD10
    81          .      .      .       NORTH
                .      .      .          .
                .      .      .          .
    87          .      CP3.....................
                .      .
                .      .
    89          CP4.............
                .
                .
    91          .      EAST1-D

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *               JUN   1998             *
 *            VERSION 4.1               *
 *                                      *
 *  RUN DATE   16MAR22  TIME  11:49:56  *
 *                                      *
 ****************************************

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

WESTWOOD PROFESSIONAL SERVICES
ALPINE RIDGE EAST
AR EAST DRAINAGE CONDITION

RETURN PERIOD ------- 100-YR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- TRI2104
FILENAME ------------ AR-EAST.H1
DATE ---------------- APRIL 2022
MODELED BY ---------- JR/PK

   SIX HOUR DEPTH-AREA REDUCTION FACTORS
   DRAINAGE AREA (MI^2)    DARF
   0.0-0.49                1.00
   0.5-0.99                0.98
   1.0-1.99                0.97
```

| | |
|---|---|
| 2.0-3.99 | 0.93 |
| 10-YR | 0.54 |

21 IO OUTPUT CONTROL VARIABLES

| | | |
|---|---|---|
| IPRNT | 5 | PRINT CONTROL |
| IPLOT | 0 | PLOT CONTROL |
| QSCAL | 0. | HYDROGRAPH PLOT SCALE |

IT HYDROGRAPH TIME DATA

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

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .98 .97 .93 .54

1

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

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00 | RATIO 2 .98 | RATIO 3 .97 | RATIO 4 .93 | RATIO 5 .54 |
|---|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 700. | 225. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.50 |
| ROUTED TO | | | | | | | | | |
| + | ROFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 701. | 225. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.75 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF1-E | .47 | 1 | FLOW | 325. | 315. | 309. | 288. | 98. |
| | | | | TIME | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| HYDROGRAPH AT | | | | | | | | | |
| + | EAST3-P | .01 | 1 | FLOW | 20. | 20. | 20. | 18. | 7. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | DUMMY1 | 2.07 | 1 | FLOW | 966. | 932. | 915. | 848. | 273. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF2-E | .08 | 1 | FLOW | 103. | 101. | 99. | 93. | 39. |
| | | | | TIME | 3.67 | 3.67 | 3.67 | 3.67 | 3.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3-E | .02 | 1 | FLOW | 29. | 28. | 28. | 26. | 11. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP1 | 2.17 | 1 | FLOW | 986. | 951. | 934. | 867. | 285. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF4-E | .04 | 1 | FLOW | 65. | 63. | 62. | 58. | 24. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | EAST2-P | .00 | 1 | FLOW | 3. | 3. | 3. | 3. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

```
 HYDROGRAPH AT
+                OF2-E*       .01     1   FLOW          23.      23.      22.      21.       9.
                                          TIME          3.58     3.58     3.58     3.58     3.58

 DIVERSION TO
+                  SD10       .01     1   FLOW           9.       9.       9.       9.       9.
                                          TIME          3.33     3.33     3.33     3.33     3.58

 HYDROGRAPH AT
+                 NORTH       .01     1   FLOW          14.      14.      13.      12.       0.
                                          TIME          3.58     3.58     3.58     3.58      .00

  3 COMBINED AT
+                   CP3       .06     1   FLOW          80.      78.      77.      72.      25.
                                          TIME          3.58     3.58     3.58     3.58     3.58

  2 COMBINED AT
+                   CP4      2.23     1   FLOW         994.     959.     943.     876.     291.
                                          TIME          4.42     4.50     4.50     4.50     4.67

 HYDROGRAPH AT
+               EAST1-D       .00     1   FLOW           3.       3.       3.       2.       1.
                                          TIME          3.50     3.50     3.50     3.50     3.50
1
                                  SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                      (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                                COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                     PEAK                                       PEAK

                               (MIN)      (CFS)      (MIN)      (IN)     (MIN)      (CFS)      (MIN)       (IN)

        FOR PLAN = 1  RATIO=  .00
           ROFF3  MANE          5.00     796.24     275.00      1.53      5.00     796.24     275.00       1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           ROFF3  MANE          5.00     768.88     275.00      1.48      5.00     768.88     275.00       1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           ROFF3  MANE          5.00     755.25     275.00      1.45      5.00     755.25     275.00       1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           ROFF3  MANE          5.00     701.11     275.00      1.35      5.00     701.11     275.00       1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR=    .0

        FOR PLAN = 1  RATIO=  .00
           ROFF3  MANE          5.00     224.93     285.00       .45      5.00     224.93     285.00        .45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR=   -.1



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

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   24MAR22  TIME  22:10:26   *
*                                       *
*****************************************
```

Referenced from TDS

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***
                  *DIAGRAM
             1    ID     WESTWOOD PROFESSIONAL SERVICES
             2    ID     ALPINE RIDGE EAST
             3    ID     AR WEST DRAINAGE CONDITION
             4    ID
             5    ID     RETURN PERIOD ------- 100-YR
             6    ID     DISTRIBUTION -------- 6-HOUR SDN3
             7    ID     PROJECT NO. --------- TRI2104
             8    ID     FILENAME ------------ AR-WEST.H1
             9    ID     DATE ---------------- APRIL 2022
            10    ID     MODELED BY ---------- JR/PK
            11    ID
            12    ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
            13    ID        DRAINAGE AREA (MI^2)    DARF
            14    ID        0.0-0.49                1.00
            15    ID        0.5-0.99                0.98
            16    ID        1.0-1.99                0.97
            17    ID        2.0-3.99                0.93
            18    ID        10-YR                   0.54
            19    ID
            20    IT      5       0       0     300
            21    IO      5       0       0
            22    IN      5       0       0
            23    JR    PREC    1.00    0.98    0.97    0.93    0.54
                  *

            24    KK    OFF3
            25    BA   1.584
            26    PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            27    PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
            28    PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
            29    PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
            30    PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
            31    PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
            32    PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
            33    PC   0.998   0.999   1.000
            34    PB    3.43
            35    LS       0    79.3
            36    UD   0.938
                  *

            37    KK   ROFF3
            38    KM   ROUTE OFF3 TO CP1
            39    KM   NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
            40    RD    8500   0.034   0.025       0    TRAP      32       3
                  *

            41    KK  OFF1-E
            42    BA  0.4726
            43    PB    3.00
            44    LS       0    82.5
            45    UD   0.512
                  *
```

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

   46         KK WEST3-D
   47         BA  0.0141
   48         PB    3.00
   49         LS       0    89.1
   50         UD   0.097
              *

   51         KK  DUMMY1
   52         HC       3
   53         KO       1
              *

   54         KK  OFF2-E
   55         BA  0.0823
   56         PB    3.00
   57         LS       0    88.0
   58         UD   0.248
   59         KO       1
              *

   60         KK  DUMMY2
   61         HC       2
   62         KO       1
              *

   63         KK  OFF3-E
   64         BA  0.0182
   65         PB    3.00
   66         LS       0    88.0
   67         UD   0.108
   68         KO       1
              *

   69         KK     CP1
   70         HC       2
              *

   71         KK  OFF4-E
   72         BA  0.0448
   73         PB    3.00
   74         LS       0    88.0
   75         UD   0.174
              *

   76         KK WEST2-D
   77         BA  0.0013
   78         PB    3.00
   79         LS       0    91.0
   80         UD   0.066
              *
```



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

   81         KK  OF2-E*
   82         KM   REFERENCED FROM IRON MOUNTAIN DEVELOPMENT
   83         BA  0.0148
   84         PB    3.00
   85         LS       0    88.0
   86         UD   0.123
              *

   87         KK   NORTH
   88         KM   ONLY 10-YR STORM DRAIN TO DRAIN EAST IN RADLEY AVE
   89         KM   LEFTOVER 100-YR FLOW TO DRAIN NORTH IN ALPINE RIDGE WAY
   90         DT    SD10
   91         DI       0       9      30
   92         DQ       0       9       9
              *

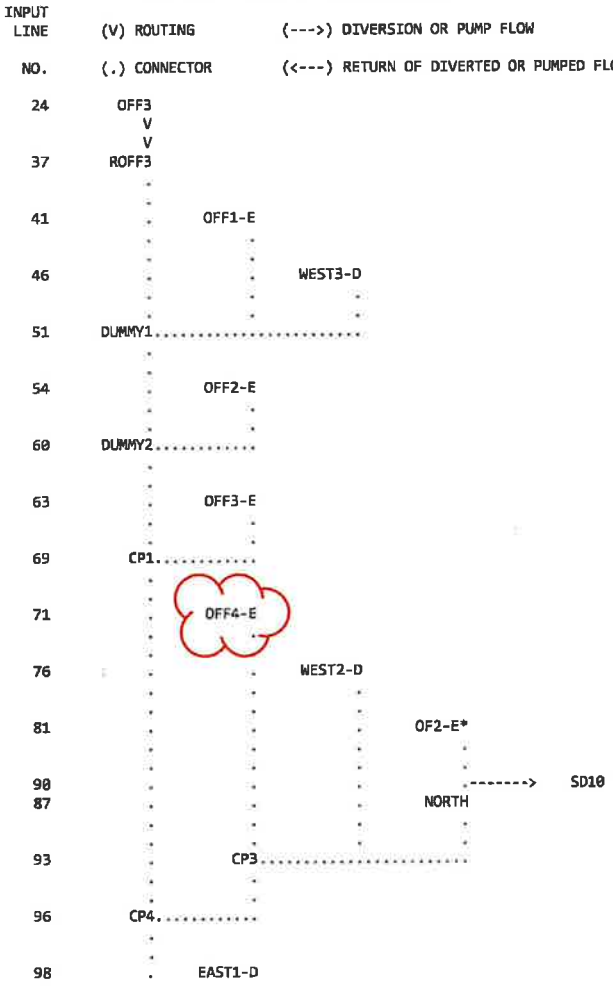
   93         KK     CP3
   94         HC       3
   95         KO       1
              *

   96         KK     CP4
   97         HC       2
              *

   98         KK EAST1-D
   99         BA  0.0013
  100         PB    3.00
  101         LS       0    91.0
  102         UD   0.065
              *
  103         ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK




(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

```
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   24MAR22  TIME  22:10:26  *
*                                      *
**************************************
```

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

WESTWOOD PROFESSIONAL SERVICES
ALPINE RIDGE EAST
AR WEST DRAINAGE CONDITION

RETURN PERIOD ------- 100-YR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- TRI2104
FILENAME ------------ AR-WEST.H1
DATE ---------------- APRIL 2022
MODELED BY ---------- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS

| DRAINAGE AREA (MI^2) | DARF |
|---|---|
| 0.0-0.49 | 1.00 |
| 0.5-0.99 | 0.98 |
| 1.0-1.99 | 0.97 |
| 2.0-3.99 | 0.93 |
| 10-YR | 0.54 |

21 IO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0505 | 62 | 4. | * | 1 | 1120 | 137 | 0. | * | 1 | 1735 | 212 | 0. | * | 1 | 2350 | 287 | 0. |
| 1 | 0510 | 63 | 3. | * | 1 | 1125 | 138 | 0. | * | 1 | 1740 | 213 | 0. | * | 1 | 2355 | 288 | 0. |
| 1 | 0515 | 64 | 2. | * | 1 | 1130 | 139 | 0. | * | 1 | 1745 | 214 | 0. | * | 2 | 0000 | 289 | 0. |
| 1 | 0520 | 65 | 1. | * | 1 | 1135 | 140 | 0. | * | 1 | 1750 | 215 | 0. | * | 2 | 0005 | 290 | 0. |
| 1 | 0525 | 66 | 1. | * | 1 | 1140 | 141 | 0. | * | 1 | 1755 | 216 | 0. | * | 2 | 0010 | 291 | 0. |
| 1 | 0530 | 67 | 1. | * | 1 | 1145 | 142 | 0. | * | 1 | 1800 | 217 | 0. | * | 2 | 0015 | 292 | 0. |
| 1 | 0535 | 68 | 1. | * | 1 | 1150 | 143 | 0. | * | 1 | 1805 | 218 | 0. | * | 2 | 0020 | 293 | 0. |
| 1 | 0540 | 69 | 1. | * | 1 | 1155 | 144 | 0. | * | 1 | 1810 | 219 | 0. | * | 2 | 0025 | 294 | 0. |
| 1 | 0545 | 70 | 1. | * | 1 | 1200 | 145 | 0. | * | 1 | 1815 | 220 | 0. | * | 2 | 0030 | 295 | 0. |
| 1 | 0550 | 71 | 1. | * | 1 | 1205 | 146 | 0. | * | 1 | 1820 | 221 | 0. | * | 2 | 0035 | 296 | 0. |
| 1 | 0555 | 72 | 1. | * | 1 | 1210 | 147 | 0. | * | 1 | 1825 | 222 | 0. | * | 2 | 0040 | 297 | 0. |
| 1 | 0600 | 73 | 0. | * | 1 | 1215 | 148 | 0. | * | 1 | 1830 | 223 | 0. | * | 2 | 0045 | 298 | 0. |
| 1 | 0605 | 74 | 0. | * | 1 | 1220 | 149 | 0. | * | 1 | 1835 | 224 | 0. | * | 2 | 0050 | 299 | 0. |
| 1 | 0610 | 75 | 0. | * | 1 | 1225 | 150 | 0. | * | 1 | 1840 | 225 | 0. | * | 2 | 0055 | 300 | 0. |
| | | | | * | | | | | * | | | | | * | | | | |

| PEAK FLOW | TIME | | MAXIMUM AVERAGE FLOW | | | |
|---|---|---|---|---|---|---|
| | | | 6-HR | 24-HR | 72-HR | 24.92-HR |
| + (CFS) | (HR) | | | | | |
| | | (CFS) | | | | |
| + 25. | 3.58 | | 3. | 1. | 1. | 1. |
| | | (INCHES) | .510 | .510 | .510 | .510 |
| | | (AC-FT) | 2. | 2. | 2. | 2. |

CUMULATIVE AREA = .06 SQ MI

1

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

| | | | | | RATIOS APPLIED TO PRECIPITATION | | | | |
|---|---|---|---|---|---|---|---|---|---|
| OPERATION | STATION | AREA | PLAN | | RATIO 1 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 |
| | | | | | 1.00 | .98 | .97 | .93 | .54 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 700. | 225. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.50 |
| ROUTED TO | | | | | | | | | |
| + | ROFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 701. | 225. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.75 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF1-E | .47 | 1 | FLOW | 325. | 315. | 309. | 288. | 98. |
| | | | | TIME | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| HYDROGRAPH AT | | | | | | | | | |
| + | WEST3-D | .01 | 1 | FLOW | 24. | 24. | 23. | 22. | 10. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 3 COMBINED AT | | | | | | | | | |
| + | DUMMY1 | 2.07 | 1 | FLOW | 966. | 932. | 915. | 849. | 273. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF2-E | .08 | 1 | FLOW | 103. | 101. | 99. | 93. | 39. |
| | | | | TIME | 3.67 | 3.67 | 3.67 | 3.67 | 3.67 |
| 2 COMBINED AT | | | | | | | | | |
| + | DUMMY2 | 2.15 | 1 | FLOW | 983. | 949. | 932. | 864. | 283. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3-E | .02 | 1 | FLOW | 29. | 28. | 28. | 26. | 11. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP1 | 2.17 | 1 | FLOW | 986. | 952. | 935. | 867. | 286. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF4-E | .04 | 1 | FLOW | 65. | 63. | 62. | 58. | 24. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | WEST2-D | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OF2-E* | .01 | 1 | FLOW | 23. | 23. | 22. | 21. | 9. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| DIVERSION TO | | | | | | | | | |
| + | SD10 | .01 | 1 | FLOW | 9. | 9. | 9. | 9. | 9. |
| | | | | TIME | 3.33 | 3.33 | 3.33 | 3.33 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | NORTH | .01 | 1 | FLOW | 14. | 14. | 13. | 12. | 8. |

AR-WEST.OUT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | .00 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP3 | .06 | 1 | FLOW | 81. | 78. | 77. | 72. | 25. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP4 | 2.23 | 1 | FLOW | 994. | 960. | 943. | 876. | 292. |
| | | | | TIME | 4.42 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | EAST1-D | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

1

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

| ISTAQ | ELEMENT | DT | PEAK | TIME TO PEAK | VOLUME | DT | INTERPOLATED TO COMPUTATION INTERVAL PEAK | TIME TO PEAK | VOLUME |
|---|---|---|---|---|---|---|---|---|---|
| | | (MIN) | (CFS) | (MIN) | (IN) | (MIN) | (CFS) | (MIN) | (IN) |
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 796.24 | 275.00 | 1.53 | 5.00 | 796.24 | 275.00 | 1.53 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 768.88 | 275.00 | 1.48 | 5.00 | 768.88 | 275.00 | 1.48 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 755.25 | 275.00 | 1.45 | 5.00 | 755.25 | 275.00 | 1.45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 701.11 | 275.00 | 1.35 | 5.00 | 701.11 | 275.00 | 1.35 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 224.93 | 285.00 | .45 | 5.00 | 224.93 | 285.00 | .45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1

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

Referenced from TDS

```
1*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            JUN  1998                  *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   18APR22  TIME  14:30:25   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

 *** FREE ***
                       *DIAGRAM
             1         ID     WESTWOOD PROFESSIONAL SERVICES
             2         ID     ALPINE RIDGE EAST
             3         ID     POTENTIAL DRAINAGE CONDITION
             4         ID
             5         ID     RETURN PERIOD ------- 100-YR
             6         ID     DISTRIBUTION -------- 6-HOUR SDN3
             7         ID     PROJECT NO. --------- TRI2104
             8         ID     FILENAME ------------ Potential.H1
             9         ID     DATE ---------------- APRIL 2022
            10         ID     MODELED BY ---------- JR/PK
            11         ID
            12         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
            13         ID        DRAINAGE AREA (MI^2)    DARF
            14         ID        0.0-0.49                1.00
            15         ID        0.5-0.99                0.98
            16         ID        1.0-1.99                0.97
            17         ID        2.0-3.99                0.93
            18         ID        10-YR                   0.54
            19         ID
            20         IT      5       0       0     300
            21         IO      5       0       0
            22         IN      5       0       0
            23         JR    PREC    1.00    0.98    0.97    0.93    0.54
                       *

            24         KK    OFF3
            25         BA   1.584
            26         PC      0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            27         PC  0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
            28         PC  0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
            29         PC  0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
            30         PC  0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
            31         PC  0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
            32         PC  0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
            33         PC  0.998   0.999   1.000
            34         PB   3.43
            35         LS      0    79.3
            36         UD  0.938
                       *

            37         KK   ROFF3
            38         KM  ROUTE OFF3 TO CP1
            39         KM   NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
            40         RD    8500   0.034   0.025       0    TRAP      32       3
                       *

            41         KK  OFF1-D
            42         BA  0.4508
            43         PB    3.00
            44         LS      0    86.9
            45         UD   0.436
                       *
```

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

  46          KK  OFF2-D
  47          BA  0.0861
  48          PB    3.00
  49          LS       0    90.6
  50          UD   0.175
              *

  51          KK     CP1
  52          HC       3
              *

  53          KK  OFF5-D
  54          BA  0.0143
  55          PB    3.00
  56          LS       0    89.1
  57          UD   0.096
              *

  58          KK WEST3-D
  59          BA  0.0141
  60          PB    3.00
  61          LS       0    89.1
  62          UD   0.097
              *

  63          KK  DUMMY1
  64          HC       2
              *

  65          KK  DUMMY2
  66          HC       2
              *

  67          KK  OFF6-D
  68          BA  0.0164
  69          PB    3.00
  70          LS       0    91.0
  71          UD   0.087
              *

  72          KK     CP2
  73          HC       2
              *

  74          KK  OFF7-D
  75          BA  0.0177
  76          PB    3.00
  77          LS       0    88.3
  78          UD   0.127
              *
```



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

  79          KK   AR1-U
  80          BA  0.0012
  81          PB    3.00
  82          LS       0    85.6
  83          UD   0.079
              *

  84          KK     CP3
  85          HC       2
              *

  86          KK  OFF4-D
  87          BA  0.0382
  88          PB    3.00
  89          LS       0    89.3
  90          UD   0.165
              *

  91          KK  OFF3-D
  92          BA  0.0149
  93          PB    3.00
  94          LS       0    84.3
  95          UD   0.138
              *

  96          KK  DUMMY3
  97          HC       2
              *

  98          KK   NORTH
  99          KM   ONLY 10-YR STORM DRAIN TO DRAIN EAST IN RADLEY AVE
 100          KM   LEFTOVER 100-YR FLOW TO DRAIN NORTH IN ALPINE RIDGE WAY
```

```
          101          DT    SD10
          102          DI       0       9      30
          103          DQ       0       9       9
                       *

          104          KK WEST2-D
          105          BA  0.0013
          106          PB    3.00
          107          LS       0    91.0
          108          UD   0.066
                       *

          109          KK     CP4
          110          HC       2
                       *

          111          KK     CP5
          112          HC       3
                       *
1                                                HEC-1 INPUT                                                PAGE  4

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

          113          KK  OFF8-D
          114          BA  0.0006
          115          PB    3.00
          116          LS       0    76.6
          117          UD   0.100
                       *

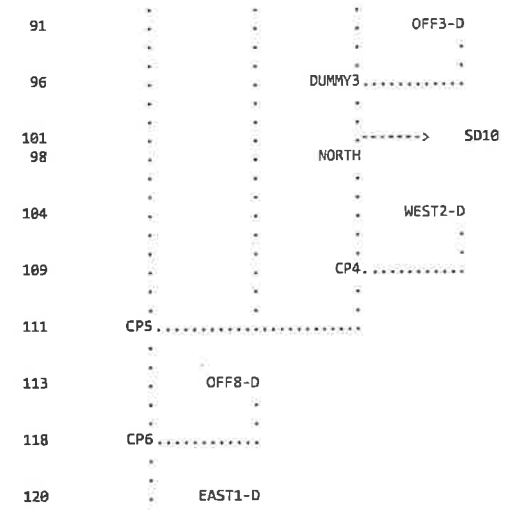
          118          KK     CP6
          119          HC       2
                       *

          120          KK EAST1-D
          121          BA  0.0013
          122          PB    3.00
          123          LS       0    91.0
          124          UD   0.065
          125          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    24        OFF3
                V
                V
    37        ROFF3
                .
                .
    41          .      OFF1-D
                .          .
                .          .
    46          .          .      OFF2-D
                .          .          .
                .          .          .
    51         CP1.........................
                .
                .
    53          .      OFF5-D
                .          .
                .          .
    58          .          .      WEST3-D
                .          .          .
                .          .          .
    63          .      DUMMY1.............
                .          .
                .          .
    65        DUMMY2.............
                .
                .
    67          .      OFF6-D
                .          .
                .          .
    72         CP2.............
                .
                .
    74          .      OFF7-D
                .          .
                .          .
    79          .          .       AR1-U
                .          .          .
                .          .          .
    84          .         CP3.............
                .          .
                .          .
    86          .          .      OFF4-D
                .          .          .
```




(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   18APR22  TIME  14:30:25   *
*                                       *
*****************************************
```

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

WESTWOOD PROFESSIONAL SERVICES
ALPINE RIDGE EAST
POTENTIAL DRAINAGE CONDITION

RETURN PERIOD ------- 100-YR
DISTRIBUTION -------- 6-HOUR SON3
PROJECT NO. --------- TRI2104
FILENAME ------------ Potential.H1
DATE ---------------- APRIL 2022
MODELED BY ---------- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS

| DRAINAGE AREA (MI^2) | DARF |
|---|---|
| 0.0-0.49 | 1.00 |
| 0.5-0.99 | 0.98 |
| 1.0-1.99 | 0.97 |
| 2.0-3.99 | 0.93 |
| 10-YR | 0.54 |

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

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

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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

    JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS
```

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .98 .97 .93 .54

1

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

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00 | RATIO 2 .98 | RATIO 3 .97 | RATIO 4 .93 | RATIO 5 .54 |
|---|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 700. | 225. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.50 |
| ROUTED TO | | | | | | | | | |
| + | ROFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 701. | 225. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.75 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF1-D | .45 | 1 | FLOW | 409. | 397. | 391. | 368. | 149. |
| | | | | TIME | 3.83 | 3.83 | 3.92 | 3.92 | 3.92 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF2-D | .09 | 1 | FLOW | 136. | 133. | 131. | 124. | 57. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP1 | 2.12 | 1 | FLOW | 966. | 933. | 917. | 852. | 290. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF5-D | .01 | 1 | FLOW | 25. | 24. | 24. | 22. | 10. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | WEST3-D | .01 | 1 | FLOW | 24. | 24. | 23. | 22. | 10. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | DUMMY1 | .03 | 1 | FLOW | 49. | 48. | 47. | 44. | 19. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | DUMMY2 | 2.15 | 1 | FLOW | 972. | 940. | 924. | 859. | 294. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF6-D | .02 | 1 | FLOW | 31. | 30. | 30. | 28. | 13. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP2 | 2.17 | 1 | FLOW | 977. | 945. | 928. | 864. | 296. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF7-D | .02 | 1 | FLOW | 20. | 20. | 19. | 18. | 6. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR1-U | .00 | 1 | FLOW | 2. | 2. | 2. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP3 | .02 | 1 | FLOW | 22. | 21. | 21. | 19. | 6. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF4-D | .04 | 1 | FLOW | 59. | 58. | 57. | 54. | 24. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3-D | .01 | 1 | FLOW | 20. | 19. | 19. | 18. | 7. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 2 COMBINED AT | | | | | | | | | |
| + | DUMMY3 | .05 | 1 | FLOW | 79. | 77. | 76. | 71. | 30. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| DIVERSION TO | | | | | | | | | |
| + | SD10 | .05 | 1 | FLOW | 9. | 9. | 9. | 9. | 9. |
| | | | | TIME | 3.17 | 3.17 | 3.17 | 3.17 | 3.33 |
| HYDROGRAPH AT | | | | | | | | | |
| + | NORTH | .05 | 1 | FLOW | 70. | 68. | 67. | 62. | 21. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | WEST2-D | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP4 | .05 | 1 | FLOW | 72. | 70. | 69. | 64. | 22. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP5 | 2.24 | 1 | FLOW | 984. | 952. | 936. | 872. | 298. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF8-D | .00 | 1 | FLOW | 1. | 1. | 1. | 1. | 0. |
| | | | | TIME | 3.50 | 3.58 | 3.58 | 3.58 | 3.58 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP6 | 2.24 | 1 | FLOW | 985. | 952. | 936. | 872. | 298. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | EAST1-D | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

1

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

| ISTAQ | ELEMENT | DT | PEAK | TIME TO PEAK | VOLUME | INTERPOLATED TO COMPUTATION INTERVAL DT | PEAK | TIME TO PEAK | VOLUME |
|---|---|---|---|---|---|---|---|---|---|
| | | (MIN) | (CFS) | (MIN) | (IN) | (MIN) | (CFS) | (MIN) | (IN) |
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 796.24 | 275.00 | 1.53 | 5.00 | 796.24 | 275.00 | 1.53 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 768.88 | 275.00 | 1.48 | 5.00 | 768.88 | 275.00 | 1.48 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 755.25 | 275.00 | 1.45 | 5.00 | 755.25 | 275.00 | 1.45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 701.11 | 275.00 | 1.35 | 5.00 | 701.11 | 275.00 | 1.35 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 224.93 | 285.00 | .45 | 5.00 | 224.93 | 285.00 | .45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1

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

Referenced Hydraulics

## Future/Ultimate Condition WSPG Summary
### AR WEST CONDITION - SOUTH SYSTEM

| WSPG Station | Storm Drain Dimension | Invert Elevation (ft) | $Q_{100}$ (cfs) | WSE (ft) | Velocity (ft/s) | FG Elevation | Facility Description | HGL Check[1] |
|---|---|---|---|---|---|---|---|---|
| 1000.00 | 36" RCP | 2913.32 | 83.00 | 2915.92 | 12.74 | 2924.40 | Connection to Mainline RCB | OK |
| 1027.49 | 36" RCP | 2913.49 | 83.00 | 2915.84 | 13.97 | 2925.16 | SDMH #2 / Connection to Open Sump (Facility P8B) | OK |
| 1029.15 | 36" RCP | 2913.50 | 83.00 | 2915.84 | 14.04 | 2925.16 | | OK |
| 1030.82 | 36" RCP | 2913.51 | 83.00 | 2915.84 | 14.11 | 2925.16 | | OK |
| 1032.49 | 36" RCP | 2913.52 | 83.00 | 2915.84 | 14.18 | 2925.16 | | OK |
| 1384.68 | 36" RCP | 2919.67 | 83.00 | 2921.98 | 14.20 | 2930.26 | SDMH #1 | OK |
| 1387.18 | 36" RCP | 2919.77 | 81.00 | 2921.95 | 14.72 | 2930.26 | | OK |
| 1389.68 | 36" RCP | 2919.87 | 81.00 | 2922.07 | 14.55 | 2930.26 | | OK |
| 1472.18 | 36" RCP | 2920.74 | 81.00 | 2922.63 | 17.24 | 2931.57 | Future SDMH | OK |
| 1473.43 | 36" RCP | 2920.79 | 81.00 | 2922.69 | 17.20 | 2931.57 | | OK |
| 1474.68 | 36" RCP | 2920.84 | 81.00 | 2922.74 | 17.17 | 2931.57 | | OK |
| 1475.93 | 36" RCP | 2920.89 | 81.00 | 2922.79 | 17.14 | 2931.57 | | OK |
| 1477.18 | 36" RCP | 2920.94 | 81.00 | 2922.85 | 17.10 | 2931.57 | | OK |
| 1534.90 | 36" RCP | 2922.32 | 81.00 | 2924.17 | 17.75 | 2931.43 | Future SDMH | OK |
| 1536.57 | 36" RCP | 2922.39 | 81.00 | 2924.24 | 17.70 | 2931.43 | | OK |
| 1538.23 | 36" RCP | 2922.45 | 81.00 | 2924.30 | 17.68 | 2931.43 | | OK |
| 1539.90 | 36" RCP | 2922.52 | 81.00 | 2924.38 | 17.64 | 2931.43 | | OK |
| 1651.71 | 36" RCP | 2926.41 | 81.00 | 2928.53 | 15.15 | 2935.43 | Future SDMH | OK |
| 1653.38 | 36" RCP | 2926.48 | 81.00 | 2928.62 | 15.05 | 2935.43 | | OK |
| 1655.04 | 36" RCP | 2926.54 | 81.00 | 2928.69 | 14.97 | 2935.43 | | OK |
| 1656.71 | 36" RCP | 2926.61 | 81.00 | 2928.77 | 14.86 | 2935.43 | | OK |
| 1719.00 | 36" RCP | 2928.28 | 81.00 | 2931.06 | 11.85 | - | Future Open Sump Inlet (Facility F1) | - |

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

Mislabel, the connection to the open sump occurs SDMH#1

```
T1 ALPINE RIDGE EAST
T2 STORM DRAIN SOUTH OF MAINLINE TO FUTURE STORM DRAIN EXTENSION
T3 AR WEST CONDITION
SO   1000.00 2913.32  36      .013                2915.24
R    1027.49 2913.49  36      .013
R    1029.15 2913.50  36      .013                                    -15.0
R    1030.82 2913.51  36      .013                                    -15.0
R    1032.49 2913.52  36      .013                                     -4.0
R    1384.68 2919.67  36      .013
JX   1387.18 2919.77  36 36   .013    2.0           2919.87         56.0
R    1389.68 2919.87  36      .013
R    1472.18 2920.74  36      .013
R    1473.43 2920.79  36      .013                                     15.0
R    1474.68 2920.84  36      .013                                     15.0   1
R    1475.93 2920.89  36      .013                                     15.0
R    1477.18 2920.94  36      .013                                      5.0
R    1534.90 2922.32  36      .013
R    1536.57 2922.39  36      .013                                     15.0
R    1538.23 2922.45  36      .013                                     15.0   1
R    1539.90 2922.52  36      .013                                      7.0
R    1651.71 2926.41  36      .013
R    1653.38 2926.48  36      .013                                    -15.0
R    1655.04 2926.54  36      .013                                    -15.0   1
R    1656.71 2926.61  36      .013                                     -5.0
R    1719.00 2928.28  36      .013
SH   1719.00 2928.28  36
CD  18  4   1   0.000   1.500    0.000 0.000 0.000  0.000
CD  24  4   1   0.000   2.000    0.000 0.000 0.000  0.000
CD  30  4   1   0.000   2.500    0.000 0.000 0.000  0.000
CD  36  4   1   0.000   3.000    0.000 0.000 0.000  0.000
CD  42  4   1   0.000   3.500    0.000 0.000 0.000  0.000
CD  48  4   1   0.000   4.000    0.000 0.000 0.000  0.000
CD  54  4   1   0.000   4.500    0.000 0.000 0.000  0.000
CD  60  4   1   0.000   5.000    0.000 0.000 0.000  0.000
Q            81.000   .0
```

ALPINE RIDGE EAST
STORM DRAIN SOUTH OF MAINLINE TO FUTURE STORM DRAIN EXTENSION
AR WEST CONDITION

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000.000 | 2913.320 | 2.603 | 2915.923 | 83.00 | 12.74 | 2.52 | 2918.44 | .00 | 2.80 | 2.03 | 3.000 | .000 | .00 | 1 .0 |
| 12.021 | .0062 | | | | | .0148 | .18 | 2.60 | 1.25 | 3.00 | .013 | .00 | .00 | PIPE |
| 1012.021 | 2913.394 | 2.472 | 2915.866 | 83.00 | 13.32 | 2.75 | 2918.62 | .00 | 2.80 | 2.28 | 3.000 | .000 | .00 | 1 .0 |
| 15.469 | .0062 | | | | | .0161 | .25 | 2.47 | 1.42 | 3.00 | .013 | .00 | .00 | PIPE |
| 1027.490 | 2913.490 | 2.350 | 2915.840 | 83.00 | 13.97 | 3.03 | 2918.87 | .00 | 2.80 | 2.47 | 3.000 | .000 | .00 | 1 .0 |
| 1.660 | .0060 | | | | | .0170 | .03 | 2.35 | 1.59 | 3.00 | .013 | .00 | .00 | PIPE |
| 1029.150 | 2913.500 | 2.339 | 2915.839 | 83.00 | 14.04 | 3.06 | 2918.90 | .00 | 2.80 | 2.49 | 3.000 | .000 | .00 | 1 .0 |
| 1.670 | .0060 | | | | | .0172 | .03 | 2.34 | 1.60 | 3.00 | .013 | .00 | .00 | PIPE |
| 1030.820 | 2913.510 | 2.327 | 2915.837 | 83.00 | 14.11 | 3.09 | 2918.93 | .00 | 2.80 | 2.50 | 3.000 | .000 | .00 | 1 .0 |
| 1.670 | .0060 | | | | | .0174 | .03 | 2.33 | 1.62 | 3.00 | .013 | .00 | .00 | PIPE |
| 1032.490 | 2913.520 | 2.315 | 2915.835 | 83.00 | 14.18 | 3.12 | 2918.96 | .00 | 2.80 | 2.52 | 3.000 | .000 | .00 | 1 .0 |
| 146.637 | .0175 | | | | | .0175 | 2.56 | 2.32 | 1.64 | 2.32 | .013 | .00 | .00 | PIPE |
| 1179.127 | 2916.081 | 2.315 | 2918.396 | 83.00 | 14.18 | 3.12 | 2921.52 | .00 | 2.80 | 2.52 | 3.000 | .000 | .00 | 1 .0 |
| 205.553 | .0175 | | | | | .0175 | 3.60 | 2.32 | 1.64 | 2.32 | .013 | .00 | .00 | PIPE |
| 1384.680 | 2919.670 | 2.312 | 2921.982 | 83.00 | 14.20 | 3.13 | 2925.11 | .00 | 2.80 | 2.52 | 3.000 | .000 | .00 | 1 .0 |
| JUNCT STR | .0400 | | | | | .0183 | .05 | 2.31 | 1.64 | | .013 | .00 | .00 | PIPE |
| 1387.180 | 2919.770 | 2.180 | 2921.950 | 81.00 | 14.72 | 3.36 | 2925.31 | .00 | 2.78 | 2.67 | 3.000 | .000 | .00 | 1 .0 |
| 2.500 | .0400 | | | | | .0189 | .05 | 2.18 | 1.81 | 1.69 | .013 | .00 | .00 | PIPE |

Starting Invert

Starting WSE

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING

Date: 4-25-2022 Time: 2:53:43

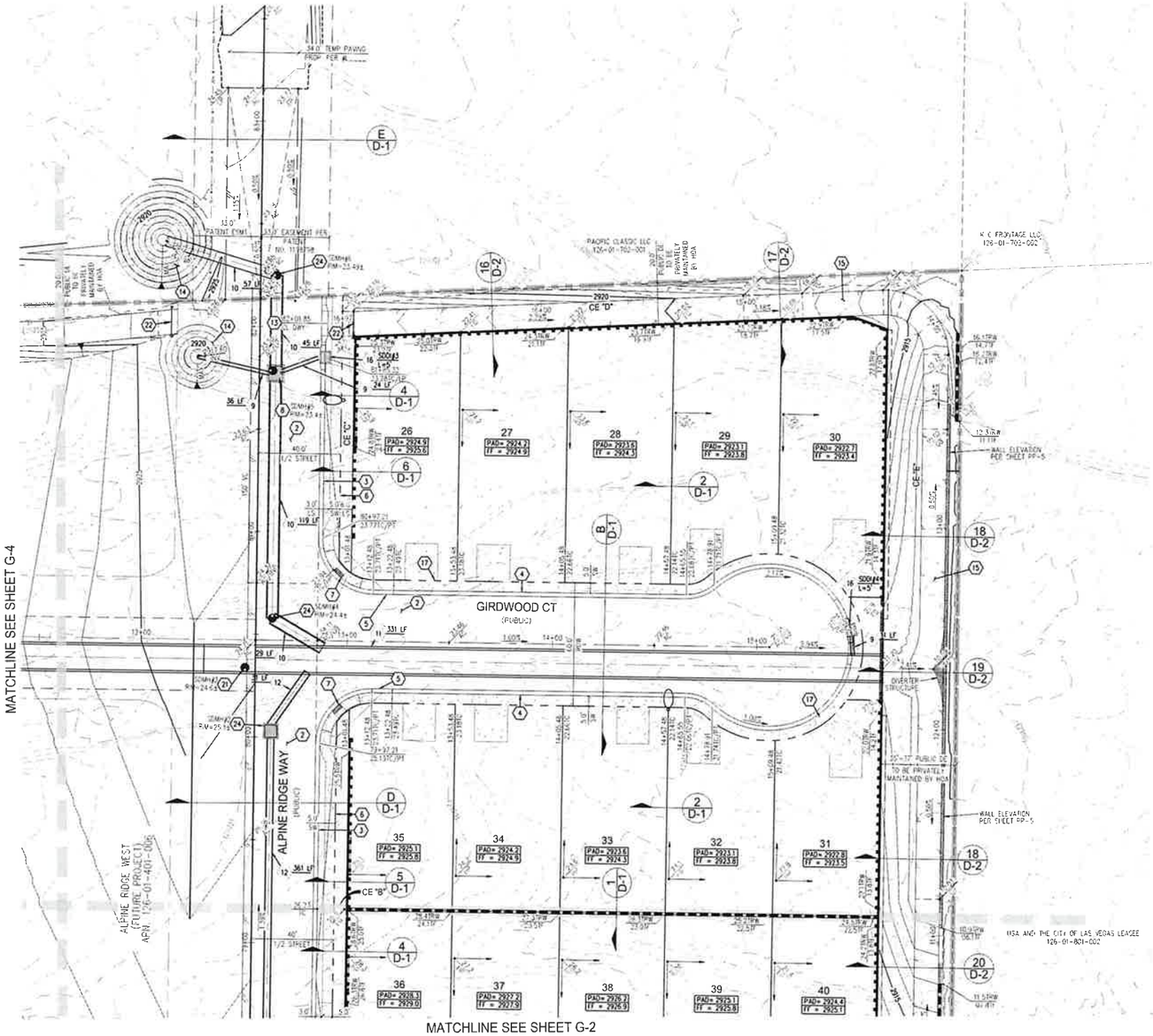
ALPINE RIDGE EAST
STORM DRAIN SOUTH OF MAINLINE TO FUTURE STORM DRAIN EXTENSION
AR WEST CONDITION

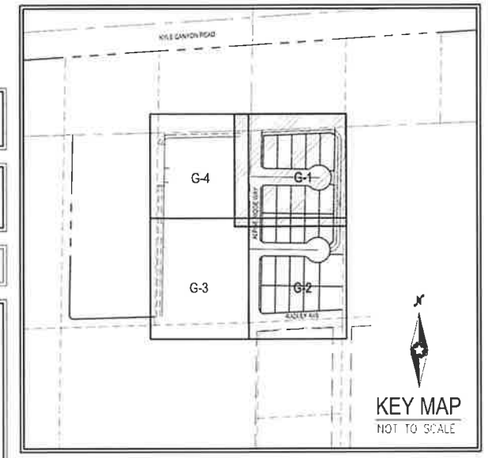
| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1389.680 | 2919.870 | 2.204 | 2922.074 | 81.00 | 14.55 | 3.29 | 2925.36 | .00 | 2.78 | 2.65 | 3.000 | .000 | .00 | 1 .0 |
| 14.165 | .0105 | | | | | .0192 | .27 | 2.20 | 1.77 | 3.00 | .013 | .00 | .00 | PIPE |
| 1403.845 | 2920.020 | 2.150 | 2922.169 | 81.00 | 14.94 | 3.47 | 2925.64 | .00 | 2.78 | 2.70 | 3.000 | .000 | .00 | 1 .0 |
| 24.362 | .0105 | | | | | .0210 | .51 | 2.15 | 1.86 | 3.00 | .013 | .00 | .00 | PIPE |
| 1428.207 | 2920.276 | 2.058 | 2922.334 | 81.00 | 15.67 | 3.81 | 2926.15 | .00 | 2.78 | 2.78 | 3.000 | .000 | .00 | 1 .0 |
| 22.717 | .0105 | | | | | .0236 | .54 | 2.06 | 2.03 | 3.00 | .013 | .00 | .00 | PIPE |
| 1450.924 | 2920.516 | 1.973 | 2922.489 | 81.00 | 16.44 | 4.19 | 2926.68 | .00 | 2.78 | 2.85 | 3.000 | .000 | .00 | 1 .0 |
| 21.256 | .0105 | | | | | .0265 | .56 | 1.97 | 2.20 | 3.00 | .013 | .00 | .00 | PIPE |
| 1472.180 | 2920.740 | 1.893 | 2922.633 | 81.00 | 17.24 | 4.61 | 2927.25 | .00 | 2.78 | 2.90 | 3.000 | .000 | .00 | 1 .0 |
| 1.250 | .0400 | | | | | .0280 | .04 | 1.89 | 2.38 | 1.69 | .013 | .00 | .00 | PIPE |
| 1473.430 | 2920.790 | 1.896 | 2922.686 | 81.00 | 17.20 | 4.60 | 2927.28 | .00 | 2.78 | 2.89 | 3.000 | .000 | .00 | 1 .0 |
| 1.250 | .0400 | | | | | .0279 | .03 | 1.90 | 2.38 | 1.69 | .013 | .00 | .00 | PIPE |
| 1474.680 | 2920.840 | 1.899 | 2922.739 | 81.00 | 17.17 | 4.58 | 2927.32 | .00 | 2.78 | 2.89 | 3.000 | .000 | .00 | 1 .0 |
| 1.250 | .0398 | | | | | .0278 | .03 | 1.90 | 2.37 | 1.69 | .013 | .00 | .00 | PIPE |
| 1475.930 | 2920.890 | 1.902 | 2922.792 | 81.00 | 17.14 | 4.56 | 2927.35 | .00 | 2.78 | 2.89 | 3.000 | .000 | .00 | 1 .0 |
| 1.250 | .0400 | | | | | .0276 | .03 | 1.90 | 2.36 | 1.69 | .013 | .00 | .00 | PIPE |
| 1477.180 | 2920.940 | 1.906 | 2922.845 | 81.00 | 17.10 | 4.54 | 2927.39 | .00 | 2.78 | 2.89 | 3.000 | .000 | .00 | 1 .0 |
| 57.720 | .0239 | | | | | .0289 | 1.67 | 1.91 | 2.35 | 2.00 | .013 | .00 | .00 | PIPE |

ALPINE RIDGE EAST
STORM DRAIN SOUTH OF MAINLINE TO FUTURE STORM DRAIN EXTENSION
AR WEST CONDITION

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 1534.900 | 2922.320 | 1.847 | 2924.167 | 81.00 | 17.75 | 4.89 | 2929.06 | .00 | 2.78 | 2.92 | 3.000 | .000 | .00 | 1 .0 |
| 1.670 | .0418 | | | | | .0301 | .05 | 1.85 | 2.50 | 1.66 | .013 | .00 | .00 | PIPE |
| 1536.570 | 2922.390 | 1.850 | 2924.240 | 81.00 | 17.70 | 4.87 | 2929.11 | .00 | 2.78 | 2.92 | 3.000 | .000 | .00 | 1 .0 |
| 1.660 | .0362 | | | | | .0300 | .05 | 1.85 | 2.49 | 1.74 | .013 | .00 | .00 | PIPE |
| 1538.230 | 2922.450 | 1.852 | 2924.302 | 81.00 | 17.68 | 4.85 | 2929.16 | .00 | 2.78 | 2.92 | 3.000 | .000 | .00 | 1 .0 |
| 1.670 | .0420 | | | | | .0299 | .05 | 1.85 | 2.49 | 1.66 | .013 | .00 | .00 | PIPE |
| 1539.900 | 2922.520 | 1.856 | 2924.376 | 81.00 | 17.64 | 4.83 | 2929.21 | .00 | 2.78 | 2.91 | 3.000 | .000 | .00 | 1 .0 |
| 13.573 | .0348 | | | | | .0294 | .40 | 1.86 | 2.48 | 1.76 | .013 | .00 | .00 | PIPE |
| 1553.473 | 2922.992 | 1.870 | 2924.863 | 81.00 | 17.48 | 4.74 | 2929.61 | .00 | 2.78 | 2.91 | 3.000 | .000 | .00 | 1 .0 |
| 48.183 | .0348 | | | | | .0275 | 1.32 | 1.87 | 2.44 | 1.76 | .013 | .00 | .00 | PIPE |
| 1601.655 | 2924.668 | 1.949 | 2926.617 | 81.00 | 16.67 | 4.31 | 2930.93 | .00 | 2.78 | 2.86 | 3.000 | .000 | .00 | 1 .0 |
| 29.663 | .0348 | | | | | .0244 | .72 | 1.95 | 2.25 | 1.76 | .013 | .00 | .00 | PIPE |
| 1631.319 | 2925.700 | 2.032 | 2927.733 | 81.00 | 15.89 | 3.92 | 2931.65 | .00 | 2.78 | 2.80 | 3.000 | .000 | .00 | 1 .0 |
| 20.391 | .0348 | | | | | .0217 | .44 | 2.03 | 2.08 | 1.76 | .013 | .00 | .00 | PIPE |
| 1651.710 | 2926.410 | 2.122 | 2928.532 | 81.00 | 15.15 | 3.56 | 2932.10 | .00 | 2.78 | 2.73 | 3.000 | .000 | .00 | 1 .0 |
| 1.670 | .0420 | | | | | .0203 | .03 | 2.12 | 1.91 | 1.66 | .013 | .00 | .00 | PIPE |
| 1653.380 | 2926.480 | 2.136 | 2928.616 | 81.00 | 15.05 | 3.52 | 2932.13 | .00 | 2.78 | 2.72 | 3.000 | .000 | .00 | 1 .0 |
| 1.660 | .0362 | | | | | .0200 | .03 | 2.14 | 1.88 | 1.74 | .013 | .00 | .00 | PIPE |

Referenced Plan Sheets




SCALE - 1"=30' FEET

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 07.00 REPRESENTS 2807.00)

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

## SOILS REPORT

SOILS REPORT BY: GEOTEK RESIDENTIAL LLC
ADDRESS: 6625 S. EASTERN AVE. ST. 1E & LAS VEGAS, NV 89119
PHONE: (702) 897-1221
PROJECT NO: 70400-LVP DATED: 04/05/2021

## EARTHWORKS

EARTHWORK QUANTITIES (RAW)
CUT= 4,530 CU YDS
FILL= 67,863 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

## 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 BROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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.

## GRADING 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/REPLACING 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 ZONES.

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 502, 502.4 & 502.5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET SECTIONS ON SHEET D-1
3. INSTALL L TYPE CURB PER CCAUSD NO. 216
4. INSTALL R TYPE CURB PER CCAUSD NO. 217.3.S1
5. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL 3 ON SHEET D-1
6. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
7. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 335, CASE 1 & 2.S1
8. INSTALL 7'x7' TYPE II SDMH PER CCAUSD NO. 401 & 403
9. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
10. INSTALL 60" CLASS III RCP STORM DRAIN (PUBLIC)
11. INSTALL 5'-0"x12'-0" RCB STORM DRAIN (PUBLIC)
12. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
13. INSTALL DRIVEWAY (W=12') PER CCAUSD NO. 224
14. INSTALL D50#8" THICKNESS=12" RIPRAP
15. CONSTRUCT 12' WIDE, CONCRETE LINED, ACCESS ROAD
16. INSTALL 3'-0" TYPE "CMU" DROP INLET PER CCAUSD NO. 422
17. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
18. INSTALL SIDEWALK DRAIN PER CCAUSD NO. 226
19. INSTALL 18" CSCO STORM DRAIN (PUBLIC)
20. INSTALL BRICK & MORTAR PLUG PER DETAIL 10 ON SHEET D-1
21. INSTALL 5D ACCESS MANHOLE PER DETAIL 22 ON SHEET D-2
22. INSTALL GALVANIZED GATE PER ROOT DETAIL FC-6, SPECIFICATION #616 724
23. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 & 405
24. INSTALL 60" TYPE II SDMH PER CCAUSD NO. 401 & 406
25. INSTALL 5.0'x16.0' RCB STORM DRAIN (PUBLIC)
26. INSTALL 5.0'x16.0' TO 5.0'x12.0' TRANSITION RCB STORM DRAIN (PUBLIC)
27. CONSTRUCT RESIDENTIAL DRIVEWAY PER CCAUSD NO. 223

## 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 HANDBOOK, SECTION III.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 HANDBOOK, SECTION III.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 ZONE

PER THE FEMA FIRM PANEL MAP 32003C1756E, DATED SEPTEMBER 27, 2007. THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE "X". AN UNSHADED ZONE "X" IS LOCATED OUTSIDE THE 0.20% ANNUAL CHANCE FLOODPLAIN.

## DRAINAGE IMPROVEMENT QUANTITIES

| | | | |
|---|---|---|---|
| 1. | 48" TYPE I STORM DRAIN MANHOLE | EA | 1 |
| 2. | 60" TYPE II STORM DRAIN MANHOLE | EA | 3 |
| 3. | 7'x7' BOX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 4. | 6'x6' BOX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 5. | 5.0' TYPE "CMU" DROP INLET | EA | 2 |
| 6. | 18" RCP CLASS III STORM DRAIN | LF | 110 |
| 7. | 36" RCP CLASS III STORM DRAIN | LF | 540 |
| 8. | 60" RCP CLASS III STORM DRAIN | LF | 250 |
| 9. | 5.0'x12.0' RCB STORM DRAIN | LF | 600 |
| 10. | 5.0'x16.0' RCB STORM DRAIN | LF | 10 |
| 11. | 5.0'x16.0' TO 5.0'x12.0' TRANSITION RCB STORM DRAIN | LF | 9 |
| 12. | RIPRAP D50=8", THICK=12" | CY | 60 |

## FLOOD CERTIFICATION

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

DANIEL S. POLL P.E. 28179 — DATE










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

| NO. | DESCRIPTION | DATE | BY | APPD. | DATE |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

tri pointe HOMES

ALPINE RIDGE EAST
GRADING PLAN I

S1 T19 S R59 E

DATE: 4/26/22
DRAFTER: ECC
DESIGNER: ECC
CHECKED: DSP

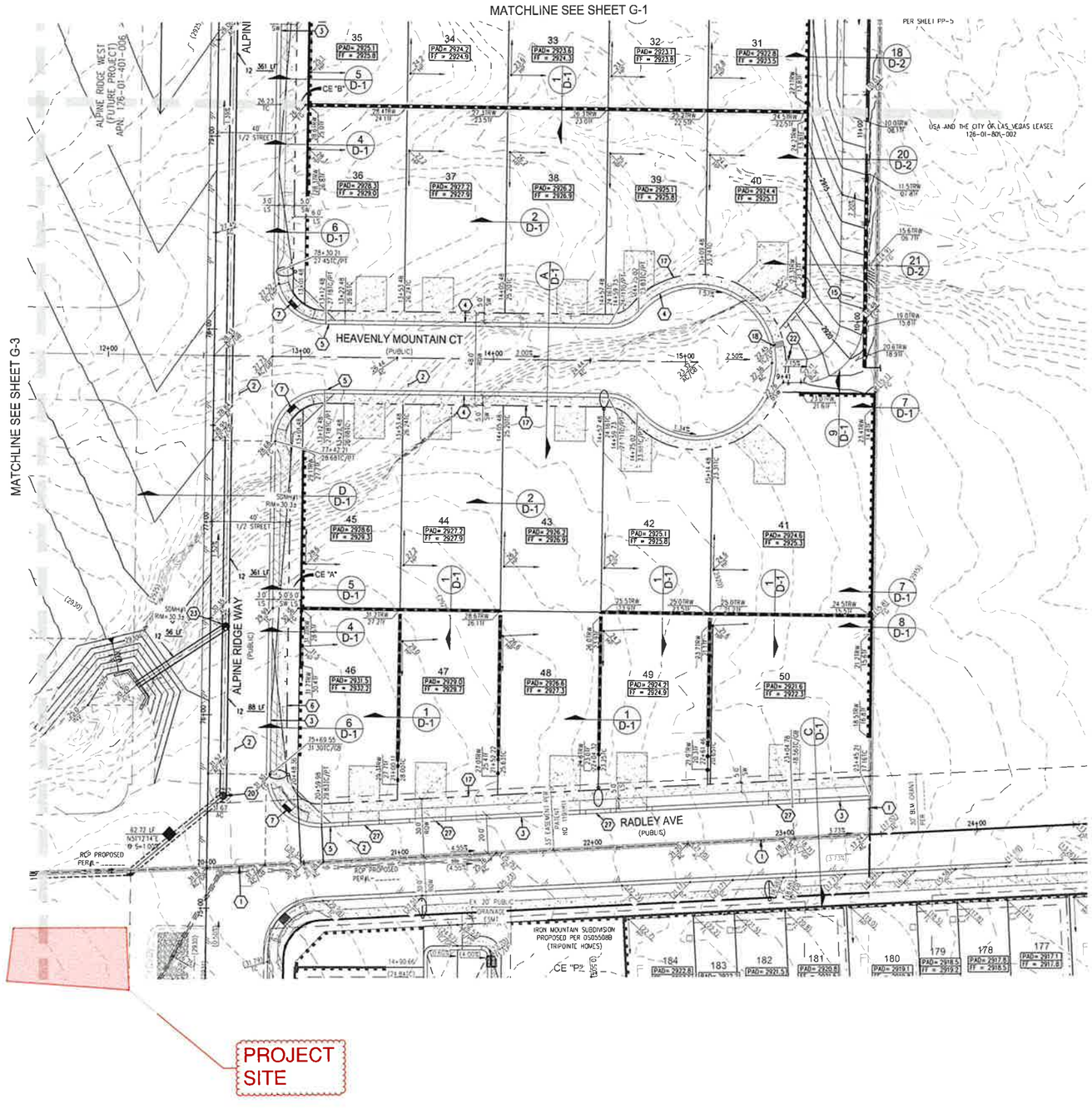
PROJECT NO.
TRI2104-000

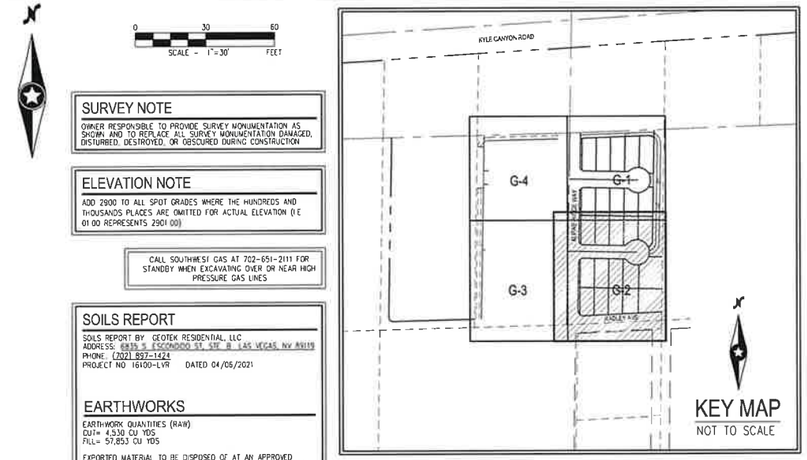



04/26/22

**G-1**
SHEET 4 OF 16

\\LV\TRI\2104-000 alpine ridge east\Active\Engineering\GP\2104 grd.dwg 4/26/2022 5:31 PM Prudhomme




SCALE - 1"=30' (0, 30, 60 FEET)

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2900 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I E 01 00 REPRESENTS 2901 00)

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

## SOILS REPORT

SOILS REPORT BY GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 S TECHNOLOGY ST, STE B LAS VEGAS, NV 89119
PHONE (702) 897-1424
PROJECT NO 16100-LVR DATED 04/05/2021

## EARTHWORKS

EARTHWORK QUANTITIES (RAW)
CUT= 4,930 CU YDS
FILL= 57,853 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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

## GRADING 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/REPLEIING 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 ZONES

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO 503, 500 4 & 500 5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET SECTIONS ON SHEET D-1
3. INSTALL L TYPE CURB PER CCAUSD NO 216
4. INSTALL R TYPE CURB PER CCAUSD NO 217 3 S1
5. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL 3 ON SHEET D-1
6. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
7. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO 235, CASE 1 & 2 2 3 1
8. INSTALL 7'X7' TYPE II SDMH PER CCAUSD NO 401 & 403
9. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
10. INSTALL 60" CLASS III RCP STORM DRAIN (PUBLIC)
11. INSTALL 5 0'X12 0' RCB STORM DRAIN (PUBLIC)
12. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
13. INSTALL DRIVEWAY (W=12') PER CCAUSD NO 224
14. INSTALL D50+6" THICKNESS=12" RIPRAP
15. CONSTRUCT 12' WIDE, CONCRETE LINED, ACCESS ROAD
16. INSTALL 5 0' TYPE "CW2" DROP INLET PER CCAUSD NO 422
17. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
18. INSTALL SIDEWALK DRAIN PER CCAUSD NO 236
19. INSTALL 18" C900 STORM DRAIN (PUBLIC)
20. INSTALL BRICK & MORTAR PLUG PER DETAIL 10 ON SHEET D-1
21. INSTALL SD ACCESS MANHOLE PER DETAIL 22 ON SHEET D-2
22. INSTALL GALVANIZED GATE PER NDOT DETAIL FC-9, SPECIFICATION #616 724
23. INSTALL 48" TYPE II SDMH PER CCAUSD NO 401 & 405
24. INSTALL 60" TYPE II SDMH PER CCAUSD NO 401 & 406
25. INSTALL 5 0'x16 0' RCB STORM DRAIN (PUBLIC)
26. INSTALL 5 0'x16 0' TO 5 0'x12 0' TRANSITION RCB STORM DRAIN (PUBLIC)
27. CONSTRUCT RESIDENTIAL DRIVEWAY PER CCAUSD NO 223

## LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQFT))

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 NVR100000, SECTION III 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 NVR100000, SECTION III 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

## DRAINAGE IMPROVEMENT QUANTITIES

| | | | |
|---|---|---|---|
| 1 | 48" TYPE I STORM DRAIN MANHOLE | EA | 1 |
| 2 | 60" TYPE II STORM DRAIN MANHOLE | EA | 3 |
| 3 | 7'x7' (8DX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 4 | 6'X6' (8DX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 5 | 5 0' TYPE "CW2" DROP INLET | EA | 2 |
| 6 | 18" RCP CLASS III STORM DRAIN | LF | 110 |
| 7 | 36" RCP CLASS III STORM DRAIN | LF | 340 |
| 8 | 60" RCP CLASS III STORM DRAIN | LF | 250 |
| 9 | 5 0'x12 0' RCB STORM DRAIN | LF | 600 |
| 10 | 5 0'x16 0' RCB STORM DRAIN | LF | 10 |
| 11 | 5 0'x16 0' TO 5 0'x12 0' TRANSITION RCB STORM DRAIN | LF | 9 |
| 12 | RIPRAP D50=6", THK=12" | CY | 60 |

## FLOOD ZONE

PER THE FEMA FIRM PANEL MAP 32003C1750E, DATED SEPTEMBER 27, 2002 THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE 'X' AN UNSHADED ZONE 'X' IS LOCATED OUTSIDE THE 0 20% ANNUAL CHANCE FLOODPLAIN

## FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY MTE **11-1111** ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

DANIEL S. POLL P.E. 28179 — DATE

FAST Call before you 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 DO OVERHEAD 1-702-227-2929

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444


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


| NO. | DESCRIPTION | DATE | BY | APP'D DATE | APP |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

tri pointe HOMES

ALPINE RIDGE EAST

GRADING PLAN II

S19 S
R59 E

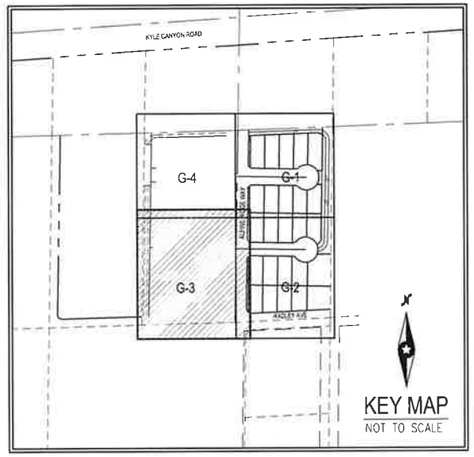
DATE: 4/26/22
DRAFTER: ECC
DESIGNER: ECC
CHECKED: DSP
PROJECT NO.
TRI2104-000

PROFESSIONAL ENGINEER - STATE OF NEVADA — DANIEL S. POLL — Exp. 12/31/2023 — CIVIL — No. 28179 — 04/26/22

G-2
SHEET 5 OF 16


N:\2104-000 alpine ridge east\civil\grading\tri2104_grd.dwg 4/26/2022 5:31 PM Brandon Ayer




SCALE – 1"=30' FEET

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2500 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I E 01 00 REPRESENTS 2901 00)

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

## SOILS REPORT

SOILS REPORT BY GEOTEK RESIDENTIAL, LLC
ADDRESS 6835 S. ESCONDIDO ST. STE. B LAS VEGAS, NV 89119
PHONE (702) 897-1424
PROJECT NO 16100-LVR DATED 04/06/2021

## EARTHWORKS

EARTHWORK QUANTITIES (RAW)
CUT= 4,530 CU YDS
FILL= 57,853 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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

## GRADING 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/REPLACING 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 ZONES

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO 503, 500 4 & 500 5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET SECTIONS ON SHEET D-1
3. INSTALL L TYPE CURB PER CCAUSD NO 216
4. INSTALL A TYPE CURB PER CCAUSD NO 217 3 51
5. CONSTRUCT 10' L-CURB TO A-CURB TRANSITION PER DETAIL 3 ON SHEET D-1
6. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
7. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO 235, CASE 1 & 235 1
8. INSTALL 7'X5' TYPE II SDMH PER CCAUSD NO 401 & 403
9. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
10. INSTALL 60" CLASS III RCP STORM DRAIN (PUBLIC)
11. INSTALL 5 0'x12 0' RCB STORM DRAIN (PUBLIC)
12. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
13. INSTALL DRIVEWAY (W=12') PER CCAUSD NO 224
14. INSTALL D50=6" THICKNESS=12" RIPRAP
15. CONSTRUCT 12' WIDE, CONCRETE LINED, ACCESS ROAD
16. INSTALL 5 0' TYPE "CM2" DROP INLET PER CCAUSD NO 422
17. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
18. INSTALL SIDEWALK DRAIN PER CCAUSD NO 236
19. INSTALL 18" C900 STORM DRAIN (PUBLIC)
20. INSTALL BRICK & MORTAR PLUG PER DETAIL 10 ON SHEET D-1
21. INSTALL SD ACCESS MANHOLE PER DETAIL 22 ON SHEET D-2
22. INSTALL GALVANIZED GATE PER NDOT DETAIL FC-9, SPECIFICATION #616 724
23. INSTALL 48" TYPE II SDMH PER CCAUSD NO 401 & 405
24. INSTALL 60" TYPE III SDMH PER CCAUSD NO 401 & 406
25. INSTALL 5 0'x16 0' RCB STORM DRAIN (PUBLIC)
26. INSTALL 5 0'x16 0' TO 5 0'x12 0' TRANSITION RCB STORM DRAIN (PUBLIC)
27. CONSTRUCT RESIDENTIAL DRIVEWAY PER CCAUSD NO 223

## 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 NVR100000, SECTION III 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 NVR100000, SECTION III 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

## DRAINAGE IMPROVEMENT QUANTITIES

| | | | |
|---|---|---|---|
| 1 | 48" TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 2 | 60" TYPE II STORM DRAIN MANHOLE | EA | 3 |
| 3 | 7'X7' BOX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 4 | 6'X6' BOX TYPE II STORM DRAIN MANHOLE | EA | 1 |
| 5 | 5 0' TYPE "CM2" DROP INLET | EA | 2 |
| 6 | 18" RCP CLASS III STORM DRAIN | LF | 110 |
| 7 | 36" RCP CLASS III STORM DRAIN | LF | 540 |
| 8 | 60" RCP CLASS III STORM DRAIN | LF | 250 |
| 9 | 5 0'x12 0' RCB STORM DRAIN | LF | 600 |
| 10 | 5 0'x16 0' RCB STORM DRAIN | LF | 10 |
| 11 | 5 0'x16 0' TO 5 0'x12 0' TRANSITION RCB STORM DRAIN | LF | 9 |
| 12 | RIPRAP D50=6", THK=12" | CY | 60 |

## FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY HTE **II-IIIII** ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

DANIEL S. POLL, P.E. 28179 DATE

## FLOOD ZONE

PER THE FEMA FIRM PANEL MAP 32003C1750E, DATED SEPTEMBER 27, 2002 THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE 'X' AN UNSHADED ZONE 'X' IS LOCATED OUTSIDE THE 0 20% ANNUAL CHANCE FLOODPLAIN










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

| NO. | DESCRIPTION | DATE | BY | APP'D DATE | APP |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

tri pointe HOMES

ALPINE RIDGE EAST

GRADING PLAN III

S 19 S
R 59 E

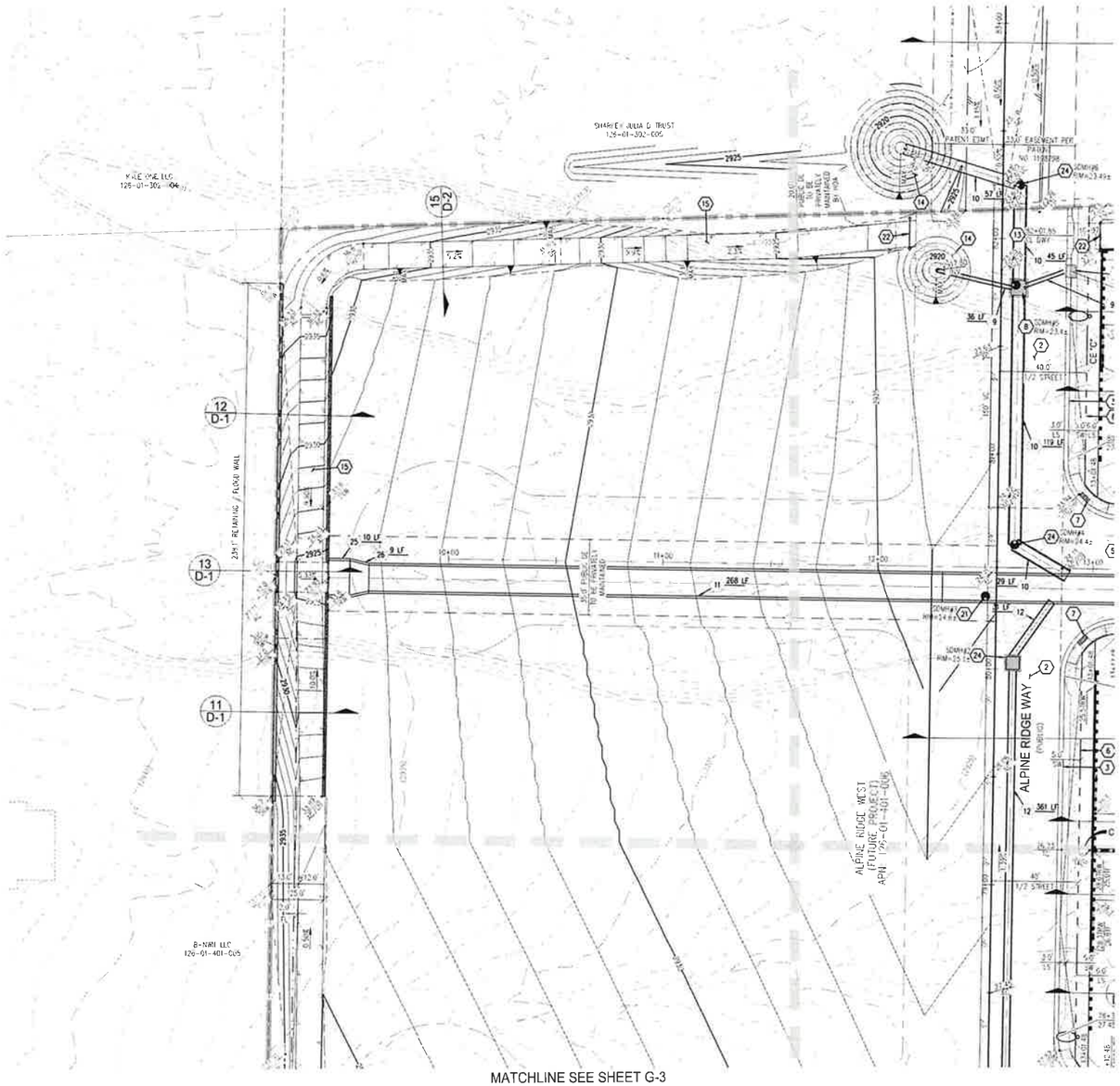
DATE: 4/26/22
DRAFTER: ECC
DESIGNER: ECC
CHECKED: DSP

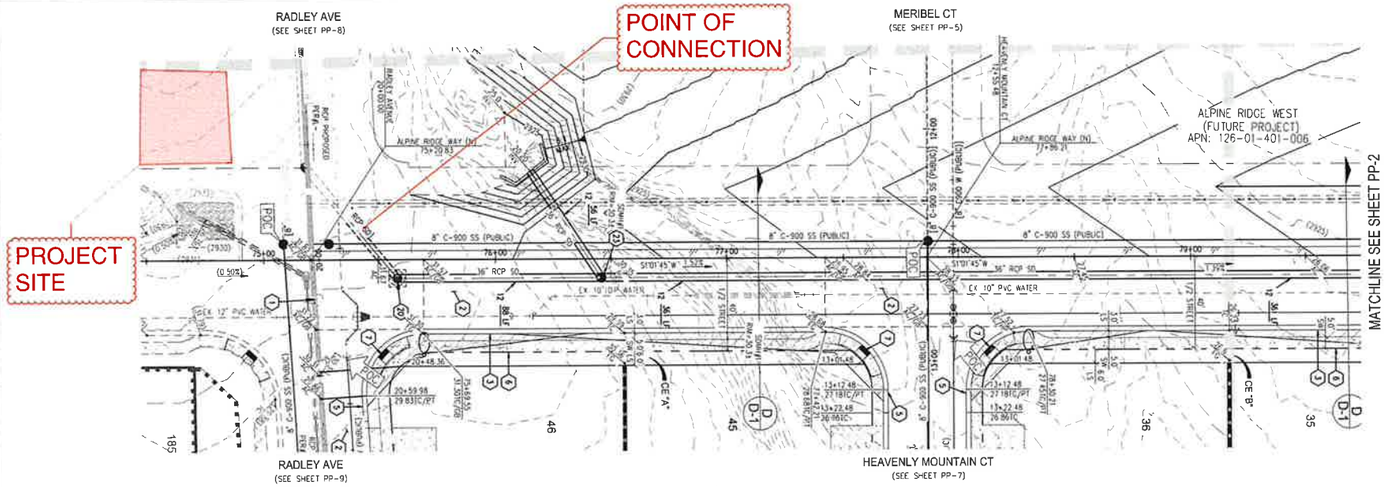
PROJECT NO.
TRI2104-000

PROFESSIONAL ENGINEER – STATE OF NEVADA
DANIEL S. POLL
Exp. 12/31/2023
CIVIL
No. 28179
04/26/22

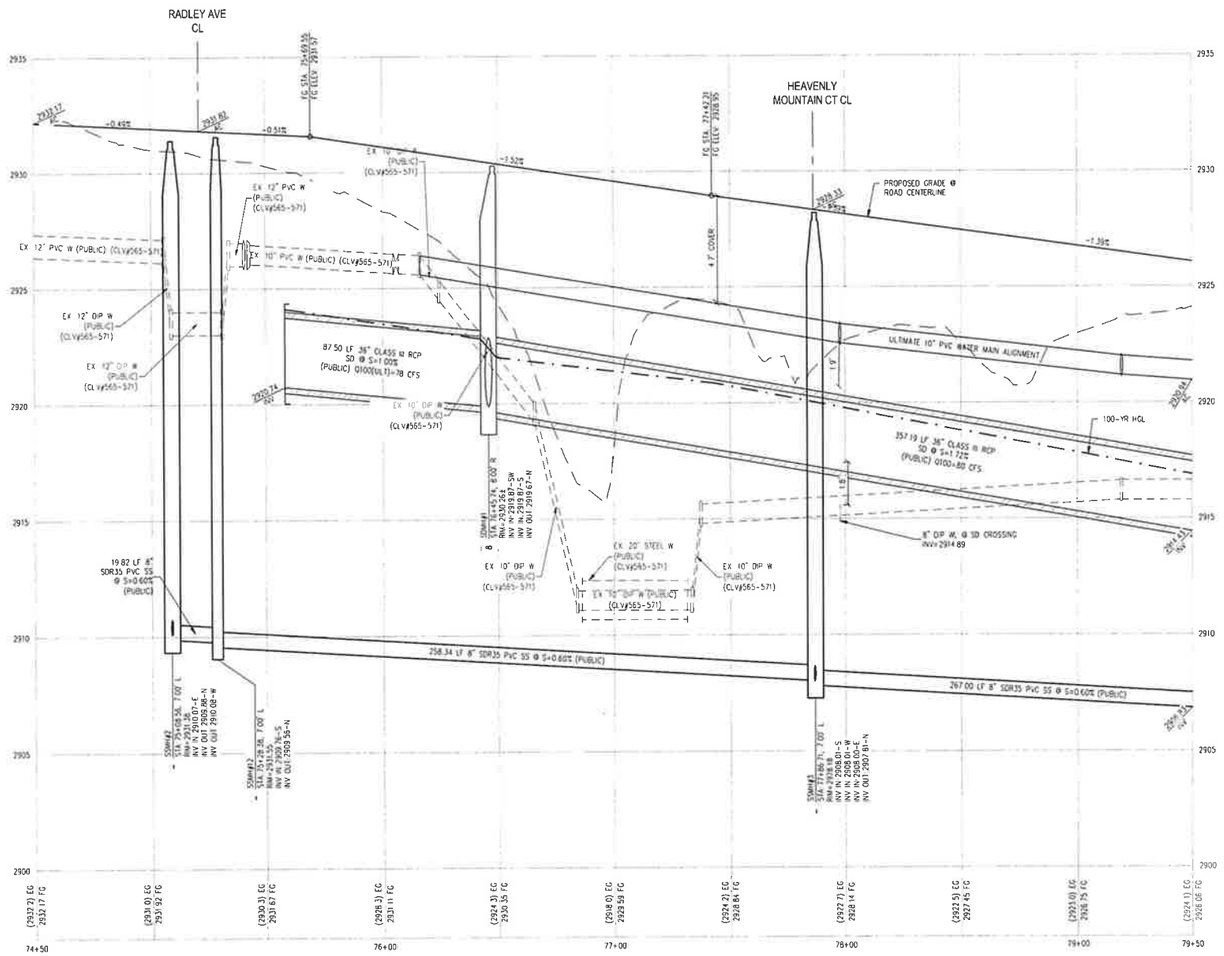
G-3
SHEET 6 OF 16

X:\tri2104-000 alpine ridge east\dwg\engrg\tri2104 grd.dwg 4/25/2022 2:31 PM Piermont Ariel


KYLE CANYON LLC
126-01-302-004
SHARP & JULIA D. TRUST
126-01-302-005
2925
2920
2930
2935
2940
2945
2950
2955
2960
2965
2970
2975
2980
2985
2990
2995
3000
3005
3010
3015
3020
3025
3030
3035
3040
3045
3050
3055
3060
3065
3070
3075
3080
3085
3090
3095
3100
3105
3110
3115
3120
3125




ALPINE RIDGE WAY - PLAN VIEW
(PUBLIC)




ALPINE RIDGE WAY - PROFILE VIEW
HORIZ: 1"=30'
VERT: 1"=3'

MATCHLINE SEE SHEET PP-2

SCALE - 1"=30' FEET

## SURVEY NOTE

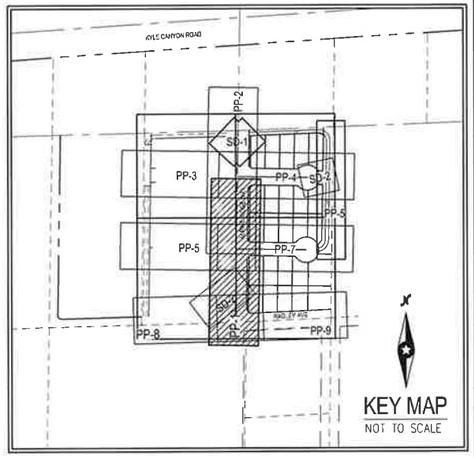
OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION

## ELEVATION NOTE

ADD 2900 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2901.00)

## SIDEWALK RAMP TABLE

| RAMP NUMBER | GRADE (%) "B" TO "A" | "A" (FT) MIN | "B" (FT) MIN |
|---|---|---|---|
| 1 | -6 TO -5.01 | 4.5 | 21.5 |
| 2 | -5 TO -4.01 | 4.5 | 15.0 |
| 3 | -4 TO -3.01 | 4.5 | 12.0 |
| 4 | -3 TO -2.01 | 4.5 | 9.5 |
| 5 | -2 TO 2 | 8.0 | 8.0 |
| 6 | 2.01 TO 3 | 9.5 | 4.5 |
| 7 | 3.01 TO 4 | 12.0 | 4.5 |
| 8 | 4.01 TO 5 | 15.0 | 4.5 |
| 9 | 5.01 TO 6 | 21.5 | 4.5 |




## SEWER CONNECTION NOTE

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE

## LVVWD NOTE

1 THE LVVWD CANNOT GUARANTEE A WATERTIGHT SHUTDOWN WHERE CONNECTIONS OR REPAIRS TO EXISTING FACILITIES ARE REQUIRED. THE CONTRACTOR SHALL ENSURE ALL LABOR AND EQUIPMENT IS AVAILABLE TO REMOVE REMAINING WATER. COORDINATION WITH INSPECTION DIVISION MUST TAKE PLACE PRIOR TO ANY TRIAL SHUTDOWN. CONTRACTOR TO INSTALL TEMPORARY SERVICE TO ENSURE PROPER SHUTDOWN IN THE EVENT NO OTHER APPURTENANCES ARE AVAILABLE.
2 MAINTAIN MINIMUM TWENTY-FOUR(24) INCH COVER PER UDACS SECTION 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION

## SEWER NOTES

1. FIELD VERIFY INVERT, SAWCUT, REMOVE CAP, & CONNECT TO EXISTING SEWER LINE
2. INSTALL 48" STANDARD MANHOLE WITH WATERTIGHT JOINTS (PER DCSWCS SD-1, SD-3, SD-4, SD-5) WITH SINGLE 24" LID
3. INSTALL 72" STANDARD MANHOLE WITH WATERTIGHT JOINTS (PER DCSWCS SD-1, SD-3, SD-4, SD-5) WITH SINGLE 24" LID
4. INSTALL 8" PVC SANITARY SEWER PIPE (PUBLIC)
5. INSTALL 8" C900 PVC SANITARY SEWER PIPE (PUBLIC)
6. INSTALL 8" SEWER PLUG
7. INSTALL 4" SDR35 PVC SEWER LATERAL PER DCSWCS SD-22 AND SD-25
8. INSTALL 4" C900 PVC SEWER LATERAL PER DCSWCS SD-23 AND SD-25

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO 503, 500.4 & 500.5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET SECTIONS ON SHEET D-1
3. INSTALL L TYPE CURB PER CCAUSD NO 216
4. INSTALL R TYPE CURB PER CCAUSD NO 217.3 SI
5. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL 3 ON SHEET D-1
6. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
7. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO 235, CASE 1 & 235.1
8. INSTALL 7'X7' TYPE II SDNH PER CCAUSD NO 401 & 403
9. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
10. INSTALL 60" CLASS III RCP STORM DRAIN (PUBLIC)
11. INSTALL 5.0'x12.0' RCB STORM DRAIN (PUBLIC)
12. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
13. INSTALL DRIVEWAY (W=12') PER CCAUSD NO 224
14. INSTALL D50=6" THICKNESS=12" RIPRAP
15. CONSTRUCT 12' WIDE, CONCRETE LINED, ACCESS ROAD
16. INSTALL 5.0' TYPE "CM2" DROP INLET PER CCAUSD NO 422
17. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
18. INSTALL SIDEWALK DRAIN PER CCAUSD NO 236
19. INSTALL 18" C900 STORM DRAIN (PUBLIC)
20. INSTALL BRICK & MORTAR PLUG PER DETAIL 10 ON SHEET D-1
21. INSTALL SD ACCESS MANHOLE PER DETAIL 22 ON SHEET D-2
22. INSTALL GALVANIZED GATE PER NDOT DETAIL FC-9; SPECIFICATION #616.724
23. INSTALL 48" TYPE II SDNH PER CCAUSD NO 401 & 405
24. INSTALL 60" TYPE III SDNH PER CCAUSD NO. 401 & 406
25. INSTALL 5.0'x16.0' RCB STORM DRAIN (PUBLIC)
26. INSTALL 5.0'x16.0' TO 5.0'x12.0' TRANSITION RCB STORM DRAIN (PUBLIC)
27. CONSTRUCT RESIDENTIAL DRIVEWAY PER CCAUSD NO. 223

## 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 WIDENING AND HALF STREET IMPROVEMENTS, THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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.

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK OC99156

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE CYLINDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24 US FEET, 892.53 METERS NAVD'88 DATUM

## BASIS OF BEARINGS

NORTH 86°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS

## APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ FIRST APPROVED DATE _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 20 GPM

FAST
Call before you
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 DO OVERHEAD
1-702-227-2929

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call
811
OR
1-800-642-2444

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

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

tri pointe HOMES

ALPINE RIDGE EAST
PLAN & PROFILE - ALPINE RIDGE WAY I

S:1 T:19S R:59E

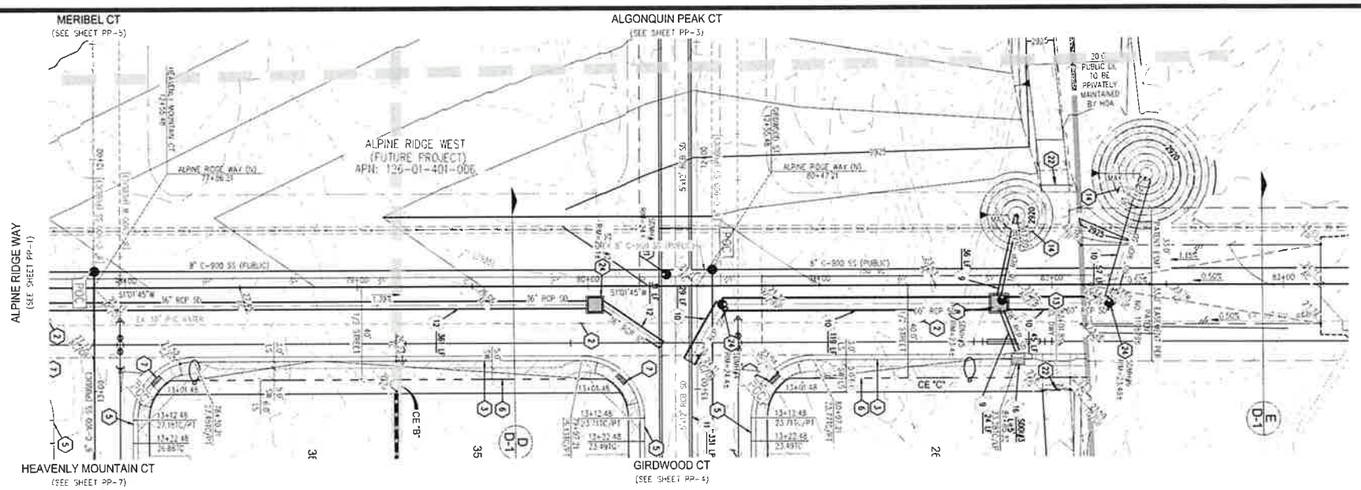
DATE: 4/26/22
DRAFTER: ECC
DESIGNER: ECC
CHECKED: DSP

PROJECT NO.
TRI2104-000

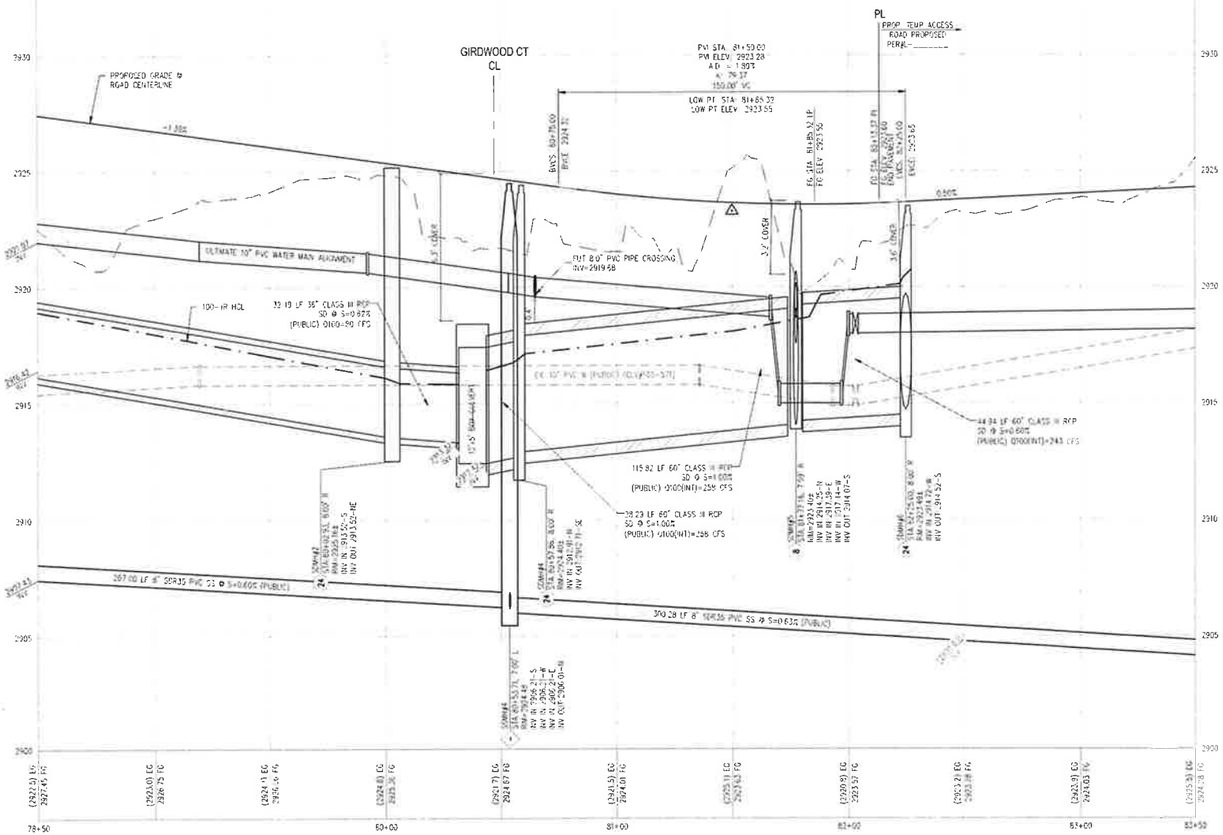
PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL S. POLL
Exp. 12/31/2023
CIVIL
No. 28179
04/26/22

PP-1
SHEET 12 OF 16

J:\TRI2104-000 alpine ridge east\Civil\Vectors\TRI2104 prp dwg 4/25/2022 5:34 PM Prashant Aryal




ALPINE RIDGE WAY - PLAN VIEW
(PUBLIC)




ALPINE RIDGE WAY - PROFILE VIEW
HORIZ: 1"=50'
VERT: 1"=5'

MATCHLINE SEE SHEET PP-1




## SURVEY NOTE

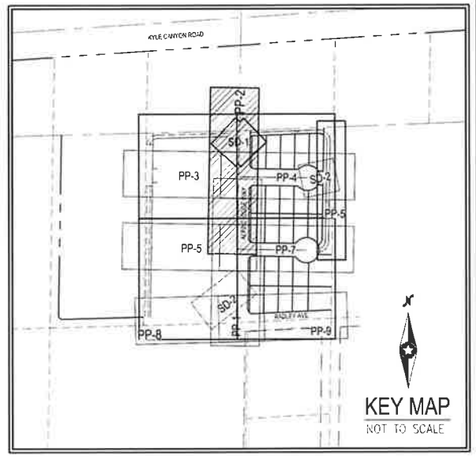
OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBSCURED DURING CONSTRUCTION

## ELEVATION NOTE

ADD 2000 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (IE 01.00 REPRESENTS 2901.00)

## SIDEWALK RAMP TABLE

| RAMP NUMBER | GRADE (%) "B" TO "A" | "A" (FT) MIN | "B" (FT) MIN |
|---|---|---|---|
| (1) | -6 TO -5.01 | 4.5 | 21.5 |
| (2) | -5 TO -4.01 | 4.5 | 15.0 |
| (3) | -4 TO -3.01 | 4.5 | 12.0 |
| (4) | -3 TO -2.01 | 4.5 | 9.5 |
| (5) | -2 TO 2 | 8.0 | 8.0 |
| (6) | 2.01 TO 3 | 9.5 | 4.5 |
| (7) | 3.01 TO 4 | 12.0 | 4.5 |
| (8) | 4.01 TO 5 | 15.0 | 4.5 |
| (9) | 5.01 TO 6 | 21.5 | 4.5 |




## SEWER CONNECTION NOTE

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE.

## LVVWD NOTE

1. THE LVVWD CANNOT GUARANTEE A WATERTIGHT SHUTDOWN WHERE CONNECTIONS OR REPAIRS TO EXISTING FACILITIES ARE REQUIRED. THE CONTRACTOR SHALL ENSURE ALL LABOR AND EQUIPMENT IS AVAILABLE TO REMOVE REMAINING WATER. COORDINATION WITH INSPECTION DIVISION MUST TAKE PLACE PRIOR TO ANY TRIAL SHUTDOWN. CONTRACTOR TO INSTALL TEMPORARY SERVICE TO ENSURE PROPER SHUTDOWN. IN THE EVENT NO OTHER APPURTENANCES ARE AVAILABLE.
2. MAINTAIN MINIMUM TWENTY-FOUR(24) INCH COVER PER UCACS SECTION 2.08.04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION.

## SEWER NOTES

1. FIELD VERIFY INVERT, SAW CUT, REMOVE CAP, & CONNECT TO EXISTING SEWER LINE
2. INSTALL 48" STANDARD MANHOLE WITH WATERTIGHT JOINTS PER DCSMCS SD-1, SD-3, SD-4, SD-5) WITH SINGLE 24" LID
3. INSTALL 72" STANDARD MANHOLE WITH WATERTIGHT JOINTS PER DCSMCS SD-1, SD-3, SD-4, SD-5) WITH OFFSET 24" LID
4. INSTALL 8" PVC SANITARY SEWER PIPE (PUBLIC)
5. INSTALL 8" C900 PVC SANITARY SEWER PIPE (PUBLIC)
6. INSTALL 8" SEWER PLUG
7. INSTALL 4" SDR35 PVC SEWER LATERAL PER DCSMCS SD-22 AND SD-25
8. INSTALL 4" C900 IPVC SEWER LATERAL PER DCSMCS SD-23 AND SD-25

## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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 ADACI/C STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER UCAUSD NO. 503, 560.4 & 560.5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET SECTIONS ON SHEET D-1
3. INSTALL L TYPE CURB PER UCAUSD NO. 215
4. INSTALL R TYPE CURB PER UCAUSD NO. 217.3.S1
5. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL 3 ON SHEET D-1
6. CONSTRUCT 5' WIDE SIDEWALK PER UCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
7. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER UCAUSD NO. 235, CASE 1 & 235.1
8. INSTALL 7'X7' TYPE II SDMH PER UCAUSD NO. 401 & 405
9. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
10. INSTALL 60" CLASS III RCP STORM DRAIN (PUBLIC)
11. INSTALL 5.0'x12.0' RCB STORM DRAIN (PUBLIC)
12. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
13. INSTALL DRIVEWAY (W=12') PER UCAUSD NO. 224
14. INSTALL D50#6" THICKNESS=12" RIPRAP
15. CONSTRUCT 12' WIDE, CONCRETE LINED, ACCESS ROAD
16. INSTALL 5.0' TYPE "CMU" DROP INLET PER UCAUSD NO. 422
17. CONSTRUCT 5' WIDE SIDEWALK PER UCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
18. INSTALL SIDEWALK DRAIN PER UCAUSD NO. 236
19. INSTALL 18" C900 STORM DRAIN (PUBLIC)
20. INSTALL BRICK & MORTAR PLUG PER DETAIL 10 ON SHEET D-1
21. INSTALL SD ACCESS MANHOLE PER DETAIL 22 ON SHEET D-2
22. INSTALL GALVANIZED GATE PER NDOT DETAIL RC-3, SPECIFICATION #616.724
23. INSTALL 48" TYPE II SDMH PER UCAUSD NO. 401 & 405
24. INSTALL 60" TYPE III SDMH PER UCAUSD NO. 401 & 405
25. INSTALL 5.0'x16.0' RCB STORM DRAIN (PUBLIC)
26. INSTALL 5.0'x16.0' TO 5.0'x12.0' TRANSITION RCB STORM DRAIN (PUBLIC)
27. CONSTRUCT RESIDENTIAL DRIVEWAY PER UCAUSD NO. 222

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK 0039156

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE CHUNDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24 US FEET, 892.63 METERS NAVD'88 DATUM

## BASIS OF BEARINGS

NORTH 89°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 180, PAGE 72 OF PLATS

## APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW: 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW: 30 GPM

FAST
Call before you
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 DO OVERHEAD
1-702-227-2929

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
Call
811
OR
1-800-642-2444

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

| NO | DESCRIPTION | DATE | BY | APP'D DATE | APP'D |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

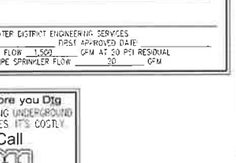
tri pointe HOMES

# ALPINE RIDGE EAST
# PLAN & PROFILE - ALPINE RIDGE WAY II

S1 T19S R59E

DATE: 4/26/22
DRAFTER: ECC
DESIGNER: ECC
CHECKED: DSP

PROJECT NO.
TRI2104-000




PP-2
SHEET 13 OF 16

c:\tri2104-000 alpine ridge east\dwg\commercial\tri2104 proj dwg 4/25/2022 5:35 PM Prashant Aryal

# APPENDIX G

Reference Material
Technical Drainage Study for Iron Mountain
(DS 5508)

# Approval Letters

| **CITY OF LAS VEGAS**<br>**INTER-OFFICE MEMORANDUM** | | | **DATE:**<br><br>**July 16, 2022** |
|---|---|---|---|
| **TO:**<br>**Land Development Services**<br>Department of Building & Safety | | | **FROM:**<br>Albert Sung, P.E.<br>Flood Control Project Engineer<br>Department of Public Works |
| **SUBJECT:** | Drainage Study for: | | **COPIES TO:** |
| **Iron Mountain** | | | Westwood Professional Services |
| **Cross Streets:** | NEC Iron Mountain Rd. & Alpine Ridge Way | | Tri Pointe Homes Nevada, Inc. |
| **File Number:** | F:\Depot\DSMemos\DS5508D.doc | | Bart Anderson, P.E., DevCo |
| **Parcel Number:** | 126-01-801-010, 011, 012, 013, 014, 015, 016 | | CCRFCD |
| **Zoning Action:** | 21-0315-TMP1 | | |
| **FEMA Flood Zone** | YES | NO **X** | |
| **Proposed Storm Drain** | YES **X** | NO | |

| HISTORY | DATE RECEIVED | DATE REVIEWED | COMMENTS | REVIEW FEES | FEES PAID Payment Trn # |
|---|---|---|---|---|---|
| 1st Submittal | 10/14/2021 | 11/22/2021 | Not Approved | $400.00 | 4492234: $400 |
| 2nd Submittal & Supplement | 12/28/2021 & 2/23/2022 | 3/18/2022 | Not Approved | $400.00 | 4586659: $400 |
| 3rd Submittal | 5/9/2022 | 5/26/2022 | Not Approved | $400.00 | 4778909: $400 |
| 4th Submittal & Supplement | 6/14/2022 & 7/5/2022 | 7/16/2022 | See Comments Below | $400.00 | 4828575: $400 |
| | | | **TOTAL FEES (LDDRS):** | **$1,600.00** | **----** |

**REMARKS:**

2nd Submittal with Supplemental drainage.

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. |

1. This Drainage Study shows that the site will be developed in two Phases/Units. The off-site improvements may be phased, however the requirements of Title 19.02.130.2 & 19.02.130.3 shall be met. Paraphrasing – *"All building permits beyond 50% will be withheld until all required off-site improvements are guaranteed (bonded). When 75% of the development is complete, 100% of the off-sites shall be complete."* Coordinate the proposed Unit Boundaries and off-site Improvements with Devco for compliance with the Title 19 requirements prior to final approval of the Drainage Study and/or final approval of any Final Map.

2. Coordinate the required improvements within the west half of Alpine Ridge with City of Las Vegas Right-of-Way (Nancy Logan 229-6545) and submit appropriate information to support BLM reservation on the Future Officer Soldo Memorial Park. No improvements may be constructed prior to BLM Grant.

3. **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 (CCRFCD)* has issued a letter of concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

4. The project proposes to build a temporary drainage facilities. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (off-site berms or channels) and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to City of Las Vegas Flood Control for approval. Once the drainage study is conditionally approved, the engineer should contact the City's Land Development Section (229-6371) to begin the agreement process.

   In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

The following are comments pertaining to the subject site specific drainage study and grading plans:

5. This Study has addressed the Existing, Proposed, and Potential Conditions needed for this development to be adequately protected and therefore meet the intent of the MPU. It is understood that the flows are conveyed within the wash system north of the site (between Radley St. and Kyle Canyon Rd). The recognized flow conditions from the Supplemental HEC-1 submittal at Concentration CP8 are:

   **Existing – 889 cfs, Proposed – 896 cfs, and Potential – 907 cfs**

6. **Unit 1 Sheet G-5 to Sheet G-8**: The plans showed that *Iron Mountain Road* is to be improved during Unit 1 construction. Include plan & profile sheet for the street improvement of *Iron Mountain Road* in the improvement plans submittal to *City Land Development*.

7. Continue to coordinate offsite efforts with the proposed commercial development to the east by Lochsa Engineers.

8. Continue to coordinate offsite efforts with the proposed development to the north "Alpine Ridge" by Westwood.

**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/R59E/01
AREA F-01

Referenced Drainage Exhibits

## Unit 1 Interim Condition Flow Rate Summary

| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|---|
| OFF1-E | 302.9 | 0.47 | 325 | 98 |
| OFF2-E | 52.7 | 0.08 | 103 | 39 |
| OFF3-E | 11.7 | 0.02 | 29 | 11 |
| OFF4-E | 29.7 | 0.04 | 65 | 24 |
| OFF5-E | 17.4 | 0.03 | 30 | 8 |
| AR1-E | 3.8 | 0.01 | 7 | 2 |
| AR2-E | 3.9 | 0.01 | 10 | 4 |
| AR3-E | 2.2 | <0.01 | 6 | 2 |
| AR4-E | 0.9 | <0.01 | 2 | 1 |
| OFF3 | 1013.8 | 1.58 | 755 | 225 |
| IRON1 | 10.1 | 0.02 | 33 | 15 |
| IRON2-I | 5.9 | 0.01 | 17 | 7 |
| IRON3-I | 7.2 | 0.01 | 25 | 12 |
| OF2-E | 8.6 | 0.01 | 23 | 9 |
| IMR1 | 3.7 | <0.01 | 9 | 3 |
| IMR1 | 1.9 | <0.01 | 7 | 4 |
| RS1 | 1.4 | <0.01 | 5 | 3 |
| **Concentration Point ID** | **Area (ac)** | **Area (sq. mi)** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** |
| CP1<br>Q = OFF3 + OFF1-E + AR1-E + OFF2-E | N/A | 2.14 | 863 | 282 |
| CP2<br>Q = OFF3-E + AR2-E | N/A | 0.02 | 39 | 15 |
| CP3<br>Q = OFF4-E + AR3-E + OF2-E | N/A | 0.06 | 93 | 35 |
| CP4<br>Q = CP1 + CP2 + CP3 | N/A | 2.23 | 879 | 293 |
| CP5<br>Q = IRON1 + IRON2 + ARW1 + RS1 | N/A | 0.04 | 82 | 38 |
| CP6<br>Q = CP4 + CP7 + AR4-E + OFF5-E | N/A | 2.30 | 896 | 302 |

## Subbasin Prorated Flow Rate Summary
### Unit 1 Interim Condition

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| IRON1 | 33 | 17 | 10.1 | 3.3 | 1.7 |
| IRON2-I | 17 | 7 | 5.9 | 2.9 | 1.2 |
| IRON3-I | 25 | 12 | 7.2 | 3.5 | 1.7 |
| IMR1 | 7 | 4 | 1.9 | 3.7 | 2.1 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| IRON1(A2) | 2.5 | 1 | 0.8 | 3.3 | 1.7 |
| IRON1(A3) | 3 | 1.5 | 0.9 | 3.3 | 1.7 |
| IRON1(D1) | 3 | 1.5 | 0.8 | 3.3 | 1.7 |
| IRON1(D2) | 1.5 | 1 | 0.5 | 3.3 | 1.7 |
| IRON1(F1) | 6 | 3 | 1.9 | 3.3 | 1.7 |
| IRON1(F2) | 9.5 | 5 | 2.9 | 3.3 | 1.7 |
| IRON1(F3) | 6 | 3 | 1.9 | 3.3 | 1.7 |
| IRON1(F4) | 1.5 | 1 | 0.4 | 3.3 | 1.7 |
| ***TOTAL*** | ***33*** | ***17*** | ***10.1*** | | |
| IRON2-I(B) | 3 | 1.5 | 1.1 | 2.9 | 1.2 |
| IRON2-I(C) | 3 | 1 | 1.0 | 2.9 | 1.2 |
| IRON2-I(D3) | 1 | 0.5 | 0.4 | 2.9 | 1.2 |
| IRON2-I(E) | 6.5 | 2.5 | 2.2 | 2.9 | 1.2 |
| IRON2-I(G1) | 3.5 | 1.5 | 1.1 | 2.9 | 1.2 |
| ***TOTAL*** | ***17*** | ***7*** | ***5.9*** | | |
| IRON3-I(A1) | 6 | 2.5 | 1.9 | 2.9 | 1.2 |
| IRON3-I(G2) | 5 | 2 | 1.8 | 2.9 | 1.2 |
| IRON3-I(G3) | 5 | 2 | 1.7 | 2.9 | 1.2 |
| IRON3-I(G4) | 5 | 2 | 1.8 | 2.9 | 1.2 |
| ***TOTAL*** | ***21*** | ***9*** | ***7.2*** | | |
| IMR1(A) | 5 | 3 | 1.4 | 3.7 | 2.1 |
| IMR1(B) | 2 | 1 | 0.5 | 3.7 | 2.1 |
| ***TOTAL*** | ***7*** | ***4*** | ***1.9*** | | |

## Unit 1 Interim Condition
### 100-Year Street Flow Summary Interior Streets

| Section ID | Description | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|---|
| B<br>Q = IRON2-I(B) +<br>11 CFS (Overtop from Section C) | Half Street, Offset Crowned, R-Curb | 14 | 0.70 | 0.68 | 3.32 | 2.3 |
| C<br>Q = Q = IRON1(A2 + A3) + IRON3-I(A1+C) | Half Street, Offset Crowned, R-Curb | 14 | 0.70 | 0.57 | 3.13 | 1.8 |
| C (Capacity)<br>Q = Capacity | Half Street, Offset Crowned, R-Curb | 3 | 0.70 | 0.38 | 1.95 | 0.7 |
| D2<br>Q = IRON1(D2) | Half Street, Normal Crowned, R-curb | 1.5 | 3.20 | 0.27 | 2.98 | 0.8 |
| D3<br>Q = IRON1(D2) + IRON2-I(D3) +<br>3 CFS (Overtop from Section E4) | Half Street, Normal Crowned, L-curb | 5.5 | 3.20 | 0.36 | 4.02 | 1.4 |
| D4<br>Q = IRON1(F2+F3) | Half Street, Normal Crowned, L-curb | 15.5 | 3.20 | 0.48 | 5.14 | 2.5 |
| E1<br>Q = DI#2 Bypass + IRON1(A2+A3) + IRON2-I(B+C) + IRON3-I(A1) | Full Street, Normal Crowned, R-curb | 46.0 | 0.88 | 0.64 | 3.84 | 2.5 |
| E2<br>Q = IRON1(D2+F2+F3+F4) +<br>IRON2-I(E+D3+G1) + IRON3-I(G2+G3+G4) | Full Street, Normal Crowned, R-curb | 44.5 | 4.11 | 0.51 | 6.32 | 3.2 |
| E3<br>Q = IRON1(D2+F2+F3+F4) +<br>IRON2-I(D3+G1) + IRON3-I(G2) | Full Street, Normal Crowned, R-curb | 28 | 4.11 | 0.45 | 5.49 | 2.5 |
| E4<br>Q = IRON1(F2+F3) + IRON2-I(G1) | Half Street, Normal Crowned, L-curb | 19 | 3.20 | 0.51 | 5.47 | 2.8 |
| E4<br>Q = Capacity | Half Street, Normal Crowned, L-curb | 16 | 3.20 | 0.48 | 5.20 | 2.5 |
| G1<br>Q = IRON1(F4) + IRON2-I(G1) | Full Street, Normal Crowned, R-curb | 5 | 1.07 | 0.35 | 2.16 | 0.8 |
| F3<br>Q = IRON1(F3) | Full Street, Normal Crowned, R-curb | 6 | 0.64 | 0.39 | 1.84 | 0.7 |

## Onsite Hydraulic Section Summary
### Unit 1 Interim Condition

| Section ID | $Q_{100}$ (cfs) | Section Description | Slope (%) | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|
| Section V1<br>Q = OF2-E + ARW1 | 26 | Earthen V-Ditch, 3:1 SS | 1.00 | 1.39 | 4.50 |
| Section T1<br>Q = OF2-E + ARW1 + IRON (F1+D1) + (1/3)RS1 | 37 | Earthen Trap Chnl, 3:1 SS, 2' BW | 4.29 | 0.92 | 8.39 |
| Section T2<br>Q = OF2-E + ARW1 + IRON (F1+D1) + RS1 | 40 | Earthen Trap Chnl, 3:1 SS, 2' BW | 3.73<br>2.68<br>1.83 | 0.99<br>1.07<br>1.17 | 8.12<br>7.19<br>6.24 |

## Recommended Mainline Facilities Summary
### Unit 1 Interim Condition

| Facility ID | Facility Description | $Q_{Design}$ (cfs) | Notes |
|---|---|---|---|
| RADLEY SD SYSTEM | | | |
| A0 | Proposed 48" RCP | - | Capped in proposed condition. To be extended for future SD extension, east in Radley Street. |
| A1 | Proposed 48" RCP | 81.5 | To be removed for future SD extension, east in Radley Street |
| A2 | Proposed 24" RCP | 19.5 | |
| ONSITE SD SYSTEM | | | |
| B1 | Proposed 42" RCP | 62 | |

## Recommended Drop Inlet Facility Summary
### Unit 1 Interim Condition

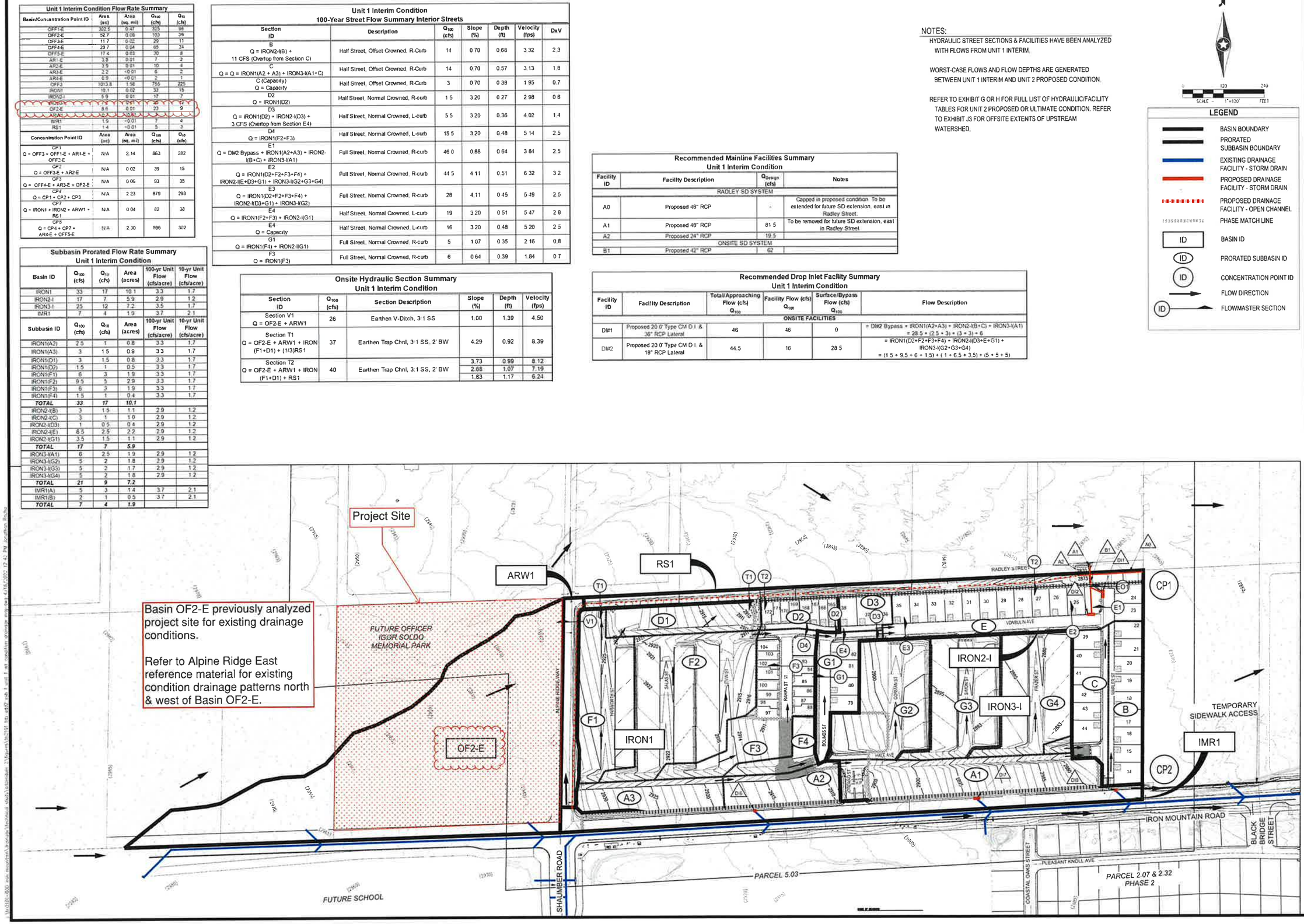
| Facility ID | Facility Description | Total/Approaching Flow (cfs) $Q_{100}$ | Facility Flow (cfs) $Q_{100}$ | Surface/Bypass Flow (cfs) $Q_{100}$ | Flow Description |
|---|---|---|---|---|---|
| ONSITE FACILITIES | | | | | |
| DI#1 | Proposed 20.0' Type CM D.I. & 36" RCP Lateral | 46 | 46 | 0 | = DI#2 Bypass + IRON1(A2+A3) + IRON2-I(B+C) + IRON3-I(A1)<br>= 28.5 + (2.5 + 3) + (3 + 3) + 6 |
| DI#2 | Proposed 20.0' Type CM D.I. & 18" RCP Lateral | 44.5 | 16 | 28.5 | = IRON1(D2+F2+F3+F4) + IRON2-I(D3+E+G1) + IRON3-I(G2+G3+G4)<br>= (1.5 + 9.5 + 6 + 1.5) + ( 1 + 6.5 + 3.5) + (5 + 5 + 5) |

NOTES:

HYDRAULIC STREET SECTIONS & FACILITIES HAVE BEEN ANALYZED WITH FLOWS FROM UNIT 1 INTERIM.

WORST-CASE FLOWS AND FLOW DEPTHS ARE GENERATED BETWEEN UNIT 1 INTERIM AND UNIT 2 PROPOSED CONDITION.

REFER TO EXHIBIT G OR H FOR FULL LIST OF HYDRAULIC/FACILITY TABLES FOR UNIT 2 PROPOSED OR ULTIMATE CONDITION. REFER TO EXHIBIT J3 FOR OFFSITE EXTENTS OF UPSTREAM WATERSHED.







LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITY - STORM DRAIN
- PROPOSED DRAINAGE FACILITY - STORM DRAIN
- PROPOSED DRAINAGE FACILITY - OPEN CHANNEL
- PHASE MATCH LINE
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION


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. | DATE

CITY OF LAS VEGAS, NV

# DRAINAGE MAP

TRI POINTE HOMES

IRON MOUNTAIN

UNIT 1 INTERIM CONDITION DRAINAGE

S 19
T 19S
R 59E

DATE: APRIL 2022
DRAFTER: PI
DESIGNER: JSR
CHECKED: MF

PROJECT NO.
TRI2101.000

EXHIBIT F
SHEET 1 OF 1

Referenced from DS 5508 TDS Addendum 2

## Unit 2 Proposed Condition Flow Rate Summary

| Basin/Concentration Point ID | Area (ac) | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|---|
| OFF1-E | 302.5 | 0.47 | 325 | 98 |
| OFF2-E | 92.7 | 0.08 | 103 | 39 |
| OFF3-E | 11.7 | 0.02 | 29 | 11 |
| OFF4-E | 28.7 | 0.04 | 65 | 24 |
| OFF5-E | 17.4 | 0.03 | 30 | 8 |
| AR1-E | 3.8 | 0.01 | 7 | 2 |
| AR2-E | 3.9 | 0.01 | 10 | 4 |
| AR3-E | 2.2 | <0.01 | 6 | 2 |
| AR4-E | 0.9 | <0.01 | 2 | 1 |
| OFF3 | 1013.8 | 1.58 | 755 | 229 |
| IRON1 | 10.1 | 0.02 | 33 | 15 |
| IRON2 | 13.9 | 0.02 | 37 | 16 |
| OF2-E | 8.6 | 0.01 | 23 | 9 |
| ARW1 | 0.7 | <0.01 | 3 | 1 |
| IMR1 | 1.9 | <0.01 | 7 | 4 |
| RS1 | 1.4 | <0.01 | 5 | 3 |
| **Concentration Point ID** | **Area (ac)** | **Area (sq. mi)** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** |
| CP1<br>Q = OFF3 + OFF1-E + AR1-E + OFF2-E | N/A | 2.14 | 863 | 282 |
| CP2<br>Q = OFF3-E + AR2-E | N/A | 0.02 | 39 | 15 |
| CP3<br>Q = OFF4-E + AR3-E + OF2-E | N/A | 0.06 | 93 | 35 |
| CP4<br>Q = CP1 + CP2 + CP3 | N/A | 2.23 | 879 | 293 |
| CP7<br>Q = IRON1 + IRON2 + ARW1 + RS1 | N/A | 0.04 | 77 | 35 |
| CP8<br>Q = CP4 + CP7 + AR4-E + OFF5-E | N/A | 2.30 | 895 | 302 |

## Subbasin Prorated Flow Rate Summary
### Unit 2 Proposed Condition

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| IRON1 | 33 | 17 | 10.1 | 3.3 | 1.7 |
| IRON2 | 37 | 18 | 13.0 | 2.8 | 1.4 |
| IMR1 | 7 | 4 | 1.9 | 3.7 | 2.1 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| IRON1(A2) | 2.5 | 1 | 0.8 | 3.3 | 1.7 |
| IRON1(A3) | 3 | 1.5 | 0.9 | 3.3 | 1.7 |
| IRON1(D1) | 3 | 1.5 | 0.8 | 3.3 | 1.7 |
| IRON1(D2) | 1.5 | 1 | 0.5 | 3.3 | 1.7 |
| IRON1(F1) | 3 | 2 | 1.0 | 3.3 | 1.7 |
| IRON1(F2) | 3 | 1 | 0.9 | 3.3 | 1.7 |
| IRON1(F3) | 5.5 | 3 | 1.8 | 3.3 | 1.7 |
| IRON1(F4) | 5.5 | 3 | 1.7 | 3.3 | 1.7 |
| IRON1(F5) | 6 | 3 | 1.8 | 3.3 | 1.7 |
| ***TOTAL*** | ***33*** | ***17*** | ***10.1*** | | |
| IRON2(A1) | 5.5 | 2.5 | 1.9 | 2.8 | 1.4 |
| IRON2(B) | 3 | 1.5 | 1.1 | 2.8 | 1.4 |
| IRON2(C) | 3 | 1.5 | 1.0 | 2.8 | 1.4 |
| IRON2(D3) | 1 | 0.5 | 0.4 | 2.8 | 1.4 |
| IRON2(E) | 6.5 | 3 | 2.2 | 2.8 | 1.4 |
| IRON2(G1) | 2.5 | 1.5 | 0.9 | 2.8 | 1.4 |
| IRON2(G2) | 5.5 | 2.5 | 1.9 | 2.8 | 1.4 |
| IRON2(G3) | 5 | 2.5 | 1.7 | 2.8 | 1.4 |
| IRON2(G4) | 5 | 2.5 | 1.8 | 2.8 | 1.4 |
| ***TOTAL*** | ***37*** | ***16*** | ***13.0*** | | |
| IMR1(A) | 5 | 3 | 1.4 | 3.7 | 2.1 |
| IMR1(B) | 2 | 1 | 0.5 | 3.7 | 2.1 |
| ***TOTAL*** | ***7*** | ***4*** | ***1.9*** | | |

## Unit 2 Proposed Condition
### 100-Year Street Flow Summary Interior Streets

| Section ID | Description | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|---|
| A1<br>Q =IRON1(A2 + A3) + IRON2(A1) | Half Street, Normal Crowned, R-curb | 11 | 2.70 | 0.45 | 4.45 | 2.0 |
| | | | 5.57 | 0.41 | 5.85 | 2.4 |
| A2<br>Q = IRON1(A2 + A3) | Half Street, Normal Crowned, R-Curb | 5.5 | 2.70 | 0.38 | 3.71 | 1.4 |
| | | | 3.39 | 0.37 | 4.04 | 1.5 |
| A3<br>Q = IRON1(A3) | Half Street, Normal Crowned, R-Curb | 3 | 3.39 | 0.32 | 3.53 | 1.1 |
| B<br>Q = IRON2(B) + 11-CFS (Overtop from Section C) | Half Street, Offset Crowned, R-Curb | 14 | 0.70 | 0.68 | 3.32 | 2.3 |
| C<br>Q = IRON1(A2+A3) + IRON2(A1+C) | Half Street, Offset Crowned, R-Curb | 14 | 0.70 | 0.57 | 3.13 | 1.8 |
| C (capacity)<br>Q = Capacity | Half Street, Offset Crowned, R-Curb | 3 | 0.70 | 0.38 | 1.95 | 0.7 |
| D1<br>Q = IRON1(D1) | Half Street, Normal Crowned, R-curb | 3 | 3.20 | 0.32 | 3.46 | 1.1 |
| D2<br>Q = Bypass D#4 + IRON1(D2) + IRON2(D3) | Half Street, Normal Crowned, R-curb | 3.5 | 3.20 | 0.33 | 3.56 | 1.2 |
| D3<br>Q = IRON1(F2+F3+F4) | Half Street, Normal Crowned, L-curb | 14 | 3.20 | 0.47 | 5.02 | 2.4 |
| D4<br>Q = Bypass D#5 + IRON1(F5) + IRON2(G1) | Half Street, Normal Crowned, L-curb | 16 | 3.20 | 0.48 | 5.20 | 2.5 |
| E1<br>Q = Section E2 + IRON1(A2+A3) + IRON2(A1+B+C) - D#2 Collection | Full Street, Normal Crowned, R-curb | 43.5 | 0.88 | 0.83 | 3.76 | 2.4 |
| E2<br>Q = Bypass (D#4 + #5) + IRON1(D2 + F5) + IRON2(D3+E+G1+G2+G3+G4) | Full Street, Normal Crowned, R-curb | 41.5 | 4.11 | 0.50 | 6.17 | 3.1 |
| E3<br>Q = Bypass (D#4 + #5) + IRON1(D2 + F5) + IRON2(D3+G1+G2) | Full Street, Normal Crowned, R-curb | 25 | 4.11 | 0.44 | 5.34 | 2.3 |
| F1<br>Q = IRON1(F1) | Half Street, Offset Crowned, R-Curb | 3 | 1.00 | 0.40 | 2.58 | 1.0 |
| F2<br>Q = IRON1(F2) | Half Street, Offset Crowned, R-Curb | 3 | 0.60 | 0.39 | 1.84 | 0.7 |
| F3<br>Q = IRON1(F5) | Full Street, Normal Crowned, R-curb | 6 | 0.60 | 0.37 | 1.73 | 0.6 |
| G1<br>Q = IRON2(G2) | Full Street, Normal Crowned, R-curb | 5.5 | 1.07 | 0.38 | 4.04 | 1.5 |
| G2<br>Q = IRON2(G1) | Half Street, Offset Crowned, R-Curb | 2.5 | 0.76 | 0.40 | 2.21 | 0.9 |
| G3<br>Q = IRON2(G1) | Half Street, Offset Crowned, R-Curb | 2.5 | 0.76 | 0.36 | 1.90 | 0.7 |

## 100-Year Street Flow Summary
### Interior Streets (Emergency Overflow)

| Section ID | Description | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|---|
| D1<br>Q = D#3 + IRON1(D1) | Half Street, Normal Crowned, R-curb | 6 | 3.20 | 0.38 | 4.04 | 1.5 |
| D2<br>Q = D#3 + Bypass D#4 + IRON1(D2) | Half Street, Normal Crowned, R-curb | 5.5 | 3.20 | 0.37 | 3.95 | 1.5 |
| E1<br>Q = D#3 + Bypass (D#2) + IRON1(A2 + A3) +IRON2(A1 + B + C) | Full Street, Normal Crowned, R-curb | 47 | 0.88 | 0.64 | 3.87 | 2.5 |
| E2<br>Q = D#3 + Bypass (D#4 + #5) + IRON1(D2 + F5) + IRON2( D3 + E + G1 + G2 + G3 + G4) | Full Street, Normal Crowned, R-curb | 44.5 | 4.11 | 0.51 | 6.32 | 3.2 |
| E3<br>Q = D#3 + Bypass (D#4 + #5) + IRON1(D2 + F5) + IRON2(D3+G1+G2) | Full Street, Normal Crowned, R-curb | 28 | 4.11 | 0.45 | 5.49 | 2.5 |

## Recommended Mainline Facilities Summary

| Facility ID | Facility Description | $Q_{Design}$ (cfs) | Notes |
|---|---|---|---|
| | RADLEY SD SYSTEM | | |
| A0 | Proposed 48" RCP | - | Capped in proposed condition. To be extended for future SD extension, east in Radley Street |
| A1 | Proposed 48" RCP | 79 | To be removed for future SD extension, east in Radley Street. |
| A2 | Proposed 24" RCP | 20.5 | |
| A3 | Proposed 24" RCP | 11.5 | |
| A4 | Proposed 18" RCP | 9 | Open inlet in Unit 1 interim & Unit 2 Proposed Conditions<br>For future SD extension for Alpine Ridge Way (by others) |
| | ONSITE SD SYSTEM | | |
| B1 | Proposed 42" RCP | 58.5 | |
| B2 | Proposed 18" RCP | 8.5 | |

## Recommended Drop Inlet Facility Summary

| Facility ID | Facility Description | Total/Approaching Flow (cfs) $Q_{100}$ | Facility Flow (cfs) $Q_{100}$ | Surface/Bypass Flow (cfs) $Q_{100}$ | Flow Description |
|---|---|---|---|---|---|
| | **ONSITE FACILITIES** | | | | |
| DI#1 | Proposed 20.0' Type CM D.I. & 36" RCP Lateral | 43.5 | 43.5 | 0 | = (IRON1 + IRON2) - Drop Inlet Collection (#2 + #3 + #4 + #5)<br>= (33 + 37) - (15 - 3 - 2 - 5.5) |
| DI#2 | Proposed 20.0' Type CM D.I. & 18" RCP Lateral | 20.75 | 15 | 5.75 | = (1/2)*[ Bypass (DI#4 + DI#5) + IRON1(D2 + F5) + IRON2(D3 + E + G1 + G2 + G3 + G4) ]<br>= (1/2) * [(2 + 6.5)+(1.5+6)+(1+6.5+2.5+5.5+5+5)] |
| DI#3 | Proposed 5.0' Type CM D.I. & 18" RCP Lateral | 3 | 3 | 0 | IRON(F1) |
| DI#4 | Proposed 5.0' Type CM D.I. & 18" RCP Lateral | 3 | 2 | 1 | IRON(D1) |
| DI#5 | Proposed 10.0' Type CM D.I. & 18" RCP Lateral | 14 | 6.5 | 7.5 | IRON1(F2+F3+F4) |
| | **IRON MOUNTAIN FACILITIES** | | | | |
| DI#6 | Proposed 5.0' Type CM2 D.I. & Ex. 18" C900 Lateral | 0 | N/A | N/A | Nuisance Only |
| DI#7 | Proposed 5.0' Type CM2 D.I. & Ex. 18" RCP Lateral | 5 | 3 | 2 | IMR1(a) |
| DI#8 | Proposed 5.0' Type CM2 D.I. & Ex. 18" RCP Lateral | 0 | N/A | N/A | Nuisance Only |

## 100-Year Street Flow Summary
### Perimeter Streets

| Section ID | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|
| 4<br>Q = IMR1 | 7 | 4.00 | 0.37 | 4.62 | 1.7 |
| AW1<br>Q = OF2-E + ARW1 | 26 | 0.55 | 0.71 | 2.74 | 1.9 |
| R1<br>Q = OF2-E + ARW1 + RS1 | 31 | 2.49 | 0.61 | 5.26 | 3.2 |
| | | 4.36 | 0.56 | 6.51 | 3.6 |

## 10-Year Street Flow Summary
### Perimeter Streets

| Section ID | $Q_{10}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV | Dry Lane (ft) |
|---|---|---|---|---|---|---|
| IM10<br>Q = IMR1 | 4 | 4.00 | 0.32 | 4.08 | 1.3 | 22.5 |
| AW1<br>Q = ARW1 | 1 | 0.55 | 0.29 | 1.38 | 0.4 | 24.0 |

NOTES:

HYDRAULIC STREET SECTIONS & FACILITIES HAVE BEEN ANALYZED WITH FLOWS FROM UNIT 2 PROPOSED.

WORST-CASE FLOWS AND FLOW DEPTHS ARE GENERATED BETWEEN UNIT 1 INTERIM AND UNIT 2 PROPOSED CONDITION.

REFER TO EXHIBIT J3 FOR OFFSITE EXTENTS OF UPSTREAM WATERSHED.

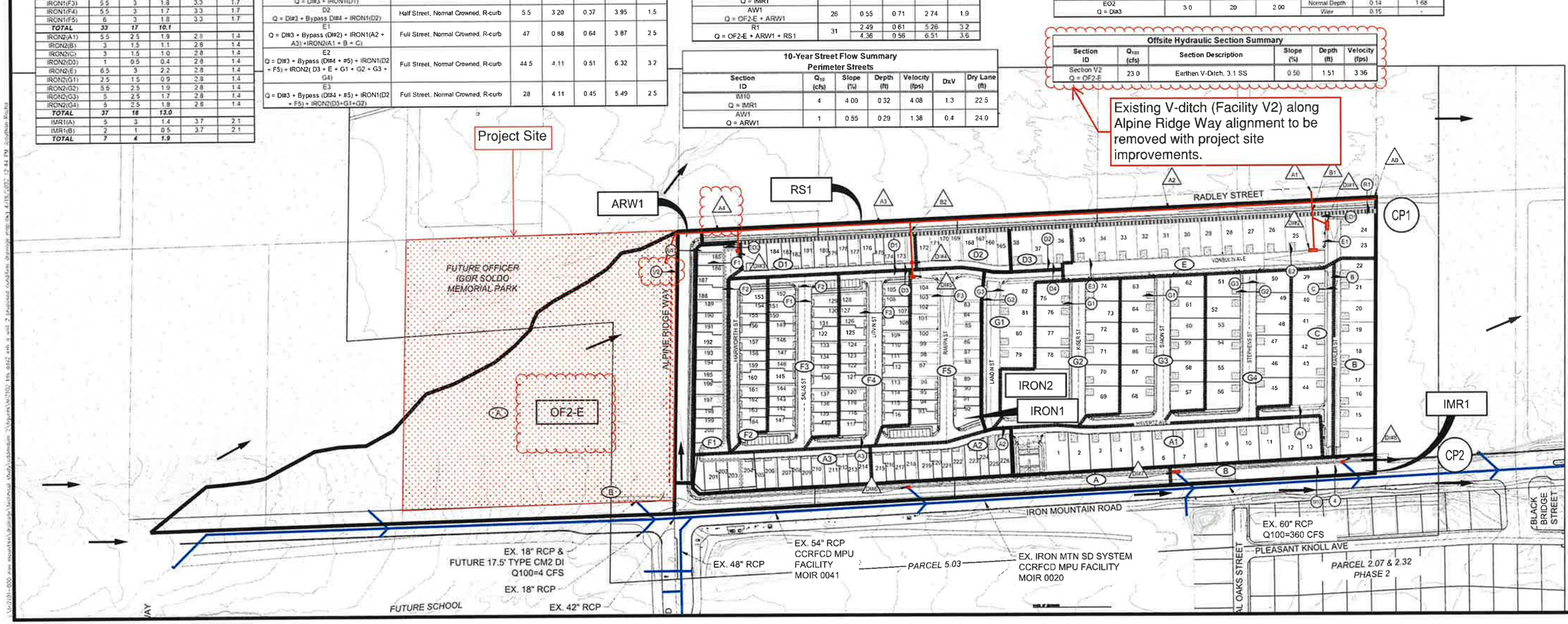
## Drainage Easement Hydraulic Summary
### Emergency Overflow Condition

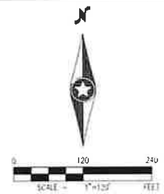
| Section ID | $Q_{100}$ (cfs) | Width (ft) | Slope (%) | Type of Analysis | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|---|
| EO1<br>Q = D#3 + D#1 | 46.5 | 30 | 0.50 | Normal Depth | 0.37 | 4.13 |
| | | | | Weir | 0.64 | - |
| EO2<br>Q = D#3 | 3.0 | 20 | 2.00 | Normal Depth | 0.14 | 1.68 |
| | | | | Weir | 0.15 | - |

## Offsite Hydraulic Section Summary

| Section ID | $Q_{100}$ (cfs) | Section Description | Slope (%) | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|
| Section V2<br>Q = OF2-E | 23.0 | Earthen V-Ditch, 3:1 SS | 0.50 | 1.51 | 3.36 |

Existing V-ditch (Facility V2) along Alpine Ridge Way alignment to be removed with project site improvements.




LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY - OPEN CHANNEL
- PHASE MATCH LINE
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID


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 |
|---|---|---|---|---|
| | | | | |

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

IRON MOUNTAIN

UNIT 2 PROPOSED CONDITION DRAINAGE MAP

S 01
R 59E

DATE: APRIL 2022
DRAFTER: JSR
DESIGNER: JSR
CHECKED: MF
PROJECT NO.
TRI2101.000

EXHIBIT G
SHEET 1 OF 1

Referenced from DS 5508 TDS Addendum 2

Project Site

**Ultimate Condition Flow Rate Summary**

| Basin ID | Area (ac) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| IRON1 | 10.1 | 33 | 15 |
| IRON2 | 13.0 | 37 | 18 |
| WPRK10* | 10.0 | 19 | 8 |
| ARW1* | 8.7 | 19 | 8 |
| IMR1 | 1.9 | 7 | 4 |
| RS1 | 1.4 | 5 | 3 |
| **Concentration Point ID** | **Area (sq. mi)** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** |
| CP1<br>Q = WPRK10 + ARW1 + IRON1 + IRON2 + RS1 | - | 97 | 43 |

* REFERENCED FROM SKYE CANYON PHASE 3B & 3C INFRASTRUCTURE STUDY (DS 4943)

CP1 HAS BEEN ALGEBRAICALLY ADDED

**Recommended Mainline Facilities Summary**

| Facility ID | Facility Description | $Q_{design}$ (cfs) | Notes |
|---|---|---|---|
| | RADLEY SD SYSTEM | | |
| A0 | Proposed 48" RCP | - | Capped in proposed condition. To be extended for future SD extension, east in Radley Street |
| A1 | Proposed 48" RCP | 79 | To be removed for future SD extension, east in Radley Street. |
| A2 | Proposed 24" RCP | 20.5 | |
| A3 | Proposed 24" RCP | 12 | |
| A4 | Proposed 18" RCP | 9 | Open inlet in Unit 1 Interim & Unit 2 Proposed Conditions<br>For future SD extension for Alpine Ridge Way (by others) |
| | ONSITE SD SYSTEM | | |
| B1 | Proposed 42" RCP | 56.5 | |
| B2 | Proposed 18" RCP | 6.5 | |

Anticipated storm drain facility flow rate.

**Subbasin Prorated Flow Rate Summary**

| Basin ID | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) | 10-yr Unit Flow (cfs/acre) |
|---|---|---|---|---|---|
| IRON1 | 33 | 17 | 10.1 | 3.3 | 1.7 |
| IRON2 | 37 | 18 | 13.0 | 2.8 | 1.4 |
| IMR1 | 7 | 4 | 1.9 | 3.7 | 2.1 |
| **Subbasin ID** | **$Q_{100}$ (cfs)** | **$Q_{10}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** | **10-yr Unit Flow (cfs/acre)** |
| IRON1(A2) | 2.5 | 1 | 0.8 | 3.3 | 1.7 |
| IRON1(A3) | 3 | 1.5 | 0.9 | 3.3 | 1.7 |
| IRON1(D1) | 3 | 1.5 | 0.8 | 3.3 | 1.7 |
| IRON1(D2) | 1.5 | 1 | 0.5 | 3.3 | 1.7 |
| IRON1(F1) | 3 | 2 | 1.0 | 3.3 | 1.7 |
| IRON1(F2) | 3 | 1 | 0.9 | 3.3 | 1.7 |
| IRON1(F3) | 5.5 | 3 | 1.8 | 3.3 | 1.7 |
| IRON1(F4) | 5.5 | 3 | 1.7 | 3.3 | 1.7 |
| IRON1(F5) | 6 | 3 | 1.8 | 3.3 | 1.7 |
| ***TOTAL*** | ***33*** | ***17*** | ***10.1*** | | |
| IRON2(A1) | 5.5 | 2.5 | 1.9 | 2.8 | 1.4 |
| IRON2(B) | 3 | 1.5 | 1.1 | 2.8 | 1.4 |
| IRON2(C) | 3 | 1.5 | 1.0 | 2.8 | 1.4 |
| IRON2(D3) | 1 | 0.5 | 0.4 | 2.8 | 1.4 |
| IRON2(E) | 6.5 | 3 | 2.2 | 2.8 | 1.4 |
| IRON2(G1) | 2.5 | 1.5 | 0.9 | 2.8 | 1.4 |
| IRON2(G2) | 5.5 | 2.5 | 1.9 | 2.8 | 1.4 |
| IRON2(G3) | 5 | 2.5 | 1.7 | 2.8 | 1.4 |
| IRON2(G4) | 5 | 2.5 | 1.8 | 2.8 | 1.4 |
| ***TOTAL*** | ***37*** | ***18*** | ***13.0*** | | |
| IMR1(A) | 5 | 3 | 1.4 | 3.7 | 2.1 |
| IMR1(B) | 2 | 1 | 0.5 | 3.7 | 2.1 |
| ***TOTAL*** | ***7*** | ***4*** | ***1.9*** | | |

**Recommended Drop Inlet Facility Summary**

| Facility ID | Facility Description | Total/Approaching Flow (cfs) $Q_{100}$ | Facility Flow (cfs) $Q_{100}$ | Surface/Bypass Flow (cfs) $Q_{100}$ | Flow Description |
|---|---|---|---|---|---|
| | | ONSITE FACILITIES | | | |
| DI#1 | Proposed 20.0' Type CM D I & 36" RCP Lateral | 43.5 | 43.5 | 0 | = (IRON1 + IRON2) - Drop Inlet Collection (#2 + #3 + #4 + #5)<br>= (33 + 37) - (15 - 3 - 2 - 6.5) |
| DI#2 | Proposed 20.0' Type CM D I & 18" RCP Lateral | 20.75 | 15 | 5.75 | = (1/2)*[ Bypass (DI#4 + DI#5) + IRON1(D2 + F5) + IRON2(D3 + E + G1 + G2 + G3 + G4) ]<br>= (1/2) * [(2 + 6.5)+(1.5+6)+(1+6.5+2.5+5.5+5+5)] |
| DI#3 | Proposed 5.0' Type CM D I & 18" RCP Lateral | 3 | 3 | 0 | IRON(F1) |
| DI#4 | Proposed 5.0' Type CM D I & 18" RCP Lateral | 3 | 2 | 1 | IRON(D1) |
| DI#5 | Proposed 10.0' Type CM D I & 18" RCP Lateral | 14 | 6.5 | 7.5 | IRON1(F2+F3+F4) |
| | | IRON MOUNTAIN FACILITIES | | | |
| DI#6 | Proposed 5.0' Type CM2 D I & Ex. 18" CI900 Lateral | 0 | N/A | N/A | Nuisance Only |
| DI#7 | Proposed 5.0' Type CM2 D I & Ex. 18" RCP Lateral | 5 | 3 | 2 | IMR1(a) |
| DI#8 | Proposed 5.0' Type CM2 D I & Ex. 18" RCP Lateral | 0 | N/A | N/A | Nuisance Only |

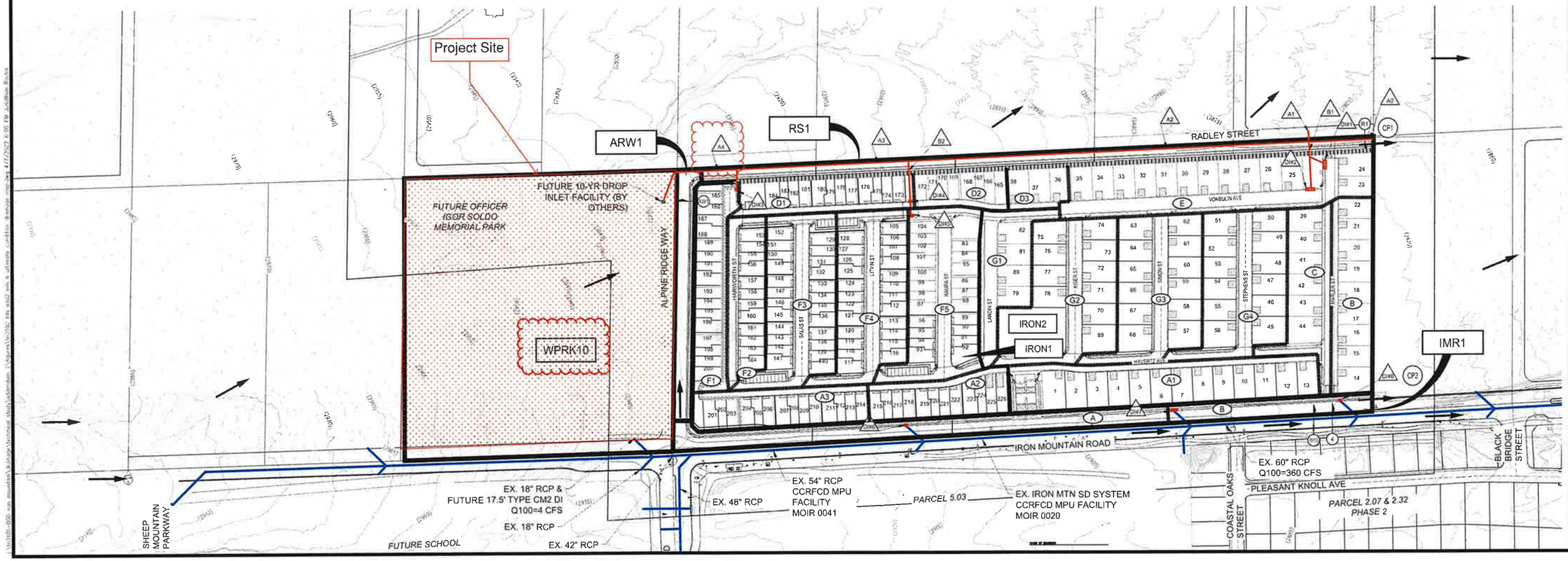
NOTES:

HYDRAULIC STREET SECTIONS & FACILITIES UTILIZED FOR THE ULTIMATE CONDITION HAVE BEEN ANALYZED WITH FLOWS FROM UNIT 2 PROPOSED. REFER TO EXHIBIT G FOR SUMMARY TABLES OF HYDRAULIC SECTIONS AND FACILITIES NOT LISTED ON THIS EXHIBIT.

0 120 240
SCALE - 1"=120' FEET

**LEGEND**

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- EXISTING DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY
- PROPOSED DRAINAGE FACILITY - OPEN CHANNEL
- FUTURE DRAINAGE FACILITY
- PHASE MATCH LINE
- ID — BASIN ID
- ID — PRORATED SUBBASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- ID — FACILITY ID





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'D |
|---|---|---|---|---|
| | | | | |

CITY OF LAS VEGAS, NV

TRI POINTE HOMES

IRON MOUNTAIN

ULTIMATE CONDITION DRAINAGE MAP

S 01 T 19S R 59E

DATE: FEB 2022
DRAFTER: PH
DESIGNER: JSR
CHECKED: MF
PROJECT NO: TRI2101.000

EXHIBIT H
SHEET 1 OF 1

Referenced from DS 5508 TDS Addendum Supplement

Referenced Hydrology

Referenced from
TDS Addendum 2



```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   04APR22  TIME  14:43:36   *
*                                       *
*****************************************
```

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

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

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

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



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

*** FREE ***
                       *DIAGRAM
               1       ID     WESTWOOD PROFESSIONAL SERVICES
               2       ID     IRON MOUNTAIN
               3       ID     UNIT 1 INTERIM DRAINAGE CONDITION
               4       ID
               5       ID     RETURN PERIOD ------- 100-YR
               6       ID     DISTRIBUTION -------- 6-HOUR SDN3
               7       ID     PROJECT NO. --------- TRI2104
               8       ID     FILENAME ------------ PRO.H1
               9       ID     DATE ----------------- APRIL 2022
              10       ID     MODELED BY ---------- JR/PK
              11       ID
              12       ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
              13       ID        DRAINAGE AREA (MI^2)    DARF
              14       ID        0.0-0.49                1.00
              15       ID        0.5-0.99                0.98
              16       ID        1.0-1.99                0.97
              17       ID        2.0-3.99                0.93
              18       ID        10-YR                   0.54
              19       ID
              20       IT       5       0       0     300
              21       IO       5       0       0
              22       IN       5       0       0
              23       JR    PREC    1.00    0.98    0.97    0.93    0.54
                       *
              24       KK    OFF3
              25       BA   1.584
              26       PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
              27       PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
              28       PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
              29       PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
              30       PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
              31       PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
              32       PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
              33       PC   0.998   0.999       1
              34       PB    3.43
              35       LS       0    79.3
              36       UD   0.938
                       *
              37       KK    ROFF3
              38       KM    REFERENCED FROM KYLE CANYON GATEWAY 21-13876
              39       KM    ROUTE OFF3 TO CP1
              40       KM    NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
              41       RD     8500   0.034   0.025       0    TRAP      32       3
                       *
              42       KK  OFF1-E
              43       BA  0.4726
```

```
     44          PB    3.00
     45          LS       0    82.5
     46          UD   0.512
                 *
```



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

     47          KK    AR1-E
     48          BA  0.0059
     49          PB    3.00
     50          LS       0    81.2
     51          UD   0.100
                 *

     52          KK   DUMMY1
     53          HC       3
                 *

     54          KK   OFF2-E
     55          BA  0.0823
     56          PB    3.00
     57          LS       0    88.0
     58          UD   0.248
                 *

     59          KK     CP1
     60          HC       2
                 *

     61          KK   OFF3-E
     62          BA  0.0182
     63          PB    3.00
     64          LS       0    88.0
     65          UD   0.108
                 *

     66          KK    AR2-E
     67          BA  0.0061
     68          PB    3.00
     69          LS       0    88.0
     70          UD   0.100
                 *

     71          KK     CP2
     72          HC       2
                 *

     73          KK   OFF4-E
     74          BA  0.0448
     75          PB    3.00
     76          LS       0    88.0
     77          UD   0.174
                 *

     78          KK    AR3-E
     79          BA  0.0034
     80          PB    3.00
     81          LS       0    88.0
     82          UD   0.100
                 *
```



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

     83          KK    OF2-E
     84          BA  0.0148
     85          PB    3.00
     86          LS       0    88.0
     87          UD   0.123
                 *

     88          KK     CP3
     89          HC       3
                 *

     90          KK     CP4
     91          HC       3
                 *

     92          KK    AR4-E
     93          BA  0.0014
     94          PB    3.00
     95          LS       0    88.0
     96          UD   0.100
                 *
```

```
 97          KK  OFF5-E
 98          BA  0.0272
 99          PB    3.00
100          LS       0    80.1
101          UD   0.150
             *

102          KK   IRON1
103          BA  0.0158
104          LS       0    94.0
105          UD   0.089
             *

106          KK IRON2-I
107          BA  0.0091
108          LS       0    91.0
109          UD   0.099
             *

110          KK IRON3-I
111          BA  0.0112
112          LS       0    94.0
113          UD   0.062
             *

114          KK    ARW1
115          BA  0.0011
116          LS       0    98.0
117          UD   0.066
             *
```

1 HEC-1 INPUT PAGE 4

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

118          KK     RS1
119          BA  0.0021
120          LS       0    98.0
121          UD   0.073
             *

122          KK     CP7
123          HC       5
             *

124          KK     CP8
125          HC       4
             *

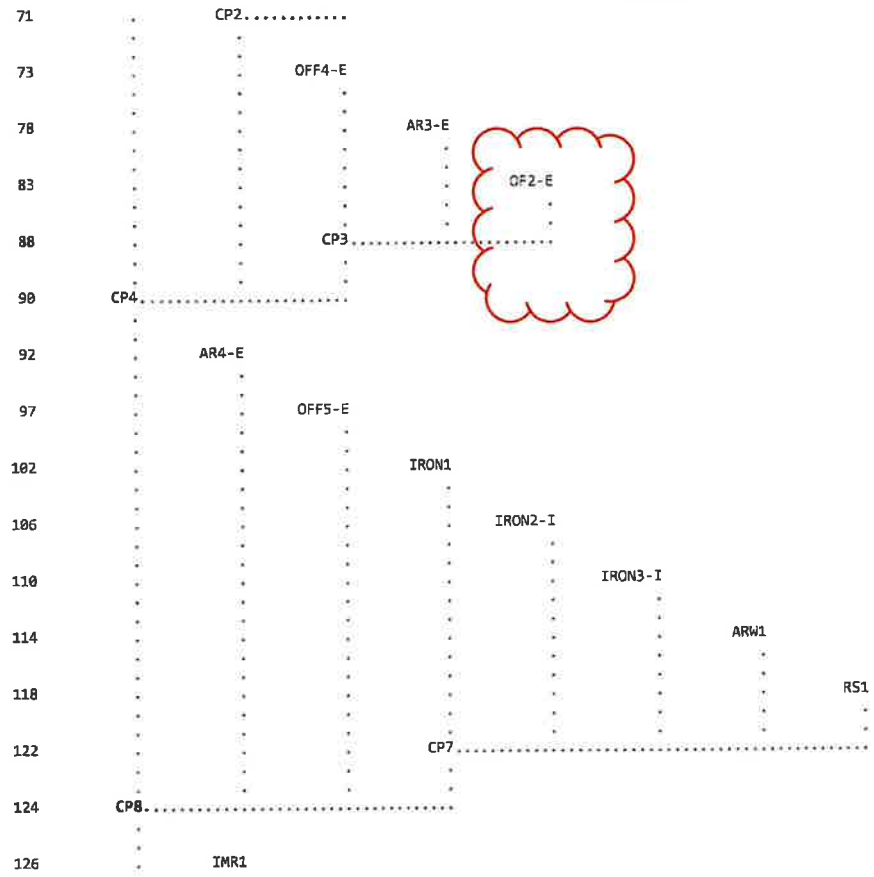
126          KK    IMR1
127          BA  0.0030
128          LS       0    98.0
129          UD   0.073
             *
130          ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   24        OFF3
               V
               V
   37       ROFF3
              .
              .
   42         .      OFF1-E
              .         .
              .         .
   47         .         .       AR1-E
              .         .         .
              .         .         .
   52       DUMMY1.....................
              .
              .
   54         .      OFF2-E
              .         .
              .         .
   59         CP1.......
              .
              .
   61         .      OFF3-E
              .         .
              .         .
   66         .         .       AR2-E
              .         .         .
              .         .         .
```




(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   04APR22  TIME  14:43:36   *
*                                       *
*****************************************
```

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

WESTWOOD PROFESSIONAL SERVICES
IRON MOUNTAIN
UNIT 1 INTERIM DRAINAGE CONDITION

RETURN PERIOD ------- 100-YR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- TRI2104
FILENAME ------------ PRO.H1
DATE ---------------- APRIL 2022
MODELED BY ---------- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS

| DRAINAGE AREA (MI^2) | DARF |
|---|---|
| 0.0-0.49 | 1.00 |
| 0.5-0.99 | 0.98 |
| 1.0-1.99 | 0.97 |
| 2.0-3.99 | 0.93 |
| 10-YR | 0.54 |

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

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
```

```
                IDATE      1    0  STARTING DATE
                ITIME           0000  STARTING TIME
                  NQ             300  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      2    0  ENDING DATE
               NDTIME           0055  ENDING TIME
               ICENT              19  CENTURY MARK

          COMPUTATION INTERVAL      .08 HOURS
            TOTAL TIME BASE    24.92 HOURS

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

JP        MULTI-PLAN OPTION
               NPLAN          1  NUMBER OF PLANS

JR        MULTI-RATIO OPTION
             RATIOS OF PRECIPITATION
            1.00      .98       .97       .93       .54
1
```

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

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00 | RATIO 2 .98 | RATIO 3 .97 | RATIO 4 .93 | RATIO 5 .54 |
|---|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 700. | 225. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.50 |
| ROUTED TO | | | | | | | | | |
| + | ROFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 701. | 225. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.75 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF1-E | .47 | 1 | FLOW | 325. | 315. | 309. | 288. | 98. |
| | | | | TIME | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR1-E | .01 | 1 | FLOW | 7. | 7. | 7. | 6. | 2. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | DUMMY1 | 2.06 | 1 | FLOW | 964. | 930. | 914. | 847. | 272. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF2-E | .08 | 1 | FLOW | 103. | 101. | 99. | 93. | 39. |
| | | | | TIME | 3.67 | 3.67 | 3.67 | 3.67 | 3.67 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP1 | 2.14 | 1 | FLOW | 981. | 947. | 930. | 863. | 282. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3-E | .02 | 1 | FLOW | 29. | 28. | 28. | 26. | 11. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR2-E | .01 | 1 | FLOW | 10. | 10. | 10. | 9. | 4. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP2 | .02 | 1 | FLOW | 39. | 38. | 37. | 35. | 15. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF4-E | .04 | 1 | FLOW | 65. | 63. | 62. | 58. | 24. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR3-E | .00 | 1 | FLOW | 6. | 5. | 5. | 5. | 2. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OF2-E | .01 | 1 | FLOW | 23. | 23. | 22. | 21. | 9. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |

| | | | | | | | | INT.OUT | | |
|---|---|---|---|---|---|---|---|---|---|---|
| + | CP3 | .06 | 1 | FLOW | 93. | 90. | 89. | 84. | 35. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP4 | 2.23 | 1 | FLOW | 996. | 963. | 946. | 879. | 293. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR4-E | .00 | 1 | FLOW | 2. | 2. | 2. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF5-E | .03 | 1 | FLOW | 30. | 29. | 28. | 26. | 8. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IRON1 | .02 | 1 | FLOW | 33. | 32. | 31. | 30. | 15. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IRON2-I | .01 | 1 | FLOW | 17. | 16. | 16. | 15. | 7. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IRON3-I | .01 | 1 | FLOW | 25. | 25. | 24. | 23. | 12. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | ARW1 | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | RS1 | .00 | 1 | FLOW | 5. | 5. | 5. | 5. | 3. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 5 COMBINED AT | | | | | | | | | |
| + | CP7 | .04 | 1 | FLOW | 82. | 80. | 79. | 75. | 38. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 4 COMBINED AT | | | | | | | | | |
| + | CP8 | 2.30 | 1 | FLOW | 1015. | 981. | 964. | 896. | 302. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IMR1 | .00 | 1 | FLOW | 7. | 7. | 7. | 7. | 4. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

1

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

| | | | | | | INTERPOLATED TO COMPUTATION INTERVAL | | | |
|---|---|---|---|---|---|---|---|---|---|
| ISTAQ | ELEMENT | DT | PEAK | TIME TO PEAK | VOLUME | DT | PEAK | TIME TO PEAK | VOLUME |
| | | (MIN) | (CFS) | (MIN) | (IN) | (MIN) | (CFS) | (MIN) | (IN) |
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| | ROFF3 MANE | 5.00 | 796.24 | 275.00 | 1.53 | 5.00 | 796.24 | 275.00 | 1.53 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| | ROFF3 MANE | 5.00 | 768.88 | 275.00 | 1.48 | 5.00 | 768.88 | 275.00 | 1.48 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| | ROFF3 MANE | 5.00 | 755.25 | 275.00 | 1.45 | 5.00 | 755.25 | 275.00 | 1.45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| | ROFF3 MANE | 5.00 | 701.11 | 275.00 | 1.35 | 5.00 | 701.11 | 275.00 | 1.35 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| | ROFF3 MANE | 5.00 | 224.93 | 285.00 | .45 | 5.00 | 224.93 | 285.00 | .45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1

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

Referenced from
TDS Addendum 2



```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   04APR22  TIME  14:43:40   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

 *** FREE ***
                    *DIAGRAM
                1   ID     WESTWOOD PROFESSIONAL SERVICES
                2   ID     IRON MOUNTAIN
                3   ID     UNIT 2 PROPOSED DRAINAGE CONDITION
                4   ID
                5   ID     RETURN PERIOD ------- 100-YR
                6   ID     DISTRIBUTION -------- 6-HOUR SDN3
                7   ID     PROJECT NO. --------- TRI2104
                8   ID     FILENAME ------------ PRO.H1
                9   ID     DATE ---------------- APRIL2022
               10   ID     MODELED BY ---------- JR/PK
               11   ID
               12   ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
               13   ID        DRAINAGE AREA (MI^2)    DARF
               14   ID        0.0-0.49                1.00
               15   ID        0.5-0.99                0.98
               16   ID        1.0-1.99                0.97
               17   ID        2.0-3.99                0.93
               18   ID        10-YR                   0.54
               19   ID
               20   IT       5       0       0     300
               21   IO       5       0       0
               22   IN       5       0       0
               23   JR    PREC    1.00    0.98    0.97    0.93    0.54
                    *
               24   KK    OFF3
               25   BA   1.584
               26   PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
               27   PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
               28   PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
               29   PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
               30   PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
               31   PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
               32   PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
               33   PC   0.998   0.999       1
               34   PB    3.43
               35   LS       0    79.3
               36   UD   0.938
                    *
               37   KK   ROFF3
               38   KM   REFERENCED FROM KYLE CANYON GATEWAY 21-13876
               39   KM   ROUTE OFF3 TO CP1
               40   KM   NATURAL WASH TRAPEZOIDAL CHANNEL 32'W 3:1 SS
               41   RD    8500   0.034   0.025       0    TRAP      32       3
                    *
               42   KK  OFF1-E
               43   BA  0.4726
```

```
 44          PB    3.00
 45          LS       0    82.5
 46          UD   0.512
             *
```



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

 47          KK   AR1-E
 48          BA 0.0059
 49          PB    3.00
 50          LS       0    81.2
 51          UD   0.100
             *

 52          KK  DUMMY1
 53          HC       3
             *

 54          KK  OFF2-E
 55          BA 0.0823
 56          PB    3.00
 57          LS       0    88.0
 58          UD   0.248
             *

 59          KK     CP1
 60          HC       2
             *

 61          KK  OFF3-E
 62          BA 0.0182
 63          PB    3.00
 64          LS       0    88.0
 65          UD   0.108
             *

 66          KK   AR2-E
 67          BA 0.0061
 68          PB    3.00
 69          LS       0    88.0
 70          UD   0.100
             *

 71          KK     CP2
 72          HC       2
             *

 73          KK  OFF4-E
 74          BA 0.0448
 75          PB    3.00
 76          LS       0    88.0
 77          UD   0.174
             *

 78          KK   AR3-E
 79          BA 0.0034
 80          PB    3.00
 81          LS       0    88.0
 82          UD   0.100
             *
```



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

 83          KK   OF2-E
 84          BA 0.0148
 85          PB    3.00
 86          LS       0    88.0
 87          UD   0.123
             *

 88          KK     CP3
 89          HC       3
             *

 90          KK     CP4
 91          HC       3
             *

 92          KK   AR4-E
 93          BA 0.0014
 94          PB    3.00
 95          LS       0    88.0
 96          UD   0.100
             *
```

```
 97          KK  OFF5-E
 98          BA  0.0272
 99          PB    3.00
100          LS       0    88.1
101          UD   0.150
             *

102          KK   IRON1
103          BA  0.0158
104          LS       0    94.0
105          UD   0.089
             *

106          KK   IRON2
107          BA  0.0203
108          LS       0    91.0
109          UD   0.099
             *

110          KK    ARW1
111          BA  0.0011
112          LS       0    98.0
113          UD   0.066
             *

114          KK     RS1
115          BA  0.0021
116          LS       0    98.0
117          UD   0.073
             *
```



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

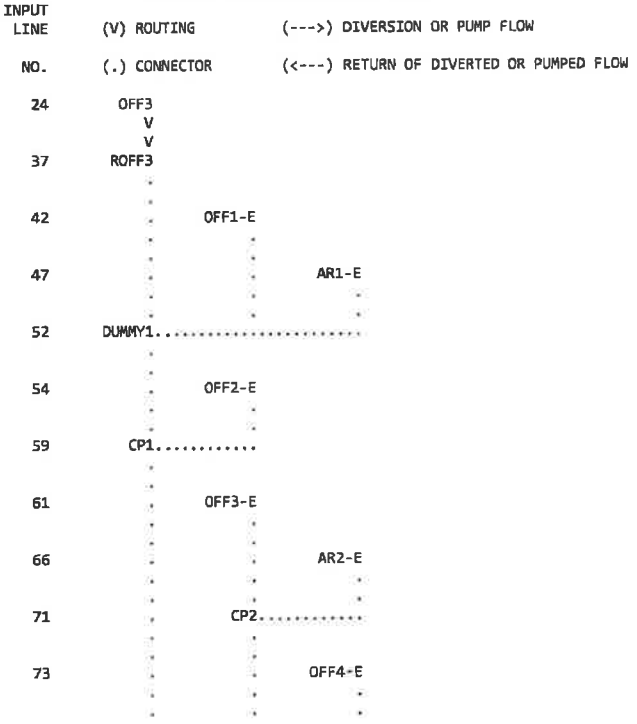
118          KK     CP7
119          HC       4
             *

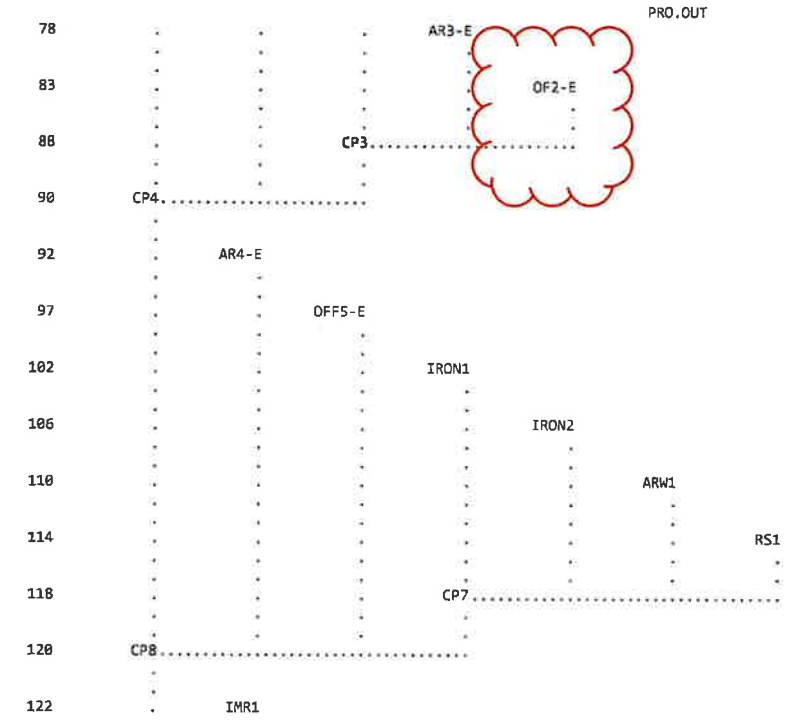
120          KK     CP8
121          HC       4
             *

122          KK    IMR1
123          BA  0.0030
124          LS       0    98.0
125          UD   0.073
             *
126          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK






(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   04APR22  TIME  14:43:40   *
*                                       *
*****************************************
```

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

WESTWOOD PROFESSIONAL SERVICES
IRON MOUNTAIN
UNIT 2 PROPOSED DRAINAGE CONDITION

RETURN PERIOD ------- 100-YR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- TRI2104
FILENAME ------------ PRO.H1
DATE ---------------- APRIL2022
MODELED BY ---------- JR/PK

SIX HOUR DEPTH-AREA REDUCTION FACTORS

| DRAINAGE AREA (MI^2) | DARF |
|---|---|
| 0.0-0.49 | 1.00 |
| 0.5-0.99 | 0.98 |
| 1.0-1.99 | 0.97 |
| 2.0-3.99 | 0.93 |
| 10-YR | 0.54 |

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

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

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS
```

ENGLISH UNITS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00 .98 .97 .93 .54

1

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

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00 | RATIO 2 .98 | RATIO 3 .97 | RATIO 4 .93 | RATIO 5 .54 |
|---|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 700. | 225. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.50 |
| ROUTED TO | | | | | | | | | |
| + | ROFF3 | 1.58 | 1 | FLOW | 796. | 769. | 755. | 701. | 225. |
| | | | | TIME | 4.58 | 4.58 | 4.58 | 4.58 | 4.75 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF1-E | .47 | 1 | FLOW | 325. | 315. | 309. | 288. | 98. |
| | | | | TIME | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR1-E | .01 | 1 | FLOW | 7. | 7. | 7. | 6. | 2. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | DUMMY1 | 2.06 | 1 | FLOW | 964. | 930. | 914. | 847. | 272. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF2-E | .08 | 1 | FLOW | 103. | 101. | 99. | 93. | 39. |
| | | | | TIME | 3.67 | 3.67 | 3.67 | 3.67 | 3.67 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP1 | 2.14 | 1 | FLOW | 981. | 947. | 930. | 863. | 282. |
| | | | | TIME | 4.42 | 4.42 | 4.42 | 4.42 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF3-E | .02 | 1 | FLOW | 29. | 28. | 28. | 26. | 11. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR2-E | .01 | 1 | FLOW | 10. | 10. | 10. | 9. | 4. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 2 COMBINED AT | | | | | | | | | |
| + | CP2 | .02 | 1 | FLOW | 39. | 38. | 37. | 35. | 15. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF4-E | .04 | 1 | FLOW | 65. | 63. | 62. | 58. | 24. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR3-E | .00 | 1 | FLOW | 6. | 5. | 5. | 5. | 2. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OF2-E | .01 | 1 | FLOW | 23. | 23. | 22. | 21. | 9. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP3 | .05 | 1 | FLOW | 93. | 90. | 89. | 84. | 35. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| 3 COMBINED AT | | | | | | | | | |
| + | CP4 | 2.23 | 1 | FLOW | 996. | 963. | 946. | 879. | 293. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | AR4-E | .00 | 1 | FLOW | 2. | 2. | 2. | 2. | 1. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | OFF5-E | .03 | 1 | FLOW | 30. | 29. | 28. | 26. | 8. |
| | | | | TIME | 3.58 | 3.58 | 3.58 | 3.58 | 3.58 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IRON1 | .02 | 1 | FLOW | 33. | 32. | 31. | 30. | 15. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IRON2 | .02 | 1 | FLOW | 37. | 36. | 36. | 34. | 16. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | ARW1 | .00 | 1 | FLOW | 3. | 3. | 3. | 2. | 1. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| HYDROGRAPH AT | | | | | | | | | |
| + | RS1 | .00 | 1 | FLOW | 5. | 5. | 5. | 5. | 3. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 4 COMBINED AT | | | | | | | | | |
| + | CP7 | .04 | 1 | FLOW | 77. | 75. | 74. | 71. | 35. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 4 COMBINED AT | | | | | | | | | |
| + | CP8 | 2.30 | 1 | FLOW | 1014. | 980. | 963. | 895. | 302. |
| | | | | TIME | 4.50 | 4.50 | 4.50 | 4.50 | 4.67 |
| HYDROGRAPH AT | | | | | | | | | |
| + | IMR1 | .00 | 1 | FLOW | 7. | 7. | 7. | 7. | 4. |
| | | | | TIME | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

1

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

| ISTAQ | ELEMENT | DT | PEAK | TIME TO PEAK | VOLUME | INTERPOLATED TO COMPUTATION INTERVAL DT | PEAK | TIME TO PEAK | VOLUME |
|---|---|---|---|---|---|---|---|---|---|
| | | (MIN) | (CFS) | (MIN) | (IN) | (MIN) | (CFS) | (MIN) | (IN) |
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 796.24 | 275.00 | 1.53 | 5.00 | 796.24 | 275.00 | 1.53 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8991E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 768.88 | 275.00 | 1.48 | 5.00 | 768.88 | 275.00 | 1.48 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1250E+03 EXCESS= .0000E+00 OUTFLOW= .1250E+03 BASIN STORAGE= .8848E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 755.25 | 275.00 | 1.45 | 5.00 | 755.25 | 275.00 | 1.45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1227E+03 EXCESS= .0000E+00 OUTFLOW= .1228E+03 BASIN STORAGE= .8775E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 701.11 | 275.00 | 1.35 | 5.00 | 701.11 | 275.00 | 1.35 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1139E+03 EXCESS= .0000E+00 OUTFLOW= .1139E+03 BASIN STORAGE= .8159E-02 PERCENT ERROR= .0

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FOR PLAN = 1 RATIO= .00 | | | | | | | | | |
| ROFF3 | MANE | 5.00 | 224.93 | 285.00 | .45 | 5.00 | 224.93 | 285.00 | .45 |

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3793E+02 EXCESS= .0000E+00 OUTFLOW= .3798E+02 BASIN STORAGE= .7709E-02 PERCENT ERROR= -.1

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

Referenced Hydraulics

```
T1 TRI2101 IRON MOUNTAIN TDS ADD2
T2 RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
T3 FROM MAIN-DI1 MODEL TO OPEN SUMP
SO   1000.0002867.570 18                          2870.040
R    1195.3102868.950 18      .013
JX   1200.3102868.990 18      .013
R    1589.4802888.400 18      .013
JX   1594.4802888.650 18      .013
R    1984.4802901.450 18      .013
JX   1989.4802901.610 18 18   .013    8.5           2901.610          -90.0
R    2196.7102910.970 18      .013
JX   2201.7102911.200 18      .013
R    2408.9402918.820 18      .013
JX   2413.7802919.000 18 18   .013    3.0           2919.000          -90.0
R    2549.6502926.240 18      .013                                    -15.0   1
R    2550.6502926.300 18      .013                                    -15.0   1
R    2551.6502926.350 18      .013                                    -15.0   1
R    2552.6502926.400 18      .013                                    -15.0   1
R    2553.6502926.460 18      .013                                     -4.0   1
JX   2554.6502926.510 18      .013
R    2604.2102926.760 18      .013
SH   2604.2102926.760 18
CD  18  4   1   0.000   1.500    0.000 0.000 0.000  0.0000.00  0.00
CD  24  4   1   0.000   2.000    0.000 0.000 0.000  0.0000.00  0.00
Q             9.000   .0
```

10-yr design flow rate

FILE: RAD.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 4- 6-2022 Time:10:40:23

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 18 | 4 | 1 | | 1.500 | | | | | | | | | | | | | | |
| CD | 24 | 4 | 1 | | 2.000 | | | | | | | | | | | | | | |

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

TRI2101 IRON MOUNTAIN TDS ADD2

HEADING LINE NO 2 IS -

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

HEADING LINE NO 3 IS -

FROM MAIN-DI1 MODEL TO OPEN SUMP

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 1000.000 | 2867.570 | 18 | 2870.040 |

ELEMENT NO 2 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1195.310 | 2868.950 | 18 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 3 IS A JUNCTION * * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1200.310 | 2868.990 | 18 | 0 | 0 | .013 | .000 | .000 | .000 | .000 | .000 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 4 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1589.480 | 2888.400 | 18 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 5 IS A JUNCTION * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1594.480 | 2888.650 | 18 | 0 | 0 | .013 | .000 | .000 | .000 | .000 | .000 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 6 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1984.480 | 2901.450 | 18 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 7 IS A JUNCTION * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1989.480 | 2901.610 | 18 | 18 | 0 | .013 | 8.500 | .000 | 2901.610 | .000 | -.900 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 8 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 2196.710 | 2910.970 | 18 | .013 | .000 | .000 | .000 | 0 |

W S P G W PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

```
ELEMENT NO   9 IS A JUNCTION          *         *     *     *                 *                 *                 *
                 U/S DATA    STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                             2201.710 2911.200   18     0     0   .013      .000      .000      .000      .000    .000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  10 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2408.940 2918.820   18              .013                       .000     .000      .000     0
ELEMENT NO  11 IS A JUNCTION          *         *     *     *               *                 *                 *
                 U/S DATA    STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                             2413.780 2919.000   18    18     0   .013     3.000      .000  2919.000      .000  -.900     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
ELEMENT NO  12 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2549.650 2926.240   18              .013                       .000     .000   -15.000     1
ELEMENT NO  13 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2550.650 2926.300   18              .013                       .000     .000   -15.000     1
ELEMENT NO  14 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2551.650 2926.350   18              .013                       .000     .000   -15.000     1
ELEMENT NO  15 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2552.650 2926.400   18              .013                       .000     .000   -15.000     1
ELEMENT NO  16 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2553.650 2926.460   18              .013                       .000     .000    -4.000     1
ELEMENT NO  17 IS A JUNCTION          *         *     *     *               *                 *                 *
                 U/S DATA    STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                             2554.650 2926.510   18     0     0   .013      .000      .000      .000      .000    .000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
                                                W S P G W                                                        PAGE NO   4
                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  18 IS A REACH             *         *     *
                 U/S DATA    STATION    INVERT  SECT              N                      RADIUS    ANGLE     ANG PT  MAN H
                             2604.210 2926.760   18              .013                       .000     .000      .000     0
ELEMENT NO  19 IS A SYSTEM HEADWORKS                *                 *
                 U/S DATA    STATION    INVERT  SECT                          W S ELEV
                             2604.210 2926.760   18                             .000
```

WATER SURFACE PROFILE LISTING Date: 4- 6-2022 Time:10:40:24

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) / SF Ave | Water Elev / HF | Q (CFS) / SE Dpth | Vel (FPS) / Froude N | Vel Head / Norm Dp | Energy Grd.El. / "N" | Super Elev / X-Fall | Critical Depth / ZR | Flow Top Width | Height/ Dia.-FT / Base Wt or I.D. | ZL | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000.000 | 2867.570 | 2.470 | 2870.040 | 20.50 | 11.03 | 1.89 | 2871.93 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| 195.310 | .0071 | | | | | .0345 | 6.73 | 2.47 | .00 | 1.50 | .013 | .00 | .00 | PIPE |
| 1195.310 | 2868.950 | 7.821 | 2876.771 | 20.50 | 11.03 | 1.89 | 2878.66 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0080 | | | | | .0345 | .17 | 7.82 | .00 | | .013 | .00 | .00 | PIPE |
| 1200.310 | 2868.990 | 7.953 | 2876.943 | 20.50 | 11.03 | 1.89 | 2878.83 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| 389.170 | .0499 | | | | | .0345 | 13.41 | 7.95 | .00 | 1.04 | .013 | .00 | .00 | PIPE |
| 1589.480 | 2888.400 | 1.954 | 2890.354 | 20.50 | 11.03 | 1.89 | 2892.24 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0500 | | | | | .0345 | .17 | 1.95 | .00 | | .013 | .00 | .00 | PIPE |
| 1594.480 | 2888.650 | 1.877 | 2890.526 | 20.50 | 11.03 | 1.89 | 2892.42 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| 390.000 | .0328 | | | | | .0345 | 13.44 | 1.88 | .00 | 1.27 | .013 | .00 | .00 | PIPE |
| 1984.480 | 2901.450 | 2.516 | 2903.966 | 20.50 | 11.03 | 1.89 | 2905.86 | .00 | 1.46 | .00 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0320 | | | | | .0238 | .12 | 2.52 | .00 | | .013 | .00 | .00 | PIPE |
| 1989.480 | 2901.610 | 4.265 | 2905.875 | 12.00 | 6.79 | .72 | 2906.59 | .00 | 1.31 | .00 | 1.500 | .000 | .00 | 1 .0 |
| 64.104 | .0452 | | | | | .0131 | .84 | 4.27 | .00 | .78 | .013 | .00 | .00 | PIPE |
| 2053.584 | 2904.505 | 2.205 | 2906.711 | 12.00 | 6.79 | .72 | 2907.43 | .00 | 1.31 | .00 | 1.500 | .000 | .00 | 1 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 2053.584 | 2904.505 | .783 | 2905.288 | 12.00 | 12.86 | 2.57 | 2907.86 | .00 | 1.31 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 26.446 | .0452 | | | | | .0452 | 1.19 | .78 | 2.87 | .78 | .013 | .00 | .00 | PIPE |

WATER SURFACE PROFILE LISTING Date: 4- 6-2022 Time:10:40:24

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2080.030 | 2905.700 | .783 | 2906.483 | 12.00 | 12.86 | 2.57 | 2909.05 | .00 | 1.31 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 75.724 | .0452 | | | | | .0441 | 3.34 | .78 | 2.87 | .78 | .013 | .00 | .00 | PIPE |
| 2155.754 | 2909.120 | .795 | 2909.915 | 12.00 | 12.62 | 2.47 | 2912.39 | .00 | 1.31 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 40.956 | .0452 | | | | | .0404 | 1.66 | .79 | 2.79 | .78 | .013 | .00 | .00 | PIPE |
| 2196.710 | 2910.970 | .826 | 2911.796 | 12.00 | 12.03 | 2.25 | 2914.04 | .00 | 1.31 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0460 | | | | | .0373 | .19 | .83 | 2.59 | | .013 | .00 | .00 | PIPE |
| 2201.710 | 2911.200 | .834 | 2912.034 | 12.00 | 11.89 | 2.20 | 2914.23 | .00 | 1.31 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 3.603 | .0368 | | | | | .0368 | .13 | .83 | 2.55 | .83 | .013 | .00 | .00 | PIPE |
| 2205.313 | 2911.333 | .834 | 2912.166 | 12.00 | 11.89 | 2.20 | 2914.36 | .00 | 1.31 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 77.096 | .0368 | | | | | .0367 | 2.83 | .83 | 2.55 | .83 | .013 | .00 | .00 | PIPE |
| 2282.409 | 2914.167 | .834 | 2915.002 | 12.00 | 11.89 | 2.19 | 2917.20 | .00 | 1.31 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 75.214 | .0368 | | | | | .0346 | 2.60 | .83 | 2.54 | .83 | .013 | .00 | .00 | PIPE |
| 2357.623 | 2916.933 | .867 | 2917.801 | 12.00 | 11.33 | 1.99 | 2919.79 | .00 | 1.31 | 1.48 | 1.500 | .000 | .00 | 1 .0 |
| 23.493 | .0368 | | | | | .0305 | .72 | .87 | 2.36 | .83 | .013 | .00 | .00 | PIPE |
| 2381.116 | 2917.797 | .902 | 2918.699 | 12.00 | 10.80 | 1.81 | 2920.51 | .00 | 1.31 | 1.47 | 1.500 | .000 | .00 | 1 .0 |
| 13.125 | .0368 | | | | | .0270 | .35 | .90 | 2.19 | .83 | .013 | .00 | .00 | PIPE |
| 2394.241 | 2918.280 | .940 | 2919.219 | 12.00 | 10.30 | 1.65 | 2920.87 | .00 | 1.31 | 1.45 | 1.500 | .000 | .00 | 1 .0 |
| 8.628 | .0368 | | | | | .0240 | .21 | .94 | 2.03 | .83 | .013 | .00 | .00 | PIPE |

WATER SURFACE PROFILE LISTING Date: 4- 6-2022 Time:10:40:24

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2402.869 | 2918.597 | .979 | 2919.576 | 12.00 | 9.82 | 1.50 | 2921.07 | .00 | 1.31 | 1.43 | 1.500 | .000 | .00 | 1 .0 |
| 6.071 | .0368 | | | | | .0213 | .13 | .98 | 1.87 | .83 | .013 | .00 | .00 | PIPE |
| 2408.940 | 2918.820 | 1.021 | 2919.841 | 12.00 | 9.37 | 1.36 | 2921.20 | .00 | 1.31 | 1.40 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0372 | | | | | .0367 | .18 | 1.02 | 1.72 | | .013 | .00 | .00 | PIPE |
| 2413.780 | 2919.000 | .633 | 2919.633 | 9.00 | 12.70 | 2.51 | 2922.14 | .00 | 1.16 | 1.48 | 1.500 | .000 | .00 | 1 .0 |
| 20.502 | .0533 | | | | | .0532 | 1.09 | .63 | 3.24 | .63 | .013 | .00 | .00 | PIPE |
| 2434.282 | 2920.092 | .633 | 2920.726 | 9.00 | 12.69 | 2.50 | 2923.23 | .00 | 1.16 | 1.48 | 1.500 | .000 | .00 | 1 .0 |
| 60.194 | .0533 | | | | | .0499 | 3.00 | .63 | 3.23 | .63 | .013 | .00 | .00 | PIPE |
| 2494.477 | 2923.300 | .657 | 2923.956 | 9.00 | 12.10 | 2.27 | 2926.23 | .00 | 1.16 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 19.307 | .0533 | | | | | .0438 | .85 | .66 | 3.02 | .63 | .013 | .00 | .00 | PIPE |
| 2513.783 | 2924.329 | .681 | 2925.010 | 9.00 | 11.54 | 2.07 | 2927.08 | .00 | 1.16 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 11.012 | .0533 | | | | | .0385 | .42 | .68 | 2.81 | .63 | .013 | .00 | .00 | PIPE |
| 2524.795 | 2924.916 | .706 | 2925.622 | 9.00 | 11.00 | 1.88 | 2927.50 | .00 | 1.16 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 7.439 | .0533 | | | | | .0339 | .25 | .71 | 2.62 | .63 | .013 | .00 | .00 | PIPE |
| 2532.235 | 2925.312 | .733 | 2926.045 | 9.00 | 10.49 | 1.71 | 2927.75 | .00 | 1.16 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 5.433 | .0533 | | | | | .0298 | .16 | .73 | 2.44 | .63 | .013 | .00 | .00 | PIPE |
| 2537.667 | 2925.602 | .761 | 2926.363 | 9.00 | 10.00 | 1.55 | 2927.92 | .00 | 1.16 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 4.139 | .0533 | | | | | .0263 | .11 | .76 | 2.27 | .63 | .013 | .00 | .00 | PIPE |

TRI2101 IRON MOUNTAIN TDS ADD2
RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION
FROM MAIN-DI1 MODEL TO OPEN SUMP

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2541.807 | 2925.822 | .790 | 2926.612 | 9.00 | 9.53 | 1.41 | 2928.02 | .00 | 1.16 | 1.50 | 1.500 | .000 | .00 | 1 .0 |
| 3.239 | .0533 | | | | | .0232 | .08 | .79 | 2.12 | .63 | .013 | .00 | .00 | PIPE |
| 2545.046 | 2925.995 | .821 | 2926.816 | 9.00 | 9.09 | 1.28 | 2928.10 | .00 | 1.16 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 2.566 | .0533 | | | | | .0205 | .05 | .82 | 1.97 | .63 | .013 | .00 | .00 | PIPE |
| 2547.612 | 2926.131 | .854 | 2926.985 | 9.00 | 8.67 | 1.17 | 2928.15 | .00 | 1.16 | 1.49 | 1.500 | .000 | .00 | 1 .0 |
| 2.038 | .0533 | | | | | .0181 | .04 | .85 | 1.83 | .63 | .013 | .00 | .00 | PIPE |
| 2549.650 | 2926.240 | .888 | 2927.128 | 9.00 | 8.26 | 1.06 | 2928.19 | .00 | 1.16 | 1.47 | 1.500 | .000 | .00 | 1 .0 |
| 1.000 | .0601 | | | | | .0163 | .02 | .89 | 1.69 | .61 | .013 | .00 | .00 | PIPE |
| 2550.650 | 2926.300 | .913 | 2927.213 | 9.00 | 7.99 | .99 | 2928.20 | .00 | 1.16 | 1.46 | 1.500 | .000 | .00 | 1 .0 |
| 1.000 | .0500 | | | | | .0150 | .01 | .91 | 1.61 | .64 | .013 | .00 | .00 | PIPE |
| 2551.650 | 2926.350 | .937 | 2927.287 | 9.00 | 7.75 | .93 | 2928.22 | .00 | 1.16 | 1.45 | 1.500 | .000 | .00 | 1 .0 |
| 1.000 | .0498 | | | | | .0138 | .01 | .94 | 1.53 | .64 | .013 | .00 | .00 | PIPE |
| 2552.650 | 2926.400 | .967 | 2927.367 | 9.00 | 7.47 | .87 | 2928.23 | .00 | 1.16 | 1.44 | 1.500 | .000 | .00 | 1 .0 |
| .294 | .0601 | | | | | .0129 | .00 | .97 | 1.44 | .61 | .013 | .00 | .00 | PIPE |
| 2552.944 | 2926.417 | .981 | 2927.398 | 9.00 | 7.35 | .84 | 2928.24 | .00 | 1.16 | 1.43 | 1.500 | .000 | .00 | 1 .0 |
| .706 | .0601 | | | | | .0119 | .01 | .98 | 1.40 | .61 | .013 | .00 | .00 | PIPE |
| 2553.650 | 2926.460 | 1.023 | 2927.483 | 9.00 | 7.01 | .76 | 2928.25 | .00 | 1.16 | 1.40 | 1.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0500 | | | | | .0097 | .01 | 1.02 | 1.29 | | .013 | .00 | .00 | PIPE |

TRI2101 IRON MOUNTAIN TDS ADD2

RADLEY STORM DRAIN SYSTEM - UNIT 2 PROPOSED CONDITION

FROM MAIN-DI1 MODEL TO OPEN SUMP

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 2554.650 | 2926.510 | 1.160 | 2927.670 | 9.00 | 6.14 | .58 | 2928.25 | .00 | 1.16 | 1.26 | 1.500 | .000 | .00 | 1 .0 |
| 2.059 | .0050 | | | | | .0078 | .02 | 1.16 | 1.00 | 1.50 | .013 | .00 | .00 | PIPE |
| 2556.709 | 2926.521 | 1.219 | 2927.740 | 9.00 | 5.85 | .53 | 2928.27 | .00 | 1.16 | 1.17 | 1.500 | .000 | .00 | 1 .0 |
| 9.225 | .0050 | | | | | .0071 | .07 | 1.22 | .90 | 1.50 | .013 | .00 | .00 | PIPE |
| 2565.934 | 2926.567 | 1.287 | 2927.854 | 9.00 | 5.58 | .48 | 2928.34 | .00 | 1.16 | 1.05 | 1.500 | .000 | .00 | 1 .0 |
| 24.797 | .0050 | | | | | .0066 | .16 | 1.29 | .79 | 1.50 | .013 | .00 | .00 | PIPE |
| 2590.731 | 2926.692 | 1.370 | 2928.062 | 9.00 | 5.32 | .44 | 2928.50 | .00 | 1.16 | .85 | 1.500 | .000 | .00 | 1 .0 |
| 13.479 | .0050 | | | | | .0064 | .09 | 1.37 | .66 | 1.50 | .013 | .00 | .00 | PIPE |
| 2604.210 | 2926.760 | 1.400 | 2928.160 | 9.00 | 5.24 | .43 | 2928.59 | .00 | 1.16 | .75 | 1.500 | .000 | .00 | 1 .0 |

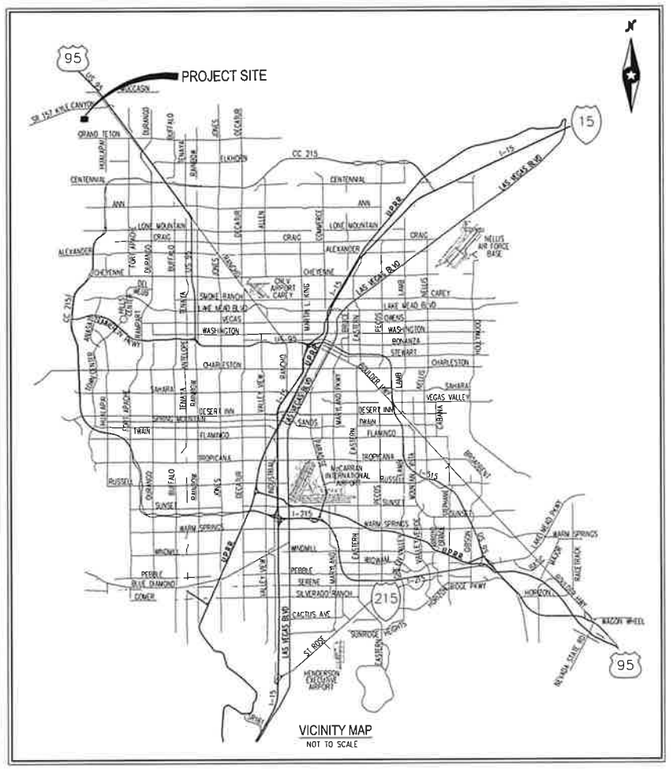
Referenced Plan Sheets

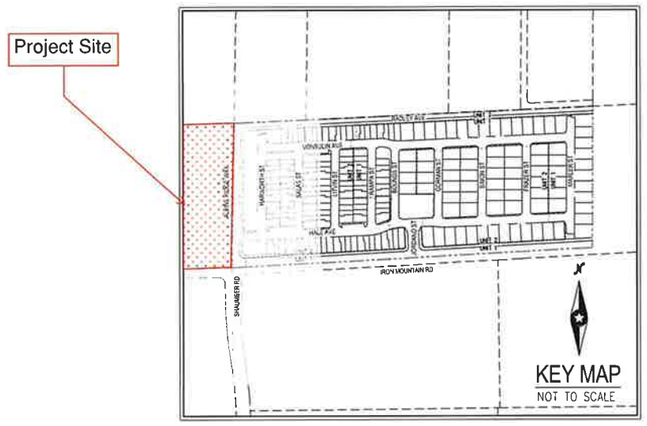
tri pointe HOMES

# IMPROVEMENT PLANS FOR IRON MOUNTAIN UNIT 2

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION

APN: 126-01-801-010, 126-01-801-011, 126-01-801-012, 126-01-801-013, 126-01-801-014, 126-01-801-015, 126-01-801-016




| SHEET INDEX | | |
|---|---|---|
| NO. | Sheet Number | Sheet Title |
| 1 | C-1 | COVER SHEET |
| 2 | C-2 | GENERAL NOTES |
| 3 | C-3 | LEGEND, ABBREVIATIONS, & QUANTITIES |
| 4 | G-1 | GRADING PLAN I |
| 5 | G-2 | GRADING PLAN II |
| 6 | G-3 | GRADING PLAN III |
| 7 | G-4 | GRADING PLAN IV |
| 8 | G-5 | GRADING PLAN V |
| 9 | G-6 | GRADING PLAN VI |
| 10 | G-7 | GRADING PLAN VII |
| 11 | G-8 | GRADING PLAN VIII |
| 12 | G-9 | GRADING PLAN IX - TEMPORARY AC SIDEWALK |
| 13 | D-1 | DETAIL SHEET I |
| 14 | D-2 | DETAIL SHEET II |
| 15 | PP-1 | PLAN AND PROFILE - SDD! 1 & 2 |
| 16 | PP-2 | PLAN AND PROFILE - SDD! 3, 4 & 5 |
| 17 | PP-3 | PLAN AND PROFILE - SDD! 6, 7 & 8 |
| 18 | PP-4 | PLAN AND PROFILE - RADLEY AVE STA 19+00 TO 25+00 |
| 19 | PP-5 | PLAN AND PROFILE - RADLEY AVE STA 25+00 TO 30+50 |
| 20 | PP-6 | PLAN AND PROFILE - RADLEY AVE STA 30+50 TO 34+00 |
| 21 | PP-7 | PLAN AND PROFILE - RADLEY AVE STA 34+00 TO 37+50 |

## APPROVALS

CLV ENGINEERING OFFICE

CLV FIRE & RESCUE

CLV 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 STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO 135879 FIRST APPROVED DATE:
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 30 GPM
SHEETS: C-1 THRU C-3, D-2, PP-1 THRU PP-7

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 — SWG UID — DATE

COX COMMUNICATIONS LAS VEGAS, INC — DATE

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK OC99156

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE
CYLINDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24 US FEET, 892.53 METERS NAVD'88 DATUM

## BASIS OF BEARINGS

NORTH 86°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS

## OWNER/DEVELOPER

TRI POINTE HOMES NEVADA, INC.
4675 W TECO AVE., SUITE 115
LAS VEGAS, NV 89118
PH (702) 614-1400
FX (702) 873-6881
CONTACT: JAI JORDANO

## ENGINEER

WESTWOOD PROFESSIONAL SERVICES
5725 W BADURA AVE, SUITE 100
LAS VEGAS, NV 89118
PH (702) 284-5300
FX: (702) 284-5389
CONTACT: DAN POLL

## FEMA FLOOD ZONE INFORMATION

PER THE FEMA FIRM PANEL MAP 32003C1750E, DATED SEPTEMBER 27, 2002 THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE 'X' AN UNSHADED ZONE 'X' IS LOCATED OUTSIDE THE 0.20% ANNUAL CHANCE FLOODPLAIN

## LEGAL DESCRIPTION

(APN: 126-01-801-010):
THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO CLARK COUNTY BY DEED RECORDED JUNE 5, 1979, IN BOOK 1066 AS DOCUMENT NO. 1025476, OF OFFICIAL RECORDS.

ALSO KNOWN AS LOT ONE (1), AS DELINEATED ON THAT CERTAIN CERTIFICATE OF LAND DIVISION 54-79, RECORDED JUNE 5, 1979, IN BOOK 1066 AS DOCUMENT NO. 1025475, OF OFFICIAL RECORDS

TOGETHER WITH,

(APN: 126-01-801-011):
THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59, EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA,

EXCEPTING THEREFROM THOSE PORTIONS AS CONVEYED TO CLARK COUNTY, BY A DEED RECORDED JUNE 5, 1979 IN BOOK 1066 AS DOCUMENT NO. 1025476, OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

ALSO KNOWN AS LOT TWO (2), OF THAT CERTAIN CERTIFICATE OF LAND DIVISION RECORDED JUNE 5, 1979 AS DOCUMENT NO. 1025475, OF OFFICIAL RECORDS.

TOGETHER WITH,

(APN: 126-01-801-012):
THE EAST HALF (E 1/2) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

TOGETHER WITH,

(APN: 126-01-801-013):
THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO CLARK COUNTY BY THAT CERTAIN GRANT, BARGAIN, SALE DEED RECORDED AUGUST 1, 1979 IN BOOK 1095 AS INSTRUMENT NO. 1054704, OFFICIAL RECORDS

ALSO KNOWN AS LOT ONE (1) OF THAT CERTAIN CERTIFICATE OF LAND DIVISION RECORDED JULY 25, 1979 AS DOCUMENT NO. 1050800 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

TOGETHER WITH,

(APN: 126-01-801-014)
THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO CLARK COUNTY BY THAT CERTAIN GRANT, BARGAIN, SALE DEED RECORDED AUGUST 1, 1979, IN BOOK 1095, AS INSTRUMENT NO. 1054704, IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA
TOGETHER WITH,

(APN: 126-01-801-015)
THE EAST HALF (E 1/2) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) IN SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

TOGETHER WITH,

(APN: 126-01-801-016)
THE WEST HALF (W 1/2) OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

## M.O.U. ITEMS

1. 21-0315-TMP1, 8/19/2021
2. MINIMUM STREET WIDTH OF 33' WITH PARKING FOR PARKING ON BOTH SIDES MEASURED TO FACE OF CURB
3. SIDEWALK REQUIRED ON ONE SIDE OF INTERIOR PRIVATE GATED STREETS
4. STREET LIGHTS ON PRIVATE STREETS WITHIN SINGLE FAMILY SUBDIVISIONS SHALL NOT BE REQUIRED
5. DRIVEABLE EMERGENCY ACCESS REDUCED TO 18'

## DEVIATIONS FROM STANDARDS

1. VARIANCES PER 21-0315 AND 21-0657:
   - R-TH SETBACKS FOR ATTACHED PRODUCTS (LOTS 83-226).
     - ALLOW 3' FRONT SETBACK.
   - ALLOW STUB STREET WHERE CUL-DE-SACS ARE REQUIRED
   - ALLOW MAX WALL HEIGHT OF 16' WHERE 12' IS ALLOWED
2. ALLOW OFFSET ROAD CROWN

## SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP). 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/BMPC/STORM01.HTM. PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILING FEE.

## TOTAL DISTURBED AREA

25.37 ACRES

## PROJECT INFORMATION

| | |
|---|---|
| ACREAGE (GROSS): | = 25.37 AC |
| ACREAGE (NET): | = 23.2 AC |
| ACREAGE (NET-NET) | = 23.2 AC |
| DENSITY (LOTS/NET ACRE) | = 9.74 DU/NET AC |
| ZONING | = R-TH |
| TOTAL NO. OF RESIDENTIAL LOTS | = 226 |
| TOTAL NO. OF COMMON ELEMENTS | = 23 |
| MINIMUM LOT SIZE | = 1,607 SF± |
| MAXIMUM LOT SIZE | = 5,970 SF± |
| PROVIDED OPEN SPACE | = 75,903 SF± |

EARTHWORK SUMMARY (UNADJUSTED)

| | |
|---|---|
| CUT | = 27,878 CY. |
| FILL | = 127,295 CY. |
| NET (FILL) | = 99,417 CY. |

## GEOTECHNICAL ENGINEER

PREPARED BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 S. ESCONDIDO ST. STE. B LAS VEGAS, NV 89119
PHONE: (702) 897-1424
PROJECT No 16103-LVR
DATED: 09/17/2021










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

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

IRON MOUNTAIN UNIT 2
COVER SHEET

S:1 T:19 S R:59 E

tri pointe HOMES

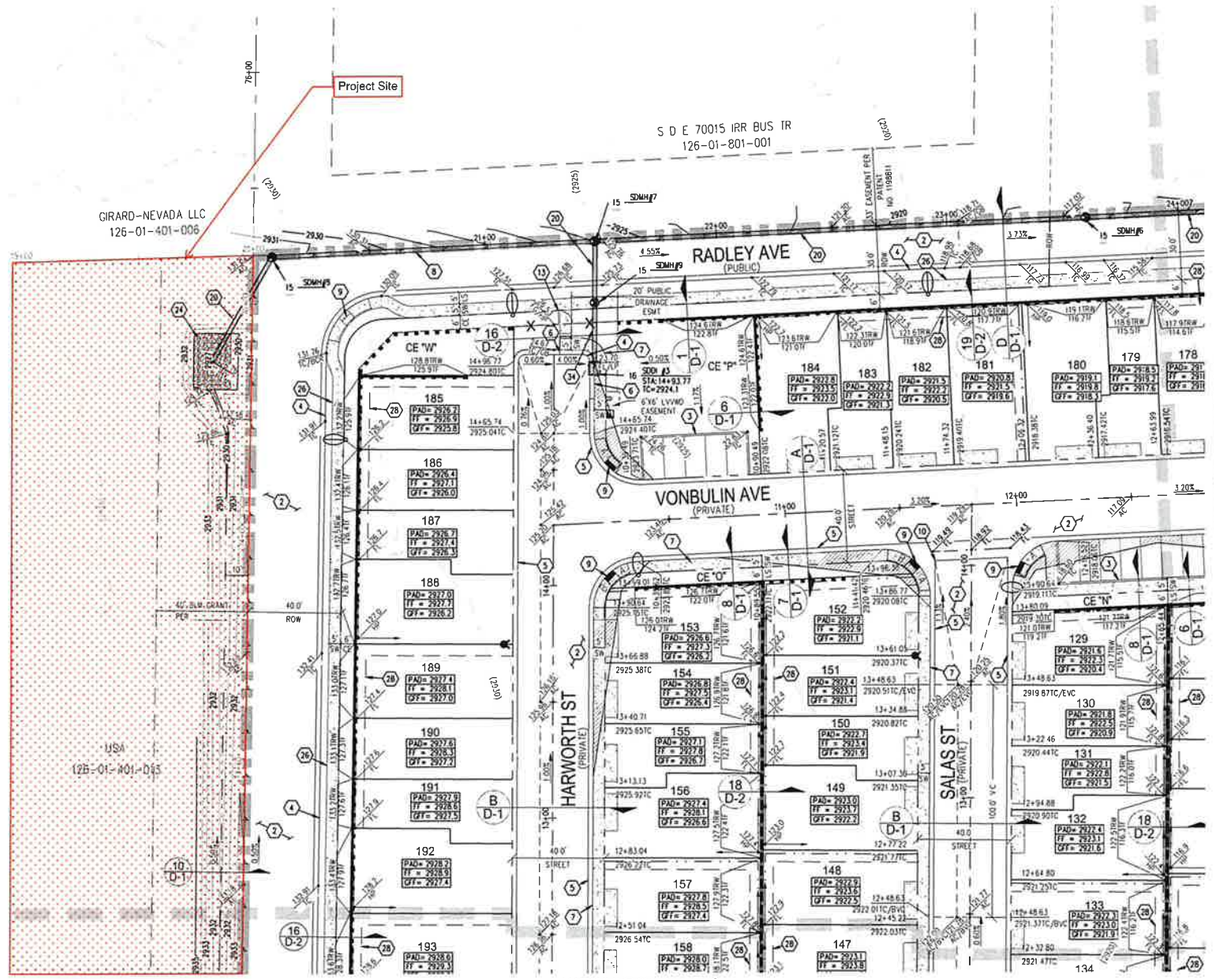
DATE: 04/20/2022
DRAFTER: ND
DESIGNER: ND
CHECKED: OIQ

PROJECT NO.
TRI2101-000

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL S. POLL
Exp. 12/31/2023
CIVIL
No. 28179
09/09/2022

C-1
SHEET 1 OF 21

J:\JOBS\tri-000 Iron mountain\Civil\Version\Current\LV\21101.ver Apr 6, 2022 2:35 PM Kevin Evans




0 30 60
SCALE - 1"=30' FEET

## HOA NOTE

ALL ONSITE STORM DRAIN FACILITIES WITHIN THIS DEVELOPMENT SHALL BE PRIVATELY MAINTAINED BY THE HOA. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENT AND PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED BY HOA.

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2801.00)

## BASIS OF BEARINGS

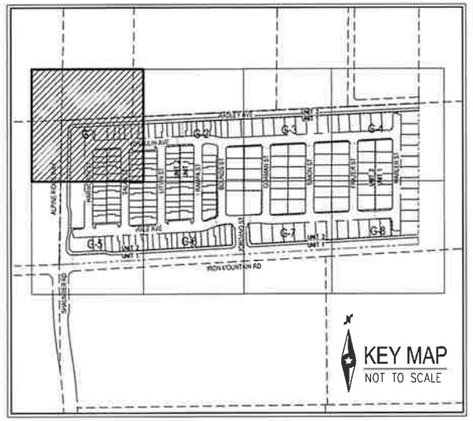
NORTH 86°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS.

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK OC991S6

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE CYLINDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24' US FEET, 892.53 METERS NAVD'88 DATUM




## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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.

## GRADING 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/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.

8 NO STRUCTURE, VEGETARION, 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 ZONES

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 503, 500.4 & 500.5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET DETAILS ON SHEET D-1
3. INSTALL A TYPE CURB PER CCAUSD NO. 219
4. INSTALL L TYPE CURB PER CCAUSD NO. 216
5. INSTALL R TYPE CURB PER CCAUSD NO. 217.3.S1
6. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL ON SHEET D-1
7. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
8. INSTALL 18" C1900 STORM DRAIN (PUBLIC)
9. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1 A=B=8'-0"
10. CONSTRUCT MODIFIED 6' WIDE CROSS GUTTER PER CCAUSD NO. 228
11. INSTALL PAVERS WITH SOLDIER COURSE BANDING
12. INSTALL 2' WIDE CONCRETE STRIP
13. INSTALL WROUGHT IRON FENCE WITH PEDESTRIAN ACCESS GATE
14. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 & 405.2 (PUBLIC)
15. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403 & 403.1 (PUBLIC)
16. INSTALL 5.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
17. INSTALL 10.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
18. INSTALL 17.5' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
19. INSTALL 20.0' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
20. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
21. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
22. INSTALL 42" CLASS III RCP STORM DRAIN (PUBLIC)
23. INSTALL 48" CLASS III RCP STORM DRAIN (PUBLIC)
24. INSTALL RIP RAP OVER 12" TYPE II AGGREGATE BASE D50=6", T=12"
25. CONSTRUCT COMMERCIAL DRIVEWAY PER CCASUD NO. 224
26. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
27. CONSTRUCT 5' WIDE TEMPORARY ASPHALT PAVEMENT SIDEWALK
28. 5' PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED BY HOMEOWNER
29. INSTALL 48" RCP NDOT END SECTION PER NDOT DETAIL R-2.3.1 (PUBLIC)
30. INSTALL NON-EROSIVE LANDSCAPE
31. CONSTRUCT 6" CONCRETE OVER 6" TYPE II PATH FOR EMERGENCY VEHICLE ACCESS
32. INSTALL 6" THICK COMPACTED DECOMPOSED GRANITE
33. INSTALL WROUGHT IRON FENCE WITH 20.0' ACCESS GATE PER CCAUSD NO. 425.S1
34. INSTALL 18" CLASS III RCP STORM DRAIN (PRIVATE)
35. INSTALL 36" CLASS III RCP STORM DRAIN (PRIVATE)

## FLOOD ZONE

PER THE FEMA FIRM PANEL MAP 32003C1750E, DATED SEPTEMBER 27, 2002. THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE 'X' AN UNSHADED ZONE 'X' IS LOCATED OUTSIDE THE 0.20% ANNUAL CHANCE FLOODPLAIN

## FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT CITY OF LAS VEGAS FOR THIS SUBJECT PROJECT (055508)

06/09/2022
DANIEL S. POLL, P.E. 28179 — DATE

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

## SOILS REPORT

SOILS REPORT BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 S. ESCONDIDO ST. STE. B LAS VEGAS, NV 89119
PHONE: (702) 837-1424
PROJECT NO. 16100-LVR DATED 09/17/2021

## EARTHWORKS

EARTHWORK QUANTITIES (RAW)
CUT= 28,551 CU YDS
FILL= 114,244 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT

## DRAINAGE IMPROVEMENT QUANTITIES

| | | | PRIVATE | PUBLIC |
|---|---|---|---|---|
| 1 | 48" TYPE I STORM DRAIN MANHOLE | EA | - | 8 |
| 2 | 48" TYPE II STORM DRAIN MANHOLE | EA | - | 2 |
| 3 | 5.0' TYPE "CM2" DROP INLET | EA | 2 | 2 |
| 4 | 10.0' TYPE "CM2" DROP INLET | EA | 1 | 0 |
| 5 | 17.5' TYPE "CM2" DROP INLET | EA | - | 1 |
| 6 | 20.0' TYPE "CM2" DROP INLET | EA | 2 | - |
| 7 | 18" RCP CLASS III STORM DRAIN | LF | 285 | 1,585 |
| 8 | 36" RCP CLASS III STORM DRAIN | LF | 50 | - |
| 9 | 42" RCP CLASS III STORM DRAIN | LF | - | 27 |
| 10 | 48" RCP CLASS III STORM DRAIN | LF | - | 174 |
| 11 | RIPRAP D50=6", THK=12" | CY | - | 95 |
| 12 | 8' WDE CONCRETE VALLEY GUTTER | SF | 5,965 | 750 |
| 13 | 48" RCP NDOT END SECTION | EA | - | 1 |

## POST-CONSTRUCTION BMP'S NOTE

POST-CONSTRUCTION BMP'S (PCBMP'S)/CONTROL MEASURES NOTED ON THE GRADING PLANS ARE MANDATORY PERMANENT REGULATORY STORMWATER POLLUTION CONTROLS. THESE PCBMP'S MUST BE INSTALLED PER THE APPROVED PLANS AND MUST BE PERMANENTLY MAINTAINED.

## 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 (NVR100000, 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 (NVR100000, 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.










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

| NO. | DESCRIPTION | DATE | BY | APP. DATE | APP. |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

tri pointe HOMES

# IRON MOUNTAIN UNIT 2
## GRADING PLAN I

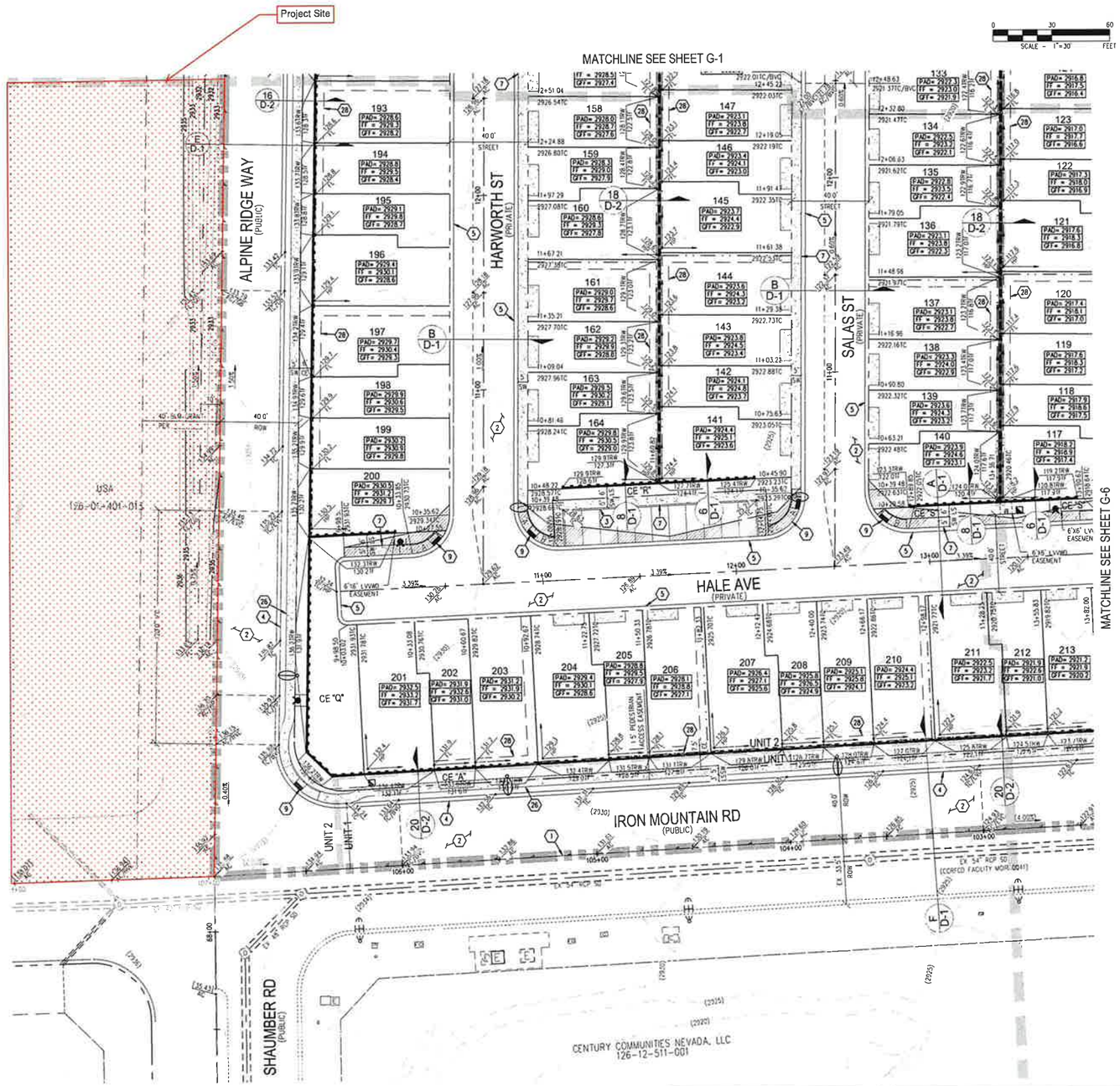
S1 T19 S R59 E

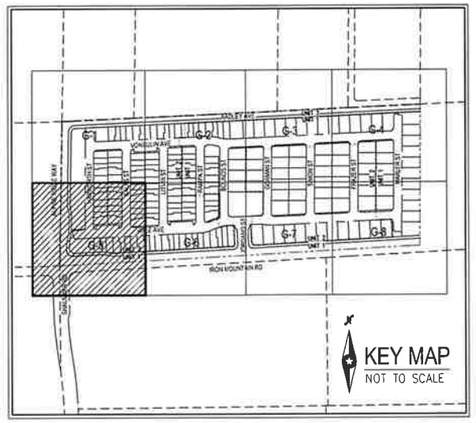
DATE: 04/20/2022
DRAFTER: ND
DESIGNER: ND
CHECKED: OIQ
PROJECT NO.
TRI2101-000




G-1
SHEET 4 OF 21

J:\tri2101-000 iron mountain\dwg\Vertigrix\exhibit\tri2101 grd dwg 6/9/2022 2:36 PM Kevin Rasos




## HOA NOTE

ALL ONSITE STORM DRAIN FACILITIES WITHIN THIS DEVELOPMENT SHALL BE PRIVATELY MAINTAINED BY THE HOA. ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENT AND PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED BY HOA.

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2801.00)

## BASIS OF BEARINGS

NORTH 86°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK OC09156

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE CYLINDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24 US FEET, 892.53 METERS NAVD'88 DATUM

## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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

## GRADING 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/REPLACING 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 ZONES.

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO 503, 500.4 & 500.5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET DETAILS ON SHEET D-1
3. INSTALL A TYPE CURB PER CCAUSD NO 219
4. INSTALL L TYPE CURB PER CCAUSD NO 216
5. INSTALL R TYPE CURB PER CCAUSD NO 217.3 S1
6. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL ON SHEET D-1
7. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
8. INSTALL 18" C900 STORM DRAIN (PUBLIC)
9. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1 A=B=8.0'
10. CONSTRUCT MODIFIED 8' WIDE CROSS GUTTER PER CCAUSD NO. 228
11. INSTALL PAVERS WITH SOLDIER COURSE BANDING
12. INSTALL 2' WIDE CONCRETE STRIP
13. INSTALL WROUGHT IRON FENCE WITH PEDESTRIAN ACCESS GATE
14. INSTALL 48" TYPE II SDMH PER CCAUSD NO. 401 & 405.2 (PUBLIC)
15. INSTALL 48" TYPE I SDMH PER CCAUSD NO. 403 & 403.1 (PUBLIC)
16. INSTALL 5.0' TYPE "CW2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
17. INSTALL 10.0' TYPE "CW2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
18. INSTALL 17.5' TYPE "CW2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
19. INSTALL 20.0' TYPE "CW2" DROP INLET PER CCAUSD NO. 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
20. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
21. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
22. INSTALL 42" CLASS III RCP STORM DRAIN (PUBLIC)
23. INSTALL 48" CLASS III RCP STORM DRAIN (PUBLIC)
24. INSTALL RIP RAP OVER 12" TYPE II AGGREGATE BASE D50=6", T=12"
25. CONSTRUCT COMMERCIAL DRIVEWAY PER CCASUD NO. 224
26. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
27. CONSTRUCT 5' WIDE TEMPORARY ASPHALT PAVEMENT SIDEWALK
28. 5' PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED BY HOMEOWNER
29. INSTALL 48" RCP NDOT END SECTION PER NDOT DETAIL R-2.3.1 (PUBLIC)
30. INSTALL NON-EROSIVE LANDSCAPE
31. CONSTRUCT 6" CONCRETE OVER 6" TYPE II PATH FOR EMERGENCY VEHICLE ACCESS
32. INSTALL 6" THICK COMPACTED DECOMPOSED GRANITE
33. INSTALL WROUGHT IRON FENCE WITH 20.0' ACCESS GATE PER CCAUSD NO 425.S1
34. INSTALL 18" CLASS III RCP STORM DRAIN (PRIVATE)
35. INSTALL 36" CLASS III RCP STORM DRAIN (PRIVATE)

## 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 NVR100000, SECTION III.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 NVR100000, SECTION III.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 ZONE

PER THE FEMA FIRM PANEL MAP 32003C1750E, DATED SEPTEMBER 27, 2002 THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED UNSHADED ZONE "X" AN UNSHADED ZONE "X" IS LOCATED OUTSIDE THE 0.20% ANNUAL CHANCE FLOODPLAIN

## FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT CITY OF LAS VEGAS FOR THIS SUBJECT PROJECT (DSS508)

DANIEL S. POLL, P.E. 28179 — 06/09/2022 DATE

CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

## SOILS REPORT

SOILS REPORT BY: GEOTEK RESIDENTIAL, LLC
ADDRESS: 6835 S. ESCONDIDO ST. STE. B, LAS VEGAS, NV 89119
PHONE: (702) 957-1424
PROJECT NO. 16100-LOR — DATED 09/17/2021

## EARTHWORKS

EARTHWORK QUANTITIES (RAW)
CUT= 28,551 CU YDS
FILL= 114,244 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

## DRAINAGE IMPROVEMENT QUANTITIES

| | | | PRIVATE | PUBLIC |
|---|---|---|---|---|
| 1 | 48" TYPE I STORM DRAIN MANHOLE | EA | - | 8 |
| 2 | 48" TYPE II STORM DRAIN MANHOLE | EA | - | 2 |
| 3 | 5.0' TYPE "CW2" DROP INLET | EA | 2 | 2 |
| 4 | 10.0' TYPE "CW2" DROP INLET | EA | 1 | 0 |
| 5 | 17.5' TYPE "CW2" DROP INLET | EA | - | 1 |
| 6 | 20.0' TYPE "CW2" DROP INLET | EA | 2 | - |
| 7 | 18" RCP CLASS III STORM DRAIN | LF | 285 | 1,585 |
| 8 | 36" RCP CLASS III STORM DRAIN | LF | 50 | - |
| 9 | 42" RCP CLASS III STORM DRAIN | LF | - | 27 |
| 10 | 48" RCP CLASS III STORM DRAIN | LF | - | 174 |
| 11 | RIPRAP D50=6", THK=12" | CY | - | 95 |
| 12 | 8' WIDE CONCRETE VALLEY GUTTER | SF | 5,965 | 750 |
| 13 | 48" RCP NDOT END SECTION | EA | - | 1 |

## POST-CONSTRUCTION BMP'S NOTE

POST-CONSTRUCTION BMP'S (PCBMP'S)/CONTROL MEASURES NOTED ON THE GRADING PLANS ARE MANDATORY PERMANENT REGULATORY STORMWATER POLLUTION CONTROLS. THESE PCBMP'S MUST BE INSTALLED PER THE APPROVED PLANS AND MUST BE PERMANENTLY MAINTAINED.










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

| NO. | DESCRIPTION | DATE | BY | APP. | APP. DATE |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS, NV

# IRON MOUNTAIN UNIT 2
# GRADING PLAN V

S:19 R:59E

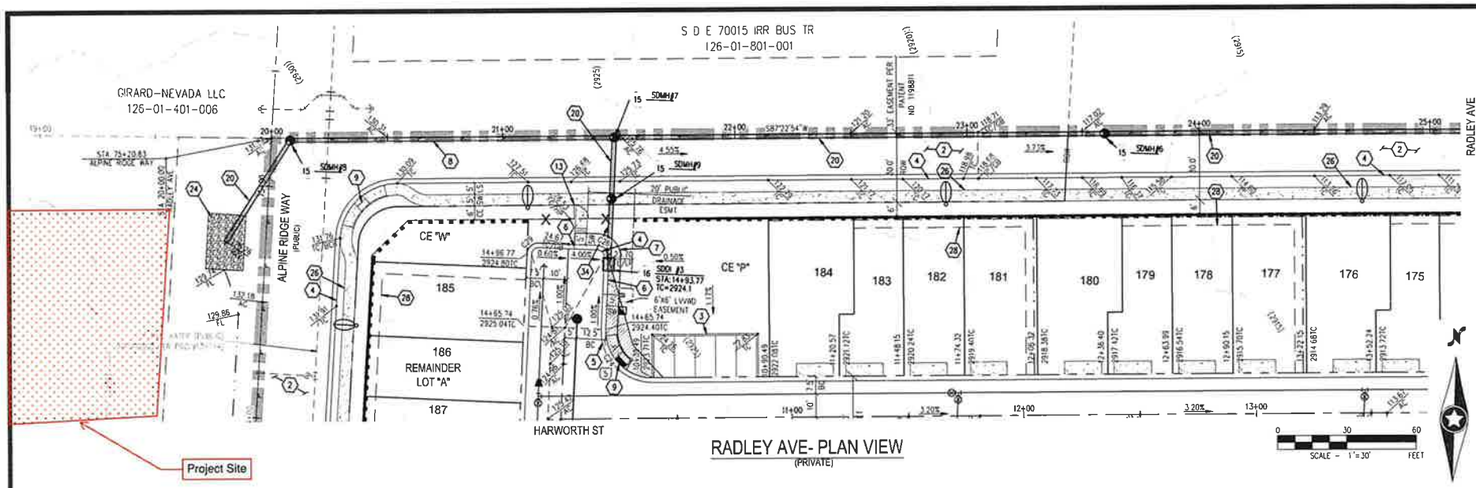
tri pointe HOMES

DATE: 04/20/2022
DRAFTER: ND
DESIGNER: ND
CHECKED: OIQ
PROJECT NO.
TRI2101-000

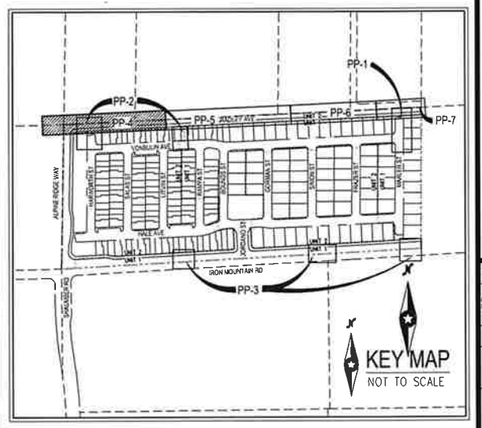
PROFESSIONAL ENGINEER — STATE OF NEVADA — DANIEL S. POLL — Exp. 12/31/2023 — CIVIL — No. 28179 — 06/09/2022

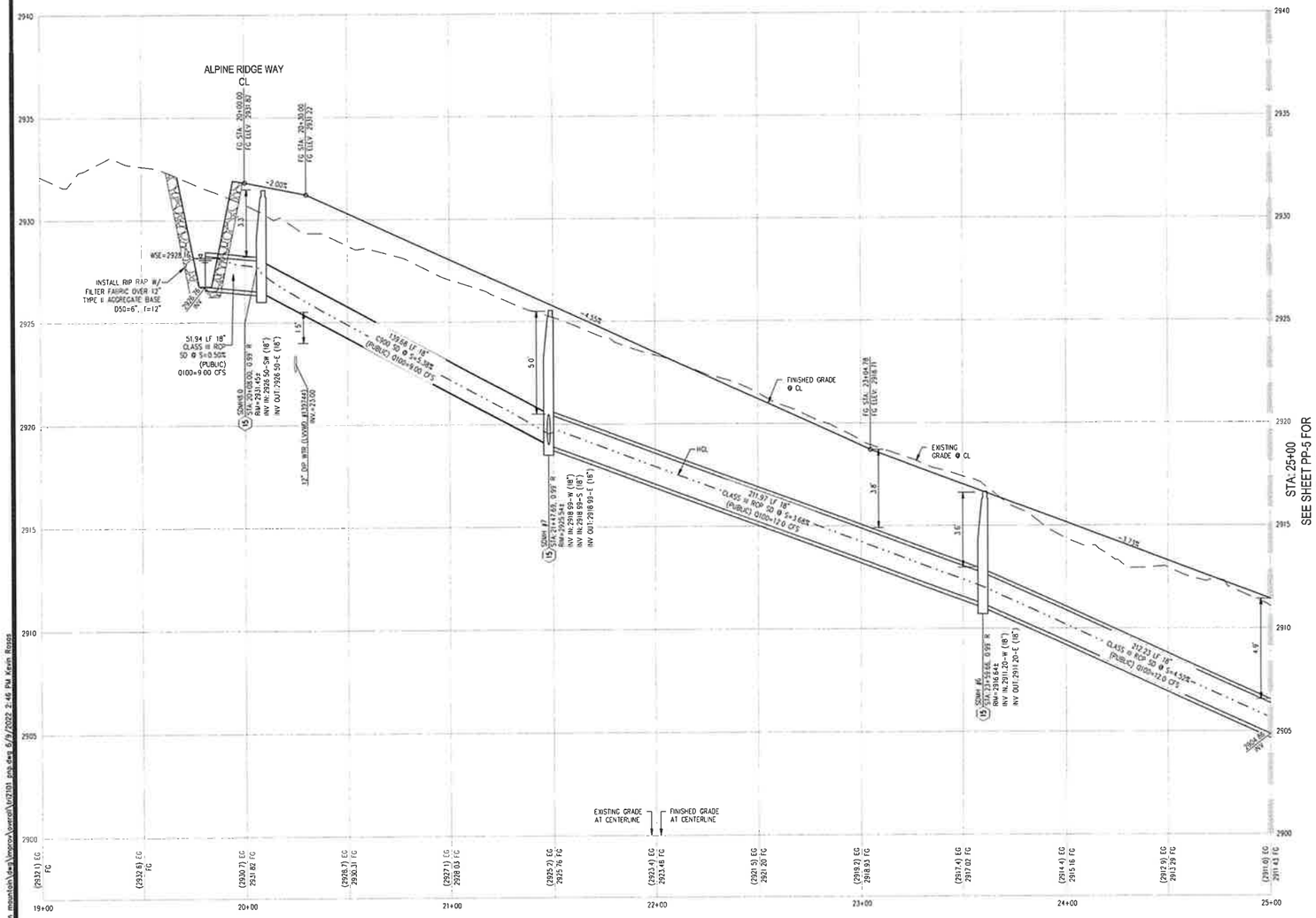
G-5
SHEET 8 OF 21

\tri2101-000 iron mountain\dwg\Vanguard\Vanguard\tri2101 grd.dwg 6/9/2022 2:38 PM Kevin Rocco




RADLEY AVE- PLAN VIEW
(PRIVATE)




RADLEY AVE- PROFILE VIEW
HORIZ: 1"=30'
VERT: 1"=30'

## SURVEY NOTE

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

## ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 2801.00)

## BASIS OF BEARINGS

NORTH 86°52'17" EAST BEING THE BEARING OF THE SOUTH LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP THEREOF ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS

## BENCHMARK

CITY OF LAS VEGAS BENCHMARK 0C99156

RIVET AND 2" ROUND ALUMINUM DISK IN CONCRETE CYLINDER AT THE SW CORNER OF ALPINE RIDGE WAY & KYLE CANYON RD

ELEVATION=2928.24 US FEET, 892.53 METERS NAVD'88 DATUM

## 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 WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT 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

## SEWER CONNECTION NOTE

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE

## LVVWD NOTE

1 THE LVVWD CANNOT GUARANTEE A WATERTIGHT SHUTDOWN WHERE CONNECTIONS OR REPAIRS TO EXISTING FACILITIES ARE REQUIRED. THE CONTRACTOR SHALL ENSURE ALL LABOR AND EQUIPMENT IS AVAILABLE TO REMOVE REMAINING WATER. COORDINATION WITH INSPECTION DIVISION MUST TAKE PLACE PRIOR TO ANY TRIAL SHUTDOWN. CONTRACTOR TO INSTALL TEMPORARY SERVICE TO ENSURE PROPER SHUTDOWN IN THE EVENT NO OTHER APPURTENANCES ARE AVAILABLE

2 MAINTAIN MINIMUM TWENTY-FOUR(24) INCH COVER PER UDACS SECTION 2 08 04. GRADING MUST BE COMPLETED PRIOR TO WATERLINE INSTALLATION

## SEWER NOTES

1. FIELD VERIFY INVERT. SAWCUT, REMOVE CAP, & CONNECT TO EXISTING SEWER LINE
2. INSTALL 48" STANDARD MANHOLE WITH WATERTIGHT JOINTS (PER DCSWCS SD-1, SD-3, SD-4, SD-5) WITH SINGLE 24" LID
3. INSTALL 48" STANDARD MANHOLE WITH WATERTIGHT JOINTS & CORROSION PROTECTION (PER DCSWCS SD-1, SD-3, SD-4, SD-5 AND DCSWCS 3.16.0)
4. INSTALL 8" PVC SANITARY SEWER PIPE (PUBLIC)
5. INSTALL 8" C900 PVC SANITARY SEWER PIPE (PUBLIC)
6. INSTALL 8" SEWER PLUG
7. INSTALL 4" SDR35 PVC SEWER LATERAL PER DCSWCS SD-22 AND SD-25
8. INSTALL 4" C900 PVC SEWER LATERAL PER DCSWCS SD-23 AND SD-25

## GRADING NOTES

1. MATCH EXISTING IMPROVEMENTS PER CCAUSD NO 503, 500 4 & 500 5
2. INSTALL ASPHALT PAVEMENT WITH TYPE II AGGREGATE BASE PER STREET DETAILS ON SHEET D-1
3. INSTALL A TYPE CURB PER CCAUSD NO 219
4. INSTALL L TYPE CURB PER CCAUSD NO 216
5. INSTALL R TYPE CURB PER CCAUSD NO 217.3 S1
6. CONSTRUCT 10' L-CURB TO R-CURB TRANSITION PER DETAIL ON SHEET D-1
7. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO 234 (5" THICK W/ 5" TYPE II AGGREGATE BASE)
8. INSTALL 18" C900 STORM DRAIN (PUBLIC)
9. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO 235, CASE 1 A=B=8'0"
10. CONSTRUCT MODIFIED 8' WIDE CROSS GUTTER PER CCAUSD NO. 228
11. INSTALL PAVERS WITH SOLDIER COURSE BANDING
12. INSTALL 2' WIDE CONCRETE STRIP
13. INSTALL WROUGHT IRON FENCE WITH PEDESTRIAN ACCESS GATE
14. INSTALL 48" TYPE II SDMH PER CCAUSD NO 401 & 405.2 (PUBLIC)
15. INSTALL 48" TYPE I SDMH PER CCAUSD NO 403 & 403.1 (PUBLIC)
16. INSTALL 5.0' TYPE "CW2" DROP INLET PER CCAUSD NO 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
17. INSTALL 10.0' TYPE "CW2" DROP INLET PER CCAUSD NO 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
18. INSTALL 17.5' TYPE "CW2" DROP INLET PER CCAUSD NO 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
19. INSTALL 20.0' TYPE "CW2" DROP INLET PER CCAUSD NO 412.1 AND STORM DRAIN WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421 (PRIVATE)
20. INSTALL 18" CLASS III RCP STORM DRAIN (PUBLIC)
21. INSTALL 36" CLASS III RCP STORM DRAIN (PUBLIC)
22. INSTALL 42" CLASS III RCP STORM DRAIN (PUBLIC)
23. INSTALL 48" CLASS III RCP STORM DRAIN (PUBLIC)
24. INSTALL RIP RAP OVER 12" TYPE II AGGREGATE BASE D50=6", t=12"
25. CONSTRUCT COMMERCIAL DRIVEWAY PER CCASUD NO. 224
26. CONSTRUCT 5' WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
27. CONSTRUCT 5' WIDE TEMPORARY ASPHALT PAVEMENT SIDEWALK
28. 5' PUBLIC DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED BY HOMEOWNER
29. INSTALL 48" RCP NOOF END SECTION PER NDOT DETAIL R-2.3.1 (PUBLIC)
30. INSTALL NON-EROSIVE LANDSCAPE
31. CONSTRUCT 5" CONCRETE OVER 6" TYPE II PATH FOR EMERGENCY VEHICLE ACCESS
32. INSTALL 6" THICK COMPACTED DECOMPOSED GRANITE
33. INSTALL WROUGHT IRON FENCE WITH 20.0' ACCESS GATE PER CCAUSD NO 425.S1
34. INSTALL 18" CLASS III RCP STORM DRAIN (PRIVATE)
35. INSTALL 36" CLASS III RCP STORM DRAIN (PRIVATE)

## SIDEWALK RAMP TABLE

| RAMP NUMBER | GRADE (%) "B" TO "A" | "A" (FT) MIN | "B" (FT) MIN |
|---|---|---|---|
| 1 | -6 TO -5.01 | 4.5 | 21.5 |
| 2 | -5 TO -4.01 | 4.5 | 15.0 |
| 3 | -4 TO -3.01 | 4.5 | 12.0 |
| 4 | -3 TO -2.01 | 4.5 | 9.5 |
| 5 | -2 TO 2 | 8.0 | 8.0 |
| 6 | 2.01 TO 3 | 9.5 | 4.5 |
| 7 | 3.01 TO 4 | 12.0 | 4.5 |
| 8 | 4.01 TO 5 | 15.0 | 4.5 |
| 9 | 5.01 TO 6 | 21.5 | 4.5 |

## CURVE TABLE

| CURVE | LENGTH | RADIUS | DELTA | TANGENT |
|---|---|---|---|---|
| C26 | 7.85' | 5.00' | 90°00'00" | 5.00' |
| C29 | 7.85' | 5.00' | 90°00'00" | 5.00' |

## APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES

PROJECT NO 139879 FIRST APPROVED DATE _____










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

| NO. | DESCRIPTION | DATE | BY | APP'D | DATE |
|---|---|---|---|---|---|

CITY OF LAS VEGAS, NV

tri pointe HOMES

IRON MOUNTAIN UNIT 2

PLAN AND PROFILE - RADLEY AVE STA 19+00 TO 25+00

S-19
R-59E

DATE: 04/20/2022
DRAFTER: ND
DESIGNER: ND
CHECKED: OIG

PROJECT NO.
TRI2101-000

PROFESSIONAL ENGINEER - STATE OF NEVADA
DANIEL S. POLL
Exp. 12/31/2023
CIVIL
No. 28179
06/09/2022

PP-4
SHEET 18 OF 21

\\v2101-000 iron mountain\dwg\improv\overall\v2101 pp4.dwg 6/9/2022 2:46 PM Kevin Ross

# APPENDIX H

Reference Material
Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure
(DS 4953)

# Approval Letters

| CITY OF LAS VEGAS<br>INTER-OFFICE MEMORANDUM | | | | DATE:<br>May 5, 2020 |
|---|---|---|---|---|
| TO:<br>**Land Development Services**<br>Department of Building & Safety | | | | FROM:<br>Jennifer Shinn, P.E.<br>Flood Control, Engr. Associate<br>Department of Public Works |
| **SUBJECT:** | Drainage Study for:<br>**Skye Canyon – Phases 3B & 3C Infrastructure – Update #2** | | | **COPIES TO:**<br>Westwood Professional Services |
| **Cross Streets:** | NWC of Skye Village Road &<br>Skye Canyon Park Drive | | | M F Land LLC / Ninety-Five Management LLC |
| **File Number:** | F:\Depot\DSMemos\DS4953F.doc | | | Bart Anderson, P.E., DevCo |
| **Parcel Number:** | 126-12-101-002 | | | CCRFCD |
| **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 # |
|---|---|---|---|---|---|
| 1st Submittal | 2/8/2017 | 3/9/2018 & 5/15/2018 | Not Approved | $400.00 | 493315: $400 |
| 2nd Submittal | 9/11/2018 | 10/10/2018 | Conditional Approval | $400.00 | 498970: $400 |
| 3rd Submittal | 5/30/2019 | 6/13/2019 & Revised 9/26/2019 | See Comments Below | $100.00 | 3151006: $100 |
| 4th Submittal | 2/20/2020 | 2/20/2020 | Approved | N/C | N/C |
| 5th Submittal | 3/11/2020 | 4/9/2020 | Conditional Approval | $100.00 | $100 |
| 6th Submittal | 4/30/2020 | 5/5/2020 | Conditional Approval | N/C | N/C |
| | | | **TOTAL FEES (LDDRS):** | **$1000.00** | **----** |

**REMARKS:**

**6th Submittal: Update #2 Supplement to decrease oversized pipe**

**5th Submittal: Update #2 to address Land Use changes, upsize facilities accordingly, and shifts in SD alignment due to utility conflicts**

**4th Submittal: CCRFCD Concurrence**

**3rd Submittal: Update #1 to shift the storm drain alignment in Iron Mountain Road 1-ft to the north from Station "IMR" 107+46.33 to Station "IMR" 83+26.07**

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. |

**The following conditions are repeated until they are complete:**

1. **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 (CCRFCD) has issued a letter of

concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.

2. All special structures and mainline storm drain connection require details and structural calculations to be reviewed by the *City of Las Vegas Building & Safety Department*. Approval by the *Building Department* must be obtained prior to the final approval of the subject drainage study.

3. *Skye Canyon Phases 3B & 3C* onsite developments are to be flood protected by *Detention Basin 2* and the *Skye Canyon Phase 3A Infrastructure*. No occupancy permits within onsite *Phases 3B & 3C* will be issued prior to the substantial completion of *Detention Basin 2 with the outfall facility (from Detention Basin 2 in Iron Mountain Road to Skye Village Road)* and the substantial completion of the *Skye Canyon Phase 3A Infrastructure*.

4. The future MPU facility within Skye Village Road north of the Skye Village/Grand Canyon/Iron Mountain intersection to the proposed MPU facility at the Kyle Canyon interchange area shall be substantially complete before occupancy of residential Units beyond Phases 3A, 3B and 3C. This includes residential development within Phases 4 & 6 and the development of Phase 5 as shown on the *Development Phasing Exhibit* dated 12/4/2017.

5. The implementation of the CCRFCD Master Plan for the Skye Canyon Master Development is being progressed with the recent 90% design submittal of the *Moccasin Rd. CCRFCD Flood Control Facility – US95/Kyle Canyon Rd Interchange to Moccasin Rd. (Skye Canyon Developer Funded)* and the *Moccasin Rd. CCRFCD Flood Control Facility – Moccasin Rd to CCRFCD Facility LVUP 1076/1077(CCRFCD Funded)*. Once building permits are released for 75% of the Skye Canyon Development west of US-95 these critical facilities shall be substantially complete in accordance with the provisions of Title 19.02.130 D.

6. The implementation of the CCRFCD Master Plan is being progressed with the recent bid opening of the NDOT US-95 facilities from the CC-215 interchange north to the Kyle Canyon interchange. Construction of the associated CCRFCD MPU facilities allows for the utilization of the existing MPU facilities constructed with the Horse Interchange. The development of Phases 3A, 3B and 3C west of US-95 shall maximize the flow collection into this facility prior to allowing flows to cross US-95 using the existing culvert system.

7. *Flood Control* acknowledges that the new *Skye Canyon Master Plan Amendment* (MPA) was included as a part of the 2018 MPU process. Any changes not incorporated in the 2018 MPU must be approved by *City of Las Vegas* and *Clark County Regional Flood Control District* (CCRFCD) and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject improvement plans.

8. The subject *Phases 3B and 3C Infrastructure Drainage Study* addresses the included street improvements of *Iron Mountain Road, Skye Canyon Park Drive, Shaumber Road*, culvert crossings and storm drain systems with the streets. Technical drainage studies will be required for the future onsite parcels as they develop.

9. Phase 3A, 3B, and 3C include storm drain improvements that will be abandoned in the future. These abandoned facilities will impact the adjoining Phase 3B and 3C development parcels. The individual parcel development shall address the impact and removal of these improvements as well as include the removal of these items in the associated improvements and Bond.

10. The project proposed to build temporary drainage facilities including drainage berms/swales over the *Phases 3B, 3C* site and along the west side of *Shaumber Road*. Prior to the final plans approval the developer must complete a ***Maintenance and Liability Agreement*** for the interim drainage improvements and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally

approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berms/swales are no longer necessary and can be removed.

11. The interim channels adjacent to the infrastructure roadways are the Maintenance responsibility of the Master Developer.

**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**
Ays/pbj/jks

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

# REGIONAL FLOOD CONTROL DISTRICT

**Steven C. Parrish, P.E.**
General Manager/Chief Engineer

***BOARD OF DIRECTORS***

**Lawrence L. Brown, III**
Chair
Clark County

**Mayor Debra March**
Vice-Chair
City of Henderson

**George Gault**
City of Mesquite

**James B. Gibson**
Clark County

**Mayor Carolyn Goodman**
City of Las Vegas

**Stavros Anthony**
City of Las Vegas

**Isaac Barron**
City of North Las Vegas

**Mayor Kiernan McManus**
City of Boulder City

July 2, 2020

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

**DISTRICT CONCURRENCE:** **SKYE CANYON - PHASE 3B & 3C INFRASTRUCTURE UPDATE #2 (DS4953E) (RFCD No. 20-13550)**

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated March 9, 2020, Supplement No. 1 dated April 21, 2020 for above-mentioned project as submitted by WESTWOOD PROFESSIONAL SERVICES, INC.. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated April 9, 2020.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works with the following condition(s):

> Note that per District's Policies and Procedures Manual, Section VIII.D.13 Uniform Regulations for the Control of Drainage, the Lead Entity shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have a regional flood control significance.

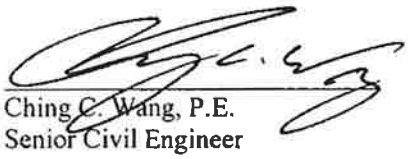
District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by WESTWOOD PROFESSIONAL SERVICES, INC. may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

REGIONAL FLOOD CONTROL DISTRICT



STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY: 
Ching C. Wang, P.E.
Senior Civil Engineer

CCW:sa

c: Lant Leavitt, P.E., Westwood Professional Services, Inc.

P:\Letters and Memos\Local Drainage\Land Development & Drainage\2020\L-20-13550as_built.doc

| CITY OF LAS VEGAS<br>INTER-OFFICE MEMORANDUM | | | | DATE:<br>April 9, 2020 |
|---|---|---|---|---|
| TO:<br>**Land Development Services**<br>Department of Building & Safety | | | | FROM:<br>Jennifer Shinn, P.E.<br>Flood Control, Engr. Associate<br>Department of Public Works |
| **SUBJECT:** | Drainage Study for:<br>**Skye Canyon – Phases 3B & 3C Infrastructure – Update #2** | | | **COPIES TO:**<br>Westwood Professional Services |
| **Cross Streets:** | NWC of Skye Village Road &<br>Skye Canyon Park Drive | | | M F Land LLC / Ninety-Five Management LLC |
| **File Number:** | F:\Depot\DSMemos\DS4953E.doc | | | Bart Anderson, P.E., DevCo |
| **Parcel Number:** | 126-12-101-002 | | | CCRFCD |
| **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 # |
|---|---|---|---|---|---|
| 1st Submittal | 2/8/2017 | 3/9/2018 & 5/15/2018 | Not Approved | $400.00 | 493315: $400 |
| 2nd Submittal | 9/11/2018 | 10/10/2018 | Conditional Approval | $400.00 | 498970: $400 |
| 3rd Submittal | 5/30/2019 | 6/13/2019 & Revised 9/26/2019 | See Comments Below | $100.00 | 3151006: $100 |
| 4th Submittal | 2/20/2020 | 2/20/2020 | Approved | N/C | N/C |
| 5th Submittal | 3/11/2020 | 4/9/2020 | Conditional Approval | $100.00 | $100 |
| | | | **TOTAL FEES (LDDRS):** | **$1000.00** | ---- |

**REMARKS:**

**5th Submittal: Update #2 to address Land Use changes, upsize facilities accordingly, and shifts in SD alignment due to utility conflicts**

**4th Submittal: CCRFCD Concurrence**

**3rd Submittal: Update #1 to shift the storm drain alignment in Iron Mountain Road 1-ft to the north from Station "IMR" 107+46.33 to Station "IMR" 83+26.07**

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. |

**The following conditions are repeated until they are complete:**

1. **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 (CCRFCD) has issued a letter of concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.

2. *Skye Canyon Phases 3B & 3C* onsite developments are to be flood protected by *Detention Basin 2* and the *Skye Canyon Phase 3A Infrastructure*. No occupancy permits within onsite *Phases 3B & 3C* will be issued prior to the substantial completion of *Detention Basin 2 with the outfall facility (from Detention Basin 2 in Iron Mountain Road to Skye Village Road)* and the substantial completion of the *Skye Canyon Phase 3A Infrastructure*.

3. The future MPU facility within Skye Village Road north of the Skye Village/Grand Canyon/Iron Mountain intersection to the proposed MPU facility at the Kyle Canyon interchange area shall be substantially complete before occupancy of residential Units beyond Phases 3A, 3B and 3C. This includes residential development within Phases 4 & 6 and the development of Phase 5 as shown on the *Development Phasing Exhibit* dated 12/4/2017.

4. The implementation of the CCRFCD Master Plan for the Skye Canyon Master Development is being progressed with the recent 90% design submittal of the *Moccasin Rd. CCRFCD Flood Control Facility – US95/Kyle Canyon Rd Interchange to Moccasin Rd. (Skye Canyon Developer Funded)* and the *Moccasin Rd. CCRFCD Flood Control Facility – Moccasin Rd to CCRFCD Facility LVUP 1076/1077(CCRFCD Funded)*. Once building permits are released for 75% of the Skye Canyon Development west of US-95 these critical facilities shall be substantially complete in accordance with the provisions of Title 19.02.130 D.

5. The implementation of the CCRFCD Master Plan is being progressed with the recent bid opening of the NDOT US-95 facilities from the CC-215 interchange north to the Kyle Canyon interchange. Construction of the associated CCRFCD MPU facilities allows for the utilization of the existing MPU facilities constructed with the Horse Interchange. The development of Phases 3A, 3B and 3C west of US-95 shall maximize the flow collection into this facility prior to allowing flows to cross US-95 using the existing culvert system.

6. *Flood Control* acknowledges that the new *Skye Canyon Master Plan Amendment* (MPA) was included as a part of the 2018 MPU process. Any changes not incorporated in the 2018 MPU must be approved by *City of Las Vegas* and *Clark County Regional Flood Control District* (CCRFCD) and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject improvement plans.

7. The subject *Phases 3B and 3C Infrastructure Drainage Study* addresses the included street improvements of *Iron Mountain Road, Skye Canyon Park Drive, Shaumber Road*, culvert crossings and storm drain systems with the streets. Technical drainage studies will be required for the future onsite parcels as they develop.

8. Phase 3A, 3B, and 3C include storm drain improvements that will be abandoned in the future. These abandoned facilities will impact the adjoining Phase 3B and 3C development parcels. The individual parcel development shall address the impact and removal of these improvements as well as include the removal of these items in the associated improvements and Bond.

9. The project proposed to build temporary drainage facilities including drainage berms/swales over the *Phases 3B, 3C* site and along the west side of *Shaumber Road*. Prior to the final plans approval the developer must complete a ***Maintenance and Liability Agreement*** for the interim drainage improvements and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

   In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berms/swales are no longer necessary and can be removed.

10. The interim channels adjacent to the infrastructure roadways are the Maintenance responsibility of the Master Developer.

**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**
Ays/pbj/jks

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

Referenced Drainage Exhibits

## LEGEND

- BASIN BOUNDARY
- PRORATE BOUNDARY
- ID — BASIN ID
- (ID) — PRORATE BASIN ID
- (ID) — CONCENTRATION POINT ID
- FLOW DIRECTION
- (ID) — FLOWMASTER SECTION

N

SCALE – 1" = 300'

0 300 600 FEET

### Interim Condition Flow Rate Summary

| Basin/Concentration Point ID | Area (ac) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| **Basins** | | | |
| EX1 | 68.0 | 161 | 63 |
| EX2 | 58.1 | 139 | 53 |
| EX3a | 14.2 | 35 | 13 |
| EX3b | 17.1 | 44 | 17 |
| EX7 | 18.9 | 46 | 18 |
| EX8 | 8.2 | 20 | 8 |
| EX9 | 12.0 | 27 | 9 |
| STR1 | 3.6 | 12 | 6 |
| STR2 | 3.9 | 13 | 7 |
| STR3 | 2.8 | 9 | 5 |
| STR4 | 4.7 | 16 | 8 |
| STR5 | 2.9 | 10 | 5 |
| STR6 | 5.6 | 19 | 10 |
| STR7 | 1.1 | 4 | 2 |
| 2.08a | 15.5 | 49 | 24 |
| 2.08b | 19.4 | 61 | 29 |
| 2.08T | 1.2 | 3 | 1 |
| 2.09 | 29.1 | 81 | 36 |
| 2.09T | 1.1 | 3 | 1 |
| 2.31 | 3.2 | 8 | 3 |
| 2.32 | 29.3 | 82 | 36 |
| 2.32b | 24.8 | 74 | 36 |
| 2.32T | 0.6 | 1 | <1 |
| 2.32Tb | 0.6 | 1 | <1 |
| 5.01 | 18.7 | 64 | 31 |
| 5.01b | 20.3 | 68 | 33 |
| **Referenced Basins** | | | |
| *SM1 | 8.8 | 20 | 10 |
| *SM2 | 4.9 | 13 | 7 |
| *SM3 | 2.1 | 7 | 3 |
| *WPR4 | 5.7 | 19 | 9 |
| *WSMA4 | 1.4 | 6 | 3 |
| *WLMA | 8.0 | 23 | 10 |
| *ON1D | 14.2 | 42 | 18 |

*Referenced from the "CBY" Study
*Referenced from the "Interior Drainage Study Update No 4"
*Referenced from the "Phase 2 (1 75 Yr)"

### Interim Condition Flow Rate Summary

| Basin/Concentration Point ID | Area (mi²) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| **Concentration Points** | | | |
| CP1 (Q = 5D1D + EX1 + STR1) | 1.1 | 217 | 114 |
| CP2a (Q = CP1 + 2.08 + 2.32T + 5.01Tb) | 1.2 | 271 | 139 |
| CP2b (Q = CP1 + 2.08 + 2.32 + 5.01) | 1.2 | 350 | 182 |
| CP2c (Q = 5.01b + 2.32b + 2.32) | 0.1 | 141 | 68 |
| RCP1 (Q = CP2c + EX1 + 02 + SVR1 + SVR2) | 1.5 | 709 | 340 |
| CP3a (Q = CP1 + 2.09 + 2.31 + 2) | 0.2 | 343 | 92 |
| CP3b (Q = CP3a + 2.08T + 2.08a + 2) | 0.2 | 317 | 115 |
| CP4 (Q = CP3 + 2.09T + STR3 + EX3a | 0.1 | 176 | 69 |
| CP5 (Q = STR4) | <0.1 | 16 | 8 |
| RCP2 (Q = WSPD + CP4 + WSMA4) | <0.1 | 156 | 48 |
| CP7 (Q = RCP2 + CP5 + STR5 + STR6 + STR7 + EX7 + EX8) | 0.1 | 331 | 179 |
| CP8 (Q = CP7 + EX9 + STR6) | 0.1 | 362 | 191 |
| CP9 (Q = CP8 + PARK) | 0.1 | 383 | 203 |
| RCP3 (Q = CP9 + 02) | 0.1 | 420 | 217 |
| RCP10 (Drainshare Comparison Point) | 1.8 | 761 | 355 |
| RCP11 (Drainshare Comparison Point) | <0.1 | 148 | 70 |
| RCP12 (Drainshare Comparison Point) | 1.3 | 751 | 358 |
| **Referenced Concentration Points** | | | |
| WD2D | <0.1 | 85 | 40 |
| RDB1 | 0.9 | 71 | 37 |
| RDB2 | 1.0 | 85 | 64 |
| PARK | <0.1 | 36 | 13 |

*Referenced from the "CBY" study
*Referenced from the "CBDT" study
*Referenced from the "Interior Drainage Study Update No 4"
*Referenced from the "Rhodes" Study
*Referenced from the "Warner 2 (10 Study"

### Prorated Flow Summary

| Basin ID | $Q_{100}$ (cfs) | Area (acres) | 100-yr Unit Flow (cfs/acre) |
|---|---|---|---|
| EX1 | 161 | 68.03 | 2.4 |
| EX2 | 139 | 58.09 | 2.4 |
| EX3b | 44 | 17.12 | 2.6 |
| EX8 | 20 | 8.31 | 2.4 |
| **SubbasIn ID** | **$Q_{100}$ (cfs)** | **Area (acres)** | **100-yr Unit Flow (cfs/acre)** |
| A1 | 67 | 28.17 | 2.4 |
| A2 | 34 | 14.25 | 2.4 |
| B | 61 | 25.61 | 2.4 |
| ***TOTAL*** | ***161*** | ***68.03*** | |
| C | 101 | 42.36 | 2.4 |
| D | 38 | 15.73 | 2.4 |
| ***TOTAL*** | ***139*** | ***58.09*** | |
| E | 13 | 5.23 | 2.6 |
| F | 31 | 11.89 | 2.6 |
| G | 10 | 4.05 | 2.4 |
| H | 8 | 3.51 | 2.4 |
| ***TOTAL*** | ***44*** | ***17.12*** | |
| L | 14 | 5.76 | 2.4 |
| M | 6 | 2.55 | 2.4 |
| ***TOTAL*** | ***20*** | ***8.31*** | |

### Interim Condition 100-Year Street Flow Summary

| Section ID | $Q_{100}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV |
|---|---|---|---|---|---|
| 1 (Q = STR4) | 16 | 2.00 | 0.41 | 4.1 | 1.7 |
| 2 (Q = STR3 + Facility P7 Bypass) | 10 | 2.00 | 0.36 | 3.8 | 1.4 |
| *3a (Q = WSPD1 – WSMC) | 9 | 2.60 | 0.42 | 4.2 | 1.8 |
| 3b (Q = STR2) | 13 | 1.00 | 0.43 | 3.0 | 1.3 |
| *4 (Q = 1.25STR1 + Facility P17 Bypass) | 6.5 | 4.00 | 0.35 | 5.2 | 1.8 |
| *5 (Q = 1.25TR1 + Facility P20 Bypass + Basin 2.32T) | 8 | 1.50 | 0.43 | 3.6 | 1.6 |
| 6 (Q = STR5) | 10 | 2.00 | 0.36 | 3.8 | 1.4 |
| *7 (Q = 1.25STR5 + Facility P27 Bypass) | 13 | 4.75 | 0.35 | 5.4 | 1.9 |
| 8 (Q = 1.25TR6 + Facility P30 Bypass) | 14 | 1.5 | 0.41 | 3.57 | 1.5 |
| *9 (Q = 1.25TR6 – 1.25TR7) | 7 | 3.44 | 0.38 | 3.59 | 1.4 |

*Modeled as a Half Street Section
*Referenced from the "Master Drainage Study Update No 4"

### Interim Condition 10-Year Street Flow Summary

| Section ID | $Q_{10}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) | DxV | Dry Lane (ft) |
|---|---|---|---|---|---|---|
| SH10 (Q = Most Conservative Shaumber Street Basin) | 8 | 1.00 | 0.37 | 2.8 | 1.0 | 15.0 |
| | | 3.24 | 0.32 | 4.2 | 1.4 | 17.5 |
| *IM10 (Q = Basin STR1) | 6 | 2.00 | 0.38 | 3.9 | 1.5 | 21.0 |
| | | 4.00 | 0.35 | 4.8 | 1.7 | 22.5 |
| SC10 (Q = Most Conservative Skye Canyon Park Street Basin) | 10 | 4.75 | 0.32 | 5.1 | 1.6 | 24.0 |

*Modeled as Half Street

### Recommended Flood Control Drop Inlet Summary

| Facility ID | Facility Description | Total/Approaching Flow (cfs) $Q_{100}$ | Facility Flow (cfs) $Q_{100}$ | Surface/Bypass Flow (cfs) $Q_{100}$ | Notes |
|---|---|---|---|---|---|
| P7 | 20.0' Type CM2 D.I. | 16 | 15 | 1 | 0.5 cfs bypass per inlet |
| P9 & P10 | 17.5' Type CM2 D.I. | 10 | 10 | 0 | |
| P16 | 47.5' Type CM2 D.I. | 6 | 6 | 0 | |
| P17 | 17.5' Type CM2 D.I. | 9 | 8 | 1 | 1 cfs bypass per inlet |
| P20 | 47.5' Type CM2 D.I. | 8 | 8 | 0 | 2 cfs bypass per inlet |
| P23 | 20.0' Type CM2 D.I. | 8 | 8 | 0 | |
| P27 | 10.0' Type CM2 D.I. | 10 | 7 | 3 | 1.5 cfs bypass per inlet |
| P30 | 10.0' Type CM2 D.I. | 13 | 8 | 5 | 2.5 cfs bypass per inlet |
| P42 | 47.5' Type CM2 D.I. | 14 | 12 | 2 | 0.5 cfs bypass per inlet |

*Note that in some areas one half of the roadway is all not be built. Therefore, the notes identify the quantity bypassed by each drop inlet

PROJECT SITE

SEE EXHIBIT E FOR EXTENTS OF OFFSITE BASINS

IRON MOUNTAIN ROAD

SKYE VILLAGE ROAD

SKYE CANYON PARK DRIVE

SHULMERIAN DRIVE

GRAND TETON DR

FUTURE MODIFIED COLLECTION BERM

INTERIM Q=729 CFS AFTER BERM IN PLACE Q=0 CFS

FUTURE Q=0 CFS AFTER BERM IN PLACE Q=0 CFS

EX1 EX2 EX3a EX3b EX7 EX8 EX9 STR1 STR2 STR3 STR4 STR5 STR6 STR7 A2 B D E F G L M 5.01 5.01b 2.32T 2.32 2.32Tb 2.32b 2.09T 2.31 2.09 2.08a 2.08b 2.08T CP1 CP2a CP2b CP2c CP3a CP3b CP4 CP5 CP6 CP7 CP8 CP9 RCP1 RCP2 RCP3 *SVR1 *SVR2 *SM1 *SM2 *SM3 *WPR4 *WSMA4 *WLMA *ON1D *WSPD0 *WSPD3 *WGRC1A *WGC3 *2.03 *2.04a *2.04b *2.05a *2.05b *2.06 *2.02 *OFF11 *OFF12 *STR1 *STR2 *STR3 *STR4 RCP10 RCP11 RCP12 RCP3 *PARK

0 CFS (76 CFS) = (106 CFS) 0 CFS

SKYE CANYON PHASE 2 INFRASTRUCTURE SHG OLY1501.001 CLV# DS4739

SKYE CANYON PARCEL 2.16 SHG OLY1607.002 CLV# DS4842

SKYE CANYON PARCEL 2.15 SHG PAR1603.000 CLV# DS4840

SKYE CANYON PARK SHG OLY1401.003 CLV# DS4707

SKYE CANYON PHASE 1 INFRASTRUCTURE SHG OLY1401.001 CLV# DS4661

SKYE CANYON PHASE 3 SMITH'S CENTER SHG OLY1403.000 CLV# DS4738

EX. 8"W P.B (QUIT 364)

Facility P17 analyzed as same for north and south half of Iron Mountain Road.


SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399


NO. | DESCRIPTION | BY | DATE | APP.

NINETY-FIVE MANAGEMENT, LLC.

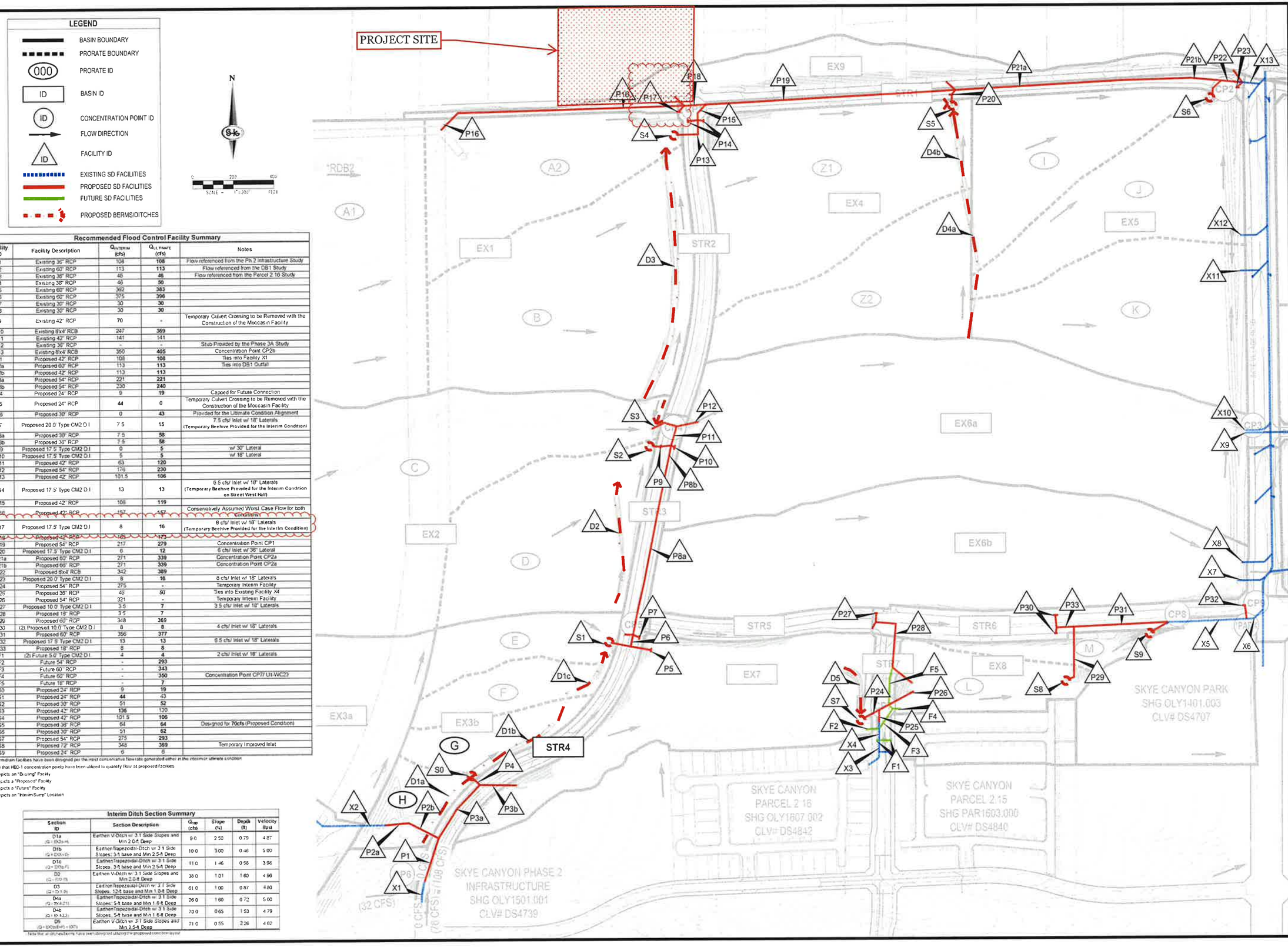
SKYE CANYON PHASE 3B, 3C INFRASTUCTURE

INTERIM CONDITION DRAINAGE MAP

DATE: SEPT 2018
DRAFTER: ETM
DESIGNER: ETM
CHECKED: LL
PROJECT NO.: OLY1609.000

**EXHIBIT F**
SHEET 1 OF 1

DS4953 TDS ADD1 MAPS- REFERENCED FOR HYDRAULIC SECTIONS AND EX. DRAINAGE FACILITIES




**Recommended Flood Control Facility Summary**

| Facility ID | Facility Description | $Q_{INTERIM}$ (cfs) | $Q_{ULTIMATE}$ (cfs) | Notes |
|---|---|---|---|---|
| X1 | Existing 36" RCP | 108 | **108** | Flow referenced from the Pin 2 Infrastructure Study |
| X2 | Existing 60" RCP | 113 | **113** | Flow referenced from the DB1 Study |
| X3 | Existing 36" RCP | 46 | **46** | Flow referenced from the Parcel 2.16 Study |
| X4 | Existing 36" RCP | 46 | **50** | |
| X5 | Existing 60" RCP | 362 | **383** | |
| X6 | Existing 60" RCP | 375 | **396** | |
| X7 | Existing 30" RCP | 30 | **30** | |
| X8 | Existing 30" RCP | 30 | **30** | |
| X9 | Existing 42" RCP | **70** | - | Temporary Culvert Crossing to be Removed with the Construction of the Moccasin Facility |
| X10 | Existing 6'x4' RCB | 247 | **369** | |
| X11 | Existing 42" RCP | 141 | **141** | |
| X12 | Existing 36" RCP | - | - | Stub Provided by the Phase 3A Study |
| X13 | Existing 6'x4' RCB | 350 | **405** | Concentration Point CP2b |
| P1 | Proposed 42" RCP | 108 | **108** | Ties into Facility X1 |
| P2a | Proposed 60" RCP | 113 | **113** | Ties into DB1 Outfall |
| P2b | Proposed 42" RCP | 113 | **113** | |
| P3a | Proposed 54" RCP | 221 | **221** | |
| P3b | Proposed 54" RCP | 230 | **240** | |
| P4 | Proposed 24" RCP | 9 | **19** | Capped for Future Connection |
| P5 | Proposed 24" RCP | **44** | 0 | Temporary Culvert Crossing to be Removed with the Construction of the Moccasin Facility |
| P6 | Proposed 30" RCP | 0 | **43** | Provided for the Ultimate Condition Alignment |
| P7 | Proposed 20.0' Type CM2 D.I | 7.5 | **15** | 7.5 cfs/ Inlet w/ 18" Laterals (Temporary Beehive Provided for the Interim Condition) |
| P8a | Proposed 30" RCP | 7.5 | **58** | |
| P8b | Proposed 36" RCP | 7.5 | **58** | |
| P9 | Proposed 17.5' Type CM2 D.I | 0 | **5** | w/ 30" Lateral |
| P10 | Proposed 17.5' Type CM2 D.I | 5 | **5** | w/ 18" Lateral |
| P11 | Proposed 42" RCP | 63 | **120** | |
| P12 | Proposed 54" RCP | 176 | **230** | |
| P13 | Proposed 42" RCP | 101.5 | **106** | |
| P14 | Proposed 17.5' Type CM2 D.I | 13 | **13** | 6.5 cfs/ Inlet w/ 18" Laterals (Temporary Beehive Provided for the Interim Condition on Street West Half) |
| P15 | Proposed 42" RCP | 108 | **119** | |
| P16 | Proposed 42" RCP | 157 | **157** | Conservatively Assumed Worst Case Flow for both Conditions |
| P17 | Proposed 17.5' Type CM2 D.I | 8 | **16** | 8 cfs/ Inlet w/ 18" Laterals (Temporary Beehive Provided for the Interim Condition) |
| P18 | Proposed 42" RCP | 105 | **173** | Concentration Point CP1 |
| P19 | Proposed 54" RCP | 217 | **279** | 6 cfs/ Inlet w/ 36" Lateral |
| P20 | Proposed 17.5' Type CM2 D.I | 6 | **12** | Concentration Point CP2a |
| P21a | Proposed 60" RCP | 271 | **339** | Concentration Point CP2a |
| P21b | Proposed 66" RCP | 271 | **339** | |
| P22 | Proposed 8'x4' RCB | 342 | **389** | 8 cfs/ Inlet w/ 18" Laterals |
| P23 | Proposed 20.0' Type CM2 D.I | 8 | **16** | Temporary Interim Facility |
| P24 | Proposed 54" RCP | 275 | - | Ties into Existing Facility X4 |
| P26 | Proposed 36" RCP | 46 | **50** | Temporary Interim Facility |
| P25 | Proposed 54" RCP | 321 | - | 3.5 cfs/ Inlet w/ 18" Laterals |
| P27 | Proposed 10.0' Type CM2 D.I | 3.5 | **7** | |
| P28 | Proposed 18" RCP | 3.5 | **7** | |
| P29 | Proposed 60" RCP | 348 | **369** | |
| P30 | (2) Proposed 10.0' Type CM2 D.I | 8 | **8** | 4 cfs/ Inlet w/ 18" Laterals |
| P31 | Proposed 60" RCP | 356 | **377** | |
| P32 | Proposed 17.5' Type CM2 D.I | 13 | **13** | 6.5 cfs/ Inlet w/ 18" Laterals |
| P33 | Proposed 18" RCP | 8 | **8** | |
| F1 | (2) Future 5.0' Type CM2 D.I | 4 | **4** | 2 cfs/ Inlet w/ 18" Laterals |
| F2 | Future 54" RCP | - | **293** | |
| F3 | Future 60" RCP | - | **343** | |
| F4 | Future 60" RCP | - | **350** | Concentration Point CP7/ UI-WC23 |
| F5 | Future 18" RCP | - | **7** | |
| S0 | Proposed 24" RCP | 9 | **19** | |
| S1 | Proposed 24" RCP | **44** | 43 | |
| S2 | Proposed 30" RCP | 51 | **52** | |
| S3 | Proposed 42" RCP | **136** | 120 | |
| S4 | Proposed 42" RCP | 101.5 | **106** | |
| S5 | Proposed 36" RCP | 54 | **64** | Designed for **70cfs** (Proposed Condition) |
| S6 | Proposed 30" RCP | 51 | **62** | |
| S7 | Proposed 54" RCP | 275 | **293** | |
| S8 | Proposed 72" RCP | 348 | **369** | Temporary Improved Inlet |
| S9 | Proposed 24" RCP | 6 | 6 | |

- Stormdrain facilities have been designed per the most conservative flowrate generated either in the interim or ultimate condition
- Note that HEC-1 concentration points have been utilized to quantify flow at proposed facilities

'X' - Depicts an "Existing" Facility
'P' - Depicts a "Proposed" Facility
'F' - Depicts a "Future" Facility
'S' - Depicts an "Interim Sump" Location

**Interim Ditch Section Summary**

| Section ID | Section Description | $Q_{cap}$ (cfs) | Slope (%) | Depth (ft) | Velocity (fps) |
|---|---|---|---|---|---|
| D1a (Q = EX2+H) | Earthen V-Ditch w/ 3:1 Side Slopes and Min 2.0-ft Deep | 9.0 | 2.50 | 0.79 | 4.87 |
| D1b (Q = EX3+G) | Earthen Trapezoidal-Ditch w/ 3:1 Side Slopes, 3-ft base and Min 2.5-ft Deep | 19.0 | 3.00 | 0.46 | 5.00 |
| D1c (Q = EX3b+F) | Earthen Trapezoidal-Ditch w/ 3:1 Side Slopes, 3-ft base and Min 2.5-ft Deep | 11.0 | 1.46 | 0.58 | 3.96 |
| D2 (Q = EX2+B) | Earthen V-Ditch w/ 3:1 Side Slopes and Min 2.0-ft Deep | 38.0 | 1.01 | 1.60 | 4.56 |
| D3 (Q = D1+B) | Earthen Trapezoidal-Ditch w/ 3:1 Side Slopes, 12-ft base and Min 1.0-ft Deep | 61.0 | 1.00 | 0.87 | 4.80 |
| D4a (Q = P4+Z1) | Earthen Trapezoidal-Ditch w/ 3:1 Side Slopes, 5-ft base and Min 1.6-ft Deep | 26.0 | 1.60 | 0.72 | 5.00 |
| D4b (Q = EX+Z1) | Earthen Trapezoidal-Ditch w/ 3:1 Side Slopes, 5-ft base and Min 1.6-ft Deep | 70.0 | 0.65 | 1.53 | 4.79 |
| D5 (Q = EX3b+F+I) | Earthen V-Ditch w/ 3:1 Side Slopes and Min 2.5-ft Deep | 71.0 | 0.55 | 2.26 | 4.62 |

Note that all ditch sections have been designed utilizing the proposed condition layout

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO. | DESCRIPTION | DATE | BY | APP. | DATE | APP.

NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON PHASE 3B, 3C INFRASTUCTURE
FACILITIES MAP

DATE: FEBRUARY 2018
DRAFTER: ETM
DESIGNER: ETM
CHECKED: LL
PROJECT NO.
OLY1609.000

**EXHIBIT H**
SHEET 1 OF 1

SEE EXHIBIT G ULTIMATE OFFSITE WEST HYDROLOGIC MAP

SEE EXHIBIT F ULTIMATE OFFSITE EAST HYDROLOGIC MAP

PROJECT SITE (HATCHED)

BASIN WPRK10 PREVIOUSLY ANALYZED PROJECT SITE. ULT Q100/10=19/7 CFS

BASIN WPRK10 ANALYZED WITH SKYE CANYON MDS. DRAINAGE PATTERNS FOR WPRK10 DRAIN NORTH.

NORTH AND SOUTH HALF OF IRON MOUNTAIN ROADWAY (WIRN2) IS COLLECTED BY EXISTING SD SYSTEM PER SKYE CANYON PHASE 3B 3C INFRASTRUCTURE (DS 4943).

787 cfs

LEGEND

- BASIN BOUNDARY (UNCHANGED BASIN)
- BASIN BOUNDARY
- MATCHLINE SEE EXHIBIT FOR MAP EXTENSION
- ID — BASIN ID
- (ID) — CONCENTRATION POINT ID
- FLOW DIRECTION
- FLOW SPLIT

NOTE:

- 5-FT TOPOGRAPHIC CONTOURS SHOWN ON EXHIBIT
- FOR BASIN BOUNDARY (UNCHANGED BASINS), REFER TO MDS UPDATE #5 FOR SUNSTONE ULTIMATE CONDITION HYDROLOGY

SCALE: 1"=600' FEET

**Ultimate Condition Flow Rate Summary Skye Canyon West Basins**

| Basin/Concentration Point ID | Area (sq. mi) | $Q_{100}$ (cfs) | $Q_{10}$ (cfs) |
|---|---|---|---|
| WARR2 | 1.1 | 4 | 1 |
| WARR3 | 3.3 | 9 | 3 |
| WARR5 | 9.0 | 18 | 8 |
| WARR6 | 2.4 | 6 | 2 |
| WGC1 | 4.8 | 17 | 7 |
| WGC2 | 8.4 | 21 | 9 |
| WGC3 | 30.4 | 95 | 47 |
| WGED1A | 29.5 | 74 | 32 |
| WGED1B | 11.9 | 33 | 17 |
| WL10A | 17.1 | 48 | 21 |
| WL10B | 18.2 | 49 | 22 |
| WL11 | 35.7 | 99 | 49 |
| WL12 | 31.4 | 84 | 38 |
| WL13A | 12.3 | 34 | 15 |
| WL13B | 11.2 | 37 | 14 |
| WL14 | 22.2 | 60 | 27 |
| WL1A | 20.0 | 62 | 28 |
| WL1B | 38.2 | 102 | 36 |
| WL2 | 19.0 | 54 | 25 |
| WL3 | 23.2 | 64 | 30 |
| WL4A | 6.9 | 23 | 10 |
| WL4B | 8.9 | 27 | 12 |
| WL5A | 10.9 | 32 | 15 |
| WL5B | 3.8 | 12 | 5 |
| WL6A | 6.2 | 19 | 9 |
| WL6B | 13.6 | 30 | 14 |
| WL7 | 11.5 | 34 | 16 |
| WL8 | 17.2 | 48 | 22 |
| WL9A | 16.2 | 48 | 22 |
| WL9B | 14.4 | 38 | 18 |
| WML1 | 20.1 | 62 | 31 |
| WML10 | 11.6 | 36 | 17 |
| WML11 | 26.7 | 81 | 38 |
| WML13 | 16.4 | 49 | 25 |
| WML14 | 19.2 | 59 | 29 |
| WML17 | 18.3 | 59 | 29 |
| WML18 | 12.0 | 36 | 18 |
| WML19 | 5.3 | 17 | 8 |
| WML20 | 18.7 | 54 | 27 |
| WML21 | 12.3 | 36 | 20 |
| WML22 | 4.5 | 16 | 8 |
| WML3 | 28.3 | 71 | 33 |
| WML5 | 20.5 | 65 | 33 |
| WML6 | 23.0 | 73 | 37 |
| WML7A | 8.1 | 28 | 14 |
| WML7B | 9.0 | 31 | 16 |
| WML9 | 16.4 | 55 | 28 |
| WML4 | 12.1 | 37 | 18 |
| WML4A | 4.8 | 17 | 9 |
| WPF1A | 20.3 | 59 | 29 |
| WPF1B | 17.4 | 58 | 31 |
| WPF5 | 0.4 | 1 | 0 |
| WPF8 | 5.6 | 11 | 4 |
| WPF9 | 1.2 | 2 | 2 |
| WPRK11 | 1.8 | 4 | 2 |
| WPRK10 | 10.0 | 19 | 7 |
| WPRK11 | 2.2 | 6 | 2 |
| WPRK12 | 0.8 | 2 | 1 |
| WPRK13 | 2.2 | 5 | 2 |
| WPRK5 | 2.0 | 5 | 2 |
| WPRK6 | 13.2 | 28 | 10 |
| WPRK7 | 3.0 | 8 | 2 |
| WPRK8 | 1.7 | 4 | 1 |
| WPRK9 | 0.5 | 1 | 0 |
| WSCH1 | 19.9 | 60 | 28 |
| WSCH2 | 12.8 | 37 | 16 |
| **WEST ROADWAY BASINS** | | | |
| WEGL1 | 3.4 | 12 | 6 |
| WEGL2 | 3.3 | 12 | 7 |
| WEGL3 | 4.8 | 16 | 8 |
| WEGN1 | 0.5 | 2 | 1 |
| WEGN2 | 2.1 | 7 | 3 |
| WEGN3 | 3.3 | 10 | 5 |
| WGRC1A | 1.3 | 4 | 2 |
| WGRC1B | 3.2 | 10 | 5 |
| WGRC2 | 2.6 | 8 | 4 |
| WGRT1 | 11.3 | 30 | 16 |
| WRN1 | 0.6 | 2 | 1 |
| WRN2 | 2.5 | 7 | 3 |
| WRN3 | 1.3 | 5 | 2 |
| WRN4 | 2.7 | 9 | 3 |
| WRN5 | 0.7 | 3 | 1 |
| WMTL1 | 1.3 | 5 | 2 |
| WSSD1 | 2.1 | 8 | 4 |
| WSCP2 | 3.0 | 11 | 6 |
| WSCP3 | 3.5 | 13 | 7 |
| WSCP4 | 7.8 | 25 | 14 |
| WSHA1 | 2.4 | 9 | 4 |
| WSHA2 | 1.5 | 6 | 3 |
| WSHA3B | 1.6 | 6 | 3 |
| WSHA4 | 1.4 | 6 | 3 |
| WSHA5 | 2.4 | 8 | 5 |
| WSHP1 | 8.4 | 19 | 9 |
| WSHP2 | 9.3 | 27 | 13 |
| WSHP3 | 10.4 | 28 | 13 |
| WSKV1A | 1.2 | 4 | 2 |
| WSKV1B | 2.3 | 11 | 6 |
| WSKV2 | 2.0 | 7 | 3 |
| WSKV3 | 4.2 | 14 | 7 |
| WSKV4 | 4.5 | 15 | 8 |
| WSPD1 | 0.7 | 3 | 1 |
| WSPD2 | 2.1 | 7 | 4 |
| WSPD3 | 0.8 | 3 | 2 |
| WSPD4 | 2.3 | 8 | 4 |
| WU599 | 9.0 | 26 | 15 |

**Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points**

| Basin/Concentration Point ID | Area (sq. mi) | $Q_{100}$ (cfs) |
|---|---|---|
| WC1 | 0.02 | 37 |
| WC2 | 0.03 | 68 |
| WC3 | 0.08 | 106 |
| WC4 | 0.06 | 155 |
| WC5 | 0.08 | 142 |
| WC6 | 0.04 | 82 |
| WC7 | 0.10 | 180 |
| WC8 | 0.02 | 34 |
| WC9 | 0.17 | 316 |
| WC10 | 0.03 | 63 |
| WC109 | 0.05 | 99 |
| WC11 | 0.07 | 127 |
| WC12 | 0.12 | 226 |
| WC13 | 0.14 | 302 |
| WC14 | 0.05 | 445 |
| WC23 | 0.03 | 46 |
| WC15 | 0.04 | 105 |
| WC16 | 0.39 | 695 |
| WC18 | 0.43 | 727 |
| WC19 | 0.06 | 83 |
| WC20 | 0.04 | 90 |
| WC21 | 0.06 | 124 |
| WC22 | 1.00 | 247 |
| WC23 | 1.02 | 287 |
| WC24 | 1.04 | 326 |
| WC25 | 1.09 | 404 |
| WC27 | 1.09 | 411 |
| WC28 | 0.07 | 127 |
| WC29 | 0.03 | 80 |
| WC30 | 0.06 | 108 |
| WC31 | 0.14 | 264 |
| WC32 | 0.27 | 523 |
| WC33 | 1.36 | 919 |
| WC34 | 1.41 | 990 |
| WC35 | 0.82 | 539 |
| WC36 | 0.43 | 157 |
| WC40 | 0.06 | 101 |
| WC41 | 0.72 | 341 |
| WC42 | 0.75 | 419 |
| WC43 | 2.17 | 1338 |
| WC44A | 2.17 | 1310 |
| WC44B | 4.02 | 1983 |
| WC44C | 0.18 | 227 |

**Ultimate Condition Flow Rate Summary Skye Canyon Offsite Concentration Points**

| Basin/Concentration Point ID | Area (sq. mi) | $Q_{100}$ (cfs) |
|---|---|---|
| **WEST CONCENTRATION POINTS** | | |
| EC95 | 2.19 | 584 |
| EP100 | 0.50 | 471 |
| EP200 | 0.17 | 204 |
| EP2A | 1.14 | 462 |
| EP2B | 0.31 | 173 |
| EP3 | 0.51 | 917 |
| EW1C | 0.56 | 764 |
| EW2 | 1.70 | 1654 |
| EW3 | 2.19 | 1978 |
| EW2N2 | 2.36 | 1096 |
| EW3SC | 2.69 | 1201 |
| EW4NB | 0.47 | 645 |
| EW5NW | 0.24 | 354 |
| EW5SW | 0.54 | 66 |
| EW2NB | 0.52 | 990 |
| EW4SB | 0.51 | 19 |
| EW5NE | 0.72 | 606 |
| EW5SE | 1.52 | 910 |
| EB1 | 0.88 | 791 |
| EW1 | 0.68 | 73 |
| EB2 | 0.57 | 667 |
| EB2 | 0.57 | 70 |
| **EAST CONCENTRATION POINTS** | | |
| EC27 | 6.34 | 3258 |
| EC28 | 6.48 | 3349 |
| **USGS CONCENTRATION POINTS** | | |
| CHC04B | 0.06 | 107 |
| CHC05 | 0.15 | 209 |
| CHC06 | 0.34 | 610 |
| CHC07B | 0.35 | 620 |
| CHC10B2 | 0.30 | 488 |
| CHC4B | 0.02 | 47 |
| CHC4U | 1.52 | 1746 |
| SB1Tot | 1.52 | 2281 |

**Ultimate Condition Flow Rate Summary Offsite Basins**

| Basin/Concentration Point ID | Area (sq. mi) | $Q_{100}$ (cfs) |
|---|---|---|
| **WEST BASINS** | | |
| CENGCA | 0.1 | 152 |
| ES1 | 0.0 | 20 |
| ES2 | 0.1 | 85 |
| NW1-C | 0.3 | 302 |
| NW7-C | 0.5 | 512 |
| NW21-C | 0.2 | 190 |
| NW29-C | 0.1 | 200 |
| NW35-C | 0.3 | 428 |
| NW71-E | 0.2 | 259 |
| NW71-W | 0.1 | 156 |
| OFF4-1 | 0.3 | 273 |
| OFF4-2 | 0.4 | 541 |
| OFF5-1 | 0.3 | 336 |
| OFF5-2 | 0.4 | 493 |
| OFF14 | 0.0 | 26 |
| OFF15 | 0.0 | 62 |
| OFF17A | 0.0 | 51 |
| OFF17B | 0.0 | 15 |
| OFF21B | 0.0 | 75 |
| OFF23 | 0.0 | 17 |
| OFFU | 0.0 | 74 |
| OFFW | 0.0 | 22 |
| OFFZ | 0.1 | 39 |
| WOFF1 | 0.4 | 403 |
| WOFF10 | 0.3 | 292 |
| WOFF11 | 0.0 | 55 |
| WOFF2 | 0.0 | 48 |
| WOFF3 | 0.0 | 38 |
| WOFF4 | 0.1 | 84 |
| WOFF5 | 0.3 | 236 |
| WOFF6 | 0.0 | 59 |
| WOFF7 | 0.0 | 10 |
| WOFF8 | 0.2 | 198 |
| WOFF9 | 0.1 | 144 |
| **US95 BASINS** | | |
| 95-4A | 0.0 | 14 |
| 95-4B | 0.0 | 15 |
| 95-5A | 0.0 | 12 |
| 95-5B | 0.0 | 11 |
| 95-6A | 0.0 | 19 |
| 95-6B | 0.0 | 12 |
| 95-7A | 0.0 | 14 |
| 95-7B | 0.0 | 16 |
| 95-8A | 0.0 | 11 |
| 95-8B | <0.01 | 7 |
| 95-9A | 0.0 | 21 |
| 95-9B | 0.0 | 22 |
| **EAST BASINS** | | |
| NW102-C | 0.2 | 269 |
| NW157 | 0.3 | 92 |

**Ultimate Condition Flow Rate Summary Skye Canyon East Concentration Points**

| Basin/Concentration Point ID | Area (sq. mi) | $Q_{100}$ (cfs) |
|---|---|---|
| EC1 | 4.97 | 7038 |
| EC2 | 5.20 | 7310 |
| EC3A | 0.22 | 292 |
| EC3 | 5.24 | 7450 |
| EC4 | 5.31 | 7440 |
| EC5 | 5.42 | 7602 |
| EC8 | 5.45 | 7624 |
| EC8A | 0.05 | 50 |
| EC8B | 0.10 | 108 |
| EC8C | 0.04 | 67 |
| EC8D | 0.06 | 69 |
| EC10 | 0.09 | 133 |
| EC11 | 0.11 | 97 |
| EC13 | 0.11 | 138 |
| EC14 | 0.17 | 232 |
| EC15 | 0.20 | 267 |
| EC16 | 0.24 | 287 |
| EC17 | 5.85 | 7842 |
| EC18 | 5.79 | 7793 |
| EC19 | 0.05 | 50 |
| EC20 | 0.17 | 167 |
| EC21A | 5.96 | 7804 |
| EC21B | 0.20 | 212 |
| EC21 | 6.13 | 8071 |
| EC22 | 0.05 | 56 |
| EC23 | 0.10 | 156 |
| EC24 | 0.04 | 63 |
| EC25 | 0.13 | 236 |
| EC26 | 0.18 | 180 |
| EC27 | 6.39 | 3233 |
| EC28 | 6.50 | 3349 |


Westwood
Phone (702) 284-5300
Fax (702) 284-5399
5740 S. Arville Street
Suite 216
Las Vegas, NV 89118
westwoodps.com
Westwood Professional Services, Inc.


| NO. | DESCRIPTION | DATE | BY | APP'D | DATE |
|---|---|---|---|---|---|
| | | | | | |

CITY OF LAS VEGAS

CENTURY COMMUNITIES

SKYE CANYON MASTER DRAINAGE STUDY

ULTIMATE CONDITION ONSITE DRAINAGE MAP

DATE: DEC 2019
DRAFTER: AA
DESIGNER: AA
CHECKED: LHL

PROJECT NO.
CEN1908.000

EXHIBIT E
SHEET 1 OF 1

DS5229 MDS UP6 MAPS - REFERENCED FOR CONCEPTUAL ULTIMATE DRAINAGE PATTERNS

Referenced Hydraulics

REFERENCED FROM TDS

# Curb Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

| | |
|---|---|
| Project Name & Number: | SKYE CANYON INFRASTRUCTURE PHASE 3B, 3C |
| Date: | 2/6/2018 |
| By: | ETM |

| | | |
|---|---|---|
| Notes: | | |
| Facility ID: | P17 | |
| Drainage Condition: | Interim | |
| Source of Flow: | Q100 = Basin WIRN1 + WIRN2 (Referenced from the MDS Study) | |
| Inlet Type: | Type CM2 (Continuous Grade) | |
| Inlet Length: | 17.5-ft | |
| Number of Grates | 6 | |
| | | |
| Input: | Variable: | Input: |
| Street Flow (cfs) | Q | 9.0 |
| Longitudinal Slope (ft/ft) | $S_o$ | 0.0200 |
| Manning's Coefficient | n | 0.016 |
| Street Flow Velocity (fps) | V | 4.19 |
| Street Flow Depth (ft) | D | 0.42 |
| Street Cross Slope (ft/ft) | $S_x$ | 0.02 |
| Grate Width (ft) | W | 1.5 |
| Grate Depression (in) | $D_g$ | 2.0 |
| Length of Grate (ft) | $L_g$ | 15.0 |
| Length of Curb Opening (ft) | $L_c$ | 17.50 |
| Clogging Factor - Grate (%) | $CF_g$ | 50% |
| Clogging Factor - Curb (%) | $CF_c$ | 50% |
| Effective Grate Length (ft) | $L_{ge}$ | 7.5 |
| Effective Curb Opening Length (ft) | $L_{ce}$ | 8.75 |
| | | |
| Output (Grate): | Equation: | Output (Grate): |
| [1] $R_f$ - Frontal Flow Factor | 1-0.09*(V-$V_x$) if V>$V_x$; else Frontal Flow Factor=1 | 1.00 |
| [2] $V_o$ - Splash Over Velocity (fps) | $V_x$=p+q*Lg-r*$L_{ge}$^2+sy*$L_{ge}$^3 ; where | 26.27 |
| | p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate) | |
| [1] E - Grate Flow Ratio | Frontal Flow/Side Flow | 0.29 |
| [2] $Q_w$ - Frontal Flow (cfs) | $Q_w = Q[1-(1-(W/T))^{2.67}]$ | 2.57 |
| [1] $Q_s$ - Side Flow (cfs) | $Q_s$ = Q-Qw | 6.4 |
| T - Side Flow Spread (ft) | $(D-D_g)/S_x$ | 12.67 |
| [1] $R_s$ - Side Flow Factor | $1/(1+(0.15*V^{1.8})/(S_x*L_{ge}^{2.3}))$ | 0.51 |
| [1] $Q_{gi}$ - Intercepted Flow (cfs) | $(R_f*E+R_s*(1-E))*Q$ | 5.9 |
| | | |
| Output (Curb): | Equation: | Output (Curb): |
| [1] $S_e$ - Equivalent Cross Slope (ft/ft) | $S_x+S_g*E$ | 0.052 |
| $Q_{sx}$ - Remaining Flow After Grate Interception (cfs) | Q-$Q_{gi}$ | 3.149 |
| $S_g$ - Gutter Cross Slope (ft/ft) | $D_g/W$ | 0.111 |
| [1] $L_t$ - Effective Interception Length (ft) | $0.60*Q_{sx}^{0.42}*S_o^{0.30}*(1/n*S_e)^{0.6}$ | 21.23 |
| [1] $Q_{ci}$ - Intercepted Flow (cfs) | $(1-(1-L_{ce}/L_t)^{1.8})*Q_{sx}$ | 1.9 |
| | or $Q_{sx}$ if $L_t$ is less than $L_{ce}$ | |
| | | |
| Output (Combination): | Equation: | Output (Combination): |
| Total Intercepted Flow (cfs) | Intercepted (Grate) + Intercepted (Curb) | 7.8 |
| | | |
| Bypass Flow (cfs) | Street Flow - Total Intercepted Flow | 1.2 |

[1] Formula referenced from the CCRFCD Manual

[2] Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

REFERENCED FROM TDS

# Grate Inlet Sizing Computation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

| | |
|---|---|
| Project Name & Number: | Skye Canyon Infrastructure Phase 3B, 3C |
| Date: | 2/7/2018 10:22 |
| By: | ETM |

**Notes:**

| | |
|---|---|
| Facility ID: | P17 |
| Drainage Condition: | Interim Condition |
| Source of Flow: | Q100= WIRN1 + WIRN2 (Referenced from the Master Study) |
| Inlet Type: | Beehive |
| Inlet Size: | 2-ft Diameter |

**Known Information:**

| | | |
|---|---|---|
| Q = | Flow (cfs) | 8.0 |
| W = | Width of Grate (ft) | |
| L = | Length of Grate (ft) | |
| D = | Diameter of Circle (in) | 24.00 |
| Cf = | Clogging Factor (%) | 50 |

**Weir Conditions:**

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

| | | |
|---|---|---|
| Cw = | Weir Coefficient | 3.30 |
| P = | Perimeter of grate (ft) | 6.3 |
| Pc = | Perimeter (w/clogging) (ft) | 3.1 |
| HW = | Headwater depth (ft) | 0.84 |

**Orifice Conditions:**

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

| | | |
|---|---|---|
| Co = | Orifice Coefficient | 0.67 |
| Ag = | Grate Area ($ft^2$) | 3.14 |
| Gf = | Grate Opening Factor | 0.67 |
| Ac = | Grate Open Area (w/ clogging) ($ft^2$) | 1.05 |
| g = | Gravity (fps) | 32.20 |
| HW = | Headwater depth (ft) | 2.00 |

**Output:**

**Worst Case Scenario Occurs Under Orifice Conditions**

**Headwater Depth = 2.00 ft with Circ Grate**

## STORM SEWER HYDRAUILIC CALCULATIONS

| CONDUIT DATA | | | | | | FLOW DATA | | | | | | | LOSS | HGL | | COMMENTS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STATION | | SIZE / TYPE | INVERTS | | LENGTH | A | R | Φ | Q | V | $H_V = V^2/2g$ | $S_f$ | PIPE | PIPE | | PRESS. FLOW? | OTHER |
| FROM | TO | | D / S ELEV. | U / S ELEV. | | ($FT^2$) | (FT) | | (CFS) | (FPS) | (FT) | (FT/FT) | $H_f$ (FT) | D/S HGL ELEV. | U/S HGL ELEV. | | |
| 1000 | 1044.42 | Round 18" RCP | 2961.17 | 2968.09 | 44.42 | 1.767146 | 0.375 | 0.004925 | 7.5 | 4.244132 | 0.2797 | 0.00507704 | 0.226 | 2969.29 | 2969.516 | No | Facility P7 |
| 1000 | 1034.69 | Round 18" RCP | 2961.17 | 2965.22 | 34.69 | 1.767146 | 0.375 | 0.004925 | 7.5 | 4.244132 | 0.2797 | 0.00507704 | 0.176 | 2969.29 | 2969.466 | Yes | Future Facility P7 |
| 1000 | 1019.58 | Round 18" RCP | 2247.02 | 2248.91 | 19.58 | 1.767146 | 0.375 | 0.004925 | 5 | 2.829421 | 0.124311 | 0.002256462 | 0.044 | 2951.58 | 2951.624 | Yes | Facility P10 |
| 1000 | 1048.73 | Round 18" RCP | 2927.29 | 2931.13 | 48.73 | 1.767146 | 0.375 | 0.004925 | 6.5 | 3.678248 | 0.210085 | 0.003813421 | 0.186 | 2931.36 | 2931.546 | No | Facility P14A |
| 1000 | 1028.89 | Round 18" RCP | 2927.29 | 2931.8 | 28.89 | 1.767146 | 0.375 | 0.004925 | 6.5 | 3.678248 | 0.210085 | 0.003813421 | 0.110 | 2931.36 | 2931.470 | No | Facility P14B |
| 1000 | 1043.84 | Round 18" RCP | 2927.64 | 2930.93 | 43.84 | 1.767146 | 0.375 | 0.004925 | 4 | 2.263537 | 0.079559 | 0.001444136 | 0.063 | 2934.60 | 2934.663 | Yes | Facility P17 |
| 1000 | 1065.06 | Round 18" RCP | 2927.64 | 2932.52 | 65.06 | 1.767146 | 0.375 | 0.004925 | 4 | 2.263537 | 0.079559 | 0.001444136 | 0.094 | 2934.60 | 2934.694 | Yes | Future Facility P17 |
| 1000 | 1065.05 | Round 18" RCP | 2879.77 | 2883.02 | 65.05 | 1.767146 | 0.375 | 0.004925 | 5.5 | 3.112363 | 0.150416 | 0.002730319 | 0.178 | 2880.25 | 2880.428 | No | Future Facility P20 |
| 1000 | 1037.1 | Round 18" RCP | 2834.14 | 2836.2 | 37.1 | 1.767146 | 0.375 | 0.004925 | 8 | 4.527074 | 0.318236 | 0.005776543 | 0.214 | 2838.34 | 2838.554 | Yes | Facility P23 |
| 1000 | 1079.46 | Round 18" RCP | 2834.14 | 2836.2 | 79.46 | 1.767146 | 0.375 | 0.004925 | 8 | 4.527074 | 0.318236 | 0.005776543 | 0.459 | 2838.34 | 2838.799 | Yes | Future Facility P23 |
| 1000 | 1038.16 | Round 18" RCP | 2920.15 | 2921.3 | 38.16 | 1.767146 | 0.375 | 0.004925 | 3.5 | 1.980595 | 0.060912 | 0.001105666 | 0.042 | 2920.60 | 2920.642 | No | Future Facility P27 |
| 1000 | 1028.89 | Round 18" RCP | 2887.99 | 2888.3 | 28.89 | 1.767146 | 0.375 | 0.004925 | 4 | 2.263537 | 0.079559 | 0.001444136 | 0.042 | 2989.80 | 2989.842 | Yes | Facility P30 |
| 1000 | 1067.38 | Round 18" RCP | 2842.49 | 2848.09 | 67.38 | | | | 5 | 3.678248 | 0.210085 | 0.003813421 | 0.257 | 2849.37 | 2849.627 | Yes | Facility P32 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Q = 8 cfs for Facility P17, the 4 cfs is a typeo

REFERENCED FROM TDS

$Sf = \Phi Hv / R^{1.33}$

$\Phi = 2g (n^2) / 2.21$

1 - Where pipes are not under pressure, assume U/S HGL is at top of pipe

FROM UP2 STUDY

## Ultimate Condition WSPG Summary
### Mainline in Iron Mountain Road along Northern Boundary of Project Site

| WSPGW Station | Invert Elevation (ft) | Equivalent Roadway Station | Improvement Plan Sheet | Storm Drain Dimension | $Q_{100}$ (cfs) | WSE (ft) | Velocity (ft/s)[1] | FG Elevation | HGL Check[2] |
|---|---|---|---|---|---|---|---|---|---|
| 940.69 | 2824.89 | N/A | PP-08 | 7' x 5' RCB | 426 | 2835.80 | 12.17 | N/A | N/A |
| 951.69 | 2825.59 | N/A | PP-08 | 7' x 5' RCB | 426 | 2835.88 | 12.17 | 2839.55 | OK |
| 1020.93 | 2830.16 | 79+10.78 | PP-08 | 7' x 5' RCB | 426 | 2836.78 | 12.17 | 2839.55 | OK |
| 1034.93 | 2830.23 | 79+24.78 | PP-08 | 7' x 5' RCB | 426 | 2836.87 | 12.17 | 2839.55 | OK |
| 1117.78 | 2830.63 | 80+07.63 | PP-08 | 7' x 5' RCB | 410 | 2837.73 | 11.71 | 2840.64 | OK |
| 1129.79 | 2830.64 | 81+11.79 | PP-08 | 7' x 5' RCB | 360 | 2838.45 | 10.29 | 2841.05 | OK |
| 1233.34 | 2832.39 | 81+23.88 | PP-08 | 7' x 5' RCB | 360 | 2834.52 | 24.19 | 2842.63 | OK |
| 1241.34 | 2832.60 | 81+31.79 | PP-08 | TRANS STRCT | 360 | 2836.12 | 22.44 | 2842.76 | OK |
| 1435.26 | 2833.78 | 83+26.07 | PP-07 | 66" RCP | 360 | 2836.63 | 28.95 | 2848.02 | OK |
| 1435.26 | 2834.28 | 83+26.07 | PP-07 | 60" RCP | 360 | 2837.39 | 28.10 | 2848.02 | OK |
| 1773.92 | 2847.18 | 86+65.17 | PP-07 | 60" RCP | 360 | 2850.28 | 28.19 | 2859.32 | OK |
| 2113.01 | 2860.30 | 90+04.25 | PP-06 | 60" RCP | 360 | 2863.43 | 27.85 | 2872.80 | OK |
| 2313.01 | 2868.30 | 92+04.25 | PP-06 | 60" RCP | 360 | 2871.56 | 26.57 | 2880.81 | OK |
| 2524.64 | 2876.27 | 94+15.89 | PP-05 | 60" RCP | 360 | 2879.81 | 24.19 | 2889.29 | OK |
| 2524.64 | 2876.77 | 98+15.89 | PP-05 | 54" RCP | 300 | 2879.71 | 27.21 | 2889.29 | OK |
| 2924.64 | 2892.75 | 98+15.89 | PP-05 | 54" RCP | 300 | 2895.73 | 26.88 | 2905.31 | OK |
| 3184.64 | 2903.15 | 100+75.89 | PP-04 | 54" RCP | 300 | 2906.25 | 25.67 | 2915.72 | OK |
| 3468.17 | 2914.35 | 103+59.42 | PP-04 | 54" RCP | 300 | 2918.25 | 20.49 | 2926.95 | OK |
| 3761.67 | 2920.88 | 106+42.59 | PP-03 | 54" RCP | 300 | 2925.27 | 18.99 | 2934.55 | OK |
| 3761.67 | 2921.88 | 106+42.59 | PP-03 | 54" RCP | 173 | 2929.33 | 17.98 | 2934.55 | OK |
| 3855.40 | 2925.64 | 107+46.33 | PP-03 | 54" RCP | 173 | 2932.35 | 17.98 | 2936.30 | OK |
| 3855.40 | 2925.64 | 107+46.33 | PP-03 | 42" C900 | 157 | 2933.96 | 16.32 | 2936.30 | OK |
| 4250.98 | 2932.49 | 111+41.91 | PP-02 | 42" RCP | 157 | 2943.80 | 16.32 | 2951.57 | OK |
| 4515.40 | 2937.07 | 114+06.33 | PP-02 | 42" RCP | 157 | 2950.44 | 16.32 | 2966.05 | OK |
| 4630.98 | 2939.07 | 115+21.91 | PP-02 | 42" RCP | 157 | 2953.47 | 16.32 | 2971.36 | OK |
| 4961.97 | 2964.23 | 118+52.90 | PP-01 | 42" RCP | 157 | 2966.30 | 25.34 | 2985.10 | OK |
| 5077.69 | 2973.02 | 119+36.99 | PP-01 | 42" RCP | 157 | 2979.77 | 8.00 | 2988.57 | OK |
| 5237.69 | 2973.79 | 119+36.99 | PP-01 | 60" RCP | 157 | 2980.36 | 8.00 | 2988.57 | OK |
| 5237.69 | 2973.79 | 120+96.99 | PP-01 | 60" RCP | 157 | 2980.36 | 8.00 | 2991.00 | OK |

HIGHLIGHTED DENOTES REFERENCED HGL FOR DROP INLETS PROPOSED IN IRON MOUNTAIN ROAD

```
T1 SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C
T2 BY OLYMPIA COMPANIES
T3 IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDITION)
SO    940.6902824.890  1      .013                2835.800
R     951.6902825.590  1      .013
R    1020.9302830.160  1      .013                                    77.922    .000 0
JX   1034.9302830.230  1      .013    0.00          2830.230         00.0
JX   1117.7802830.630  1 24 18.013    8.0      8.0  2830.64 2834.14  45.0 45.0
JX   1129.7902830.640  1 30   .013   50.00          2834.480         45.0
R    1233.3402832.390  1      .013
TS   1241.3402832.600 66      .013
R    1435.2602833.780 66      .013
JX   1435.2602834.280 60      .013    0.00          2833.870         00.0
R    1773.9202847.180 60      .013                                          8.00 1
R    2113.0102860.300 60      .013                                         00.00 1
R    2313.0102868.300 60      .013                                         00.00 1
R    2524.6402876.270 60      .013                                         00.00 1
JX   2524.6402876.770 54 18 36.013    6.0     54.0  2879.77 2878.27  45.0 45.0
R    2924.6402892.750 54      .013                                         00.00 1
R    3184.6402903.150 54      .013                                         00.00 1
R    3468.1702914.350 54      .013                                         00.00 1
R    3761.6702920.880 54      .013                                         00.00 1
JX   3761.6702921.880 42 48   .013  127.00          2921.880         44.0
R    3855.4002925.640 42      .013                                         00.00 1
JX   3855.4002925.640 42 18 18.013    8.0      8.0  2927.64 2927.64  45.0 45.0
R    4250.9802932.490 42      .013                                         00.00 1
R    4515.4002937.070 42      .013                                         00.00 1
R    4630.9802939.070 42      .013                                         00.00 1
R    4961.9502964.228 42      .013                                         15.00 1
R    4961.9602964.229 42      .013                                         15.00
R    4961.9702964.230 42      .013                                         15.00
R    5077.6862973.016 42      .013
JX   5077.6872973.017 60      .013    0.00          2973.020         00.0
R    5077.6882973.018 60      .013                                         15.00
R    5077.6892973.019 60      .013                                         15.00
R    5077.6902973.020 60      .013                                         15.00
R    5237.6902973.790 60      .013
SH   5237.6902973.790 60      .013                      2980.540
CD  18  4   1    .000   1.500     .000  .000  .000   .00
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  30  4   1    .000   2.500     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
CD  42  4   1    .000   3.500     .000  .000  .000   .00
CD  48  4   1    .000   4.000     .000  .000  .000   .00
CD  54  4   1    .000   4.500     .000  .000  .000   .00
CD  60  4   1    .000   5.000     .000  .000  .000   .00
CD  66  4   1    .000   5.500     .000  .000  .000   .00
CD  72  4   1    .000   6.000     .000  .000  .000   .00
CD   1  3   0    .000   5.000    7.000  .000  .000   .00
Q           157.000   .0
```

STA 4515.400: NUISANCE FLOW COLLECTED AT DI

FILE: UIRM1UP.WSW W S P G W - EDIT LISTING - Version 14.10 Date: 3- 9-2020 Time:11:11:25

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

| CARD CODE | SECT NO | CHN TYPE | NO OF PIER/PIP | AVE PIER WIDTH | HEIGHT 1 DIAMETER | BASE WIDTH | ZL | ZR | INV DROP | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD | 18 | 4 | 1 | | 1.500 | | | | | | | | | | | | | | |
| CD | 24 | 4 | 1 | | 2.000 | | | | | | | | | | | | | | |
| CD | 30 | 4 | 1 | | 2.500 | | | | | | | | | | | | | | |
| CD | 36 | 4 | 1 | | 3.000 | | | | | | | | | | | | | | |
| CD | 42 | 4 | 1 | | 3.500 | | | | | | | | | | | | | | |
| CD | 48 | 4 | 1 | | 4.000 | | | | | | | | | | | | | | |
| CD | 54 | 4 | 1 | | 4.500 | | | | | | | | | | | | | | |
| CD | 60 | 4 | 1 | | 5.000 | | | | | | | | | | | | | | |
| CD | 66 | 4 | 1 | | 5.500 | | | | | | | | | | | | | | |
| CD | 72 | 4 | 1 | | 6.000 | | | | | | | | | | | | | | |
| CD | 1 | 3 | 0 | .000 | 5.000 | 7.000 | .000 | .000 | .00 | | | | | | | | | | |

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDITION

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 940.690 | 2824.890 | 1 | 2835.800 |

ELEMENT NO 2 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 951.690 | 2825.590 | 1 | .013 | .000 | .000 | .000 | 0 |

ELEMENT NO 3 IS A REACH * * *

| U/S DATA | STATION | INVERT | SECT | N | RADIUS | ANGLE | ANG PT | MAN H |
|---|---|---|---|---|---|---|---|---|
| | 1020.930 | 2830.160 | 1 | .013 | 50.912 | 77.922 | .000 | 0 |

ELEMENT NO 4 IS A JUNCTION * * * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1034.930 | 2830.230 | 1 | 0 | 0 | .013 | .000 | .000 | 2830.230 | .000 | .000 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 5 IS A JUNCTION * * * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1117.780 | 2830.630 | 1 | 24 | 18 | .013 | 8.000 | 8.000 | 2830.640 | 2834.140 | 45.000 | 45.000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 6 IS A JUNCTION * * * * * * *

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1129.790 | 2830.640 | 1 | 30 | 0 | .013 | 50.000 | .000 | 2834.480 | .000 | 45.000 | .000 |

| RADIUS | ANGLE |
|---|---|
| .000 | .000 |

ELEMENT NO 7 IS A REACH * * *

```
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           1233.340 2832.390    1              .013                         .000     .000      .000     0
ELEMENT NO   8 IS A TRANSITION        *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS   ANGLE
                           1241.340 2832.600   66              .013                         .000     .000
                                              W S P G W                                                      PAGE NO   3
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO   9 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           1435.260 2833.780   66              .013                         .000     .000      .000     0
ELEMENT NO  10 IS A JUNCTION           *         *     *     *               *                *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           1435.260 2834.280   60     0     0   .013      .000      .000 2833.870       .000    .000     .000
                                                                                        RADIUS    ANGLE
                                                                                          .000    .000
ELEMENT NO  11 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           1773.920 2847.180   60              .013                         .000     .000     8.000     1
ELEMENT NO  12 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           2113.010 2860.300   60              .013                         .000     .000      .000     1
ELEMENT NO  13 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           2313.010 2868.300   60              .013                         .000     .000      .000     1
ELEMENT NO  14 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           2524.640 2876.270   60              .013                         .000     .000      .000     1
ELEMENT NO  15 IS A JUNCTION           *         *     *     *               *                *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           2524.640 2876.770   54    18    36   .013     6.000    54.000 2879.770 2878.270  45.000  45.000
                                                                                        RADIUS    ANGLE
                                                                                          .000    .000
ELEMENT NO  16 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           2924.640 2892.750   54              .013                         .000     .000      .000     1
ELEMENT NO  17 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           3184.640 2903.150   54              .013                         .000     .000      .000     1
ELEMENT NO  18 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           3468.170 2914.350   54              .013                         .000     .000      .000     1
                                              W S P G W                                                      PAGE NO   4
                      WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  19 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT              N                        RADIUS    ANGLE     ANG PT  MAN H
                           3761.670 2920.880   54              .013                         .000     .000      .000     1
ELEMENT NO  20 IS A JUNCTION           *         *     *     *               *                *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           3761.670 2921.880   42    48     0   .013   127.000      .000 2921.880       .000  44.000     .000
                                                                                        RADIUS    ANGLE
                                                                                          .000    .000
```

```
 ELEMENT NO  21 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             3855.400 2925.640   42              .013                           .000     .000      .000     1
 ELEMENT NO  22 IS A JUNCTION         *         *     *     *              *                    *                 *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                             3855.400 2925.640   42    18    18   .013     8.000     8.000  2927.640  2927.640  45.000   45.000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
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  23 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4250.980 2932.490   42              .013                           .000     .000      .000     1
 ELEMENT NO  24 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4515.400 2937.070   42              .013                           .000     .000      .000     1
 ELEMENT NO  25 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4630.980 2939.070   42              .013                           .000     .000      .000     1
 ELEMENT NO  26 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4961.950 2964.228   42              .013                           .000     .000    15.000     1
 ELEMENT NO  27 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4961.960 2964.229   42              .013                           .000     .000    15.000     0
                                                 W S P G W                                                      PAGE NO   5
                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO  28 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             4961.970 2964.230   42              .013                           .000     .000    15.000     0
 ELEMENT NO  29 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             5077.686 2973.016   42              .013                           .000     .000      .000     0
 ELEMENT NO  30 IS A JUNCTION         *         *     *     *              *                    *                 *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                             5077.687 2973.017   60     0     0   .013      .000      .000  2973.020      .000    .000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
 ELEMENT NO  31 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             5077.688 2973.018   60              .013                           .000     .000    15.000     0
 ELEMENT NO  32 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             5077.689 2973.019   60              .013                           .000     .000    15.000     0
 ELEMENT NO  33 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             5077.690 2973.020   60              .013                           .000     .000    15.000     0
 ELEMENT NO  34 IS A REACH            *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                          RADIUS    ANGLE     ANG PT  MAN H
                             5237.690 2973.790   60              .013                           .000     .000      .000     0
 ELEMENT NO  35 IS A SYSTEM HEADWORKS                 *                    *
```

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|---|---|---|---|---|
| | 5237.690 | 2973.790 | 60 | 2980.540 |

Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3- 9-2020 Time:11:11:29

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C
BY OLYMPIA COMPANIES
IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/ Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 940.690 | 2824.890 | 10.910 | 2835.800 | 426.00 | 12.17 | 2.30 | 2838.10 | .00 | 4.86 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| 11.000 | .0637 | | | | | .0069 | .08 | 10.91 | .96 | 1.86 | .013 | .00 | .00 | BOX |
| 951.690 | 2825.590 | 10.285 | 2835.875 | 426.00 | 12.17 | 2.30 | 2838.18 | .00 | 4.86 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| 69.240 | .0660 | | | | | .0069 | .47 | .00 | .96 | 1.83 | .013 | .00 | .00 | BOX |
| 1020.930 | 2830.160 | 6.618 | 2836.778 | 426.00 | 12.17 | 2.30 | 2839.08 | .00 | 4.86 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| JUNCT STR | .0050 | | | | | .0069 | .10 | .00 | .96 | | .013 | .00 | .00 | BOX |
| 1034.930 | 2830.230 | 6.644 | 2836.874 | 426.00 | 12.17 | 2.30 | 2839.17 | .00 | 4.86 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| JUNCT STR | .0048 | | | | | .0064 | .53 | 6.64 | .96 | | .013 | .00 | .00 | BOX |
| 1117.780 | 2830.630 | 7.095 | 2837.725 | 410.00 | 11.71 | 2.13 | 2839.86 | .00 | 4.74 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| JUNCT STR | .0008 | | | | | .0049 | .06 | 7.10 | .92 | | .013 | .00 | .00 | BOX |
| 1129.790 | 2830.640 | 7.809 | 2838.449 | 360.00 | 10.29 | 1.64 | 2840.09 | .00 | 4.35 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| 55.545 | .0169 | | | | | .0049 | .27 | 7.81 | .81 | 2.64 | .013 | .00 | .00 | BOX |
| 1185.335 | 2831.579 | 7.142 | 2838.720 | 360.00 | 10.29 | 1.64 | 2840.36 | .00 | 4.35 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 1185.335 | 2831.579 | 2.207 | 2833.786 | 360.00 | 23.30 | 8.43 | 2842.22 | .00 | 4.35 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| 48.005 | .0169 | | | | | .0293 | 1.41 | 2.21 | 2.76 | 2.64 | .013 | .00 | .00 | BOX |
| 1233.340 | 2832.390 | 2.126 | 2834.516 | 360.00 | 24.19 | 9.09 | 2843.60 | .00 | 4.35 | 7.00 | 5.000 | 7.000 | .00 | 0 .0 |
| TRANS STR | .0263 | | | | | .0259 | .21 | 2.13 | 2.92 | | .013 | .00 | .00 | BOX |

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C
BY OLYMPIA COMPANIES
IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head / SF Ave | Energy Grd.El. / HF | Super Elev / SE Dpth | Critical Depth / Froude N | Flow Top Width / Norm Dp | Height/Dia.-FT / "N" | Base Wt or I.D. / X-Fall | ZL / ZR | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1241.340 | 2832.600 | 3.517 | 2836.117 | 360.00 | 22.44 | 7.82 | 2843.94 | .00 | 5.06 | 5.28 | 5.500 | .000 | .00 | 1 .0 |
| 13.729 | .0061 | | | | | .0215 | .30 | 3.52 | 2.27 | 5.50 | .013 | .00 | .00 | PIPE |
| 1255.069 | 2832.684 | 3.468 | 2836.152 | 360.00 | 22.81 | 8.08 | 2844.23 | .00 | 5.06 | 5.31 | 5.500 | .000 | .00 | 1 .0 |
| 38.840 | .0061 | | | | | .0234 | .91 | 3.47 | 2.33 | 5.50 | .013 | .00 | .00 | PIPE |
| 1293.909 | 2832.920 | 3.330 | 2836.250 | 360.00 | 23.93 | 8.89 | 2845.14 | .00 | 5.06 | 5.38 | 5.500 | .000 | .00 | 1 .0 |
| 37.415 | .0061 | | | | | .0264 | .99 | 3.33 | 2.52 | 5.50 | .013 | .00 | .00 | PIPE |
| 1331.323 | 2833.148 | 3.201 | 2836.348 | 360.00 | 25.09 | 9.78 | 2846.13 | .00 | 5.06 | 5.43 | 5.500 | .000 | .00 | 1 .0 |
| 36.010 | .0061 | | | | | .0298 | 1.07 | 3.20 | 2.72 | 5.50 | .013 | .00 | .00 | PIPE |
| 1367.333 | 2833.367 | 3.078 | 2836.445 | 360.00 | 26.32 | 10.75 | 2847.20 | .00 | 5.06 | 5.46 | 5.500 | .000 | .00 | 1 .0 |
| 34.631 | .0061 | | | | | .0338 | 1.17 | 3.08 | 2.93 | 5.50 | .013 | .00 | .00 | PIPE |
| 1401.964 | 2833.577 | 2.962 | 2836.539 | 360.00 | 27.60 | 11.83 | 2848.37 | .00 | 5.06 | 5.48 | 5.500 | .000 | .00 | 1 .0 |
| 33.296 | .0061 | | | | | .0383 | 1.28 | 2.96 | 3.15 | 5.50 | .013 | .00 | .00 | PIPE |
| 1435.260 | 2833.780 | 2.851 | 2836.631 | 360.00 | 28.95 | 13.01 | 2849.64 | .00 | 5.06 | 5.50 | 5.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0000 | | | | | .0394 | .00 | 2.85 | 3.39 | | .013 | .00 | .00 | PIPE |
| 1435.260 | 2834.280 | 3.105 | 2837.385 | 360.00 | 28.10 | 12.26 | 2849.64 | .00 | 4.83 | 4.85 | 5.000 | .000 | .00 | 1 .0 |
| 338.660 | .0381 | | | | | .0383 | 12.98 | 3.11 | 3.05 | 3.11 | .013 | .00 | .00 | PIPE |
| 1773.920 | 2847.180 | 3.096 | 2850.276 | 360.00 | 28.19 | 12.34 | 2862.62 | .00 | 4.83 | 4.86 | 5.000 | .000 | .00 | 1 .0 |
| 339.090 | .0387 | | | | | .0379 | 12.85 | 3.10 | 3.06 | 3.09 | .013 | .00 | .00 | PIPE |

| Station / L/Elem | Invert Elev / Ch Slope | Depth (FT) / SF Ave | Water Elev / HF | Q (CFS) / SE Dpth | Vel (FPS) / Froude N | Vel Head / Norm Dp | Energy Grd.El. / "N" | Super Elev / X-Fall | Critical Depth / ZR | Flow Top Width | Height/ Dia.-FT / ZL | Base Wt or I.D. | No Wth Prs/Pip / Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2113.010 | 2860.300 | 3.128 | 2863.428 | 360.00 | 27.85 | 12.05 | 2875.47 | .00 | 4.83 | 4.84 | 5.000 | .000 | .00 1 .0 |
| 200.000 | .0400 | | | | | .0352 | 7.05 | 3.13 | 3.00 | 3.06 | .013 | .00 | .00 PIPE |
| 2313.010 | 2868.300 | 3.258 | 2871.558 | 360.00 | 26.57 | 10.96 | 2882.52 | .00 | 4.83 | 4.76 | 5.000 | .000 | .00 1 .0 |
| 133.307 | .0377 | | | | | .0314 | 4.18 | 3.26 | 2.78 | 3.12 | .013 | .00 | .00 PIPE |
| 2446.317 | 2873.320 | 3.394 | 2876.715 | 360.00 | 25.37 | 9.99 | 2886.71 | .00 | 4.83 | 4.67 | 5.000 | .000 | .00 1 .0 |
| 78.323 | .0377 | | | | | .0280 | 2.19 | 3.39 | 2.56 | 3.12 | .013 | .00 | .00 PIPE |
| 2524.640 | 2876.270 | 3.545 | 2879.814 | 360.00 | 24.19 | 9.08 | 2888.90 | .00 | 4.83 | 4.54 | 5.000 | .000 | .00 1 .0 |
| JUNCT STR | .0000 | | | | | .0332 | .00 | 3.54 | 2.35 | | .013 | .00 | .00 PIPE |
| 2524.640 | 2876.770 | 2.944 | 2879.714 | 300.00 | 27.21 | 11.50 | 2891.21 | .00 | 4.39 | 4.28 | 4.500 | .000 | .00 1 .0 |
| 400.000 | .0399 | | | | | .0393 | 15.73 | 2.94 | 2.99 | 2.94 | .013 | .00 | .00 PIPE |
| 2924.640 | 2892.750 | 2.976 | 2895.726 | 300.00 | 26.88 | 11.22 | 2906.95 | .00 | 4.39 | 4.26 | 4.500 | .000 | .00 1 .0 |
| 260.000 | .0400 | | | | | .0367 | 9.54 | 2.98 | 2.93 | 2.94 | .013 | .00 | .00 PIPE |
| 3184.640 | 2903.150 | 3.100 | 2906.250 | 300.00 | 25.67 | 10.24 | 2916.49 | .00 | 4.39 | 4.17 | 4.500 | .000 | .00 1 .0 |
| 94.014 | .0395 | | | | | .0333 | 3.13 | 3.10 | 2.70 | 2.96 | .013 | .00 | .00 PIPE |
| 3278.653 | 2906.864 | 3.200 | 2910.064 | 300.00 | 24.80 | 9.55 | 2919.61 | .00 | 4.39 | 4.08 | 4.500 | .000 | .00 1 .0 |
| 77.455 | .0395 | | | | | .0302 | 2.34 | 3.20 | 2.54 | 2.96 | .013 | .00 | .00 PIPE |
| 3356.108 | 2909.923 | 3.348 | 2913.271 | 300.00 | 23.64 | 8.68 | 2921.95 | .00 | 4.39 | 3.93 | 4.500 | .000 | .00 1 .0 |
| 50.574 | .0395 | | | | | .0271 | 1.37 | 3.35 | 2.32 | 2.96 | .013 | .00 | .00 PIPE |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3- 9-2020 Time:11:11:29

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C

BY OLYMPIA COMPANIES

IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3406.682 | 2911.921 | 3.509 | 2915.430 | 300.00 | 22.54 | 7.89 | 2923.32 | .00 | 4.39 | 3.73 | 4.500 | .000 | .00 | 1 .0 |
| 35.690 | .0395 | | | | | .0245 | .87 | 3.51 | 2.10 | 2.96 | .013 | .00 | .00 | PIPE |
| 3442.372 | 2913.331 | 3.690 | 2917.021 | 300.00 | 21.49 | 7.17 | 2924.20 | .00 | 4.39 | 3.46 | 4.500 | .000 | .00 | 1 .0 |
| 25.798 | .0395 | | | | | .0223 | .58 | 3.69 | 1.89 | 2.96 | .013 | .00 | .00 | PIPE |
| 3468.170 | 2914.350 | 3.898 | 2918.248 | 300.00 | 20.49 | 6.52 | 2924.77 | .00 | 4.39 | 3.06 | 4.500 | .000 | .00 | 1 .0 |
| 163.185 | .0222 | | | | | .0209 | 3.42 | 3.90 | 1.65 | 3.79 | .013 | .00 | .00 | PIPE |
| 3631.354 | 2917.981 | 4.044 | 2922.025 | 300.00 | 19.92 | 6.16 | 2928.19 | .00 | 4.39 | 2.72 | 4.500 | .000 | .00 | 1 .0 |
| 130.315 | .0222 | | | | | .0206 | 2.68 | 4.04 | 1.49 | 3.79 | .013 | .00 | .00 | PIPE |
| 3761.670 | 2920.880 | 4.387 | 2925.267 | 300.00 | 18.99 | 5.60 | 2930.87 | .00 | 4.39 | 1.41 | 4.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0000 | | | | | .0251 | .00 | 4.39 | 1.00 | | .013 | .00 | .00 | PIPE |
| 3761.670 | 2921.880 | 7.451 | 2929.330 | 173.00 | 17.98 | 5.02 | 2934.35 | .00 | 3.44 | .00 | 3.500 | .000 | .00 | 1 .0 |
| 93.730 | .0401 | | | | | .0296 | 2.77 | 7.45 | .00 | 2.50 | .013 | .00 | .00 | PIPE |
| 3855.400 | 2925.640 | 6.713 | 2932.353 | 173.00 | 17.98 | 5.02 | 2937.37 | .00 | 3.44 | .00 | 3.500 | .000 | .00 | 1 .0 |
| JUNCT STR | .0000 | | | | | .0270 | .00 | 6.71 | .00 | | .013 | .00 | .00 | PIPE |
| 3855.400 | 2925.640 | 8.319 | 2933.959 | 157.00 | 16.32 | 4.13 | 2938.09 | .00 | 3.41 | .00 | 3.500 | .000 | .00 | 1 .0 |
| 395.580 | .0173 | | | | | .0244 | 9.63 | 8.32 | .00 | 3.50 | .013 | .00 | .00 | PIPE |
| 4250.980 | 2932.490 | 11.308 | 2943.798 | 157.00 | 16.32 | 4.13 | 2947.93 | .00 | 3.41 | .00 | 3.500 | .000 | .00 | 1 .0 |
| 264.420 | .0173 | | | | | .0244 | 6.44 | 11.31 | .00 | 3.50 | .013 | .00 | .00 | PIPE |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3- 9-2020 Time:11:11:29

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C
BY OLYMPIA COMPANIES
IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |



HIGHLIGHTED DENOTES HGL FOR ADJACENT DROP INLETS

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4515.400 | 2937.070 | 13.374 | 2950.444 | 157.00 | 16.32 | 4.13 | 2954.58 | .00 | 3.41 | .00 | 3.500 | .000 | .00 | 1 .0 |
| 115.580 | .0173 | | | | | .0244 | 2.81 | 13.37 | .00 | 3.50 | .013 | .00 | .00 | PIPE |
| 4630.980 | 2939.070 | 14.395 | 2953.465 | 157.00 | 16.32 | 4.13 | 2957.60 | .00 | 3.41 | .00 | 3.500 | .000 | .00 | 1 .0 |
| 116.302 | .0760 | | | | | .0244 | 2.83 | 14.40 | .00 | 1.88 | .013 | .00 | .00 | PIPE |
| 4747.282 | 2947.910 | 8.569 | 2956.479 | 157.00 | 16.32 | 4.13 | 2960.61 | .00 | 3.41 | .00 | 3.500 | .000 | .00 | 1 .0 |
| HYDRAULIC JUMP | | | | | | | | | | | | | | |
| 4747.282 | 2947.910 | 1.926 | 2949.836 | 157.00 | 28.94 | 13.01 | 2962.84 | .00 | 3.41 | 3.48 | 3.500 | .000 | .00 | 1 .0 |
| 108.231 | .0760 | | | | | .0676 | 7.31 | 1.93 | 4.09 | 1.88 | .013 | .00 | .00 | PIPE |
| 4855.513 | 2956.137 | 1.985 | 2958.123 | 157.00 | 27.88 | 12.07 | 2970.19 | .00 | 3.41 | 3.47 | 3.500 | .000 | .00 | 1 .0 |
| 65.784 | .0760 | | | | | .0605 | 3.98 | 1.99 | 3.85 | 1.88 | .013 | .00 | .00 | PIPE |
| 4921.296 | 2961.138 | 2.065 | 2963.203 | 157.00 | 26.58 | 10.97 | 2974.17 | .00 | 3.41 | 3.44 | 3.500 | .000 | .00 | 1 .0 |
| 40.654 | .0760 | | | | | .0536 | 2.18 | 2.06 | 3.58 | 1.88 | .013 | .00 | .00 | PIPE |
| 4961.970 | 2964.230 | 2.149 | 2966.379 | 157.00 | 25.34 | 9.97 | 2976.35 | .00 | 3.41 | 3.41 | 3.500 | .000 | .00 | 1 .0 |
| 2.503 | .0759 | | | | | .0501 | .13 | 2.15 | 3.31 | 1.89 | .013 | .00 | .00 | PIPE |
| 4964.473 | 2964.420 | 2.156 | 2966.576 | 157.00 | 25.25 | 9.90 | 2976.48 | .00 | 3.41 | 3.40 | 3.500 | .000 | .00 | 1 .0 |
| 28.021 | .0759 | | | | | .0470 | 1.32 | 2.16 | 3.29 | 1.89 | .013 | .00 | .00 | PIPE |
| 4992.495 | 2966.548 | 2.245 | 2968.793 | 157.00 | 24.08 | 9.00 | 2977.79 | .00 | 3.41 | 3.36 | 3.500 | .000 | .00 | 1 .0 |
| 21.126 | .0759 | | | | | .0417 | .88 | 2.25 | 3.04 | 1.89 | .013 | .00 | .00 | PIPE |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3- 9-2020 Time:11:11:29

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C

BY OLYMPIA COMPANIES

IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch |
| 5013.621 | 2968.152 | 2.341 | 2970.493 | 157.00 | 22.96 | 8.18 | 2978.68 | .00 | 3.41 | 3.29 | 3.500 | .000 | .00 | 1 .0 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.526 | .0759 | | | | | .0371 | .61 | 2.34 | 2.81 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5030.147 | 2969.407 | 2.444 | 2971.850 | 157.00 | 21.89 | 7.44 | 2979.29 | .00 | 3.41 | 3.21 | 3.500 | .000 | .00 | 1 | .0 | | |
| 13.209 | .0759 | | | | | .0331 | .44 | 2.44 | 2.58 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5043.356 | 2970.410 | 2.554 | 2972.964 | 157.00 | 20.87 | 6.76 | 2979.73 | .00 | 3.41 | 3.11 | 3.500 | .000 | .00 | 1 | .0 | | |
| 10.676 | .0759 | | | | | .0297 | .32 | 2.55 | 2.36 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5054.033 | 2971.220 | 2.675 | 2973.895 | 157.00 | 19.90 | 6.15 | 2980.04 | .00 | 3.41 | 2.97 | 3.500 | .000 | .00 | 1 | .0 | | |
| 8.635 | .0759 | | | | | .0267 | .23 | 2.68 | 2.15 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5062.668 | 2971.876 | 2.809 | 2974.685 | 157.00 | 18.97 | 5.59 | 2980.27 | .00 | 3.41 | 2.79 | 3.500 | .000 | .00 | 1 | .0 | | |
| 6.892 | .0759 | | | | | .0242 | .17 | 2.81 | 1.94 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5069.560 | 2972.399 | 2.960 | 2975.360 | 157.00 | 18.09 | 5.08 | 2980.44 | .00 | 3.41 | 2.53 | 3.500 | .000 | .00 | 1 | .0 | | |
| 5.229 | .0759 | | | | | .0223 | .12 | 2.96 | 1.72 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5074.789 | 2972.796 | 3.142 | 2975.938 | 157.00 | 17.25 | 4.62 | 2980.56 | .00 | 3.41 | 2.12 | 3.500 | .000 | .00 | 1 | .0 | | |
| 2.897 | .0759 | | | | | .0215 | .06 | 3.14 | 1.47 | 1.89 | .013 | .00 | .00 | PIPE | | | |
| 5077.686 | 2973.016 | 3.405 | 2976.421 | 157.00 | 16.44 | 4.20 | 2980.62 | .00 | 3.41 | 1.14 | 3.500 | .000 | .00 | 1 | .0 | | |
| JUNCT STR | 1.0000 | | | | | .0126 | .00 | 3.41 | 1.00 | | .013 | .00 | .00 | PIPE | | | |
| 5077.687 | 2973.017 | 6.609 | 2979.626 | 157.00 | 8.00 | .99 | 2980.62 | .00 | 3.59 | .00 | 5.000 | .000 | .00 | 1 | .0 | | |
| 5077.688 | 2973.018 | 6.657 | 2979.675 | 157.00 | 8.00 | .99 | 2980.67 | .00 | 3.59 | .00 | 5.000 | .000 | .00 | 1 | .0 | | |
| 5077.689 | 2973.019 | 6.705 | 2979.724 | 157.00 | 8.00 | .99 | 2980.72 | .00 | 3.59 | .00 | 5.000 | .000 | .00 | 1 | .0 | | |
| 5077.690 | 2973.020 | 6.753 | 2979.773 | 157.00 | 8.00 | .99 | 2980.77 | .00 | 3.59 | .00 | 5.000 | .000 | .00 | 1 | .0 | | |
| 160.000 | .0048 | | | | | .0036 | .58 | 6.75 | .00 | 3.60 | .013 | .00 | .00 | PIPE | | | |



Program Package Serial Number: 7189

WATER SURFACE PROFILE LISTING Date: 3- 9-2020 Time:11:11:29

SKYE CANYON INFRASTRUCTURE - PHASE 3B, 3C

BY OLYMPIA COMPANIES

IRON MOUNTAIN MAIN STORM DRAIN ALIGNMENT MODEL "UIRM1" (ULTIMATE CONDI

| Station | Invert Elev | Depth (FT) | Water Elev | Q (CFS) | Vel (FPS) | Vel Head | Energy Grd.El. | Super Elev | Critical Depth | Flow Top Width | Height/ Dia.-FT | Base Wt or I.D. | ZL | No Wth Prs/Pip |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| L/Elem | Ch Slope | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5237.690 | 2973.790 | 6.565 | 2980.355 | 157.00 | 8.00 | .99 | 2981.35 | .00 | 3.59 | .00 | 5.000 | .000 | .00 | 1 .0 |

Referenced Plan Sheet(s)

SKYE CANYON

# IMPROVEMENT PLANS

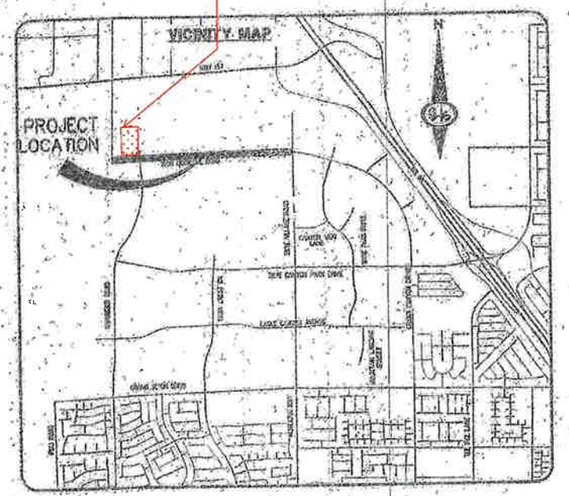
FOR

# SKYE CANYON PHASE 3B, 3C
# IRON MOUNTAIN ROAD

## SHAUMBER RD TO SKYE VILLAGE RD

APN:126-12-101-002
12.6 AC

APPROXIMATE PROJECT SITE




### BENCHMARK

MONUMENT ID: USDA (1934) 19

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD

ELEVATION = 12517.61 FEET, 956.810 METERS
NAVD 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARK BOOK - 2009 ADJUSTMENT (UPDATED 03/24/2010)

### BASIS OF BEARING

NORTH 69°18'30" WEST, BEING THE BEARING OF THE SOUTH LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 7, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 147, PAGE 71 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

### OWNER

M F LAND LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141

### DEVELOPER

NINETY-FIVE MANAGEMENT LLC
% OLYMPIA COMPANIES LLC
11411 SOUTHERN HIGHLANDS
PARKWAY, SUITE 300
LAS VEGAS, NV 89141
PH (702) 220-6565
FX (702) 220-6566

### ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE STREET #216
LAS VEGAS, NV 89118
(702) 284-5300

NOTE: PROJECT PLAN APPROVAL IS CONTINGENT UPON THE APPROVAL AND CONSTRUCTION OF
LVWD PROJECT #126409
SKYE CANYON II PHASE 3BC - SKYE CANYON PARK DRIVE AND
LVWD PROJECT #128109
SKYE CANYON 3BC - SHAUMBER ROAD

PLANS APPROVED LAND DEVELOPMENT BUILDING AND SAFETY DEPARTMENT LAS VEGAS, NEVADA
1 Jan 11 2021
2 Feb 11 2021
3 Feb 11 2021

REVIEWED BY LAS VEGAS FIRE & RESCUE
RELEASE FOR INSTALLATION AS SUBMITTED
REV. CIVIL BY 05/19/2021

## APPROVALS

CITY ENGINEER, STEVEN G. KING PE, PTOE #9213 — DATE 12-12-19

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED OF RIGHT-OF-WAY, AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIALLY LISTED UNDER DEVIATIONS FORM. THE ENGINEER SHALL RESOLVE ANY DEVIATION UNDER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.

CITY OF LAS VEGAS DEPARTMENT OF PLANNING — DATE N/A

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. 19-0110 FIRST APPROVED DATE 11/20/19
LVWD APPROVED FOR FLOW 1,400 GPM AT 20 PSI RESIDUAL
SHEETS: GR-01 THRU GR-03, GR-01, PR-01 THRU PR-03, UTL-01 THRU UTL-05, PRV-01 THRU PRV-08 & LAY-01

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM THE LAS VEGAS VALLEY WATER DISTRICT.

LAS VEGAS FIRE AND RESCUE — DATE 10/24/19

BY ENERGY — DATE 12-3-19

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.

CENTRAL TELEPHONE CO. DBA CENTURYLINK — DATE 12-3-19

THE ATTACHED CENTRAL TELEPHONE CO. DBA 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.

SOUTHWEST GAS CORPORATION — DATE 10/24/19

CENTURYLINK QC — DATE 12-3-19

### INDEX OF DRAWINGS

| SHT. NO. | DWG NO. | DESCRIPTION |
|---|---|---|
| 1 | G-01 | COVER SHEET |
| 2 | G-02 | GENERAL NOTES |
| 3 | G-03 | ABBREVIATIONS, LEGEND, AND SYMBOLS |
| 4 | TC-01 | ROADWAY SECTIONS |
| 5 | TC-02 | ROADWAY SECTIONS |
| 6 | PP-01 | CONSTRUCTION PLAN - "SB" 100+00 TO "SB" 114+00 |
| 7 | PP-02 | CONSTRUCTION PLAN - "SB" 114+00 TO "SB" 128+00 |
| 8 | PP-03 | CONSTRUCTION PLAN - "SB" 128+00 TO "SB" 139+00 |
| 9 | PP-04 | CONSTRUCTION PLAN - "SB" 139+00 TO "SB" 151+00 |
| 10 | PP-05 | CONSTRUCTION PLAN - "SB" 151+00 TO "SB" 164+00 |
| 11 | PP-06 | CONSTRUCTION PLAN - "SB" 164+00 TO "SB" 177+00 |
| 12 | PP-07 | CONSTRUCTION PLAN - "SB" 177+00 TO "SB" 191+00 |
| 13 | PP-08 | CONSTRUCTION PLAN - "SB" 191+00 TO "SB" 204+00 |
| 14 | LAY-01 | STORM DRAIN LATERALS |
| 15 | GR-01 | GRADING PLAN |
| 16 | STR-01 | STORM DRAIN RECORDS |
| 17 | UTL-01 | UTIL PLAN & PROFILE - "SB" 111+00 TO "SB" 100+00 |
| 18 | UTL-02 | UTIL PLAN & PROFILE - "SB" 128+00 TO "SB" 114+00 |
| 19 | UTL-03 | UTIL PLAN & PROFILE - "SB" 139+00 TO "SB" 128+00 |
| 20 | UTL-04 | UTIL PLAN & PROFILE - "SB" 151+00 TO "SB" 139+00 |
| 21 | UTL-05 | UTIL PLAN & PROFILE - "SB" 164+00 TO "SB" 151+00 |
| 22 | UTL-06 | UTIL PLAN & PROFILE - "SB" 177+00 TO "SB" 164+00 |
| 23 | UTL-07 | UTILITY LATERAL I |
| 24 | UTL-08 | UTILITY LATERAL II |
| 25 | PRV-01 | PRV DETAIL SHEET I |
| 26 | PRV-02 | PRV DETAIL SHEET II |
| 27 | PRV-03 | PRV DETAIL SHEET III |
| 28 | PRV-04 | PRV DETAIL SHEET IV |
| 29 | PRV-05 | PRV DETAIL SHEET V |
| 30 | PRV-06 | PRV DETAIL SHEET VI |
| 31 | TR-01 | TRAFFIC PLAN I |
| 32 | TR-02 | TRAFFIC PLAN II |
| 33 | TR-03 | TRAFFIC PLAN III |
| 34 | TR-04 | TRAFFIC PLAN IV |
| 35 | TR-05 | TRAFFIC PLAN V |
| 36 | HC-1 | HORIZONTAL CONTROL PLAN |
| 37 | HC-2 | HORIZONTAL CONTROL PLAN |
| 38 | HC-3 | HORIZONTAL CONTROL PLAN |
| 39 | HC-4 | HORIZONTAL CONTROL PLAN |
| 40 | HC-5 | HORIZONTAL CONTROL PLAN |
| 41 | HC-6 | HORIZONTAL CONTROL PLAN |
| 42 | HC-7 | HORIZONTAL CONTROL PLAN |
| 43 | HC-8 | HORIZONTAL CONTROL PLAN |
| 44 | SM.09 | GENERAL STRUCTURAL NOTES |
| 45 | SD.10 | TYPICAL DETAILS |
| 46 | SD.00 | PLAN VIEWS |
| 47 | SD.00 | SECTIONS |

### DRY UTILITY SUPPLEMENTAL INDEX

SOUTHWEST GAS

| | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

Derick Yoro — Derick Yoro — Derick Yoro

PROFESSIONAL ENGINEER — DERICK A. YORO — No. 16999 — CIVIL — STATE OF NEVADA — 11/19/20

SLATER HANIFAN GROUP
5740 S. ARVILLE ST. #216, LAS VEGAS, NV 89118
PH/FAX (702) 284-5300

| MARK | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | 1ST SUBMITTAL | 11/20/19 | DY |
| 2 | 2ND SUBMITTAL | 12/12/19 | DY |
| 3 | 3RD SUBMITTAL | 2/11/20 | DY |

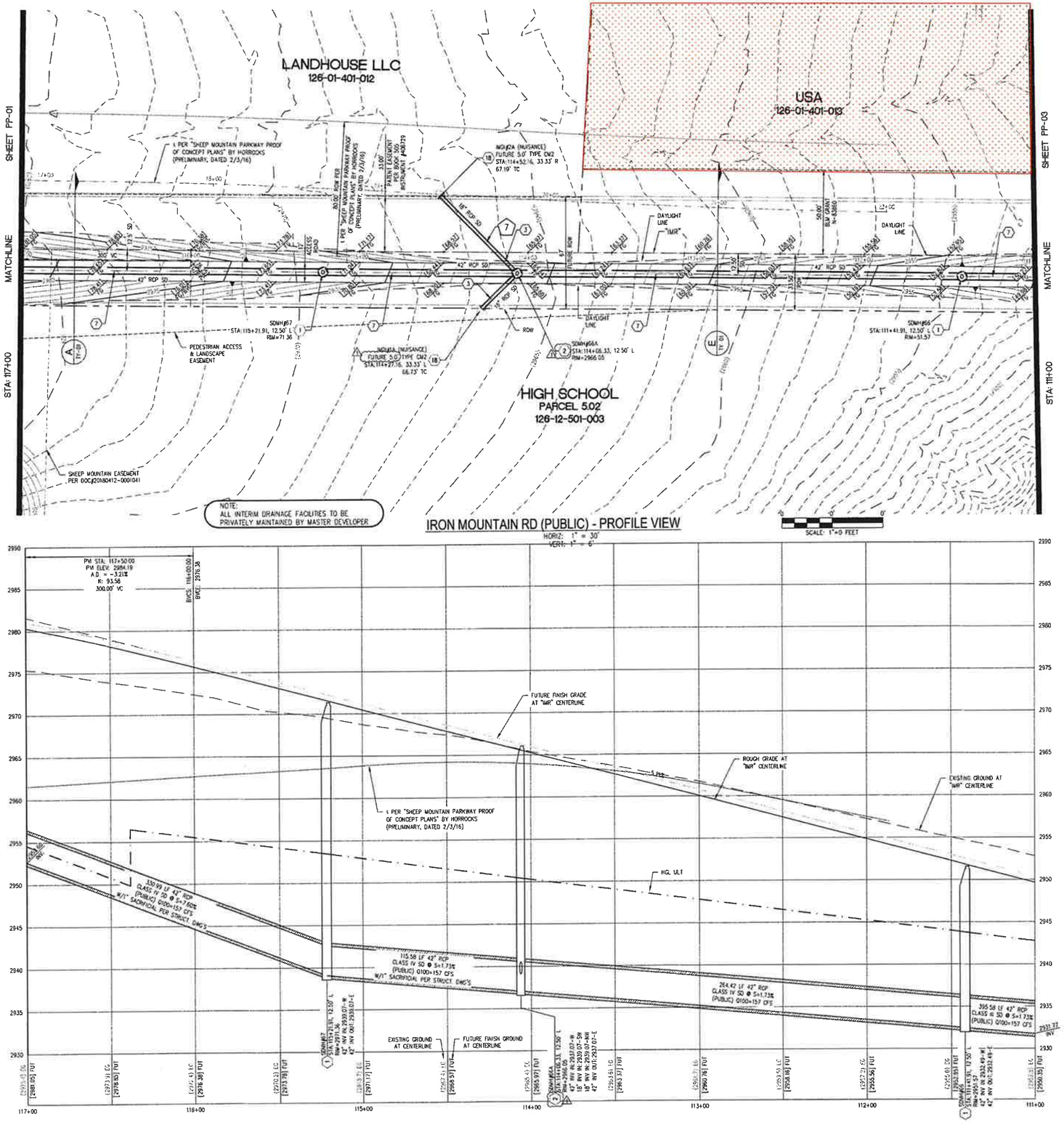
NINETY-FIVE MANAGEMENT LLC

SKYE CANYON PHASE 3BC
IRON MOUNTAIN ROAD
COVER SHEET

DATE: 5/20/19
DRAFTER: HF
DESIGNER: HF
CHECKED: DY
PROJECT NO: OLY1669.000

G-01
SHEET 1 OF 47

LIC#: 69073
10/7/21

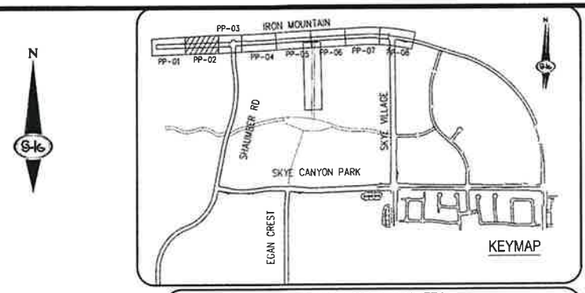



## IRON MOUNTAIN RD (PUBLIC) - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 6'

SCALE: 1"=0 FEET




## CONSTRUCTION NOTES

| | |
|---|---|
| 1 | CONSTRUCT 1" UTACS OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY SHEETS) |
| 2 | CONSTRUCT 1" UTACS OVER 6.5" PBS OVER 6" TYPE II AGGREGATE BASE (SEE TY SHEETS) |
| 3 | CONSTRUCT "A" TYPE ISLAND CURB (USDCCA STD. DWG. NO. 219) |
| 4 | CONSTRUCT "L" TYPE CURB AND GUTTER (USDCCA STD DWG NO. 216) |
| 5 | CONSTRUCT SIDEWALK RAMP (CASE II) WITH TACTILE WARNING PANEL (USDCCA STD. DWG. NO 235) |
| 6 | CONSTRUCT BUS TURN-OUT (USDCCA STD. DWG. NO. 234.1) |
| 7 | CONSTRUCT CONCRETE SIDEWALK (USDCCA STD. DWG 234) |
| P | PROTECT IN PLACE (VERIFY LOCATION AND ELEVATION OF EX. IMPROVEMENT) |

## STORM DRAIN NOTES

| | |
|---|---|
| 1 | CONSTRUCT 48" TYPE II-SD MANHOLE (USDCCA STD DWG. NO. 405.2) |
| 2 | CONSTRUCT 60" TYPE III MANHOLE (USDCCA STD. DWG. NO. 406.1) |
| 3 | INSTALL 18" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 4 | INSTALL 24" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 5 | INSTALL 30" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 6 | INSTALL 36" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 7 | INSTALL 42" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 8 | INSTALL 54" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 9 | INSTALL 60" RCP (USDCCA STD. DWG. NO. 503.2) |
| 10 | INSTALL 72" RCP (USDCCA STD. DWG. NO. 503.2) |
| 11 | INSTALL 30" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 12 | INSTALL 36" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 13 | INSTALL 42" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 14 | INSTALL 72" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 15 | CONSTRUCT TYPE "CM2" DROP INLET SIZE PER PLAN (USDCCA STD. DWG. NO 412.1 & 421) |
| 16 | RCB ACCESS MANHOLE (SEE SEE STRUCTURAL PLANS) |
| 17 | CONSTRUCT CONCRETE COLLAR (SEE DETAIL 3/DTL-01) |
| 18 | CONSTRUCT INTERIM BRICK AND MORTAR PLUG SEE DETAIL 2/DTL-01 |
| 19 | INSTALL 24" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 20 | INSTALL 54" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 21 | INSTALL 66" RCP (USDCCA STD DWG. NO. 503.2) W/1" SACRIFICIAL CONCRETE PER STRUCTURAL DWGS |

## NOTES

1. ALL RCP SHALL BE CLASS IV UNLESS OTHERWISE SHOWN
2. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF D-TOP RCB/RCA.
3. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
4. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
5. ALL PIPES ARE PUBLICLY MAINTAINED IN PUBLIC ROW.
6. ADD SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SACRIFICIAL CONCRETE.
7. DIMENSIONS ARE TO BE BACK OF CURB, FACE OF CURB, OR FACE OF MEDIAN UNLESS OTHERWISE NOTED.
8. SEE TY-SHEETS FOR TYPICAL SECTIONS.
9. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.

## DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

## LEGEND

(X) STORM DRAIN LATERAL # (SEE LAT SHEETS)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DTE-4953 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

DERICK YORO, PE# 16396 — 5/12/20 DATE

## FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1750E, DATED SEPTEMBER 27, 2002

**NOTE:**
PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER — 6/09/2020

PROJECT NO: 164410 DATE: ~~11/20/19~~ 11/20/19

PLANS APPROVED LAND DEVELOPMENT BUILDING AND SAFETY DEPARTMENT LAS VEGAS, NEVADA Approval Jul 14 2020

AVOID HITTING OVERHEAD POWER LINES. IT'S EASY! CALL BEFORE YOU DO OVERHEAD — 1-702-227-2929

FAST Call before you go UnderGround. 1-702-482-0300 — MEMBER OF NEVADA 811 SYSTEM OF PROTECTION

Call before you Dig — Call 811 — 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

| NO. | DESCRIPTION | DATE | BY | APP'D | APP DATE |
|---|---|---|---|---|---|
| 1 | UPDATE SD | 5/12/20 | SVB | | |

NINETY-FIVE MANAGEMENT LLC

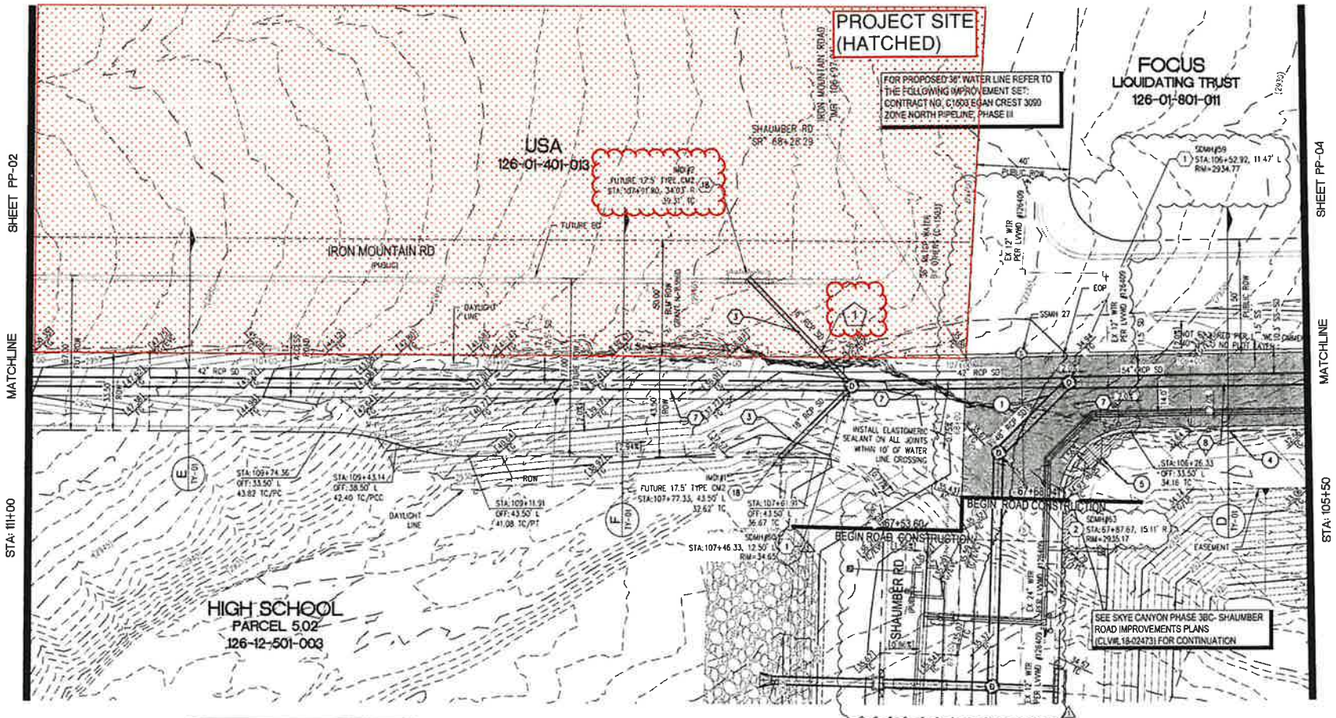
SKYE CANYON PHASE 3BC
IRON MOUNTAIN ROAD
CONSTRUCTION PLAN - "IM" 117+00 TO "IM" 111+00

DATE: 5/12/20
DRAFTER: HF
DESIGNER: HF
CHECKED: DY
PROJECT NO.
OLY1609-000

PROFESSIONAL ENGINEER - STATE OF NEVADA - DERICK D.J YORO - No. 16396 - CIVIL - Exp: 08/30/2020 - 5/12/20

PP-02
SHEET 7 OF 47

L18-02473
107V7514

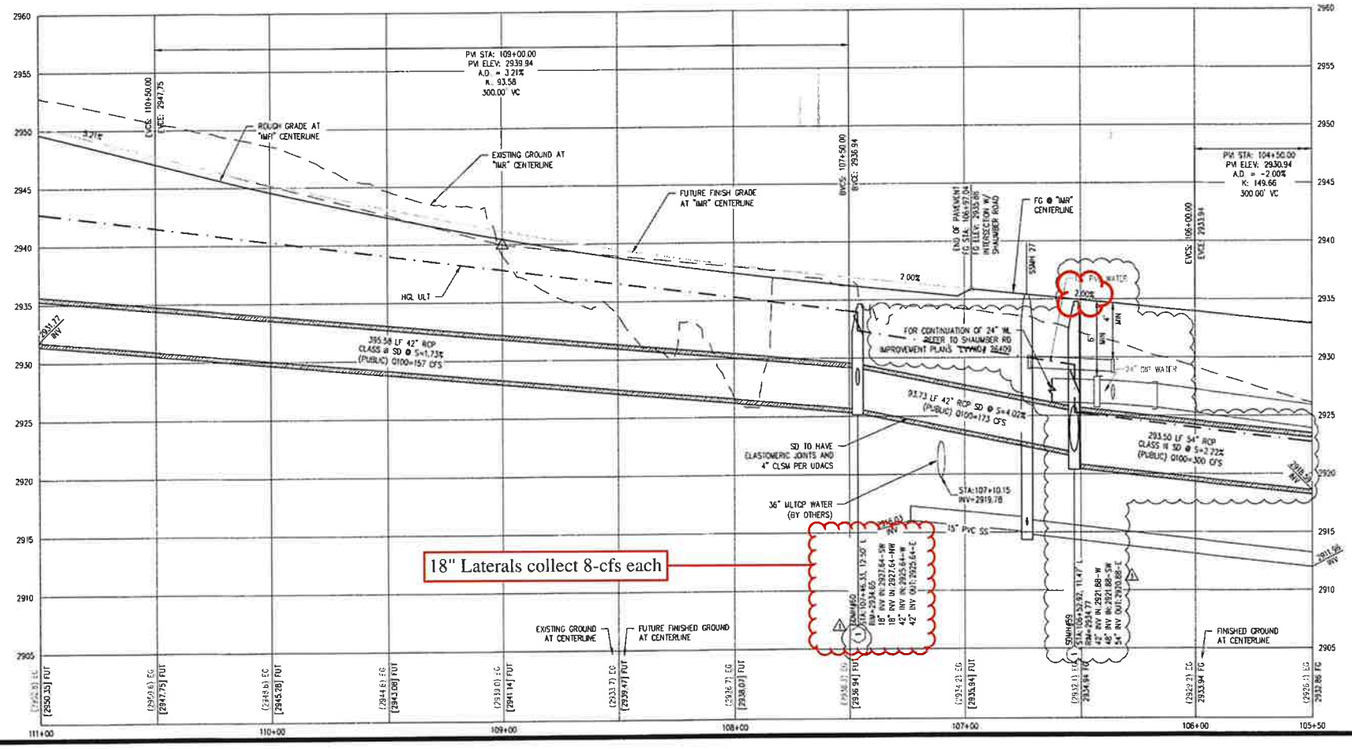


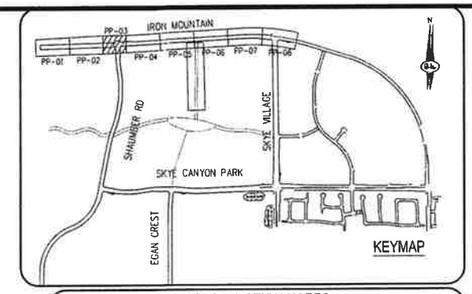

NOTE:
ALL INTERIM DRAINAGE FACILITIES TO BE PRIVATELY MAINTAINED BY MASTER DEVELOPER

## IRON MOUNTAIN RD (PUBLIC) - PROFILE VIEW

HORIZ: 1" = 30'
VERT: 1" = 6'

SCALE: 1"=0 FEET




## CONSTRUCTION NOTES

| | |
|---|---|
| 1 | CONSTRUCT 1" UTACS OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY SHEETS) |
| 2 | CONSTRUCT 1" UTACS OVER 5.5" PBS OVER 6" TYPE II AGGREGATE BASE (SEE TY SHEETS) |
| 3 | CONSTRUCT "A" TYPE ISLAND CURB (USDCCA STD. DWG NO. 219) |
| 4 | CONSTRUCT "L" TYPE CURB AND GUTTER (USDCCA STD. DWG NO 216) |
| 5 | CONSTRUCT SIDEWALK RAMP (CASE II) WITH TACTILE WARNING PANEL (USDCCA STD. DWG. NO 235) |
| 6 | CONSTRUCT BUS TURN-OUT (USDCCA STD DWG NO. 234.1) |
| 7 | CONSTRUCT CONCRETE SIDEWALK (USDCCA STD. DWG. 234) |
| P | PROTECT IN PLACE (VERIFY LOCATION AND ELEVATION OF EX. IMPROVEMENT) |

## STORM DRAIN NOTES

| | |
|---|---|
| 1 | CONSTRUCT 48" TYPE II-SD MANHOLE (USDCCA STD. DWG. NO. 405.2) |
| 2 | CONSTRUCT 60" TYPE II MANHOLE (USDCCA STD. DWG. NO. 406.1) |
| 3 | INSTALL 18" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 4 | INSTALL 24" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 5 | INSTALL 30" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 6 | INSTALL 36" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 7 | INSTALL 42" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 8 | INSTALL 54" STORM DRAIN (USDCCA STD. DWG. NO. 503.2) (SEE PLAN FOR MATERIAL) |
| 9 | INSTALL 60" RCP (USDCCA STD. DWG. NO. 503.2) |
| 10 | INSTALL 72" RCP (USDCCA STD. DWG. NO. 503.2) |
| 11 | INSTALL 30" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 12 | INSTALL 36" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 13 | INSTALL 42" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 14 | INSTALL 72" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 15 | CONSTRUCT TYPE "CM2" DROP INLET, SIZE PER PLAN (USDCCA STD. DWG. NO. 412.1 & 421) |
| 16 | RCB ACCESS MANHOLE (SEE SEE STRUCTURAL PLANS) |
| 17 | CONSTRUCT CONCRETE COLLAR (SEE DETAIL 3/DTL-01) |
| 18 | CONSTRUCT INTERIM BRICK AND MORTAR PLUG SEE DETAIL 2/DTL-01 |
| 19 | INSTALL 24" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 20 | INSTALL 54" RCP END SECTION (NDOT STD. PLAN R-2.3.1) |
| 21 | INSTALL 66" RCP (USDCCA STD. DWG. NO. 503.2) W/1" SACRIFICIAL CONCRETE PER STRUCTURAL DWGS |

## NOTES

1. ALL RCP SHALL BE CLASS III UNLESS OTHERWISE SHOWN
2. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR RCB/JRCA.
3. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO 421
4. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
5. ALL PIPES ARE PUBLICLY MAINTAINED IN PUBLIC ROW.
6. ADD SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SACRIFICIAL CONCRETE.
7. DIMENSIONS ARE TO BE BACK OF CURB, FACE OF CURB, OR FACE OF MEDIAN UNLESS OTHERWISE NOTED.
8. SEE TY-SHEETS FOR TYPICAL SECTIONS.
9. SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.

## DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE:

CAST-IN-PLACE MONOLITHIC POUR WITH WATERSTOP BETWEEN SLAB AND WALLS. BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

## LEGEND

(X) STORM DRAIN LATERAL # (SEE LAT SHEETS)

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY DS-4953 ON FILE AT THE CITY OF LAS VEGAS FOR THE SUBJECT PROJECT

DERICK YORO, P.E. 16396 — DATE 5/6/20

## FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL: 32003C1750E, DATED SEPTEMBER 27, 2002

**NOTE:**
PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER — DATE 11/20/19

PROJECT NO. 126410

PLANS APPROVED LAND DEVELOPMENT BUILDING AND SAFETY DEPARTMENT LAS VEGAS, NEVADA Jul 14 2020

CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

FAST Call before you UnderGround. 1-702-432-5300

Call before you Dig Call 811 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
6740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

| NO. | DESCRIPTION | DATE | BY | APP'D | APP DATE |
|---|---|---|---|---|---|
| 1 | WORK SO, ADD 24" AND 12" ML SD REVISIONS | 5/7/20 | SMB | | |

NINETY-FIVE MANAGEMENT LLC

SKYE CANYON PHASE 3BC
IRON MOUNTAIN ROAD
CONSTRUCTION PLAN - "IM" 111+00 TO "IM" 105+50

DATE: 5/12/20
DRAFTER: HF
DESIGNER: HF
CHECKED: DY
PROJECT NO. OLY1609-000

PROFESSIONAL ENGINEER - STATE OF NEVADA — DERICK D. J. YORO — Exp. 06/30/2020 — CIVIL — No. 16396

PP-03
SHEET 8 OF 47

L18-02473
107V7514

P:\OLY1609-000 SKYE Canyon Phase 3A 3B 3C\SURVEY\MICROSURVEY\CAD\TY\1609-000-PHP-IM.DWG 5/12/2020 3:53 PM Dennis Miller

PLANS APPROVED
LAND DEVELOPMENT
BUILDING AND
SAFETY DEPARTMENT
LAS VEGAS, NEVADA
Expires
JUN 14 2020

APPROVED FOR CONSTRUCTION

SHARI 6/08/2020

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

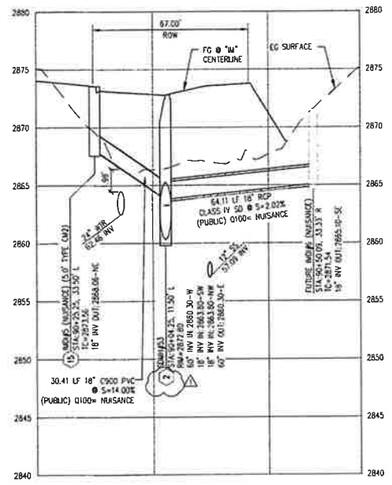
PROJECT NO. 20419 DATE: ~~6/27/2019~~ 11/20/19


SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399


| NO. | DESCRIPTION | DATE | BY | APP DATE | APP |
|---|---|---|---|---|---|
| 1 | 50 REVISIONS | 5/12/20 | SW | | |

NINETY-FIVE MANAGEMENT LLC

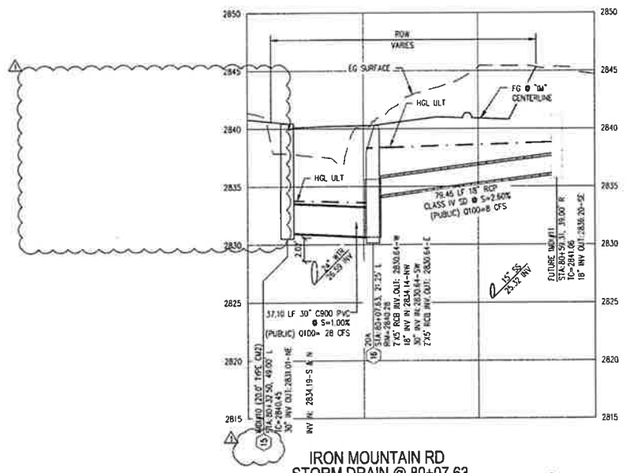
SKYE CANYON PHASE 3BC
IRON MOUNTAIN ROAD
STORM DRAIN LATERALS




IRON MOUNTAIN RD
STORM DRAIN @ 90+04.25

SCALE: HORZ. 1"=30' VERT. 1"=5'
SEE SHEET: ////

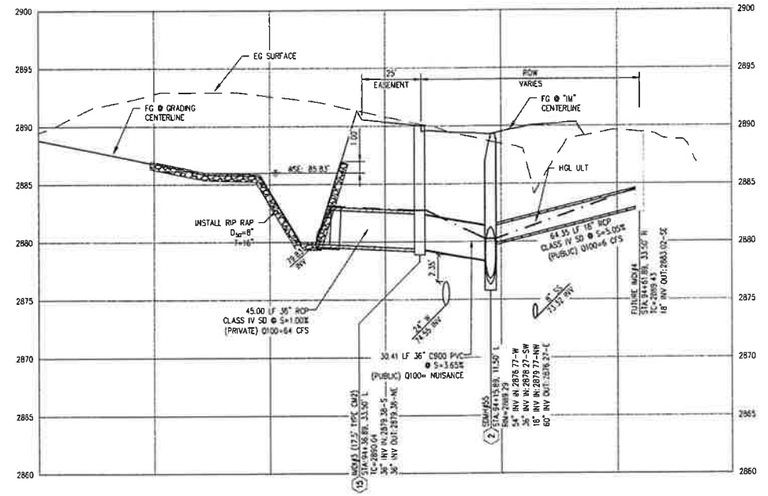
6




IRON MOUNTAIN RD
STORM DRAIN @ 80+07.63

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-08

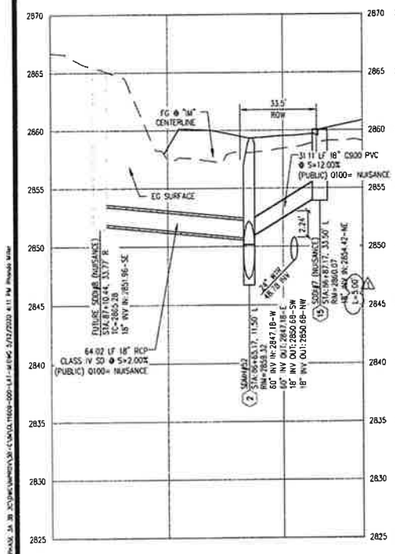
4




IRON MOUNTAIN RD
STORM DRAIN @ 94+15.89

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-05

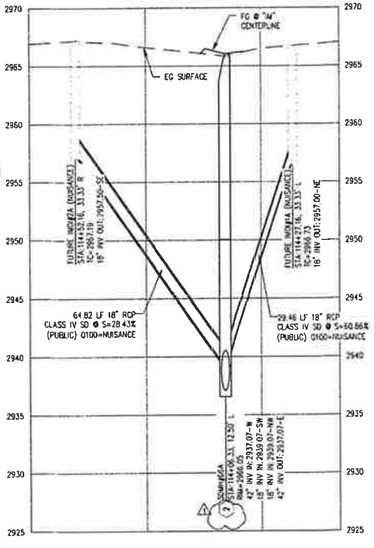
2




IRON MOUNTAIN RD
STORM DRAIN @ 86+04.25

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-07

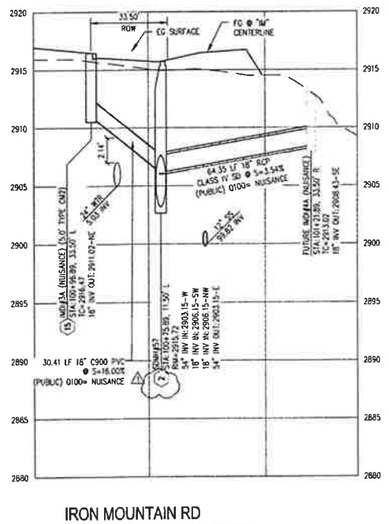
8




IRON MOUNTAIN RD
STORM DRAIN @ 114+06.33

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-02

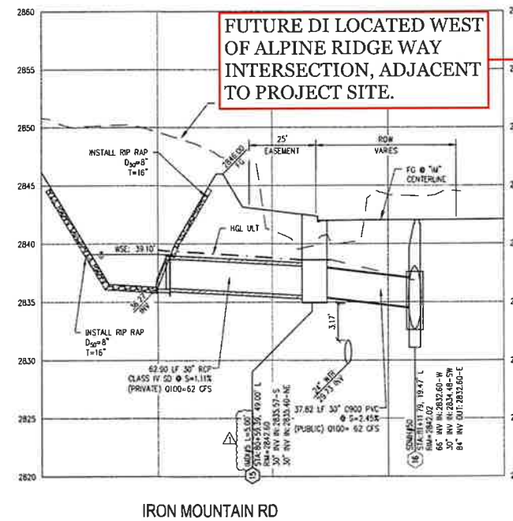
7




IRON MOUNTAIN RD
STORM DRAIN @ 100+75.89

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-04

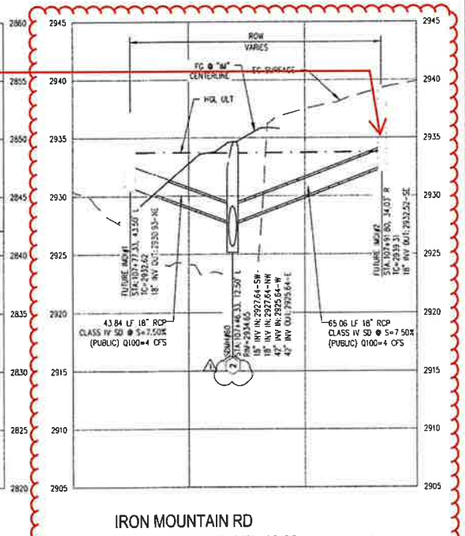
5




IRON MOUNTAIN RD
STORM DRAIN @ 81+11.79

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-08

3




IRON MOUNTAIN RD
STORM DRAIN @ 107+46.33

SCALE: HORZ. 1"=30' VERT. 1"=6'
SEE SHEET: PP-03

1

DATE: 5/12/20
DRAFTER: HF
DESIGNER: HF
CHECKED: DY

PROJECT NO.
OLY1609-000

PROFESSIONAL ENGINEER – STATE OF NEVADA
DERICK D.J. ORO
Expir: 09/30/2020
CIVIL
No. 16396

LAT-01

SHEET 14 OF 47

L18-02473
107V7514

# APPENDIX I

Improvement Plans