

DS #:

5014

APN:

126-12-410-001

PROJECT:

Skye Canyon Parcel 221B

SUBMITTAL:

1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		July 26, 2018
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E. <i>JS</i> Flood Control Engr. Associate Department of Public Works
SUBJECT:	COPIES TO:	
Drainage Study for:	Slater-Hanifan Group, Inc.	
Skye Canyon Parcel 2.21B		
Cross Streets:	NEC of Shaumber Rd. and Grand Teton Dr.	Ninety-Five Management, LLC
File Number:	F:\Depot\DSMemos\DS5014A.doc	Bart Anderson, P.E., DevCo
Parcel Number:	126-12-410-001	
Zoning Action:	TMP-73326	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	7/5/2018	7/19/2018	See Comments Below	\$400.00	497155: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

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

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

- The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.
- All roadway and flood control facilities as proposed and approved in Skye Canyon Phase 2 Infrastructures must be substantially constructed prior to the issuance of occupancy permits.
- Label the existing CCRFCD facility within Grand Teton Drive.
- Revise Exhibit B for the following:
 - The flow values shown in the Proposed Condition Flow Rate Summary for WML11W and *ON1 appear to be incorrect. Review and revise the table accordingly.
 - Delineate Basins *ON1 and *Trail as well as CP1 on the drainage exhibit.
- Revise the depth values for the Finish Floor Check Table for Lots 84 and 87 through 92 to match the normal depth calculated for Hydraulic Section 3.
- Revise the Finish Floors Fronting Non-Driveway Access Table to utilize Hydraulic Section 1 for Lots 96, 97, and 98.

7. The design finish floor elevations for Lots 63-66, 68-70, 83-85, 87, and 88 shown in the Drainage Easement Check Table do not meet minimum criteria and therefore solid grouting is required. However, Section Detail 19/D-2 does not provide solid grouting up to the required height. In addition, the grading plans do not reflect any retaining wall elevations. Review and revise the grading plans and details accordingly.
8. It is unclear how the flows in Alley F flow into the cul-de-sac on Mercury Skye Street as it appears the roll curb transitions into the sidewalk walk. Review and revise accordingly to provide positive drainage.
9. This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

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

END OF REMARKS

jks

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



TRANSMITTAL

To: Albert Sung, P.E.
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Date: July 3, 2018

Project No.: OLY1725.000

From: Jonathan S. Rocha, E.I.

Subject: Technical Drainage Study for Skye Canyon Parcel 2.21B

CC: Dan Poll, SHG
CC: Stanley Okey Amadi, SHG
CC: Mark Failla, SHG

CC: Chelsea Jensen, SHG
CC: Rhonda Miller, SHG
CC: _____

Transmitting Via:

- ☐ Mail
☒ Messenger / MDS
☐ Federal Express
☐ Pickup

For:

- ☒ Review & Comment
☐ Per your Request
☐ Information/File

Acknowledgement of Receipt:

- ☐ Not Required
☒ Acknowledgement Required

Received By: _____
Date: _____ Time: _____

<u>Copies</u>	<u>Description</u>
<u>1</u>	<u>Subject Study</u>
<u>1</u>	<u>Set of Improvement Plans</u>
<u>1</u>	<u>Stamped and Signed Standard Form 1</u>
<u>1</u>	<u>\$400 Submittal Fee (Ninety Five Management LLC, Check #1519)</u>
<u>1</u>	<u>CD containing PDF of submittal documents</u>

Comments:

Please contact us if you have any questions at 702-284-5300. Thanks.

Signed: _____

Jonathan S. Rocha, E.I.
Flood Control Division

TECHNICAL DRAINAGE STUDY
Skye Canyon Parcel 2.21B
City of Las Vegas, Nevada

Job No.: OLY1725.000
Date: June 2018

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

Prepared For:
Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Jonathan S. Rocha, E.I.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Parcel 2.21B Date: June 2018
Location of Development: a) Descriptive (Cross Streets): North/South: Shaumber Road
East/West: Grand Teton Drive
b) Section: 12 Township: 19 South Range: 59 East
c) APN: 126-12-410-001

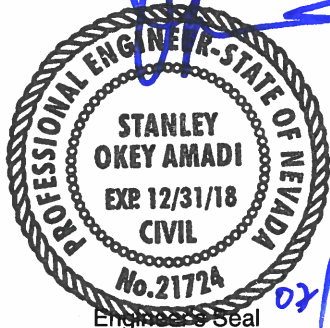
Name of Owner/Developer: KAG Development West LLC / Ninety-Five Management, LLC
Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com
Address: 11411 Southern Highlands Parkway, Suite 300; Las Vegas, NV 89141

Contact Person – Name: Stanley Okey Amadi, P.E. Telephone No.: 702-284-5300
*E-mail Address: samadi@shg-inc.com Fax No.: 702-284-5399
Firm: Slater Hanifan Group
Address: 5740 S. Arville Street, Suite 216; Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 16 Acres Being Developed/Disturbed: +/- 16 Acres
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.): Single-Family Residential
5. Approximate upstream land area which drains to the subject site: Approx. 17 acres
6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Master Drainage Study for Skye Canyon (SHG, DS4420);
Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure (SHG, DS4739)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Surface flow to existing adjacent offsite drainage easement, located northeast of the project site.
8. Briefly describe your proposed schedule for the subject project: Single Phase / ASAP



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

***Newly Required Field**

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

Revision	Date

Local Entity File No. _____

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.) Developer owns off-site areas.
X	-	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. <u>S.O.A.</u> 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.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
-	N/A	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.
X	-	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.
X	-	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.
X	-	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.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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: Skye Canyon Parcel 2.21B		Map ID:	
Firm Name: Slater Hanifan Group		Engineer: Stanley Okey Amadi, P.E	
Address: 5740 S. Arville Street, Suite 216			
City: Las Vegas		State: NV	Zip: 89118
Phone Number: 702-284-5300		Fax Number: 702-284-5399	
Property Owner: KAG Development West LLC /Ninety-Five Management, LLC			
Address: 114111 Southern Highlands Parkway, Suite 300			
City: Las Vegas		State: NV	Zip: 89141
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	
☒	☐	Design Manual Standard Form 1 with the engineer's seal and signature.
☒	☐	Design Manual Standard Form 4 .
☒	☐	2 copies of the 24" x 36" Drainage Plan.
☐	☐	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
☒	☐	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
☒	☐	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
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HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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.
X	-	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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.
☒	☐	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	
☒	☐	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
☐	☐ N/A	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.
☒	☐	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.
☒	☐	Use of correct precipitation values in and around the McCarran Airport rainfall area.
☒	☐	A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
☒	☐	A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
☒	☐	Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
☒	☐	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 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.)
X	-	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. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
-	N/A	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
-	N/A	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

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LIST OF APPENDICES

Appendix A Drainage Exhibits

- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Panel Map
- Exhibit C – CCRFCD 2013 MPU Facilities Map
- Exhibit D – Soils Map
- Exhibit E – Developed Condition Drainage Map

Appendix B Hydrologic Computations

- Curve Number and Soil Data
- Standard Form 4 Computations
- Developed Condition HEC-1 Analysis

Appendix C Hydraulic Computations

- 100-Yr Interior Street Flow Computations
- 100-Yr Perimeter Street Flow Computations
- Drainage Swale Computations

Appendix D Finished Floor Analysis

Appendix E Reference Material

Update No.4 to the Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure, by SHG

- Approval Letters
- Referenced Drainage Exhibits
- Referenced Hydrologic Computations
- Referenced Hydraulic Computations
- Referenced Improvement Plans

Appendix F Reference Material

Technical Drainage Study for Skye Canyon – Parcel 2.21A, by SHG

- Approval Letters
- Referenced Drainage Exhibits
- Referenced Hydrologic Computations
- Referenced Hydraulic Computations

Appendix G Entitlement Information

Appendix H Improvement Plans and CD of Electronic Files

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Ninety-Five Management, LLC is proposing a single-family residential development, identified as *Skye Canyon Parcel 2.21B*, within the city limits of Las Vegas, Nevada. The proposed development is approximately 16 gross acres in area and located at the northeast corner of the intersection of Shaumber Road and Grand Teton Drive. Entitlement applications (TMP-73326 & PRJ-73201) for the development have been approved by the City of Las Vegas a copy of the notice of approval has been provided in Appendix G.

The proposed development is located within the master planned Skye Canyon property and specifically in the Phase 2 area supported by the *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure* (DS-4739). All roadways and perimeter drainage infrastructure required for development of Parcel 2.21B has been technically addressed in the Phase 2 Infrastructure drainage study. It is the objective of this study to show conformance to the drainage patterns established by the Phase 2 Infrastructure drainage study.

Additionally, the 1,662-acre Skye Canyon property has been master-planned and the pertinent *Update #3 to the Master Drainage Study for Skye Canyon (DS4420)* was conditionally approved by the City of Las Vegas on August 15, 2016. Parcel 2.21B has been proposed within the framework set forth in the Master Study.

1.2 Description of Improvements

The project is located within Township 19 South, Range 59 East and Section 12, identified by APN 126-12-410-001. Parcel 2.21B is bound by Parcel 2.23B to the north, Parcel 2.21A to the east, Grand Teton Drive to the south and Shaumber Road to the west. A location map identifying the site in relation to the major streets in the vicinity has been prepared as Exhibit A, included in Appendix A.

The single-phase project consists of construction of single-family residential lots averaging less than 6,000 ft² in area and all associated interior roadways. The typical interior roadway is proposed as a 37-ft and 47-ft wide private street with curb and gutters as approved with the Tentative Map. The adjacent perimeter roadways and storm drain facilities have been installed by the Phase 2 Infrastructure improvements and are considered existing and functioning for the development of Parcel 2.21B.

1.3 FEMA Flood Zone Designation

The Parcel 2.21B site boundary has been delineated on the current FEMA FIRM Panel Map 32003C1750E, dated September 27, 2002, illustrated as Exhibit B included in Appendix A. Per the FEMA FIRM Panel, the project site is located within a FEMA designated unshaded Zone 'X', defined as areas outside the 0.2% (500-year) annual chance floodplain. An unshaded Zone 'X' is located outside of a FEMA designated Special Flood Hazard Area (SFHA).

1.4 CCRFCD Facility Information

The project site has been delineated on the current 2013 Clark County Regional Flood Control District (CCRFCD) Las Vegas Valley Flood Control Master Plan Update (2013 MPU, Reference 1) facility figure as Exhibit C, included in Appendix A. Per the 2013 MPU, a CCRFCD regional facility alignment is located in Grand Teton Drive adjacent to Parcel 2.21B identified as CCRFCD Facility CNGT. Although the project site does not impact this regional facility, the following is a summary of facility alignment, per the 2013 MPU.

- CNGT 0118 located south of the project site. This facility is identified as an existing 6'x5' RCAP. Parcel 2.21B does not contribute any flows to this regional alignment.

1.5 Referenced Documents

The following documents have been utilized as reference materials in the preparation of this drainage study. The referenced documents have been reviewed and determined acceptable for reference. Slater Hanifan Group concurs with all referenced and adopted hydrologic and hydraulic analyses from the studies and the results established therein.

1. *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure, updates and addenda*, prepared by Slater Hanifan Group (hereinafter referred to as the Phase 2 Infrastructure Study, Reference 4), has technically designed the adjacent perimeter roadways and has been referenced for offsite basin flowrates and the existing condition of the project site. The Phase 2 Infrastructure Study has been referenced to show Parcel 2.21B development conformance to the drainage patterns for the perimeter infrastructure in order to prove that the development is in accordance with the master plan for the area. Note that multiple updates to the Infrastructure Study are not pertinent to the project site therefore, referenced material from the Infrastructure Study have been gathered from the latest and relevant submittals. Reference material from the Phase 2 Infrastructure Study have been included in Appendix E.
2. *Technical Drainage Study for Skye Canyon Parcel 2.21A, and addenda*, prepared by Slater Hanifan Group (hereinafter referred to as the Parcel 2.21A Study, Reference 5), has been referenced for the offsite basin flowrates and allowable downstream flowrate. Reference material from the Parcel 2.21A Study have been included in Appendix F.

The referenced Infrastructure Study improvements were shown to be in conformance with the master drainage patterns per the Master Study. The Master Drainage Study for Skye Canyon, updates and addenda, prepared by Slater Hanifan Group (hereinafter referred to as the Master Study, Reference 5), had conceptually master-planned the drainage improvements required for the current land plan on the entire Skye Canyon property. Therefore, if this study shows that Parcel 2.21B is in conformance with drainage patterns presented in the Phase 2 Infrastructure Study, then it is surmised that it is also in conformance with the Master Study. As a result, no reference computations from the Master Study is considered necessary in the preparation of this Parcel 2.21B technical study since the materials were already adopted by the Phase 2 Infrastructure Study.

2 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 Criteria and Drainage Design Manual (CCRFCD Manual, 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.

Precipitation:

The precipitation values have been referenced from the Phase 2 Infrastructure Study. The site is located outside of the McCarran Airport Rainfall Area. Per the CCRFCD Manual precipitation exhibits, the precipitation values utilized in this study's HEC-1 models are 3.00 and 1.67 inches for the 100-year and 10-year storm events respectively and have been referenced from the Parcel 2.21A Study. No drainage areas exceed 8 square miles, thus, the SDN 3 design storm distribution referenced from Table 503 of the CCRFCD Manual is used. Referenced precipitation data have been included in Appendix F.

Curve Number:

The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The soils information within the watershed was obtained from the NRCS Natural Resources Conservation Service of the Las Vegas Valley Area, Nevada, Part of Clark County (Soil Survey, Reference 3). This study's drainage basin lies partially within the following soil types delineated on Exhibit D, included in Appendix A:

- Soil 155 – Cave gravelly fine sandy loam, 4 to 15 percent slopes. This soil is composed of 100% HSG 'D'.
- Soil 191 – Dalian very cobbly fine sandy loam, 2 to 8 percent slopes. This soil is composed of 100% HSG 'A'.

A composite curve number for land use utilized in this study's hydrologic analysis has been obtained utilizing the percentage identified above, and the computations are included in Appendix B.

Note that this project proposes lots with an average size of <6,000 ft² in area and thus, utilizes a "Commercial" lot curve number per Foot Note 3 of the CCRFCD Manual Table 602A.

Lag Time:

The lag time is defined as the time measured from the center of mass of excess 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 & Criteria

Street Flow:

Street flows have been analyzed utilizing the FlowMaster Version v8i software by Haestad Methods. In accordance with the CCRFCD Manual, the following criteria apply:

- 10-year minor storm event: maximum flow depth of 1-ft from gutter flowline, and depth times velocity factor (DxV) not exceeding 6.
- 100-year major storm event: maximum flow depth of 2-ft from gutter flowline, and depth times velocity factor (DxV) not exceeding 8.

Drainage Swales:

Drainage swales have been analyzed utilizing the FlowMaster Version v8i software by Haestad Methods.

3 EXISTING DRAINAGE CONDITION

3.1 Definition/Discussion of Existing Condition

The existing condition considers the Phase 2 Infrastructure and Parcel 2.21A improvements, and perimeter roadways as existing; and the onsite as mass graded. Therefore, the perimeter roadways for Shaumber Road and Grand Teton Drive are considered as fully developed with storm drain improvements. The project site drains in an easterly direction towards an adjacent existing drainage easement at the northeast of the site (Parcel 2.21A improvements).

The site has been assessed by the Phase 2 Infrastructure study and Master study in the past. Since the existing drainage pattern of the site had been previously assessed and no changes have occurred onsite since the approval of the Phase 2 Infrastructure Study, no additional analyses of the existing condition will be necessary. Note also that the Master Study and the Phase 2 Infrastructure Study have established the required interim condition drainage patterns and allowable flow rates for conformance. Therefore, a site specific existing condition analysis is not necessary.

4 DEVELOPED DRAINAGE CONDITION

4.1 Definition of Developed Condition

The developed condition is defined as the existing condition, but with the project site fully constructed, inclusive of the proposed interior roadway infrastructure and utilities, and the entire offsite drainage area is considered developed.

The developed and the ultimate drainage conditions both consider the entire watershed as fully developed; therefore, a separate analysis for the future ultimate condition is not required.

4.2 Discussion of Developed Condition

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

Parcel 2.21B has been assessed as a single basin identified as WML11W. As planned by the Infrastructure Study and the SHG Master Study, Basin WML11W drains in a northeasterly direction to the proposed drainage easement. The proposed drainage easement drains onsite surface flows into the adjacent existing drainage easement per Parcel 2.21A, matching existing condition drainage patterns.

Flows in the perimeter roadways for Shaumber Road and Grand Teton Drive have been referenced from the Infrastructure Study. No changes have occurred for the developed roadways and therefore, the offsite flowrates remain acceptable for reference.

4.3 Summary of Developed Condition Flows

A summary of developed condition flowrates, as determined by the developed condition HEC-1 model and referenced basin flowrates are presented in a table on Exhibit E. Refer to Appendices A and B for Exhibit E and the developed condition HEC-1 model, respectively.

The onsite drainage basin has been divided into sub-basins to help quantify flows in the perimeter streets, onsite streets, alleys, and drainage easements to more accurately determine flow depths used for finished floor analysis. A summary of the sub-basin flows rates, as determined by proration method has been provided on Exhibit E included in Appendix A.

The proposed drainage patterns and conceptual flowrates considered from the previous site analysis remain in conformance with the Parcel 2.21A Study. Therefore, the project site improvements propose no negative downstream impacts as the project site remains in conformance with the Parcel 2.21A Study.

4.4 Summary of Developed Condition Street Flows

The flows in Shaumber Road and Grand Teton Drive have been referenced from the prior approved studies. The site will not discharge any surface flows into the perimeter streets therefore, the referenced flow is acceptable for reference. Onsite street and driveway alley flows have been quantified by subbasin prorated areas. A perimeter street section for Shaumber Road as well as several interior street and alley sections have been provided for the finished floor analysis.

Refer to the developed condition 100-year street flow summary table on Exhibit E for the summary of the street flow computations. The 10-yr street flow criteria are met in the 100-yr event and therefore additional computations for the 10-yr event are not necessary.

4.5 Summary of Drainage Facilities

Refer to Exhibit E in Appendix A for an illustrated of the location and summary tables of the proposed and existing drainage facilities in the vicinity of the site.

Existing Drainage Easement: An existing offsite drainage easement located northeast of the project site collects onsite surface runoff and drains east into the existing Parcel 2.21A. The anticipated flowrate for the existing drainage easement remains as analyzed per the Parcel 2.21A Study as the onsite surface runoff remains the same. Referenced Section *B is representative of the existing drainage easement section and has been summarized on Exhibit E included in Appendix A. Relevant reference material has been included in Appendix E.

Drainage Swale: A proposed drainage swale is located north of Lot 98. The swale conveys flows from Alley D north and east into Mercury Skye Street as surface flows. The swale has been analyzed as Section SW which provides containment of the localized flows. Hydraulic computations have been provided in Appendix C.

5 SUMMARY OF FINISHED FLOORS

The proposed finished floor elevations have been designed to satisfy the CCRFCD as well as the local City of Las Vegas flood protection criteria. The finished floors are elevated a minimum of 6-inches above the adjacent top of curb elevation measured at the high side of the lot.

In addition, all finished floors are adequately flood protected and elevated above twice the depth of flow in the adjacent street. Finished floors adjacent to surface drainage easements have also been elevated a minimum of 18-inches above the water surface elevation in the easement. Flow in the streets may tend to continue forward when the street turns, generating a deeper flow depth (specific energy depth). Therefore, lots in the path of this flow have been checked against the specific energy depth. The finished floor elevation assessments have been included in Appendix D.

6 CONCLUSIONS & RECOMMENDATIONS

1. The proposed improvements are not located within a FEMA designated SFHA.

2. The project is adjacent to the existing regional alignment of CNGT-0118 in Grand Teton Drive but does not discharge any flows to the regional facility.
3. The proposed drainage patterns are in conformance with the Phase 2 Infrastructure Study as well as the Master Study. It is anticipated that the Phase 2 Infrastructure improvements are in place and functioning prior to the start of Parcel 2.21B development.
4. Proposed street flow satisfy local and CCRFCD criteria.
5. Proposed finished floors are adequately flood protected meeting criteria against design flows.
6. The grading plans and detail sheets for this project have been included with this study. These plans support the drainage patterns and conclusions detailed in this study.

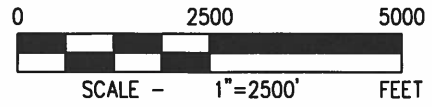
7 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. PBS&J, Louis Berger Group and Parsons Brinckerhoff, 2013.
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, Natural Resources Conservation Service, September 2016.
4. *Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure*; Slater Hanifan Group, June 2016.
5. *Technical Drainage Study for Skye Canyon Parcel 2.21A*; Slater Hanifan Group, April 2018.

APPENDIX A

Drainage Exhibits

j:\oly1725.000 skye canyon parcel 2.21b\drainage\technical study\figures\oly1725 tds exhibit a location map.dwg 6/5/2018 9:27 AM Jonathan Rocha



S-16
SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - PARCEL 2.21B
LOCATION MAP

DATE: JUNE 2018

DRAFTER: JSR

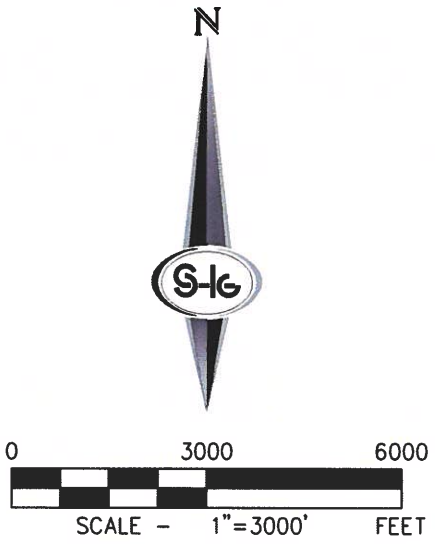
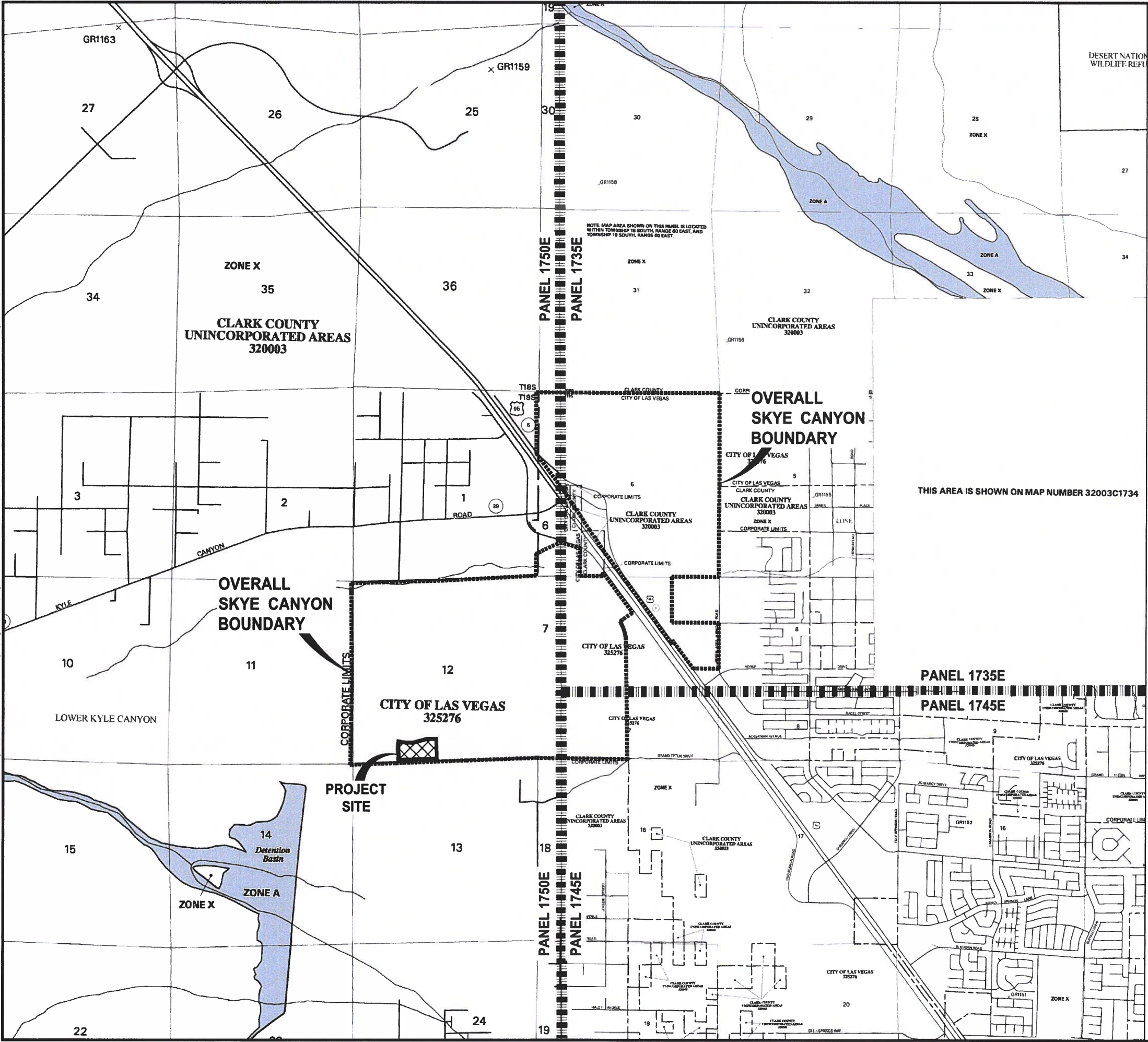
DESIGNER: JSR

CHECKED: SOA

PROJECT NO.
OLY1725.000

EXHIBIT A
SHEET 1 OF 1

j:\oly1725.000 skye canyon parcel 2.21b\drainage\technical study\figures\oly1725 tds exhibit b fema firm panel map.dwg 6/5/2018 9:19 AM Jonathan Rocha



PANEL 1750 E

FIRM FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1750 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

MAP NUMBER 32003C1750 E
MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

PANEL 1735 E

FIRM FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1735 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

MAP NUMBER 32003C1735 E
MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

PANEL 1745 E

FIRM FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 1745 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
CLARK COUNTY, NEVADA AND INCORPORATED AREAS

MAP NUMBER 32003C1745 E
MAP REVISED: SEPTEMBER 27, 2002

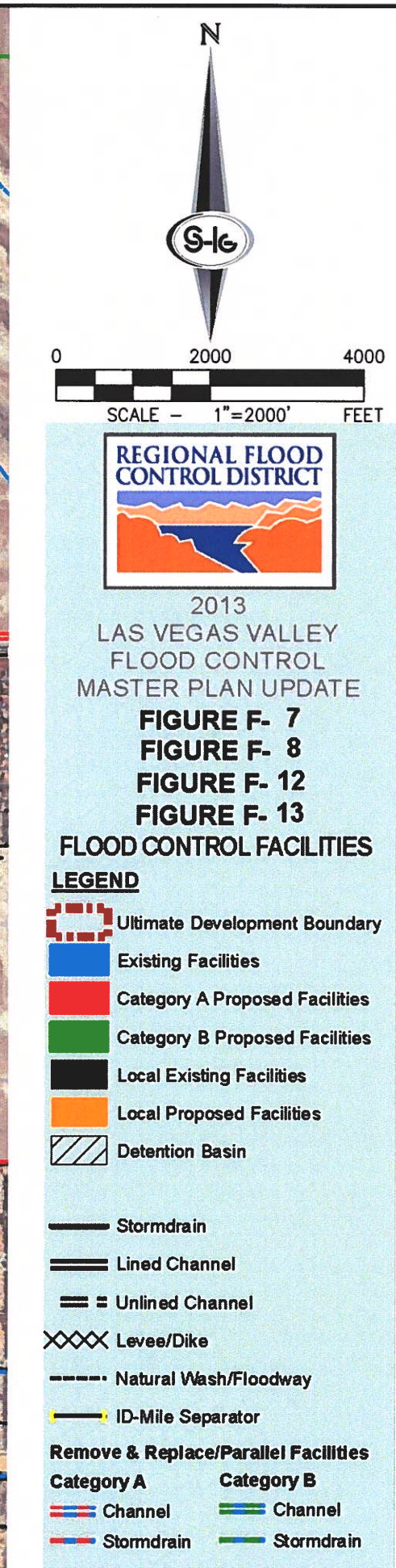
Federal Emergency Management Agency

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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP.	DATE

NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON - PARCEL 2.21B
FEMA FIRM MAP

DATE: JUNE 2018
DRAFTER: JSR
DESIGNER: JSR
CHECKED: SOA
PROJECT NO. OLY1725.000
EXHIBIT B
SHEET 1 OF 1



PROJECT SITE

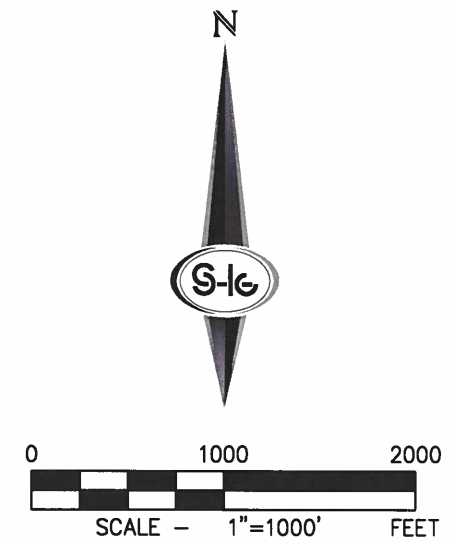
LEGEND

- BASIN BOUNDARY** (Hatched area)
- BASIN ID** (ID box)
- SOIL TYPE BOUNDARY** (Red line)

Scale: 0 1000 2000 FEET
SCALE - 1"=1000'

Soil Type Labels: 155, 191, 400

Basin ID: WML11W



LEGEND

	BASIN BOUNDARY
	BASIN ID
	SOIL TYPE BOUNDARY

PROJECT SITE

S-I-G
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[illegible]

NINETY-FIVE MANAGEMENT, LLC.

SKYE CANYON - PARCEL 2.21B

SOILS MAP

DATE:	JUNE 2018
DRAFTER:	JSR
DESIGNER:	JSR
CHECKED:	SOA
PROJECT NO.	OLY1725.000

EXHIBIT D
SHEET 1 OF 1

APPENDIX B

Hydrologic Analyses

Curve Number Data and Soil Data

Data:

Reference:

Exhibit D
NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
LV	155	Las Vegas Valley 2016	Cave gravelly fine sandy loam, 4 to 15 percent slopes	0%	0%	0%	100%
LV	191	Las Vegas Valley 2016	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	100%	0%	0%	0%

Land Use	A	B	C	D
Residential (<6,000 sf)*	89	92	94	95
Newly Graded	77	86	91	94
Desert Shrub (good)	49	68	79	84

*Commercial land use per Note 3

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP PERCENTS				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
WML11W	LV	155	65.1%	Residential (<6,000 sf)*	0%	0%	0%	100%	89	92	94	95	9.22	61.86
	LV	191	34.9%	Residential (<6,000 sf)*	100%	0%	0%	0%	89	92	94	95	4.94	31.05
TOTAL PERCENT			100.0%	TOTAL AREA & COMPOSITE CURVE NUMBER:									14.16	92.9



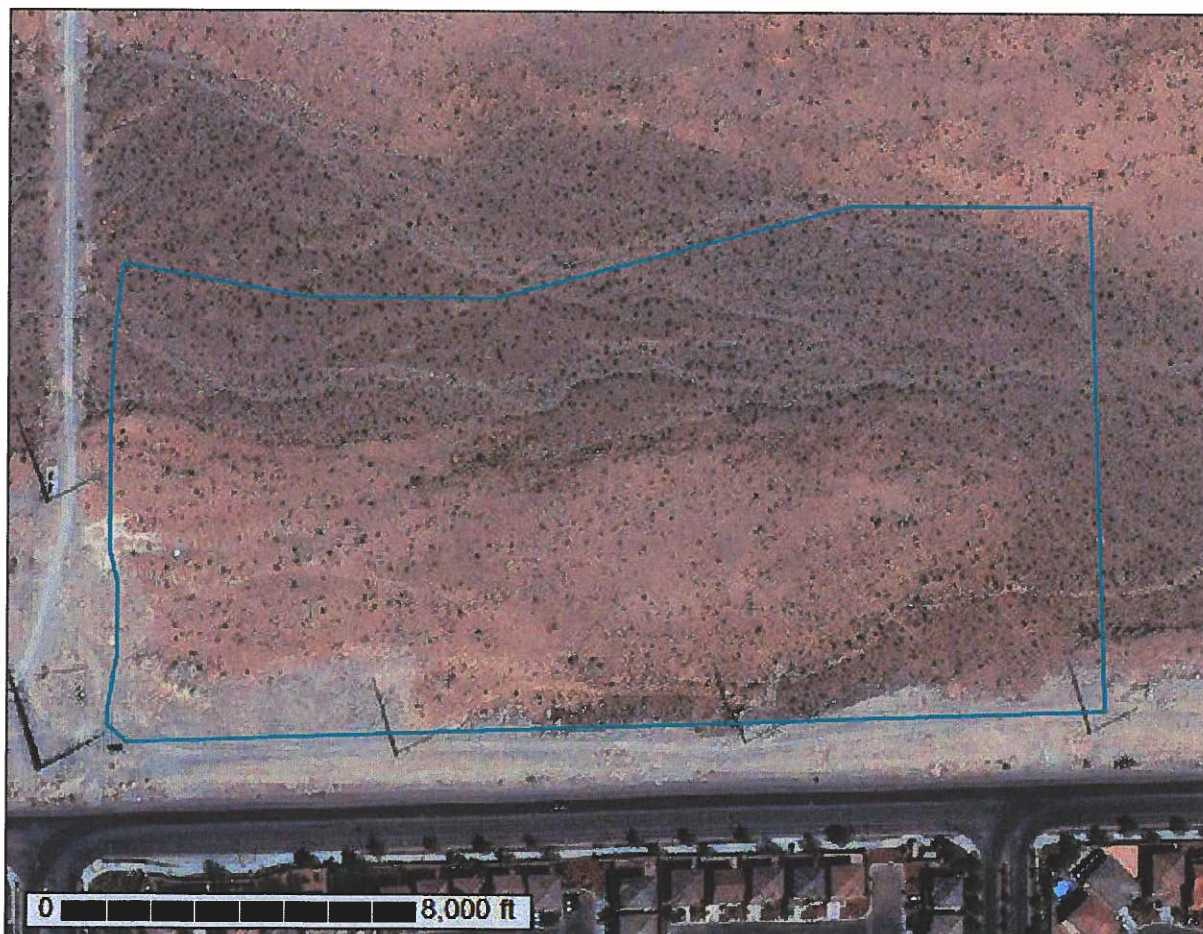
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

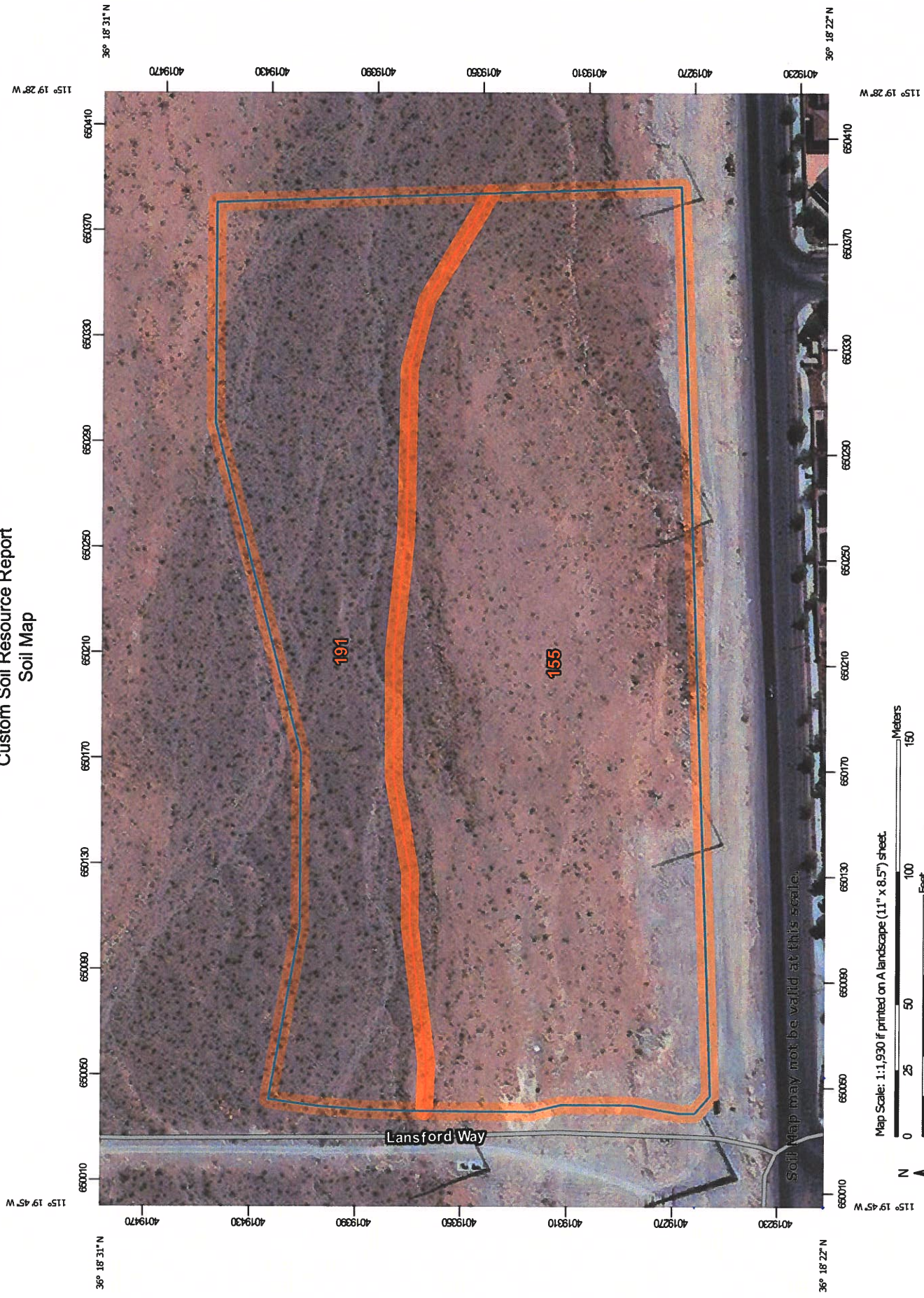
A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

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



June 5, 2018

Custom Soil Resource Report Soil Map



Map Scale: 1:1,930 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

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

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Other

Spill Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

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 12, Sep 15, 2017

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

Date(s) aerial images were photographed: Sep 19, 2015—Nov 23, 2016

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	9.2	65.2%
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	4.9	34.8%
Totals for Area of Interest		14.2	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,

Custom Soil Resource Report

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
Natural 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 in profile: 40 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: 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

191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrb4
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 61 to 66 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Dalian

Setting

Landform: Fan skirts
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolostone

Typical profile

H1 - 0 to 5 inches: very cobbly fine sandy loam
H2 - 5 to 60 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
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

Custom Soil Resource Report

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
191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes			
Dalian	100	Low	A

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Standard Form 4 Computations



Date: 5/25/2018

[illegible]

Developed Condition HEC-1 Analysis

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 25MAY18 TIME 15:28:23
*
*****
DEV.OUT
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
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X X XXXXXX XXXX X
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X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXX XXXX XXX

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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 ***

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*DIAGRAM
1 ID SKYE CANYON PARCEL 2.21B
2 ID TECHNICAL DRAINAGE STUDY
3 ID DEVELOPED CONDITION ANALYSIS
4 ID
5 ID RETURN PERIOD ----- 10- AND 100-YEAR
6 ID DISTRIBUTION ----- 6-HOUR SDN3
7 ID PROJECT NO. ----- OLY1725-000
8 ID FILENAME ----- DEV.H1
9 ID DATE ----- JUNE 2018
10 ID MODELED BY ----- JSR
11 ID
12 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
13 ID STORM EVENT RATIO
14 ID 100-YR 1.00
15 ID 10-YR 0.56
16 ID
17 IT 5 0 0 300
18 IO 5 0 0
19 IN 5 0 0
20 JR PREC 1.00 0.56
*
21 KK *ON1
22 KM REFERENCED BASIN
23 BA .0236
24 PB 3.000
25 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
26 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
27 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
28 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
29 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
30 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
31 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
32 PC 0.998 0.999 1
33 LS 0 92.4
34 UD .101
*
35 KK WML11W
36 KM ONSITE BASIN
37 BA .0221
38 LS 0 92.9
39 UD .109
*
40 KK *TRAIL
41 KM REFERENCED TRAIL BASIN
42 BA .0017
43 LS 0 81.6

```

44 UD .061
*

1

HEC-1 INPUT

PAGE 2

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

45 KK CP1
46 HC 3
*
47 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

21 *ON1
.
.
35 WML11W
.
.
40 *TRAIL
.
.
45 CP1.....

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 25MAY18 TIME 15:28:23 *

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

SKYE CANYON PARCEL 2.218
TECHNICAL DRAINAGE STUDY
DEVELOPED CONDITION ANALYSIS

RETURN PERIOD ----- 10- AND 100-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1725-000
FILENAME ----- DEV.H1
DATE ----- JUNE 2018
MODELED BY ----- JSR

SIX HOUR DEPTH-AREA REDUCTION FACTORS
STORM EVENT RATIO
100-YR 1.00
10-YR 0.56

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 .56

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	.56
HYDROGRAPH AT					
+	*ON1	.02	1 FLOW	45.	21.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	WML11W	.02	1 FLOW	41.	19.
			TIME	3.50	3.50
HYDROGRAPH AT					
+	*TRAIL	.00	1 FLOW	3.	1.
			TIME	3.50	3.50
3 COMBINED AT					
+	CP1	.05	1 FLOW	88.	41.
			TIME	3.50	3.50

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

APPENDIX C

Hydraulic Analyses

100-Yr Interior Street Flow Computations

Worksheet for Section 1 - 47' ROW 100-Yr

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.50 %
Discharge 41.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+23.50	0.50
0+40.00	0.17
0+40.00	0.13
0+41.50	0.00
0+41.50	0.48
0+42.00	0.50
0+47.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+40.00, 0.13)	0.016
(0+40.00, 0.13)	(0+47.00, 0.60)	0.013

Options

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

Worksheet for Section 1 - 47' ROW 100-Yr

Results

Normal Depth	0.66	ft
Elevation Range	0.00 to 0.60 ft	
Flow Area	13.67	ft²
Wetted Perimeter	48.18	ft
Hydraulic Radius	0.28	ft
Top Width	47.00	ft
Normal Depth	0.66	ft
Critical Depth	0.65	ft
Critical Slope	0.00522	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	0.80	ft
Froude Number	0.98	
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	0.66	ft
Critical Depth	0.65	ft
Channel Slope	0.50	%
Critical Slope	0.00522	ft/ft

Cross Section for Section 1 - 47' ROW 100-Yr

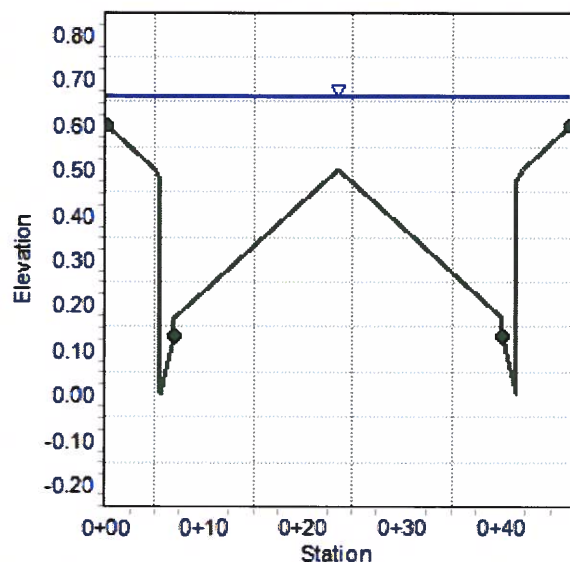
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50	%
Normal Depth	0.66	ft
Discharge	41.00	ft ³ /s

Cross Section Image



Worksheet for Section 2 - 26' ROW 100-Yr Drive Aisle (Min%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 3.26 %
Discharge 11.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.36	0.38
0+01.34	0.06
0+01.34	0.00
0+02.50	0.13
0+02.50	0.17
0+25.50	0.63
0+26.00	0.64

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+25.50, 0.63)	0.016
(0+25.50, 0.63)	(0+26.00, 0.64)	0.013

Options

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

Results

Normal Depth 0.43 ft
Elevation Range 0.00 to 0.64 ft
Flow Area 2.28 ft²

Worksheet for Section 2 - 26' ROW 100-Yr Drive Aisle (Min%)

Results

Wetted Perimeter	15.53	ft
Hydraulic Radius	0.15	ft
Top Width	15.32	ft
Normal Depth	0.43	ft
Critical Depth	0.54	ft
Critical Slope	0.00608	ft/ft
Velocity	4.82	ft/s
Velocity Head	0.36	ft
Specific Energy	0.79	ft
Froude Number	2.20	
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	0.43	ft
Critical Depth	0.54	ft
Channel Slope	3.26	%
Critical Slope	0.00608	ft/ft

Cross Section for Section 2 - 26' ROW 100-Yr Drive Aisle (Min%)

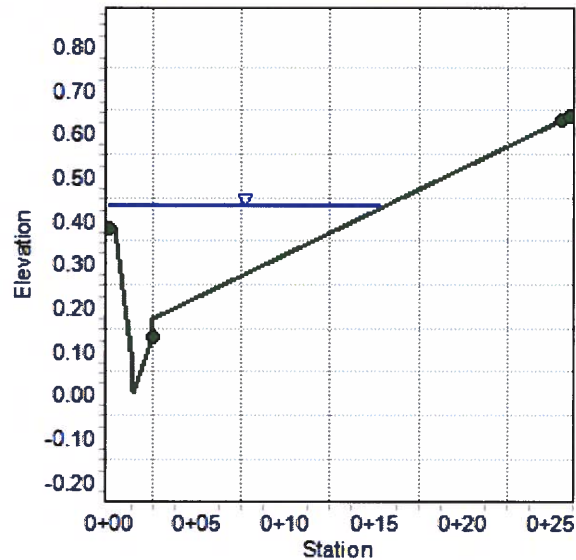
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	3.26	%
Normal Depth	0.43	ft
Discharge	11.00	ft ³ /s

Cross Section Image



Worksheet for Section 2 - 26' ROW 100-Yr Drive Aisle (Max%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 5.04 %
Discharge 11.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.36	0.38
0+01.34	0.06
0+01.34	0.00
0+02.50	0.13
0+02.50	0.17
0+25.50	0.63
0+26.00	0.64

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+25.50, 0.63)	0.016
(0+25.50, 0.63)	(0+26.00, 0.64)	0.013

Options

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

Results

Normal Depth 0.40 ft
Elevation Range 0.00 to 0.64 ft
Flow Area 1.94 ft²

Worksheet for Section 2 - 26' ROW 100-Yr Drive Aisle (Max%)

Results

Wetted Perimeter	14.35	ft
Hydraulic Radius	0.14	ft
Top Width	14.17	ft
Normal Depth	0.40	ft
Critical Depth	0.54	ft
Critical Slope	0.00605	ft/ft
Velocity	5.67	ft/s
Velocity Head	0.50	ft
Specific Energy	0.90	ft
Froude Number	2.70	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.54	ft
Channel Slope	5.04	%
Critical Slope	0.00605	ft/ft

Cross Section for Section 2 - 26' ROW 100-Yr Drive Aisle (Max%)

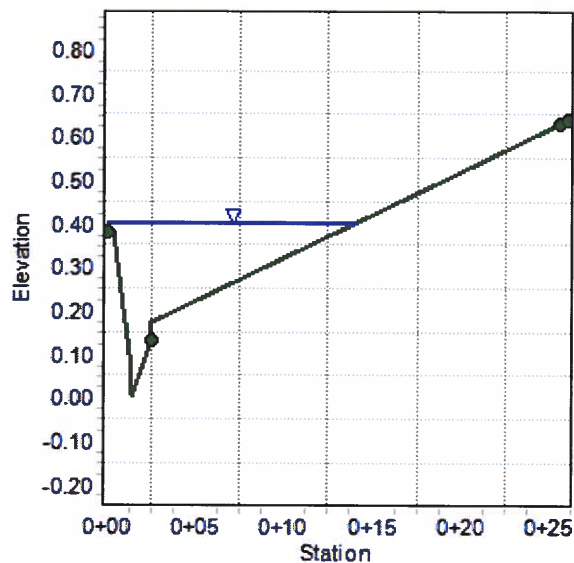
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 5.04 %
Normal Depth 0.40 ft
Discharge 11.00 ft³/s

Cross Section Image



Worksheet for Section 3 - 26' ROW 100-Yr (Min%) (Inverted Crown)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 3.66 %
Discharge 41.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.55
0+00.36	0.55
0+01.33	0.23
0+01.33	0.17
0+02.50	0.30
0+02.50	0.34
0+13.00	0.13
0+15.00	0.00
0+17.00	0.13
0+27.50	0.34
0+27.50	0.30
0+28.67	0.17
0+28.67	0.23
0+29.64	0.55
0+30.00	0.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.55)	(0+02.50, 0.30)	0.013
(0+02.50, 0.30)	(0+27.50, 0.30)	0.016
(0+27.50, 0.30)	(0+30.00, 0.55)	0.013

Options

Current Roughness Weighted Method Pavlovskii's Method

Worksheet for Section 3 - 26' ROW 100-Yr (Min%) (Inverted Crown)

Options

Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.43	ft
Elevation Range	0.00 to 0.55 ft		
Flow Area		6.25	ft ²
Wetted Perimeter		28.87	ft
Hydraulic Radius		0.22	ft
Top Width		28.58	ft
Normal Depth		0.43	ft
Critical Depth		0.62	ft
Critical Slope		0.00499	ft/ft
Velocity		6.56	ft/s
Velocity Head		0.67	ft
Specific Energy		1.10	ft
Froude Number		2.47	
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	0.43	ft
Critical Depth	0.62	ft
Channel Slope	3.66	%
Critical Slope	0.00499	ft/ft

Cross Section for Section 3 - 26' ROW 100-Yr (Min%) (Inverted Crown)

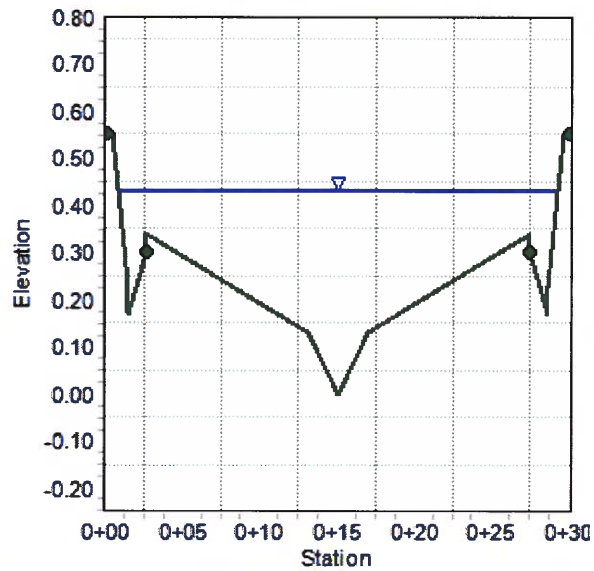
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 3.66 %
Normal Depth 0.43 ft
Discharge 41.00 ft³/s

Cross Section Image



Worksheet for Section 3 - 26' ROW 100-Yr (Max%) (Inverted Crown)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 4.90 %
Discharge 41.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.55
0+00.36	0.55
0+01.33	0.23
0+01.33	0.17
0+02.50	0.30
0+02.50	0.34
0+13.00	0.13
0+15.00	0.00
0+17.00	0.13
0+27.50	0.34
0+27.50	0.30
0+28.67	0.17
0+28.67	0.23
0+29.64	0.55
0+30.00	0.55

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.55)	(0+02.50, 0.30)	0.013
(0+02.50, 0.30)	(0+27.50, 0.30)	0.016
(0+27.50, 0.30)	(0+30.00, 0.55)	0.013

Options

Current Roughness weighted Pavlovskii's Method
Method

Worksheet for Section 3 - 26' ROW 100-Yr (Max%) (Inverted Crown)

Options

Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.42	ft
Elevation Range	0.00 to 0.55	ft
Flow Area	5.72	ft ²
Wetted Perimeter	28.75	ft
Hydraulic Radius	0.20	ft
Top Width	28.46	ft
Normal Depth	0.42	ft
Critical Depth	0.62	ft
Critical Slope	0.00500	ft/ft
Velocity	7.17	ft/s
Velocity Head	0.80	ft
Specific Energy	1.21	ft
Froude Number	2.82	
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	0.42	ft
Critical Depth	0.62	ft
Channel Slope	4.90	%
Critical Slope	0.00500	ft/ft

Project Description

Manning Formula

Normal Depth

1.11 %

20.00 ft³/s

Station (ft)

Elevation (ft)

0+00.00	0.49
0+05.00	0.39
0+05.00	0.39
0+05.36	0.39
0+06.33	0.07
0+06.33	0.01
0+07.50	0.14
0+07.50	0.18
0+24.00	0.51
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48
0+43.00	0.50
0+43.00	0.50
0+43.00	0.50
0+48.00	0.60

Start Station

Ending Station

Roughness Coefficient

(0+00.00, 0.49)	(0+07.50, 0.14)	0.013
(0+07.50, 0.14)	(0+41.00, 0.13)	0.016
(0+41.00, 0.13)	(0+48.00, 0.60)	0.013

Worksheet for Section 4 - 48' ROW 100-Yr (L+Mod Roll)

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	0.49	ft
Elevation Range	0.00 to 0.60	ft
Flow Area	6.64	ft ²
Wetted Perimeter	41.48	ft
Hydraulic Radius	0.16	ft
Top Width	40.79	ft
Normal Depth	0.49	ft
Critical Depth	0.53	ft
Critical Slope	0.00615	ft/ft
Velocity	3.01	ft/s
Velocity Head	0.14	ft
Specific Energy	0.63	ft
Froude Number	1.32	
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	0.49	ft
Critical Depth	0.53	ft
Channel Slope	1.11	%
Critical Slope	0.00615	ft/ft

Cross Section for Section 4 - 48' ROW 100-Yr (L+Mod Roll)

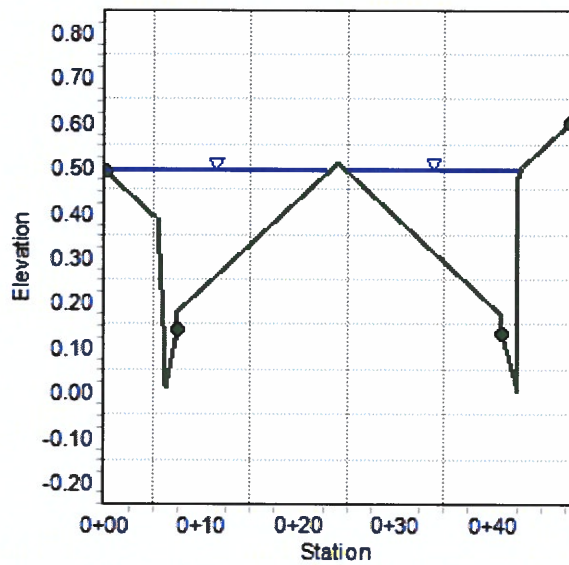
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.11	%
Normal Depth	0.49	ft
Discharge	20.00	ft ³ /s

Cross Section Image



Worksheet for Section 5 - 37' ROW 100-Yr (Min%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.74 %
Discharge 20.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+18.50	0.50
0+35.00	0.17
0+35.00	0.13
0+36.50	0.00
0+36.50	0.48
0+37.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+35.00, 0.13)	0.016
(0+35.00, 0.13)	(0+37.00, 0.50)	0.013

Options

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

Worksheet for Section 5 - 37' ROW 100-Yr (Min%)

Results

Normal Depth		0.52	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		7.33	ft ²
Wetted Perimeter		38.09	ft
Hydraulic Radius		0.19	ft
Top Width		37.00	ft
Normal Depth		0.52	ft
Critical Depth		0.53	ft
Critical Slope		0.00625	ft/ft
Velocity		2.73	ft/s
Velocity Head		0.12	ft
Specific Energy		0.63	ft
Froude Number		1.08	
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	0.52	ft
Critical Depth	0.53	ft
Channel Slope	0.74	%
Critical Slope	0.00625	ft/ft

Cross Section for Section 5 - 37' ROW 100-Yr (Min%)

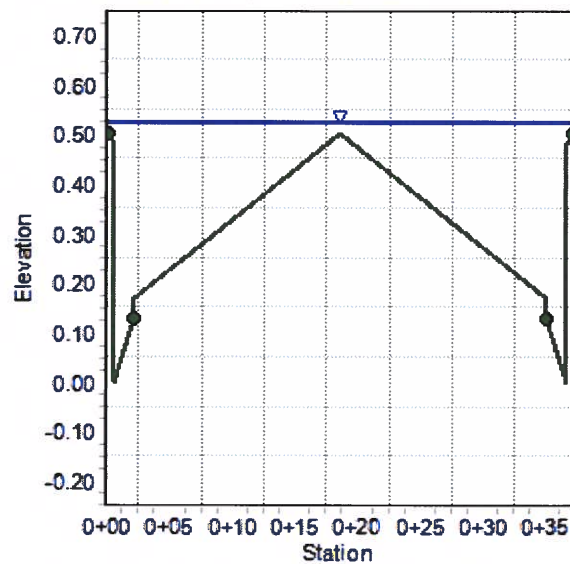
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.74	%
Normal Depth	0.52	ft
Discharge	20.00	ft ³ /s

Cross Section Image



Worksheet for Section 5 - 37' ROW 100-Yr (Max%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.44 %
Discharge 20.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+18.50	0.50
0+35.00	0.17
0+35.00	0.13
0+36.50	0.00
0+36.50	0.48
0+37.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+35.00, 0.13)	0.016
(0+35.00, 0.13)	(0+37.00, 0.50)	0.013

Options

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

Worksheet for Section 5 - 37' ROW 100-Yr (Max%)

Results

Normal Depth		0.47	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		5.76	ft²
Wetted Perimeter		34.19	ft
Hydraulic Radius		0.17	ft
Top Width		33.15	ft
Normal Depth		0.47	ft
Critical Depth		0.53	ft
Critical Slope		0.00629	ft/ft
Velocity		3.47	ft/s
Velocity Head		0.19	ft
Specific Energy		0.66	ft
Froude Number		1.47	
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	0.47	ft
Critical Depth	0.53	ft
Channel Slope	1.44	%
Critical Slope	0.00629	ft/ft

Cross Section for Section 5 - 37' ROW 100-Yr (Max%)

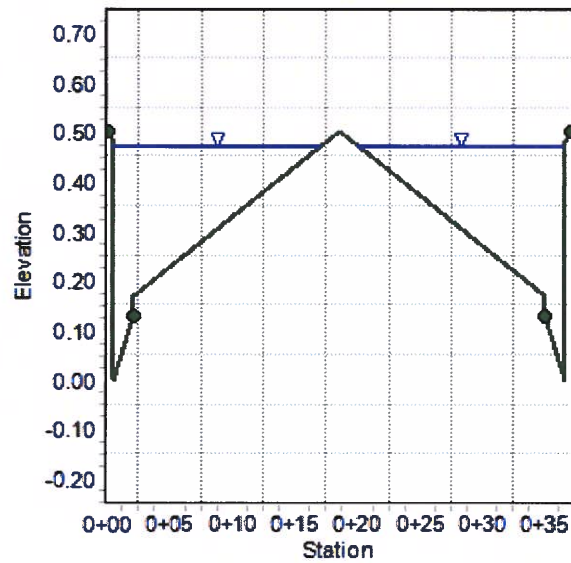
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.44	%
Normal Depth	0.47	ft
Discharge	20.00	ft ³ /s

Cross Section Image



Worksheet for Section 6 - 26' ROW 100-Yr Drive Aisle

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.67 %
Discharge 1.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.36	0.38
0+01.34	0.06
0+01.34	0.00
0+02.50	0.13
0+02.50	0.17
0+25.50	0.63
0+26.00	0.64

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+25.50, 0.63)	0.016
(0+25.50, 0.63)	(0+26.00, 0.64)	0.013

Options

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

Results

Normal Depth 0.24 ft
Elevation Range 0.00 to 0.64 ft
Flow Area 0.36 ft²

Worksheet for Section 6 - 26' ROW 100-Yr Drive Aisle

Results

Wetted Perimeter	5.24	ft
Hydraulic Radius	0.07	ft
Top Width	5.10	ft
Normal Depth	0.24	ft
Critical Depth	0.28	ft
Critical Slope	0.00771	ft/ft
Velocity	2.74	ft/s
Velocity Head	0.12	ft
Specific Energy	0.35	ft
Froude Number	1.81	
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	0.24	ft
Critical Depth	0.28	ft
Channel Slope	2.67	%
Critical Slope	0.00771	ft/ft

Cross Section for Section 6 - 26' ROW 100-Yr Drive Aisle

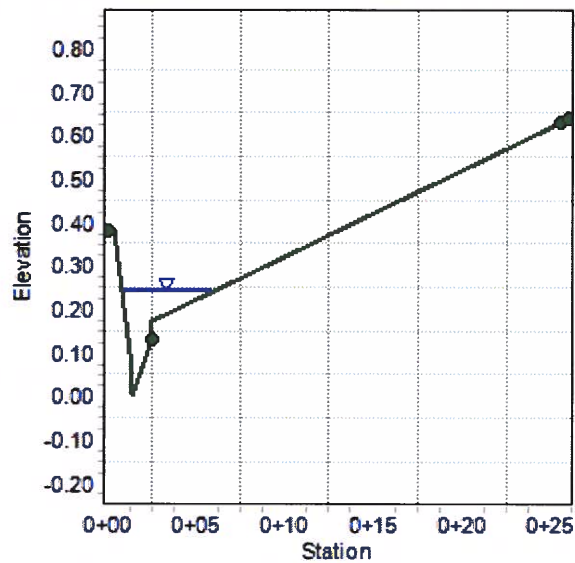
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.67 %
Normal Depth 0.24 ft
Discharge 1.00 ft³/s

Cross Section Image



Worksheet for Section 7 - 47' ROW 100-Yr (Min%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 3.86 %
Discharge 20.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+23.50	0.50
0+40.00	0.17
0+40.00	0.13
0+41.50	0.00
0+41.50	0.48
0+42.00	0.50
0+47.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+40.00, 0.13)	0.016
(0+40.00, 0.13)	(0+47.00, 0.60)	0.013

Options

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

Worksheet for Section 7 - 47' ROW 100-Yr (Min%)

Results

Normal Depth		0.41	ft
Elevation Range	0.00 to 0.60 ft		
Flow Area		3.96	ft ²
Wetted Perimeter		28.07	ft
Hydraulic Radius		0.14	ft
Top Width		27.15	ft
Normal Depth		0.41	ft
Critical Depth		0.53	ft
Critical Slope		0.00632	ft/ft
Velocity		5.06	ft/s
Velocity Head		0.40	ft
Specific Energy		0.81	ft
Froude Number		2.33	
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	0.41	ft
Critical Depth	0.53	ft
Channel Slope	3.86	%
Critical Slope	0.00632	ft/ft

Worksheet for Section 7 - 47' ROW 100-Yr (Max%)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 4.50 %
Discharge 20.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.60
0+05.00	0.50
0+05.50	0.48
0+05.50	0.00
0+07.00	0.13
0+07.00	0.17
0+23.50	0.50
0+40.00	0.17
0+40.00	0.13
0+41.50	0.00
0+41.50	0.48
0+42.00	0.50
0+47.00	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.60)	(0+07.00, 0.13)	0.013
(0+07.00, 0.13)	(0+40.00, 0.13)	0.016
(0+40.00, 0.13)	(0+47.00, 0.60)	0.013

Options

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

Worksheet for Section 7 - 47' ROW 100-Yr (Max%)

Results

Normal Depth	0.40	ft
Elevation Range	0.00 to 0.60 ft	
Flow Area	3.73	ft ²
Wetted Perimeter	27.21	ft
Hydraulic Radius	0.14	ft
Top Width	26.31	ft
Normal Depth	0.40	ft
Critical Depth	0.53	ft
Critical Slope	0.00631	ft/ft
Velocity	5.36	ft/s
Velocity Head	0.45	ft
Specific Energy	0.85	ft
Froude Number	2.51	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.40	ft
Critical Depth	0.53	ft
Channel Slope	4.50	%
Critical Slope	0.00631	ft/ft

Cross Section for Section 7 - 47' ROW 100-Yr (Max%)

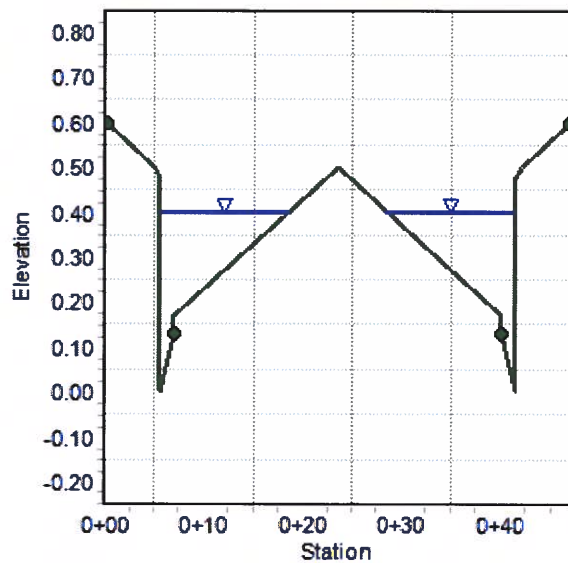
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	4.50	%
Normal Depth	0.40	ft
Discharge	20.00	ft ³ /s

Cross Section Image



100-Yr Perimeter Street Flow Computations

Project Description

Solve For	Normal Depth
-----------	--------------

Discharge	4.00	ft ³ /s
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Section Definitions

Station (ft)	Elevation (ft)
0+40.00	0.55
0+65.00	0.17
0+65.00	0.13
0+67.00	0.00
0+67.00	0.48
0+67.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+40.00, 0.55)	(0+65.00, 0.13)	0.016
(0+65.00, 0.13)	(0+67.00, 0.50)	0.013

Closed Channel Weighting Method	Pavlovskii's Method
$W_{\text{max}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$	$W_{\text{max}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
$W_{\text{min}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$	$W_{\text{min}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
$W_{\text{avg}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$	$W_{\text{avg}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
$W_{\text{std}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$	$W_{\text{std}} = \frac{1}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$

Results

Normal Depth		0.37	ft
Elevation Range	0.00 to 0.55 ft		
Flow Area		1.91	ft²
Wetted Perimeter		15.50	ft
Hydraulic Radius		0.12	ft
Top Width		15.09	ft

Worksheet for Section SH1 - 80' ROW 100-Yr

Results

Normal Depth	0.37	ft
Critical Depth	0.37	ft
Critical Slope	0.00727	ft/ft
Velocity	2.09	ft/s
Velocity Head	0.07	ft
Specific Energy	0.44	ft
Froude Number	1.04	
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	0.37	ft
Critical Depth	0.37	ft
Channel Slope	0.79	%
Critical Slope	0.00727	ft/ft

Cross Section for Section SH1 - 80' ROW 100-Yr

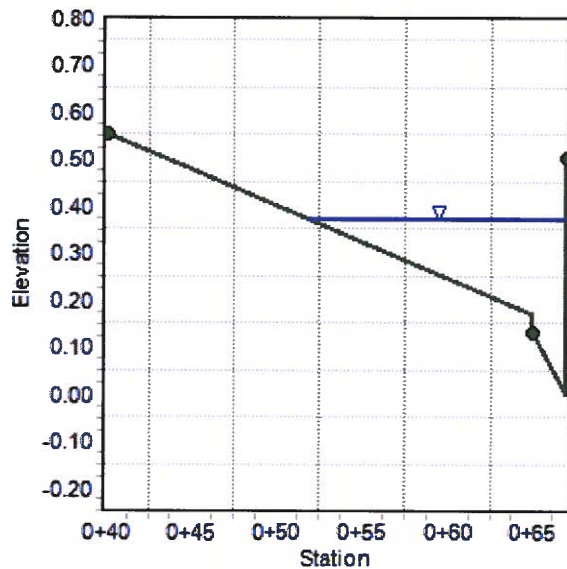
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.79	%
Normal Depth	0.37	ft
Discharge	4.00	ft ³ /s

Cross Section Image



Drainage Swale Computations

Worksheet for Section SW - Triangular Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.50 %
Left Side Slope	4.00 ft/ft (H:V)
Right Side Slope	4.00 ft/ft (H:V)
Discharge	1.00 ft ³ /s

Results

Normal Depth	0.42 ft
Flow Area	0.69 ft ²
Wetted Perimeter	3.43 ft
Hydraulic Radius	0.20 ft
Top Width	3.33 ft
Critical Depth	0.33 ft
Critical Slope	0.01730 ft/ft
Velocity	1.45 ft/s
Velocity Head	0.03 ft
Specific Energy	0.45 ft
Froude Number	0.56
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	0.42 ft
Critical Depth	0.33 ft
Channel Slope	0.50 %
Critical Slope	0.01730 ft/ft

Cross Section for Section SW - Triangular Channel

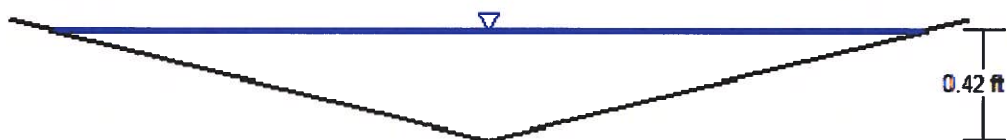
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	0.50 %
Normal Depth	0.42 ft
Left Side Slope	4.00 ft/ft (H:V)
Right Side Slope	4.00 ft/ft (H:V)
Discharge	1.00 ft ³ /s

Cross Section Image



V: 1
H: 1

APPENDIX D

Finished Floor Analysis

SKYE CANYON PARCEL 2.21B - TDS FINISH 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
1	2	3016.66	3016.28	0.43	3017.14	3017.16	3018.3	OK	OK	
2	2	3015.12	3014.74	0.43	3015.60	3015.62	3016.7	OK	OK	
3	2	3013.50	3013.12	0.43	3013.98	3014.00	3015.1	OK	OK	
4	2	3011.88	3011.50	0.43	3012.36	3012.38	3013.5	OK	OK	
5	2	3010.26	3009.88	0.43	3010.74	3010.76	3011.9	OK	OK	
6	2	3008.32	3007.94	0.43	3008.80	3008.82	3009.9	OK	OK	
7	2	3006.87	3006.49	0.43	3007.35	3007.37	3008.5	OK	OK	
8	2	3005.43	3005.05	0.43	3005.91	3005.93	3007.0	OK	OK	
9	2	3003.98	3003.60	0.43	3004.46	3004.48	3005.6	OK	OK	
10	2	3002.53	3002.15	0.43	3003.01	3003.03	3004.1	OK	OK	
11	2	3001.09	3000.71	0.43	3001.57	3001.59	3002.7	OK	OK	
12	2	2999.23	2998.85	0.43	2999.71	2999.73	3000.8	OK	OK	
13	2	2997.78	2997.40	0.43	2998.26	2998.28	2999.4	OK	OK	
14	2	2996.33	2995.95	0.43	2996.81	2996.83	2997.9	OK	OK	
15	2	2994.89	2994.51	0.43	2995.37	2995.39	2996.5	OK	OK	
16	2	2993.44	2993.06	0.43	2993.92	2993.94	2995.0	OK	OK	
17	2	2991.22	2990.84	0.43	2991.70	2991.72	2992.8	OK	OK	
18	2	2989.73	2989.35	0.43	2990.21	2990.23	2991.3	OK	OK	
19	2	2988.16	2987.78	0.43	2988.64	2988.66	2989.8	OK	OK	
20	2	2986.59	2986.21	0.43	2987.07	2987.09	2988.2	OK	OK	
21	2	2984.56	2984.18	0.43	2985.04	2985.06	2986.2	OK	OK	
22	2	2982.99	2982.61	0.43	2983.47	2983.49	2984.6	OK	OK	
23	2	2981.42	2981.04	0.43	2981.90	2981.92	2983.0	OK	OK	
24	2	2979.85	2979.47	0.43	2980.33	2980.35	2981.5	OK	OK	
25	2	2978.27	2977.89	0.43	2978.75	2978.77	2979.9	OK	OK	
26	2	2976.48	2976.10	0.43	2976.96	2976.98	2978.4	OK	OK	
27	2	2976.69	2976.31	0.43	2977.17	2977.19	2978.6	OK	OK	
28	2	2976.89	2976.51	0.43	2977.37	2977.39	2978.5	OK	OK	
29	2	2976.63	2976.25	0.43	2977.11	2977.13	2978.6	OK	OK	
30	2	2976.45	2976.07	0.43	2976.93	2976.95	2978.4	OK	OK	
31	2	2976.25	2975.87	0.43	2976.73	2976.75	2978.2	OK	OK	
32	2	2978.53	2978.15	0.43	2979.01	2979.03	2979.3	OK	OK	
33	2	2980.06	2979.68	0.43	2980.54	2980.56	2980.8	OK	OK	

SKYE CANYON PARCEL 2.21B - TDS FINISH 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
34	2	2981.63	2981.25	0.43	2982.11	2982.13	2982.4	OK	OK	
35	2	2983.20	2982.82	0.43	2983.68	2983.70	2983.9	OK	OK	
36	2	2984.78	2984.40	0.43	2985.26	2985.28	2985.5	OK	OK	
37	2	2986.80	2986.42	0.43	2987.28	2987.30	2987.5	OK	OK	
38	2	2988.37	2987.99	0.43	2988.85	2988.87	2989.1	OK	OK	
39	2	2989.97	2989.59	0.43	2990.45	2990.47	2990.7	OK	OK	
40	2	2991.63	2991.25	0.43	2992.11	2992.13	2992.4	OK	OK	
41	2	2992.90	2992.52	0.43	2993.38	2993.40	2994.1	OK	OK	
42	2	2994.19	2993.81	0.43	2994.67	2994.69	2995.5	OK	OK	
43	2	2995.64	2995.26	0.43	2996.12	2996.14	2996.9	OK	OK	
44	2	2997.09	2996.71	0.43	2997.57	2997.59	2998.3	OK	OK	
45	2	2998.95	2998.57	0.43	2999.43	2999.45	3000.1	OK	OK	
46	2	3000.39	3000.01	0.43	3000.87	3000.89	3001.4	OK	OK	
47	2	3001.84	3001.46	0.43	3002.32	3002.34	3002.8	OK	OK	
48	2	3003.29	3002.91	0.43	3003.77	3003.79	3004.3	OK	OK	
49	2	3005.15	3004.77	0.43	3005.63	3005.65	3006.0	OK	OK	
50	2	3006.59	3006.21	0.43	3007.07	3007.09	3007.5	OK	OK	
51	2	3008.04	3007.66	0.43	3008.52	3008.54	3008.9	OK	OK	
52	2	3009.28	3008.90	0.43	3009.76	3009.78	3010.0	OK	OK	
53	2	3013.31	3012.93	0.43	3013.79	3013.81	3014.9	OK	OK	
54	2	3014.93	3014.55	0.43	3015.41	3015.43	3016.5	OK	OK	
55	2	3016.40	3016.02	0.43	3016.88	3016.90	3018.0	OK	OK	
56	4	3010.01	3009.63	0.49	3010.61	3010.51	3012.0	OK	OK	
57	4	3010.23	3009.85	0.49	3010.83	3010.73	3012.1	OK	OK	
58	4	3010.68	3010.30	0.49	3011.28	3011.18	3012.3	OK	OK	
59	4	3011.07	3010.69	0.49	3011.67	3011.57	3012.8	OK	OK	
60	2	3013.55	3013.17	0.43	3014.03	3014.05	3015.3	OK	OK	
61	2	3014.96	3014.58	0.43	3015.44	3015.46	3016.7	OK	OK	
62	2	3016.00	3015.62	0.43	3016.48	3016.50	3017.7	OK	OK	
63	4	3011.56	3011.18	0.49	3012.16	3012.06	3013.4	OK	OK	
64	2	3011.28	3010.90	0.43	3011.76	3011.78	3013.0	OK	OK	
65	2	3009.88	3009.50	0.43	3010.36	3010.38	3011.6	OK	OK	
66	2	3008.13	3007.75	0.43	3008.61	3008.63	3009.7	OK	OK	

SKYE CANYON PARCEL 2.21B - TDS FINISH 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
67	2	3006.39	3006.01	0.43	3006.87	3006.89	3008.0	OK	OK	
68	2	3004.14	3003.76	0.43	3004.62	3004.64	3005.7	OK	OK	
69	2	3002.40	3002.02	0.43	3002.88	3002.90	3004.0	OK	OK	
70	2	3000.66	3000.28	0.43	3001.14	3001.16	3002.3	OK	OK	
71	2	2998.91	2998.53	0.43	2999.39	2999.41	3000.5	OK	OK	
72	2	2995.83	2995.45	0.43	2996.31	2996.33	2997.4	OK	OK	
73	2	2994.09	2993.71	0.43	2994.57	2994.59	2995.7	OK	OK	
74	2	2991.85	2991.47	0.43	2992.33	2992.35	2993.5	OK	OK	
75	2	2990.10	2989.72	0.43	2990.58	2990.60	2991.7	OK	OK	
76	2	2988.36	2987.98	0.43	2988.84	2988.86	2990.0	OK	OK	
77	2	2986.62	2986.24	0.43	2987.10	2987.12	2988.2	OK	OK	
78	2	2984.87	2984.49	0.43	2985.35	2985.37	2986.5	OK	OK	
79	2	2982.63	2982.25	0.43	2983.11	2983.13	2984.2	OK	OK	
80	2	2980.89	2980.51	0.43	2981.37	2981.39	2982.5	OK	OK	
81	2	2979.14	2978.76	0.43	2979.62	2979.64	2980.7	OK	OK	
82	2	2977.40	2977.02	0.43	2977.88	2977.90	2979.0	OK	OK	
83	2	2975.80	2975.42	0.43	2976.28	2976.30	2977.4	OK	OK	
84	3	2974.16	2973.78	0.37	2974.52	2974.66	2975.8	OK	OK	
85	1	2972.65	2972.27	0.66	2973.59	2973.15	2974.5	OK	OK	
86	1	2972.20	2971.82	0.66	2973.14	2972.70	2973.9	OK	OK	
87	3	2971.22	2970.84	0.37	2971.58	2971.72	2972.9	OK	OK	
88	3	2970.22	2969.84	0.37	2970.58	2970.72	2971.8	OK	OK	
89	3	2968.58	2968.20	0.37	2968.94	2969.08	2970.2	OK	OK	
90	3	2968.41	2968.03	0.37	2968.77	2968.91	2969.8	OK	OK	
91	3	2970.05	2969.67	0.37	2970.41	2970.55	2971.4	OK	OK	
92	3	2971.72	2971.34	0.37	2972.08	2972.22	2973.1	OK	OK	
93	2	2975.15	2974.77	0.43	2975.63	2975.65	2976.1	OK	OK	
94	2	2975.36	2974.98	0.43	2975.84	2975.86	2976.3	OK	OK	
95	2	2975.56	2975.18	0.43	2976.04	2976.06	2976.5	OK	OK	
96	6	2978.95	2978.57	0.24	2979.05	2979.45	2979.7	OK	OK	
97	6	2978.95	2978.57	0.24	2979.05	2979.45	2979.7	OK	OK	
98	6	2978.06	2977.68	0.24	2978.16	2978.56	2978.8	OK	OK	
99	6	2979.31	2978.93	0.24	2979.41	2979.81	2981.3	OK	OK	

SKYE CANYON PARCEL 2.21B - TDS FINISH 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
100	6	2979.17	2978.79	0.24	2979.27	2979.67	2981.2	OK	OK	
101	2	2975.35	2974.97	0.43	2975.83	2975.85	2976.9	OK	OK	
102	2	2978.45	2978.07	0.43	2978.93	2978.95	2980.1	OK	OK	
103	2	2980.19	2979.81	0.43	2980.67	2980.69	2981.8	OK	OK	
104	2	2981.94	2981.56	0.43	2982.42	2982.44	2983.5	OK	OK	
105	2	2983.68	2983.30	0.43	2984.16	2984.18	2985.3	OK	OK	
106	2	2985.42	2985.04	0.43	2985.90	2985.92	2987.0	OK	OK	
107	2	2987.67	2987.29	0.43	2988.15	2988.17	2989.3	OK	OK	
108	2	2989.41	2989.03	0.43	2989.89	2989.91	2991.0	OK	OK	
109	2	2991.15	2990.77	0.43	2991.63	2991.65	2992.8	OK	OK	
110	2	2992.90	2992.52	0.43	2993.38	2993.40	2994.5	OK	OK	
111	2	2994.64	2994.26	0.43	2995.12	2995.14	2996.2	OK	OK	
112	2	2996.38	2996.00	0.43	2996.86	2996.88	2998.0	OK	OK	
113	2	2998.48	2998.10	0.43	2998.96	2998.98	3000.1	OK	OK	
114	2	3000.20	2999.82	0.43	3000.68	3000.70	3001.8	OK	OK	
115	2	3001.95	3001.57	0.43	3002.43	3002.45	3003.6	OK	OK	
116	2	3003.69	3003.31	0.43	3004.17	3004.19	3005.3	OK	OK	
117	2	3005.43	3005.05	0.43	3005.91	3005.93	3007.0	OK	OK	
118	2	3007.18	3006.80	0.43	3007.66	3007.68	3008.8	OK	OK	
119	2	3008.90	3008.52	0.43	3009.38	3009.40	3010.5	OK	OK	
120	2	3010.50	3010.12	0.43	3010.98	3011.00	3012.1	OK	OK	
Where: 1: Top of Curb at High Side of Lot 2: TC-0.38 (For Modified 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: <i>-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.</i> <i>-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb.</i>										

SKYE CANYON PARCEL 2.21B - TDS FINISH 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
Finish Floors Fronting Non-Driveway Access										
32	7	2975.93	2975.93	0.41	2976.75	2976.43	2979.3	OK	OK	
33	7	2977.26	2977.26	0.41	2978.08	2977.76	2980.8	OK	OK	
34	7	2978.84	2978.84	0.41	2979.66	2979.34	2982.4	OK	OK	
35	7	2980.41	2980.41	0.41	2981.23	2980.91	2983.9	OK	OK	
36	7	2981.99	2981.99	0.41	2982.81	2982.49	2985.5	OK	OK	
37	7	2984.01	2984.01	0.41	2984.83	2984.51	2987.5	OK	OK	
38	7	2985.59	2985.59	0.41	2986.41	2986.09	2989.1	OK	OK	
39	7	2984.16	2984.16	0.41	2984.98	2984.66	2990.7	OK	OK	
40	7	2988.20	2988.20	0.41	2989.02	2988.70	2992.4	OK	OK	
41	7	2993.10	2993.10	0.41	2993.92	2993.60	2994.1	OK	OK	
42	7	2994.49	2994.49	0.41	2995.31	2994.99	2995.5	OK	OK	
43	7	2995.84	2995.84	0.41	2996.66	2996.34	2996.9	OK	OK	
44	7	2997.19	2997.19	0.41	2998.01	2997.69	2998.3	OK	OK	
45	7	2998.93	2998.93	0.41	2999.75	2999.43	3000.1	OK	OK	
46	7	3000.28	3000.28	0.41	3001.10	3000.78	3001.4	OK	OK	
47	7	3001.63	3001.63	0.41	3002.45	3002.13	3002.8	OK	OK	
48	7	3002.99	3002.99	0.41	3003.81	3003.49	3004.3	OK	OK	
49	7	3004.72	3004.72	0.41	3005.54	3005.22	3006.0	OK	OK	
50	7	3006.08	3006.08	0.41	3006.90	3006.58	3007.5	OK	OK	
51	7	3007.43	3007.43	0.41	3008.25	3007.93	3008.9	OK	OK	
52	7	3008.20	3008.20	0.41	3009.02	3008.70	3010.0	OK	OK	
96	7	2974.68	2974.68	0.41	2975.50	2975.18	2979.7	OK	OK	
97	7	2974.56	2974.56	0.41	2975.38	2975.06	2979.7	OK	OK	
98	7	2974.40	2974.40	0.41	2975.22	2974.90	2978.8	OK	OK	
1: Top of Curb at High Side of Lot 2: TC-0.38 (For Modified 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. -The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb.										

Supplemental Finish Floor Checks

Drainage Easements Check							
Lot Number	High TC/FL ¹	Section	Flow Depth ²	Min FF ³	Design FF	Check	Solid Grout
63	3012.70	*A	0.22	3014.42	3013.40	CHECK	Yes
64	3012.70	*A	0.22	3014.42	3013.00	CHECK	Yes
65	3012.70	*A	0.22	3014.42	3011.60	CHECK	Yes
66	3012.70	*A	0.22	3014.42	3009.70	CHECK	Yes
67	3006.10	*A	0.22	3007.82	3008.00	OK	No
68	3006.10	*A	0.22	3007.82	3005.70	CHECK	Yes
69	3002.40	*A	0.22	3004.12	3004.00	CHECK	Yes
70	3002.40	*A	0.22	3004.12	3002.30	CHECK	Yes
71	3002.40	*A	0.22	3004.12	3000.50	CHECK	Yes
72	2997.50	*A	0.22	2999.22	2997.40	CHECK	Yes
73	2997.50	*A	0.22	2999.22	2995.70	CHECK	Yes
74	2997.50	*A	0.22	2999.22	2993.50	CHECK	Yes
75	2992.70	*A	0.22	2994.42	2991.70	CHECK	Yes
76	2992.70	*A	0.22	2994.42	2990.00	CHECK	Yes
77	2987.70	*A	0.22	2989.42	2988.20	CHECK	Yes
78	2987.70	*A	0.22	2989.42	2986.50	CHECK	Yes
79	2987.70	*A	0.22	2989.42	2984.20	CHECK	Yes
80	2984.60	*A	0.22	2986.32	2982.50	CHECK	Yes
81	2984.60	*A	0.22	2986.32	2980.70	CHECK	Yes
82	2981.50	*A	0.22	2983.22	2979.00	CHECK	Yes
83	2981.50	*A	0.22	2983.22	2977.40	CHECK	Yes
84	2976.40	*A	0.22	2978.12	2975.80	CHECK	Yes
85	2976.40	*A	0.22	2978.12	2974.50	CHECK	Yes
86	2971.20	*A	0.22	2972.92	2973.90	OK	No
87	2971.20	*A	0.22	2972.92	2972.90	CHECK	Yes
88	2971.20	*A	0.22	2972.92	2971.80	CHECK	Yes
89	2968.20	*A	0.22	2969.92	2970.20	OK	No
89	2968.43	*A	0.22	2970.15	2970.20	OK	No
89	2965.23	*B	0.68	2967.41	2970.20	OK	No
90	2965.23	*B	0.68	2967.41	2969.80	OK	No
98	2976.88	SW	0.42	2978.80	2978.80	OK	No

1: High TC/FL is at the high side of the drainage easement flowline or the highest TC adjacent to the easement if flow is weiring over the curb.

2: Flow depth is either normal depth or weir depth (whichever is higher).

3: Min FF is the High TC/FL plus the Flow Depth plus 18 inches.

Adjacent/Perimeter Street Check									
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout
1	SHAUMBER	3017.95	3017.45	SH1	0.37	3018.19	3018.3	OK	No
1	GRAND TETON	3014.41	3013.91	*GT3	0.40	3014.71	3018.3	OK	No
2	GRAND TETON	3013.20	3012.70	*GT3	0.40	3013.50	3016.7	OK	No
3	GRAND TETON	3011.97	3011.47	*GT3	0.40	3012.27	3015.1	OK	No
4	GRAND TETON	3009.88	3009.38	*GT3	0.40	3010.18	3013.5	OK	No
5	GRAND TETON	3009.88	3009.38	*GT3	0.40	3010.18	3011.9	OK	No
6	GRAND TETON	3007.53	3007.03	*GT3	0.40	3007.83	3009.9	OK	No
7	GRAND TETON	3005.60	3005.10	*GT3	0.40	3005.90	3008.5	OK	No
8	GRAND TETON	3003.23	3002.73	*GT3	0.40	3003.53	3007.0	OK	No
9	GRAND TETON	3003.23	3002.73	*GT3	0.40	3003.53	3005.6	OK	No
10	GRAND TETON	3000.94	3000.44	*GT3	0.40	3001.24	3004.1	OK	No
11	GRAND TETON	2999.14	2998.64	*GT3	0.40	2999.44	3002.7	OK	No
12	GRAND TETON	2997.05	2996.55	*GT3	0.40	2997.35	3000.8	OK	No
13	GRAND TETON	2997.05	2996.55	*GT4	0.34	2997.23	2999.4	OK	No
14	GRAND TETON	2995.14	2994.64	*GT4	0.34	2995.32	2997.9	OK	No
15	GRAND TETON	2993.06	2992.56	*GT4	0.34	2993.24	2996.5	OK	No
16	GRAND TETON	2993.06	2992.56	*GT4	0.34	2993.24	2995.0	OK	No
17	GRAND TETON	2987.70	2987.20	*GT4	0.34	2987.88	2992.8	OK	No
18	GRAND TETON	2987.32	2986.82	*GT4	0.34	2987.50	2991.3	OK	No
19	GRAND TETON	2985.59	2985.09	*GT4	0.34	2985.77	2989.8	OK	No
20	GRAND TETON	2983.74	2983.24	*GT4	0.34	2983.92	2988.2	OK	No
21	GRAND TETON	2981.86	2981.36	*GT4	0.34	2982.04	2986.2	OK	No
22	GRAND TETON	2981.86	2981.36	*GT4	0.34	2982.04	2984.6	OK	No
23	GRAND TETON	2979.90	2979.40	*GT4	0.34	2980.08	2983.0	OK	No
24	GRAND TETON	2978.01	2977.51	*GT4	0.34	2978.19	2981.5	OK	No
25	GRAND TETON	2976.21	2975.71	*GT4	0.34	2976.39	2979.9	OK	No
26	GRAND TETON	2974.28	2973.78	*GT4	0.34	2974.46	2978.4	OK	No
27	GRAND TETON	2972.48	2971.98	*GT4	0.34	2972.66	2978.6	OK	No
28	GRAND TETON	2972.48	2971.98	*GT4	0.34	2972.66	2978.5	OK	No

Adjacent/Perimeter Street Check									
Lot Number	Street	High TC ¹	High FL ²	Section	Flow Depth ³	Min FF ⁴	Design FF	Check	Solid Grout
55	SHAUMBER	3018.68	3018.18	SH1	0.37	3018.92	3018.0	CHECK	Yes
56	SHAUMBER	3019.01	3018.51	SH1	0.37	3019.25	3012.0	CHECK	Yes
57	SHAUMBER	3019.40	3018.90	SH1	0.37	3019.64	3012.1	CHECK	Yes
58	SHAUMBER	3019.81	3019.31	SH1	0.37	3020.05	3012.3	CHECK	Yes
59	SHAUMBER	3020.05	3019.55	SH1	0.37	3020.29	3012.8	CHECK	Yes
60	SHAUMBER	3020.71	3020.21	SH1	0.37	3020.95	3015.3	CHECK	Yes
61	SHAUMBER	3021.34	3020.84	SH1	0.37	3021.58	3016.7	CHECK	Yes
62	SHAUMBER	3021.58	3021.08	SH1	0.37	3021.82	3017.7	CHECK	Yes

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation for modified roll curb, 0.50-ft is subtracted for L-curb.

3: Flow depth is the normal depth in adjacent perimeter street

4: Min FF is the High FL plus twice the depth of flow.

Specific Energy Check							
Lot Number	High TC ¹	High FL ²	Section	Specific Energy ³	Min FF ⁴	Design FF	Check
85	2972.91	2972.53	1	0.80	2973.33	2974.50	OK
86	2972.32	2971.94	1	0.80	2972.74	2973.90	OK
92	2971.77	2971.39	2	0.90	2972.29	2973.10	OK
102	2976.88	2976.50	6	0.35	2976.85	2980.10	OK

1: High TC is the elevation at the high side of the adjacent perimeter street

2: 0.38-ft is subtracted from the High TC to obtain the High FL elevation

2: Specific energy depth is taken from FlowMaster calculation for street directing flow toward lot.

3: Min FF is the High FL plus the specific energy depth.

APPENDIX E

Reference Material

*Update No.4 to the Technical Drainage Study for Skye Canyon –
Phase 2 Infrastructure*

Approval Letter

TECHNICAL DRAINAGE STUDY

Skye Canyon (Phase 2 Infrastructure)

City of Las Vegas, Nevada

Job No.: OLY1501.001

Date: June 2015

Prepared By:

Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

Prepared For:

Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Erick Mata, EI

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		October 19, 2017
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: Skye Canyon – Phase 2 Infrastructure Update #5		COPIES TO: Slater Hanifan Group, Inc.
Cross Streets:	NWC of Grand Teton Blvd. & Hualapai Way	Section 12, LLC / Ninety Five Mgmt.
File Number:	F:\Depot\DSMemos\DS4739J.doc	Bart Anderson, P.E., DevCo
Parcel Number:	Portion of 126-12-000-001	CCRFCD
Zoning Action:	TMP-58560	
FEMA Flood Zone	YES NO X	
Proposed Storm Drain	YES X NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal & Supplemental	6/18/2015, 8/4/2015	8/26/2015	Not Approved	\$400.00	402578: \$400
2 nd Submittal	10/19/2015	11/02/2015	Not Approved	\$400.00	419048: \$400
3 rd Submittal	11/19/2015 & Supplemental	1/7/2016	Conditional Approval	\$400.00	423549: \$400
4 th Submittal	4/4/2016	4/13/2016	Conditional Approval	\$100.00	438958: \$100
5 th Submittal & CCRFCD	5/12/2016 & 5/16/2016	6/8/2016 & 6/21/2016	Conditional Approval	\$100.00	443735: \$100
6 th Submittal	12/15/2016 & 1/17/2017	1/19/2017	Conditional Approval	\$100.00	469104: \$100
7 th Submittal	6/19/2017	7/10/2017	Not Approved	\$100.00	488195: \$100
8 th Submittal	8/2/2017	8/17/2017	Approved	\$400.00	489157: \$400
9 th Submittal	9/28/2017	10/19/2017	See Comments Below	\$100.00	490355: \$100
TOTAL FEES (LDDRS):				\$2,100.00	----

REMARKS:

9th Submittal: Update #5 for minor revision of storm drain connection at the intersection of Grand Teton Boulevard and Egan Crest Drive.

7th & 8th Submittals: Update #4 & Addendum for minor relocations of drop inlets and the discharge stub of Parcel 2.27

6th Submittal: Update #3 Revise storm drain system capture and collection points based upon Parcel development.

5th Submittal: Update #2 and CCRFCD concurrence received. Revised Memo on 6/21/2016. Approved "At Risk".

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

X	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is approved "At Risk" subject to the final approval of the Revised Master Drainage Study.

The following conditions are repeated until they are complete:

A Flood Control Master Plan Amendment (MPA) shall be updated to reflect the latest Master Plan for the Skye Canyon Development and approved by the City prior to submitting residential development plans outside of the shadow of protection from Detention Basin #1 and outside of the limits of the Phase 2 pods.

Detention Basin #1 and the Phase 2 Infrastructure are required to be substantially complete prior to the final inspection of the first Unit in Phase 2. No Certificate of Occupancy on the houses will be issued until after the detention basin has been accepted for Substantial Completion by the City.

1. Note that the ***Skye Canyon Master Drainage Study*** has not been approved in the current stage. The subject *Skye Canyon Infrastructure Phase 2* drainage study is approved **"At Risk"** until the final approval of the Master Drainage Study. Any changes required by the Master Drainage Study to the Phase 2 area shall require a drainage study update to the ***Phase 2 Infrastructure Study*** and any required facility changes to the Phase 2 Infrastructure shall be provided at the developers' cost.
2. The ***Skye Canyon Phase 2 Development*** is based on the sole protection of a planned ***Skye Canyon Detention Basin #1*** from major storm flood events. The Detention Basin #1 drainage study has been approved.
3. Building Permits for onsite developments within Phase 2 will be issued subject to the construction and substantial completion of the ***Skye Canyon Detention Basin #1***. The notice of Substantial Completion from the City of Las Vegas, Department of Public Works is required for the release of Occupancy Permits for any development within Phase 2.
4. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. CCRFCD concurrence has been provided for the Phase 2 Infrastructure.
5. The impacts to existing downstream neighborhoods of the long term discharge from the detention basin(s) and the Phase 2 developments without the associated regional outfall facilities is a major concern of both the City and the Clark County Regional Flood Control District. Flood Control understands that these interim impacts are addressed with Skye Canyon Detention Basin #1. The proposed interim impact solution was included as a part of the Skye Canyon Detention Basin #1 improvements until the overall Skye Canyon MPU facilities are completed.
6. The drainage study for Phase 2 Infrastructure assumes that the project will be constructed in one phase. It was noted within this Addendum response that the developer desires to phase the construction of the improvements. If improvement plans are submitted to break the Phase 2 Infrastructure into separate phases, a drainage study update will be required for each phase addressing the interim condition.
7. The development of Parcel 2.23B, identified as Parcel WML9 on Exhibit E2, drains through the future park and onto Eagle Canyon (WC10A) near Station 41+00 on Sheet C-03. The roadway plans shall incorporate the proposed drainage facilities as the 60 cfs will impact the 17-foot sidewalk & amenity zone. Provide concrete low flow channel connection through the 17-foot sidewalk & amenity zone.

8. The provided Phase 2 Infrastructure plans only show the proposed drainage facilities. The complete improvement plans will require additional review for impacts with other needed infrastructure; i.e. sanitary sewer, water, gas, etc. Any changes to the proposed storm drain system shall require a drainage study update.
9. The Storm Drain Plans have been revised to accommodate the proposed cross fall street sections and include added nuisance inlets at low points within the intersections.
10. The plans show preliminary mass grading with collection facilities within the parcels to intercept the flows prior to entering the infrastructure roadway improvements. It was noted that the inlet collection system needs to incorporate stormwater quality (SWQ) features and Best Management Practices (BMP's) at these interim collection points. This information will be provided and shown on the SWPPP, a copy of which shall be provided to Flood Control prior to permits. Additionally, the mass grading plan (Sheet GR-03) shows sheet flow from Basin ON2-IB discharging directly onto Hualapai Way without any interim collection. Revise to incorporate interim collection.
11. All drainage facilities proposed in this **Phase 2 Infrastructure Study** are considered interim facilities and must be maintained by the Master Developer until the facilities are dedicated to and formally accepted by the *City of Las Vegas*.
12. Since the streets network and the associated storm drain facilities will eventually be accepted by the City, the engineer must coordinate with *City of Las Vegas Streets & Sanitation Department* for their review and approval prior to the final approval of the subject drainage study.
13. The provided WSPG Model shows that the storm drain in *Eagle Canyon Avenue* exceeds the maximum allowed velocity (25 fps) per the *CCRFCD Hydrologic & Hydraulic Design Manual*. A *Special Construction Note* has been added to the plan & profile sheets that call out the special construction requirement and the required special inspection for the additional sacrificial concrete.
14. Structural plans for the storm drain improvements must be submitted for review. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to the *City of Las Vegas Building Department* for processing (call *Building Department* to confirm their submittal requirements). The engineer must provide a copy of *Building Department* approval of the structures to *City Flood Control Section* prior to the final acceptance of the technical drainage study.
15. The project proposes to build temporary drainage berms/swales over the *Phase 2* site. Prior to final plan 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 facility 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.
16. Technical drainage studies are required for each of the future PODs. Final approval for the infrastructure study must be obtained prior to final approval of the impacted POD drainage studies.
17. A note on the Grading Plans has been provided that "*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 the vegetation.*"
18. A numbering system for the manholes and inlets has been provided. It was noted in the response that the project may be divided into additional phases.
19. Show the size of all the proposed riprap areas. The rip-rap pads are shown on the GR-Sheets and some of the SD-Sheets include the pad size. Add the pad size to the grading plans and revise all pertinent plans and callouts accordingly.

20. Revise the pipe penetration detail to include a concrete collar with dowelled rebar connections. The detail has not been provided at this time and was noted that it will be a part of the Structural Details.
21. Provide details for the transition structure modifications to accommodate the 66"-RCP connection and the removal of the existing facilities to allow construction of the proposed improvements. The detail has not been provided at this time and was noted that it will be a part of the Structural Details.

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

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

END OF REMARKS
AYS/PBJ

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

Referenced Drainage Exhibits

100-Year Street Flow Summary									
Interim Condition									
Cross Section	Shape	Base	Base	Depth	Velocity	Discharge	Wetted Area	Wetted Perimeter	Day
		ft	ft	ft	ft/s	cfs	sq ft	ft	
EC01	4.80	4.80	3.0	0.65	6.0	7.2	2.2	1.2	1
EC02	4.80	4.80	4.3	0.50	6.5	3.2	2.2	1.2	1
EC03b	2.00	13	0.40	0.40	3.5	1.4	0.5	0.4	1
EC03a	4.94	5	0.28	0.28	6.5	1.1	0.5	0.4	1
EC04	4.94	42	0.48	0.45	4.5	3.2	2.2	1.2	1
EC04	0.50	51	0.71	0.29	3.3	0.8	0.5	0.4	1
ENG1a	2.46	4	0.29	0.29	2.9	0.3	0.2	0.1	1
ENG1b	0.50	2.5	0.38	1.6	0.6	0.6	0.5	0.4	1
ENG2	0.50	3	0.33	1.5	0.5	0.5	0.5	0.4	1
SH4	2.75	2.5	0.29	3.0	0.9	0.9	0.5	0.4	1
(West Half)	2.75	2.5	0.26	2.3	0.6	0.6	0.5	0.4	1
SH4T	2.75	5	0.30	3.2	1.0	1.0	0.5	0.4	1
***G13	3.80	10	0.40	5.6	2.2	2.2	1.2	1.2	1
***G15	3.80	5	0.34	4.3	1.5	1.5	1.2	1.2	1
***G19	3.40	3	0.30	4.1	1.3	1.3	1.2	1.2	1
***G17	3.50	2	0.27	3.5	0.9	0.9	0.5	0.4	1
***G19	3.30	2	0.28	3.4	0.9	0.9	0.5	0.4	1
***G19	3.60	2	0.27	3.2	0.9	0.9	0.5	0.4	1
***G2	0.57	61	0.62	3.9	3.6	3.6	2.2	1.2	1
***G2b	0.57	45	0.64	3.6	3.0	3.0	2.2	1.2	1

*Based on 100-Year Storms

*Base CTD0 - 494ps and/or CTD4 Street than

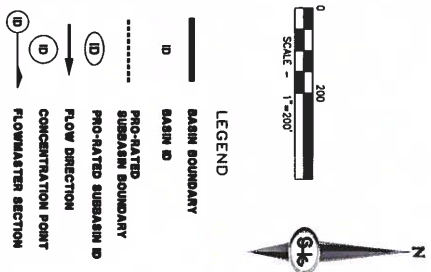
*Base CTD0 - 494ps and/or CTD4 Street than

Basin Flow Rate Summary (Interim Condition)				
Basin/Concentration Point ID	Area (ac)	Q _{iso} (cfs)	Q _{iso} (cfs)	
ON1-I	52.4	170	78	
ON2-I	57.4	176	83	
ON3-I	32.6	94	44	
ON4-I	28.4	90	43	
OFF1-I	19.7	35	11	
OFF2-I	8.8	19	6	
OFF3-I	13.6	32	12	
EG41-I	2.3	8	4	
EG42-I	1.9	7	4	
EG43-I	0.6	2	1	
EG44-I	2.2	8	4	
EG45-I	0.9	3	2	
GTD	5.9	18	10	
*JUL1	8.2	28	11	
SH4U1	1.0	4	2	
SH4U2	1.4	5	3	

PERFORMED FROM THE SIVE CANON (PAVE) SLODY.

Concentration Points Summary (Inhibin Condition)			
Bait/Concentration Point ID	Area (a5)	Q10 (a6)	Q15 (a7)
CP1 (OFF + OFF2 + OFF3 + SHAM)	-	82	32
CP2 (ON2 + TESTA)	-	62	30
CP3 (ON1 + EDMA/UL + ON3 + ON5)	-	217	100
CP4 (ON2 + ON4 + ED22 + ON4 + CP5)	470	221	
RAHU (CP4 + WULU)	-	486	232

INTERIM CONDITION BASIN SHAUM
GENERATES FLOW EQUAL TO THE
ULTIMATE CONDITION SUBBASIN
WSHA5(B). THEREFORE, ULTIMATE
BASIN FLOWRATE UTILIZED FOR
PERIMETER STREET FLOW DEPTH.



10-Year Street Flow Summary						
Intermittent Condition						
Cross Section	Flow (cfs)	Depth (ft)	Velocity (ft/sec)	D/V	Dry Lane (ft)	
EGN1A	2.46	0.24	2.6	0.6	0.6	21
EGN1B	0.50	1	0.30	1.3	0.4	19
EGN2	0.50	2	0.30	1.3	0.4	18
SH41	2.75	3	0.26	2.9	0.7	20
HU2	0.57	20	0.73	3.2	2.4	9
HU2B	0.57	22	0.67	3.0	2.0	12

[illegible]

100-Year Street Flow Summary					
Ultimate Condition					
Cross Section	Slope	Q (cfs)	Depth (ft)	Velocity (ft/sec)	Div
EC41	4.00	53	0.46	1.1	2.8
EC42	4.00	89	0.62	1.4	5.2
EC43	2.00	47	0.36	1.3	2.7
EC43B	4.54	17	0.36	3.3	2.0
EC43C	4.54	13	0.36	4.3	1.8
EC43D	4.54	32	0.46	6.1	2.8
EC44	0.50	25	0.56	2.5	1.4
EC44B	2.46	4	0.28	2.9	0.8
EC44C	0.50	2.5	0.36	1.8	0.6
EC44D	0.50	4	0.36	1.8	0.5
EC45	2.75	4	0.33	3.3	1.1
SH4A	2.75	4	0.28	2.5	0.7
(Water Hm)	2.75	3	0.26	2.9	0.7
SH42	0.57	59	0.92	3.8	3.5
SH43	0.57	41	0.82	3.5	2.9

Referenced Ultimate Condition Flow Rate Summary					
Concentration Points					
Basin/Concentration Point ID	Area (ac. mi)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
WC1A	0.03	60	30		
Q = WMA9 + WMA10					
WC1B	0.05	99	48		
Q = WC1A + WC1B + WMA1					
WC1	0.07	127	61		
Q = WC1A + WC1B + WMA1					
WC12	0.11	226	109		
Q = WC12 + WC11					
WC13	0.17	352	170		
Q = WC13 + WMA1 + WMA13 + WMA14					
WC2	0.24	465	226		
Q = WMA1 + WMA13 + WMA14 + WC2					
WC2A	0.05	99	42		
Q = WMA1 + WMA13 + WMA14 + WC2A					
WC2B	0.05	99	42		
Q = WMA1 + WMA13 + WMA14 + WC2B					

Ultimate Condition Perforated Flow Summary					
Basin	Q (cfs)	Area (acres)	Unit Flow (cfs/ac)	Q (cfs)	Q (cfs)
WSH4A	8	2.4	3.4		
WSH4B	8	2.1	3.0		
WEGN2	8	2.1	3.0		
WEGN3	10	3.3	3.0		
Subbasin	Q (cfs)	Area (acres)	Unit Flow (cfs/ac)	Q (cfs)	Q (cfs)
WSH4A	8	2.4	3.4		
WSH4B	8	2.1	3.0		
WEGN2	8	2.1	3.0		
WEGN3	10	3.3	3.0		
TOTAL	34	11.9	2.8		
WSH4A	4	1.1	3.4		
WSH4B	4	1.1	3.0		
WEGN2	4	1.5	3.0		
WEGN3	4	1.5	3.0		
TOTAL	16	5.2	3.0		
WSH4A	2	0.8	3.0		
WSH4B	2	0.8	3.0		
TOTAL	4	1.6	3.0		

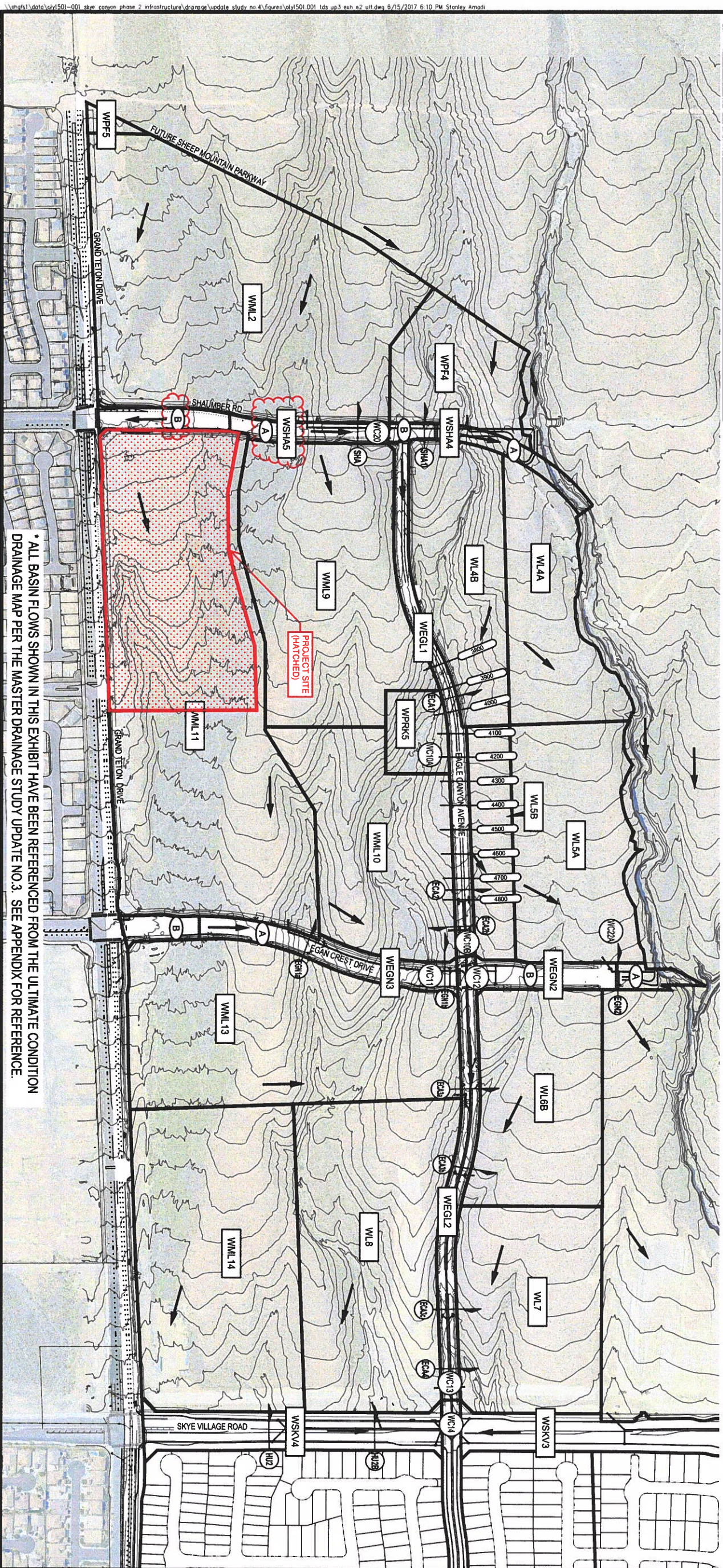
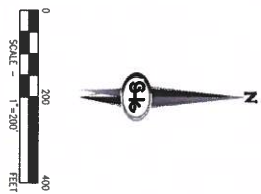
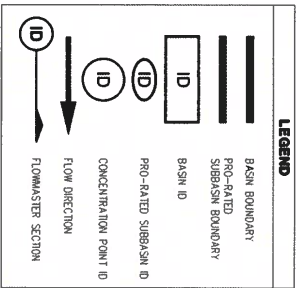
Referenced Ultimate Condition Flow Rate Summary					
Basin/Concentration Point ID	Area (ac)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)
WL4A	8.0	23	10		
WL4B	8.0	27	12		
WL4C	10.9	32	15		
WL4D	3.8	12	5		
WL5	10.9	32	14		
WL6	11.5	34	16		
WL7	11.6	38	17		
WL8	16.0	48	23		
WL9	16.4	49	25		
WL10	19.2	59	29		
WL11	27.4	78	38		
WL12	16.4	55	28		
WL13	5.7	19	9		
WPK5	0.4	1	0		
WPK6	2.0	5	2		
WPK7	3.4	12	6		
WPK8	3.3	12	7		
WPK9	3.3	10	6		
WPK10	1.4	6	3		
WPK11	2.4	8	5		
WPK12	4.2	14	7		
WPK13	4.5	15	8		

HEC-RAS Summary Table						
River Sta	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Vel Cfm (ft/s)	Overbank Left/Right Velocity (ft/sec)	Top Width (ft)
-3800	99	2974.12	2974.74	8.43	2.13/2.13	54.61
-3900	99	2969.22	2969.84	8.43	2.13/2.13	54.61
-4000	99	2964.32	2964.94	8.43	2.13/2.13	54.61
-4100	99	2959.42	2960.04	8.43	2.13/2.13	54.61
-4200	99	2954.52	2955.14	8.43	2.13/2.13	54.61
-4300	99	2949.62	2950.24	8.43	2.13/2.13	54.61
-4400	99	2944.72	2945.34	8.44	2.13/2.13	54.59
-4500	99	2939.82	2940.44	8.43	2.13/2.13	54.61
-4600	99	2934.92	2935.54	8.44	2.13/2.13	54.59
-4700	99	2930.02	2930.64	8.43	2.13/2.13	54.61
-4800	99	2925.12	2925.74	8.43	2.13/2.13	54.61

10-Year Street Flow Summary					
Ultimate Condition					
Cross Section	Slope (%)	Q (cfs)	Depth (ft)	Div	Dry Lane (ft)
EC41A	2.46	2	0.34	2.6	0.1
EC41B	0.50	1	0.30	1.3	0.4
EC41C	0.50	2	0.30	1.3	0.4
SH41	2.75	29	0.73	3.2	0.5
SH42	0.57	28	0.71	2.8	2.4
SH43	0.57	22	0.67	3.0	2.0

1 To range drop from capture flows to mitigate Dry Lane

REFERENCED FOR FLOWRATE IN PERIMETER STREET



OLYMPIA COMPANIES

SKYE CANYON - PHASE 2 INFRASTRUCTURE UPDATE NO.4

ULTIMATE CONDITION DRAINAGE MAP

DATE: JUNE 2016

DRAFTER: ETM

DESIGNER: ETM

CHECKED: SMJ

PROJECT NO. OLY1501.001

EXHIBIT E2

SHEET 1 OF 1

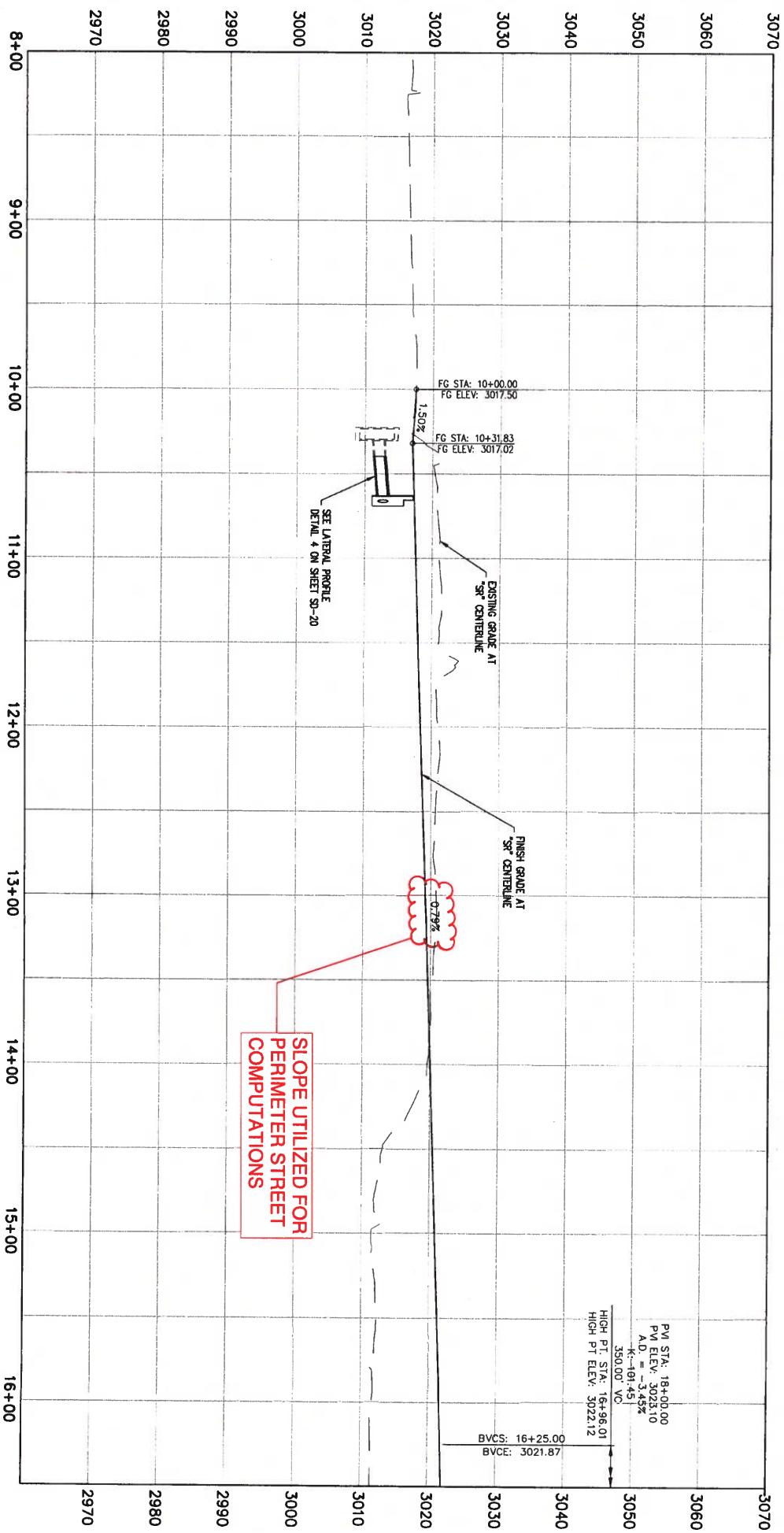
SLATER HANIFAN GROUP

CONSULTING ENGINEERS & PLANNERS

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118

PHONE (702) 284-5300 FAX (702) 284-5399

Referenced Improvement Plans



1	CONSTRUCT TYPE "C42" ROP INLET (USDOCA STD. DWG. NO. 412)
2	REMOVE EXISTING LATERAL STOP AND CONSTRUCT ROP PLUG (SEE DETAIL 5, DRAWING SP-26)
3	CONSTRUCT 60 TYPE I MANHOLE (USDOCA STD. DWG. NO. 404.1)
4	CONSTRUCT 60 TYPE III MANHOLE (USDOCA STD. DWG. NO. 406.1)
5	CONSTRUCT 60 TYPE III MANHOLE WITH TYPE I A RISER (USDOCA STD. DWG. NO. 404.1 AND 404.1)
6	CONSTRUCT NOOT TYPE 4 MANHOLE (NOOT STD. PLAN R-4.3.2)
7	INSTALL 18" ROP (USDOCA STD. DWG. NO. 503.2)
8	INSTALL 24" ROP (USDOCA STD. DWG. NO. 503.2)
9	INSTALL 30" ROP (USDOCA STD. DWG. NO. 503.2)
10	INSTALL 36" ROP (USDOCA STD. DWG. NO. 503.2)
11	INSTALL 42" ROP (USDOCA STD. DWG. NO. 503.2)
12	INSTALL 54" ROP (USDOCA STD. DWG. NO. 503.2)
13	INSTALL 60" ROP (USDOCA STD. DWG. NO. 503.2)
14	INSTALL 66" ROP (USDOCA STD. DWG. NO. 503.2)
15	INSTALL 18" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
16	INSTALL 24" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
17	INSTALL 30" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
18	INSTALL 36" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
19	INSTALL 42" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
20	PIPE PENETRATION (SEE DETAIL 4, DRAWING SP-26)
21	CONSTRUCT CONCRETE COLLAR (SEE DETAIL 2, DRAWING SP-26)
22	CONSTRUCT BRICK AND MORTAR PLUG (SEE DETAIL 1, DRAWING SP-26)
23	INSTALL 48" ROP (USDOCA STD. DWG. NO. 503.2)
24	INSTALL 48" ROP END SECTION (NOOT STD. PLAN R-2.3.1)
25	INSTALL DRAINWAY (USDOCA STD. DWG. NO. 224)
26	CONSTRUCT TYPE "C42" DROPE INLET (USDOCA STD. DWG. NO. 412)

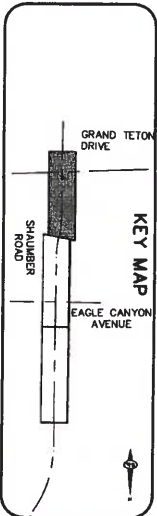
1. ALL ROP SHALL BE CLASS III UNLESS OTHERWISE SHOWN.
2. ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF DI OR ROR/CAL.
3. ALL ROP INLET SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDOCA STD. DMC NO. 40.
4. SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
5. ALL PIPES ARE PUBLICLY MAINTAINED.
6. AND SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SACRIFICIAL ANODES.

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 (MAYTEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

ERIAL # (SEE SHEETS SD-20 THRU SD-24)

DATE _____

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.

[illegible]

**S-I-G SLATER
HANIFAN
GROUP**
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #218, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NINETY-FIVE MANAGEMENT LLC

SKYE CANYON PHASE 2
SHAUMBER ROAD STORM DRAIN PLAN AND PROFILE
"SR" 8+00.00 TO "SR" 16+50.00

NINETY-FIVE MANAGEMENT LLC

DATE:	11/19/15
DRAFTER:	JAS
DESIGNER:	DAM
CHECKED:	JSR
PROJECT NO.	OLY1501-001

SD-07

SHEET 10 OF 33



Referenced Hydraulic Computations

PER TDS STUDY

Section - GT3 (Half Street) Worksheet for Irregular Channel

Project Description	
Worksheet	Section - GT3 (Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	3.80 %
Discharge	10.00 cfs

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

Results	
Mannings Coefficient	0.014
Water Surface Elevation	0.40 ft
Elevation Range	0.00 to 1.03
Flow Area	1.8 ft ²
Wetted Perimeter	13.30 ft
Top Width	12.85 ft
Actual Depth	0.40 ft
Critical Elevation	0.53 ft
Critical Slope	0.48 %
Velocity	5.60 ft/s
Velocity Head	0.49 ft
Specific Energy	0.88 ft
Froude Number	2.65
Flow Type	Supercritical

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+45.00	0.016

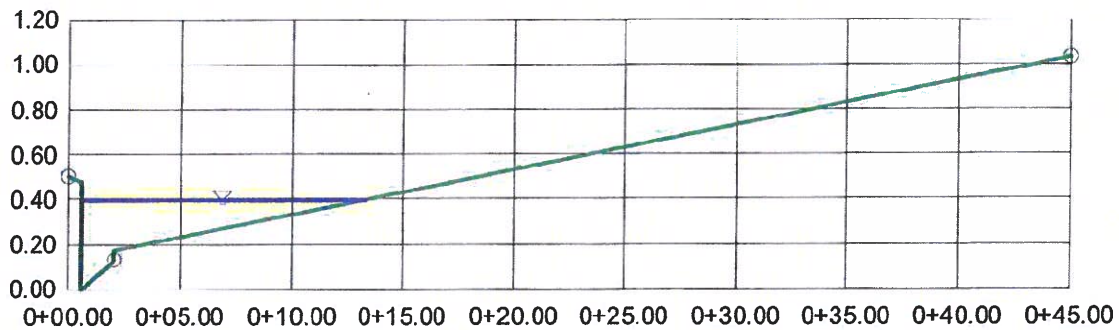
Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+45.00	1.03

PER TDS STUDY

Section - GT3 (Half Street) Cross Section for Irregular Channel

Project Description	
Worksheet	Section - GT3 (Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.014
Channel Slope	3.80 %
Water Surface Elevation	0.40 ft
Elevation Range	0.00 to 1.03
Discharge	10.00 cfs



V:10.0
H:1
NTS

PER TDS STUDY

Section - GT4 (Half Street) Worksheet for Irregular Channel

Project Description	
Worksheet	Section - GT4 (Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	3.80 %
Discharge	5.00 cfs

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

Results	
Mannings Coefficient	0.015
Water Surface Elevation	0.34 ft
Elevation Range	0.00 to 1.03
Flow Area	1.2 ft ²
Wetted Perimeter	10.52 ft
Top Width	10.13 ft
Actual Depth	0.34 ft
Critical Elevation	0.43 ft
Critical Slope	0.68 %
Velocity	4.30 ft/s
Velocity Head	0.29 ft
Specific Energy	0.63 ft
Froude Number	2.24
Flow Type	Supercritical

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+45.00	0.016

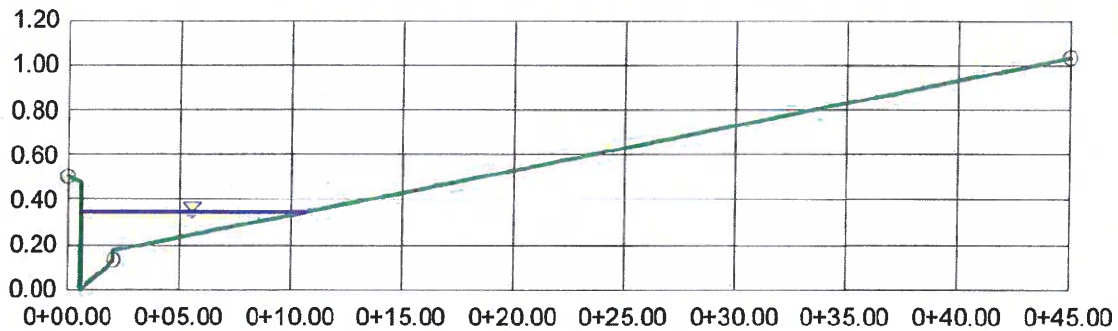
Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+45.00	1.03

PER TDS STUDY

Section - GT4 (Half Street) Cross Section for Irregular Channel

Project Description	
Worksheet	Section - GT4 (Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	3.80 %
Water Surface Elevation	0.34 ft
Elevation Range	0.00 to 1.03
Discharge	5.00 cfs



V: 10.0
H: 1
NTS

APPENDIX F

Reference Material

Technical Drainage Study for Skye Canyon – Parcel 2.21A

Approval Letter

TECHNICAL DRAINAGE STUDY

Skye Canyon Parcel 2.21A

City of Las Vegas, Nevada

Job No.: OLY1724.000

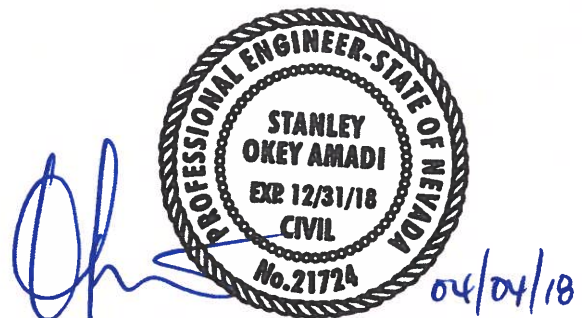
Date: April 2018

Prepared By:

Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

Prepared For:

Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Erick Mata, EI

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

May 10, 2018

TO:

Land Development Services
Department of Building & Safety

FROM:

Jennifer Shinn 
Flood Control Eng. Associate
Department of Public Works

SUBJECT:

Drainage Study for:

Skye Canyon Parcel 2.21A

COPIES TO:

Slater-Hanifan Group, Inc.

Cross Streets:

NWC of Egan Crest Dr. & Grand Teton Dr.

Ninety-Five Management, LLC

File Number:

F:\Depot\DSMemos\DS4974B.doc

Bart Anderson, P.E., DevCo

Parcel Number:

126-12-810-001

Zoning Action:

TMP-72585

FEMA Flood Zone

YES

NO

X

Proposed Storm Drain

YES

X

NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	4/4/2018	4/19/2018	See Comments Below	\$400.00	494635: \$400
2 nd Submittal	4/26/2018	5/10/2018	See Comments Below	\$400.00	495306: \$400
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS:

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

	is approved subject to conformance to all City standards and the following conditions:
	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. The 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 (CCRCD) has issued a letter of concurrence. The engineer should contact the CCRCD to confirm that they have begun their review.
2. Resolve the rip rap size discrepancy between the Grading Notes and the Drainage Quantities.

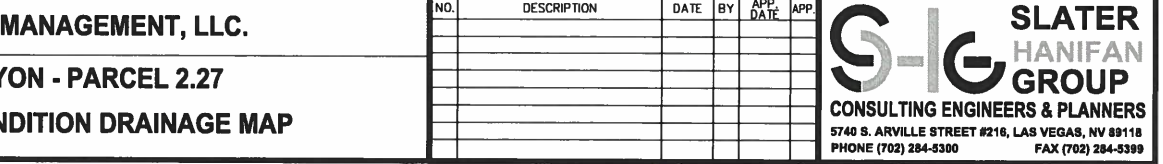
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on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

END OF REMARKS

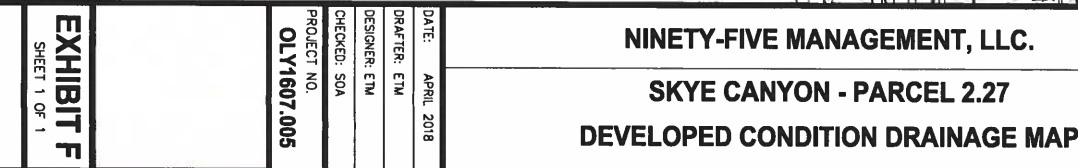
jks

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

Referenced Drainage Exhibits



P1	Existing 36 RCP	88	88
P2	Proposed 36 RCP	54	54
P3	Proposed 36 RCP	20	16
P4	Proposed 36 RCP	54	54
P5	Proposed 17.5 type O&M DI	24	7
P6	Proposed 18 RCP	7	7
P7	Proposed 15.0 type O&M DI	7	0
P8	Proposed 42 RCP	78	78
P9	Proposed 42 RCP	16	25
P10	Proposed 36 RCP	85.5	6
P11	Proposed 10.7 type O&M DI	2.5	0
P12	Proposed 36 RCP	88	0



Referenced Hydrologic Computations

* REFERENCED FROM PHASE 2 INFRASTRUCTURE STUDY



Precipitation Worksheet Rainfall Data and Computations

Project: Kyle Canyon Master Drainage Study
Date: 6/1/2010

Data:

Project is located in: Township: 19 S. Range: 59 E. Section: 12

Reference

APN Map

Figure 513^a

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.35 inches

Figure 503^a

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 2.1 inches

Figure 506^a

Precipitation Adjustment Ratios:

10-Year: 1.24

Table 501^a

100-Year: 1.43

Table 501^a

Six Hour Depth Area Reduction Factors (DARF):

Area (gross acres): 10.0 = 0.0156 square miles

Table 502^a

DARF = 1.00

Calculations:

$P_{10} = 1.67$ 10-Year Precipitation (in)

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

$P_{10}/P_{100} = 0.56$ HEC-1 Multiple Ratio Value

Equations:

$$P = (\text{Rainfall})^a (\text{Precipitation Adjustment Ratio})^b (\text{Depth Area Reduction Factor})$$

Comments:

* Kyle Canyon West Basins, West of Hualapai

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX HOUR DEPTH-AREA REDUCTION FACTORS

<u>Drainage Area (Square Miles)</u>	<u>Six-Hour Depth-Area Reduction Factor</u>
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.

<i>Revision</i>	<i>Date</i>

**WRC
ENGINEERING**

REFERENCE:

USACE, Los Angeles District, 1988

TABLE 502

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

Percent of Total Storm Depth				Percent of Total Storm Depth			
Storm Time (In Minutes)	SDN3	SDN4	SDN5	Storm Time (In Minutes)	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	58.1
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

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 26MAR18 TIME 16:27:36
*

DEV

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

X X XXXXXXX XXXX X
X X X X X
X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXXX XXXX XXX

HIGHLIGHTED
DENOTES
REFERENCED DATA

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1
HEC-1 INPUT
PAGE 1

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

*DIAGRAM
1 ID SKYE CANYON PARCEL 2.21A
2 ID TECHNICAL DRAINAGE STUDY
3 ID DEVELOPED CONDITION ANALYSIS
4 ID
5 ID RETURN PERIOD ----- 10- AND 100-YEAR
6 ID DISTRIBUTION ----- 6-HOUR SDN3
7 ID PROJECT NO. ----- OLY1724-000
8 ID FILENAME ----- DEV.H1
9 ID DATE ----- MARCH 2018
10 ID MODELED BY ----- ETM
11 ID
12 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
13 ID STORM EVENT RATIO
14 ID 100-YR 1.000
15 ID 10-YR 0.560
16 ID
17 IT 5 0 0 300
18 IO 5 0 0
19 IN 5 0 0
20 JR PREC 1.000 0.560
*

21 KK ON1
22 KM ONSITE BASIN
23 BA .0236
24 PB 3.000
25 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
26 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
27 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
28 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
29 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
30 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
31 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
32 PC 0.998 0.999 1
33 LS 0 92.4
34 UD .101
*

35 KK OFF1
36 KM OFFSITE BASIN
37 BA .0221
38 LS 0 92.6
39 UD .110
*

40 KK TRAIL
41 KM TRAIL BASIN
42 BA .0017
43 LS 0 81.6
44 UD .061

PROJECT SITE
BASIN

←

Page 1

1

HEC-1 INPUT

PAGE 2

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

45 KK CP1
46 HC 3
47 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (---) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (---) RETURN OF DIVERTED OR PUMPED FLOW

21 ON1

35 OFF1

40 TRAIL

45 CP1

HIGHLIGHTED
DENOTES
REFERENCED DATA

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 26MAR18 TIME 16:27:36 *

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

SKYE CANYON PARCEL 2.21A
TECHNICAL DRAINAGE STUDY
DEVELOPED CONDITION ANALYSIS

RETURN PERIOD ----- 10- AND 100-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1724-000
FILENAME ----- DEV.H1
DATE ----- MARCH 2018
MODELED BY ----- ETM

SIX HOUR DEPTH-AREA REDUCTION FACTORS
STORM EVENT RATIO
100-YR 1.000
10-YR 0.560

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 .56

DEV

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	.56
HYDROGRAPH AT						
+	ON1	.02	1	FLOW	45.	21.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OFF1	.02	1	FLOW	41.	19.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	TRAIL	.00	1	FLOW	3.	1.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP1	.05	1	FLOW	88.	41.
				TIME	3.50	3.50

HIGHLIGHTED
DENOTES
REFERENCED DATA

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

Referenced Hydraulic Computations

Section - A

Project Description

Friction Method Manning Formula

Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	3.50000	%
Bottom Width	2.00	ft
Discharge	3.00	ft³/s

Results

Normal Depth	0.22	ft
Flow Area	0.44	ft²
Wetted Perimeter	2.44	ft
Hydraulic Radius	0.18	ft
Top Width	2.00	ft
Critical Depth	0.41	ft
Critical Slope	0.00524	ft/ft
Velocity	6.82	ft/s
Velocity Head	0.72	ft
Specific Energy	0.94	ft
Froude Number	2.57	
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	0.22	ft
Critical Depth	0.41	ft
Channel Slope	3.50000	%
Critical Slope	0.00524	ft/ft

Cross Section for Section - A

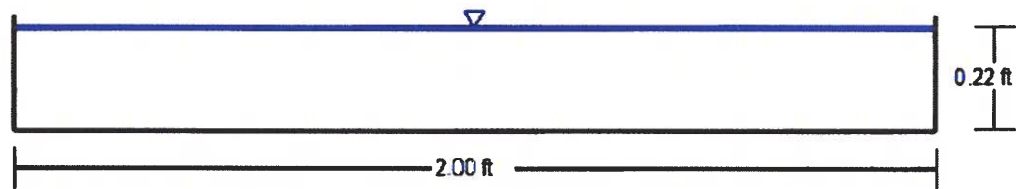
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	3.50000 %
Normal Depth	0.22 ft
Bottom Width	2.00 ft
Discharge	3.00 ft³/s

Cross Section Image



V: 1
H: 1

Section - B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	1.23000	%
Left Side Slope	5.00	%
Right Side Slope	5.00	%
Discharge	41.00	ft³/s

Results

Normal Depth	0.60	ft
Flow Area	7.22	ft²
Wetted Perimeter	24.06	ft
Hydraulic Radius	0.30	ft
Top Width	24.03	ft
Critical Depth	0.76	ft
Critical Slope	0.00340	ft/ft
Velocity	5.68	ft/s
Velocity Head	0.50	ft
Specific Energy	1.10	ft
Froude Number	1.83	
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	0.60	ft
Critical Depth	0.76	ft
Channel Slope	1.23000	%
Critical Slope	0.00340	ft/ft

Cross Section for Section - B

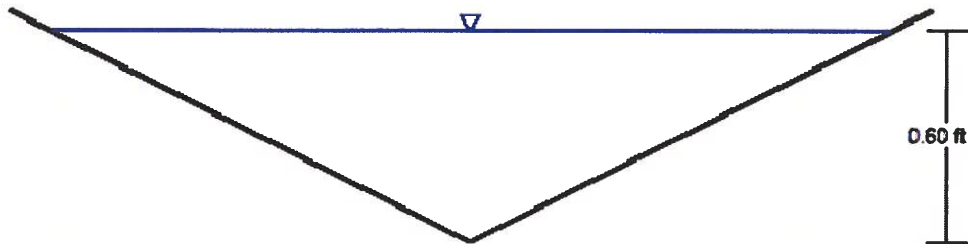
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	1.23000 %
Normal Depth	0.60 ft
Left Side Slope	5.00 %
Right Side Slope	5.00 %
Discharge	41.00 ft ³ /s

Cross Section Image



V: 10
H: 1

Section - B (Weir)

Project Description

Solve For Headwater Elevation

Input Data

Discharge		41.00	ft ³ /s
Crest Elevation		0.00	ft
Tailwater Elevation		0.60	ft
Crest Surface Type	Gravel		
Crest Breadth		5.00	ft
Crest Length		30.00	ft

Results

Headwater Elevation	0.68	ft
Headwater Height Above Crest	0.68	ft
Tailwater Height Above Crest	0.60	ft
Weir Coefficient	2.75	US
Submergence Factor	0.90	
Adjusted Weir Coefficient	2.46	US
Flow Area	20.28	ft ²
Velocity	2.02	ft/s
Wetted Perimeter	31.35	ft
Top Width	30.00	ft

Cross Section for Section - B (Weir)

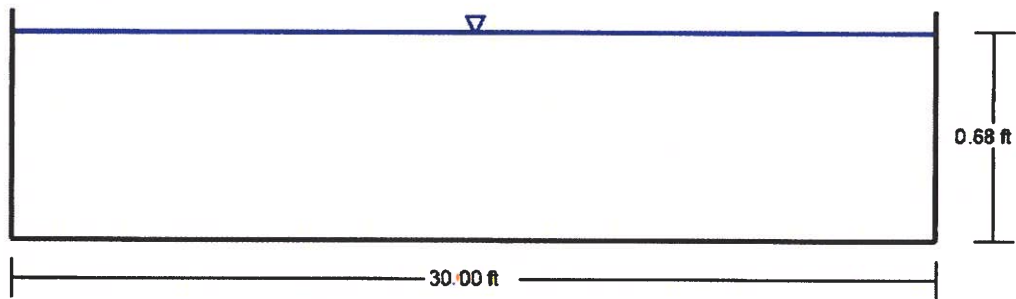
Project Description

Solve For Headwater Elevation

Input Data

Discharge	41.00	ft ³ /s
Headwater Elevation	0.68	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.60	ft
Crest Surface Type	Gravel	
Crest Breadth	5.00	ft
Crest Length	30.00	ft

Cross Section Image



V: 10
H: 1

APPENDIX G Entitlement Information



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

LOIS TARKANIAN
Mayor Pro Tem

STAVROS S. ANTHONY

BOB COFFIN

STEVEN G. SEROKA

MICHELE FIORE

CEDRIC CREAR

SCOTT D. ADAMS
City Manager

DEPARTMENT OF PLANNING

ROBERT SUMMERFIELD
DIRECTOR

**DEVELOPMENT
SERVICES CENTER**

DEPARTMENT OF PLANNING

333 N. RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NV 89106
702.229.6301 | VOICE
702.474.7463 | FAX
711 | TTY



cityoflasvegas
lasvegasnevada.gov

June 13, 2018

Mr. Ben Morris
KAG Development West, LLC
11411 Southern Highland Parkway, Ste. 300
Las Vegas, Nevada 89141

**RE: TMP-73326 [PRJ-73201] - TENTATIVE MAP
PLANNING COMMISSION MEETING OF JUNE 12, 2018**

Dear Applicant:

Your request for a Tentative Map FOR A 120-LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION on 16.01 acres on the northeast corner of Grand Teton Drive and Shaumber Road (APN 126-12-410-001), T-D (Traditional Development) Zone [ML (Medium-Low Density Residential) Kyle Canyon Special Land Use Designation], Ward 6 (Fiore) [PRJ-73201], was considered by the Planning Commission on June 12, 2018.

The Planning Commission voted to **APPROVE** your request, subject to the following:

Planning

1. Approval of the Tentative Map shall be for no more than four (4) years. If a Final Map is not recorded on all or a portion of the area embraced by the Tentative Map within four (4) years of the approval of the Tentative Map, this action is void.
2. Street names must be provided in accordance with the City's Street Naming Regulations.
3. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.
4. In conjunction with creation, declaration and recordation of the subject common-interest community, and prior to recordation of the Covenants, Codes and Restrictions ("CC&R"), or conveyance of any unit within the community, the Developer is required to record a Declaration of Private Maintenance Requirements ("DPMR") as a covenant on all associated properties, and on behalf of all current and future property owners. The DPMR is to include a listing of all privately owned and/or maintained infrastructure improvements, along with assignment of maintenance responsibility for each to the

common interest community or the respective individual property owners, and is to provide a brief description of the required level of maintenance for privately maintained components. The DPMR must be reviewed and approved by the City of Las Vegas Department of Field Operations prior to recordation, and must include a statement that all properties within the community are subject to assessment for all associated costs should private maintenance obligations not be met, and the City of Las Vegas be required to provide for said maintenance. Also, the CC&R are to include a statement of obligation of compliance with the DPMR. Following recordation, the Developer is to submit copies of the recorded DPMR and CC&R documents to the City of Las Vegas Department of Field Operations.

5. All development is subject to the conditions of City Departments and State Subdivision Statutes.

Public Works

6. Private streets must be granted and labeled on the Final Map for this site as Public Utility Easements (P.U.E.), Public Sewer Easements, and Public Drainage Easements to be privately maintained by the Homeowner's Association. Additionally, grant an Emergency Access Easement over Common Element "A" on the Final Map for this site.
7. Sewers in alleys must be 10 feet from curb lines and maintain minimum separation requirements from water lines and other utilities. Grant a Public Sewer Easement adjacent to alleys if required to maintain public sewer separations from other utilities.
8. All landscaping and private improvements installed with this project shall be situated and maintained so as to not create sight visibility obstructions for vehicular traffic at all development access drives and abutting street intersections. Per condition of approval # 19 of the Skye Canyon II Parent Tentative Map (TMP-65803), landscaping within calculated Site Visibility Restriction Zones (SVRZs) will be limited in height by the City Traffic Engineer.
9. Submit an addendum to the Skye Canyon Wastewater Collection System Master Plan. The addendum must be approved by the Sanitary Sewer Planning Section of the Department of Public Works prior to the submittal of any civil improvement plans for this project.
10. Prior to the release of a Final Map for recordation on this site, the property owner must contact the Special Improvement District Section of the Department of Public Works (702-229-2136) acknowledging a per lot assessment of all lots that will be created through a Final Map for this site. The City shall prepare an apportionment report following recordation of the Final Map.

TMP-73326 [PRJ-73201] - Page Four
June 13, 2018

No building permits or business licenses related to these items shall be issued prior to the expiration of the required ten day waiting period, or until any filed appeal is resolved pursuant to LVMC Title 19.18.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Bengtson", with a long horizontal flourish extending to the right.

Paul Bengtson
Senior Management Analyst
Case Planning Division

PB:nl

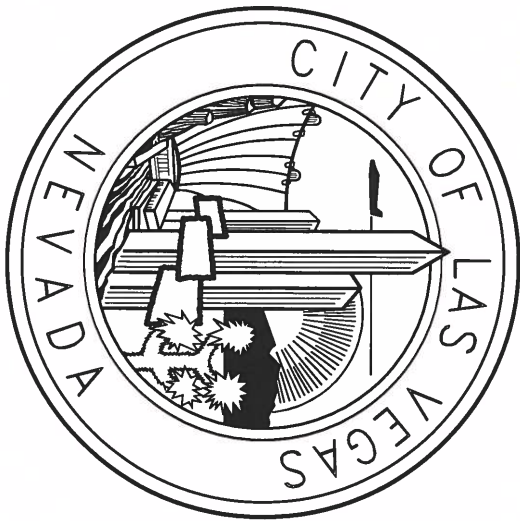
cc:

Ninety-Five Management, LLC
11411 Southern Highland Parkway, Ste. 300
Las Vegas, Nevada 89141

Ms. Chelsea Jensen
Slater Hanifan Group
5740 South Arville, Ste. 216
Las Vegas, Nevada 89118

TENTATIVE MAP FOR SKYE CANYON PARCEL 2.21B

A SINGLE-FAMILY RESIDENTIAL SUBDIVISION
OF THE SKYE CANYON MASTER-PLANNED COMMUNITY
WITHIN THE CITY OF LAS VEGAS, NEVADA, GENERALLY LOCATED AT THE
NORTHEAST CORNER OF SHAUMBER RD AND GRAND TETON DR



OWNER/DEVELOPER

SECTION 12 L/C/K&G L/C/
P N INC.
11411 SOUTHERN HIGHLANDS #300
LAS VEGAS, NV 89141
PH (702) 220-6545
PH (702) 220-6566

ENGINEER

SLATER HANFMAN GROUP
5750 S. ARVILLE ST SUITE 216
LAS VEGAS, NV 89118
PH (702) 284-5300
FX (702) 284-5359

LEGAL DESCRIPTION

BEING A PORTION OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST N.M.M., CLARK COUNTY, NEVADA.

BENCHMARK
BM 7190 TMS CITY OF LAS VEGAS RIVET AND ROUND PLATE IN
CONCRETE CYLINDER, SOUTHEAST CORNER OF HUALAPAI WAY AND
IRON MOUNTAIN ROAD.
ELEV. 2840.13 FEET (865.67 METERS) (MAY 1968)

BASIS OF BEARING
SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTH-EAST QUARTER (NE 1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, 101A AS PER FILE 151, PAGE 14 OF SURVEY, ON FILE IN THE COUNTY RECORDER'S OFFICE.

DISCLAIMER NOTE

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ALL 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.

PROJECT SUMMARY	
APRACADE (PONES) INCLUDING AIRPORT	16.0 AC
APRACADE (NET)	14.9 AC
ROBERT (LOT) RESERVE	7.49 AC
ROBERT (NET)	1.0
TOTAL, NO. OF RESIDENTIAL LOTS	120
TOTAL, NO. OF COMMON ELEMENTS *	18
MINIMUM LOT SIZE	3,000 S.F.
MINIMUM OPEN SPACE	AT LEAST 0%
*NOTE: THE MINIMUM REQUIRED OPEN SPACE FOR COMMON ELEMENTS SHALL BE 10% OF THE TOTAL AREA OF THE PROJECT, MINUS THE AREA OF THE EXISTING SITE ASSOCIATION.	
ESTIMATED AVERAGE DAILY SEWER CONTRIBUTIONS	
120 LOTS X 220 GPD/LOT = 26,400 GPD	0.020 MGD
10% PEAK FLOW = 0.020 MGD X 1.15 (PEAK FACTOR) = 0.1056 MGD	
UTILITY SERVICE BY	
WATER	LOS ANGELES WATER DISTRICT
SEWER	REPUBLIC SERVICES OF CALIFORNIA, NORTON
POWER	BY ENERGY
TELEPHONE	ENTRANT LUK
TELEVISION CABLE	SOUTHWEST DIAL COMPANY

NOTES

1. ALL ROADWAY CONSTRUCTION SHALL CONFORM TO CLARK COUNTY/CITY APPROVED WITH THE KYLE CANTON HIGHWAY DESIGN CRITERIA OR DEVELOPMENT STANDARDS. LANDSCAPE DESIGN TO BE DETERMINED WITH FINAL GRADING AND LAYOUT.
2. ROADWAY LOCATIONS SHOWN HEREON ARE SCHEMATIC AND FINAL DESIGN LOCATIONS MAY VARY. RESIDENT ON FINAL DEVELOPMENT STAGES.
3. STREET SECTIONS ARE IN CONFORMANCE WITH EXHIBIT L OF THE DEVELOPMENT ORDINANCE.
4. THE DEVELOPMENT IS CONTROLLED BY THE FIRST MAJORITY AND MAY BE TRANSFERRED BY THE DEVELOPER. ADOPTION BY EITHER THE CITY OF KYLE AND THE TOWN OF KYLE, EITHER SEPARATELY OR JOINTLY.
5. THERE WILL BE A HOA AND C.C.R.'S ESTABLISHED FOR THIS SUBDIVISION BY THE RESIDENTIAL BUILDER.
6. LANDSCAPE EXISTENCES AND COMMON LOT'S SHOWN HEREON WILL BE MAINTAINED BY THE MASTER ASSOCIATION AND SUBDIVISION HOA(S).
7. EXISTENCES REQUIRED FOR STORM DRAIN, DRY UTILITIES, SANITARY SEWER, AND SERVICE MAINS SHALL BE GRANTED ON THE FINAL MAP.
8. WATER TO SERVICE THIS PROJECT WILL BE GRANTED BY THE KYLE LOCAL WATER TREATMENT PLANT. WATER SERVICE DESIGN WILL BE ACCORDING TO AN APPROVED TECHNICAL STUDY.
9. SEWER SERVICE FOR THIS PROJECT WILL CONNECT TO EXISTING SEWER MAINS AND TREATMENT PLANT. SEWER SERVICE DESIGN WILL BE ACCORDING TO AN APPROVED TECHNICAL STUDY.
10. EXISTING EXISTENCES ON THESE PROPERTIES WILL BE REMAINTAINED AND MAINTAINED.
11. ALL STREETS, PARKING CORRIDORS, UTILITY CORRIDORS, PARKS, TRAILS, OPEN SPACES, AND SCHOOLS SHOWN ON THIS MAP ARE PRIVATE UTILITIES NOTED OTHERWISE.
12. ALL ABOVE GROUND UTILITY BODIES SHALL NOT BE PLACED WITHIN FINAL DEVELOPMENT.
13. PARKING NOT ALLOWED ON ALLEYS AND CURBS TO BE PAINTED RED.

SHEET INDEX

1	COVER SHEET AND SECTIONS
2	PLAN SHEET
3	PROFILES
4	WALL DETAILS

S-I-G SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #210, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

[illegible]

NINETY FIVE MANAGEMENT
SKYE CANYON PARCEL 2.21B
TENTATIVE MAP

DATE: 4/2/18

DRAFTER: CP

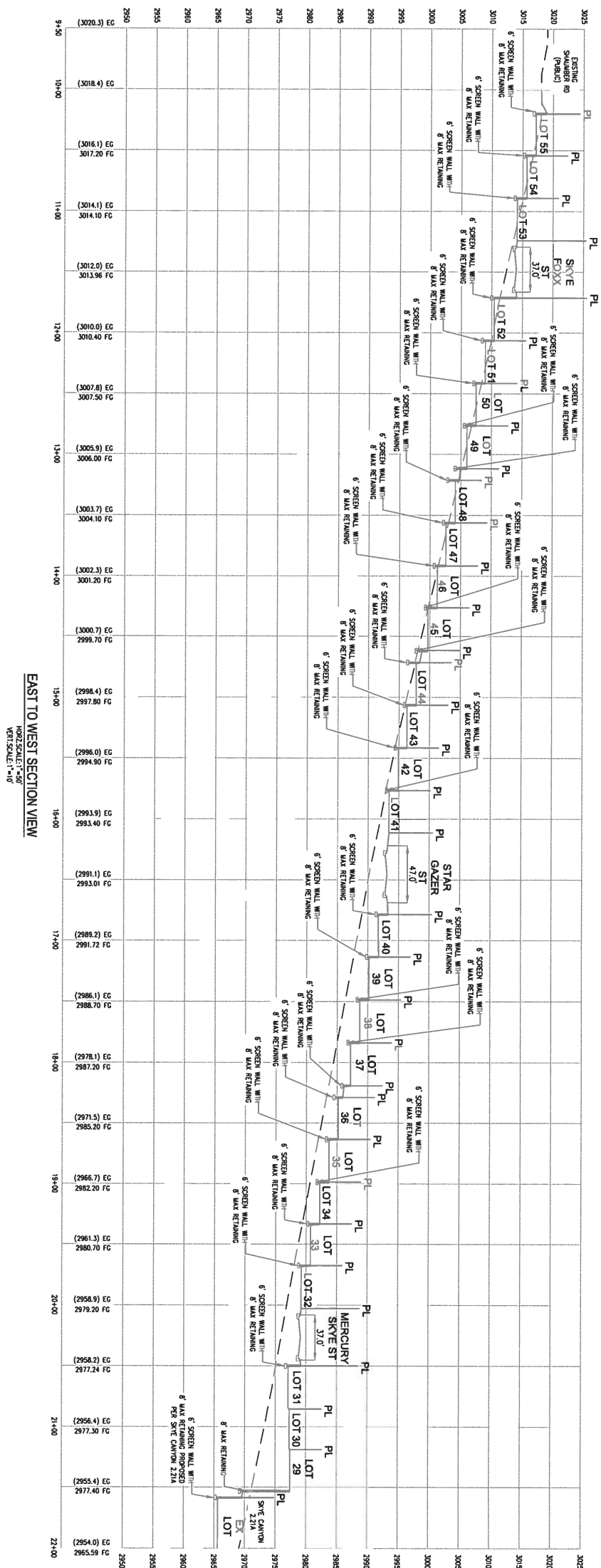
CHECKED: DSP

PROJECT NO.

OLY1725-000



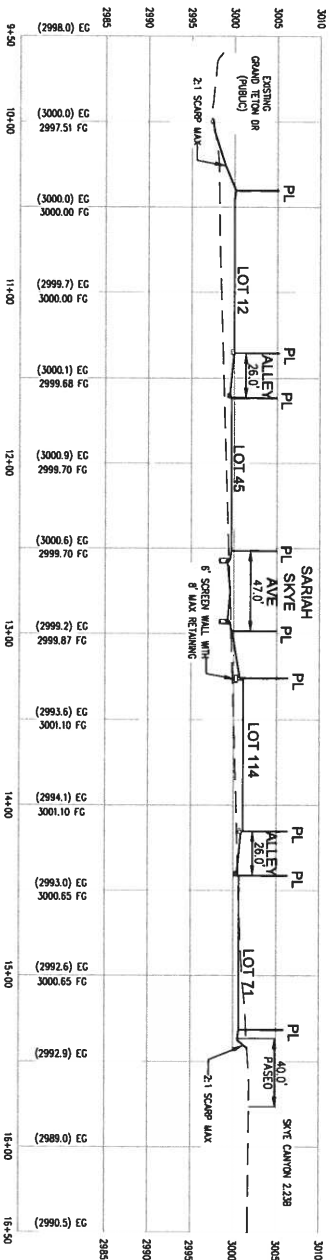
TM-1
SHEET 1 OF 4



EAST TO WEST SECTION VIEW

HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'

VERT. SCALE: 1"=10'



SOUTH TO NORTH SECTION VIEW

HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'

VERT. SCALE: 1"=10'

NOTE:

- THE SUBJECT SITE SLOPES GREATER THAN 2% WEST TO EAST. PERIMETER AND RETAINING WALLS SUBJECT TO REQUIREMENTS OF T19.06.070 TABLE 8 AND T19.06.080 TABLE 9.
- PERIMETER AND RETAINING WALL STEPBACKS ARE SUBJECT TO THE REQUIREMENTS OF T19.070 TABLE 9 AND T19.06.080 TABLE 10

NOTE:
PERIMETER WALLS TO HAVE 20% MINIMUM CONTRASTING MATERIAL ACCORDING TO CLV T19.06.070 TABLE 8 & T19.06.080 TABLE 9.

[illegible]

**S-I-E SLATER
HANIFAN
GROUP**
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #218, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NINETY FIVE MANAGEMENT
SKYE CANYON PARCEL 2.21B
TENTATIVE MAP

CITY OF LAS VEGAS, NV

DATE: 4/2/18

DRAFTER: CP

DESIGNER: CP

PROJECT NO.

OLY1725-000

TM-3
SHEET 3 OF 4



N.T.S

[illegible]

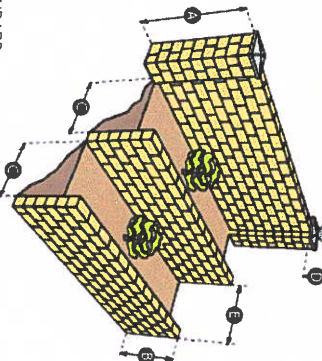
N.T.S

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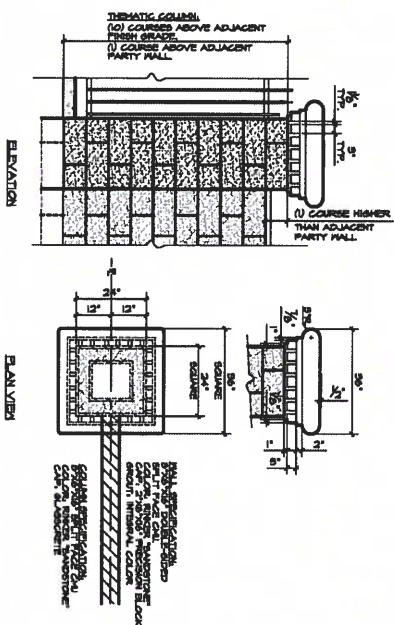
N.T.S

SEE DESIGN STANDARDS	
A. Maximum Primary wall Height	12' EXTERIOR - 14' INTERIOR 6" RETAINING WALL EXTERIOR 8" RETAINING WALL INTERIOR
B. Maximum Secondary wall Height	4 feet
C. Minimum spacing between wall sections - Inside Dimensions	4 feet
D. Maximum Plaster Height	18 inches
E. Minimum spacing between wall sections - Outside Dimensions	5 feet

FIGURE 9 - RETAINING AND PERIMETER WALL STANDARD STEPBACK



SKYE CANYON WALL STANDARD



N.T.S

NOTE:

- THE SUBJECT SITE SLOPES GREATER THAN 2% WEST TO EAST. PERIMETER AND RETAINING WALLS SUBJECT TO REINFORCEMENTS OF 119.06.070 TABLE 8 AND 119.06.080 TABLE 9.

- RETAINING WALL STEPPERS ARE SUBJECT TO THE REQUIREMENTS OF 119.070 TABLE 9 AND 119.080 TABLE 10.

NOTE:

PERIMETER WALLS TO HAVE 20% UNUSUAL CONTRASTING COLOR SCHEMES TO CLAY 119.06.070 TABLE 8 & 119.06.080 TABLE 9.

[illegible]

CITY OF LAS VEGAS, NV

NINETY FIVE MANAGEMENT
SKYE CANYON PARCEL 2.21B
TENTATIVE MAP

CITY OF LAS VEGAS, NV

DATE: 4/2/18

DRAFTER: CP

DESIGNER: CP

CHECKED: DS

PROJECT NO.

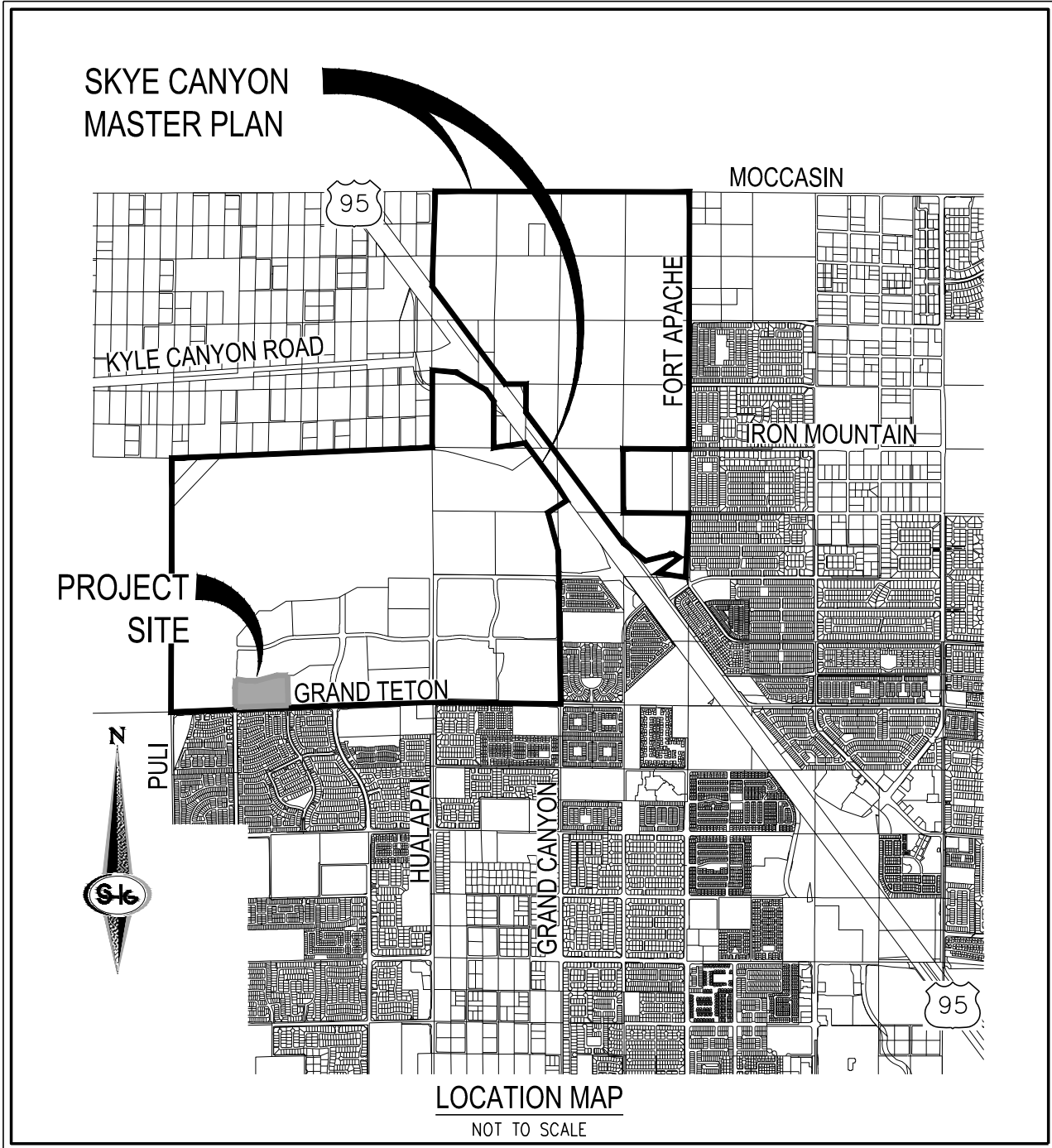
000-07/1170



TM-4
SHEET 4 OF 4

APPENDIX H

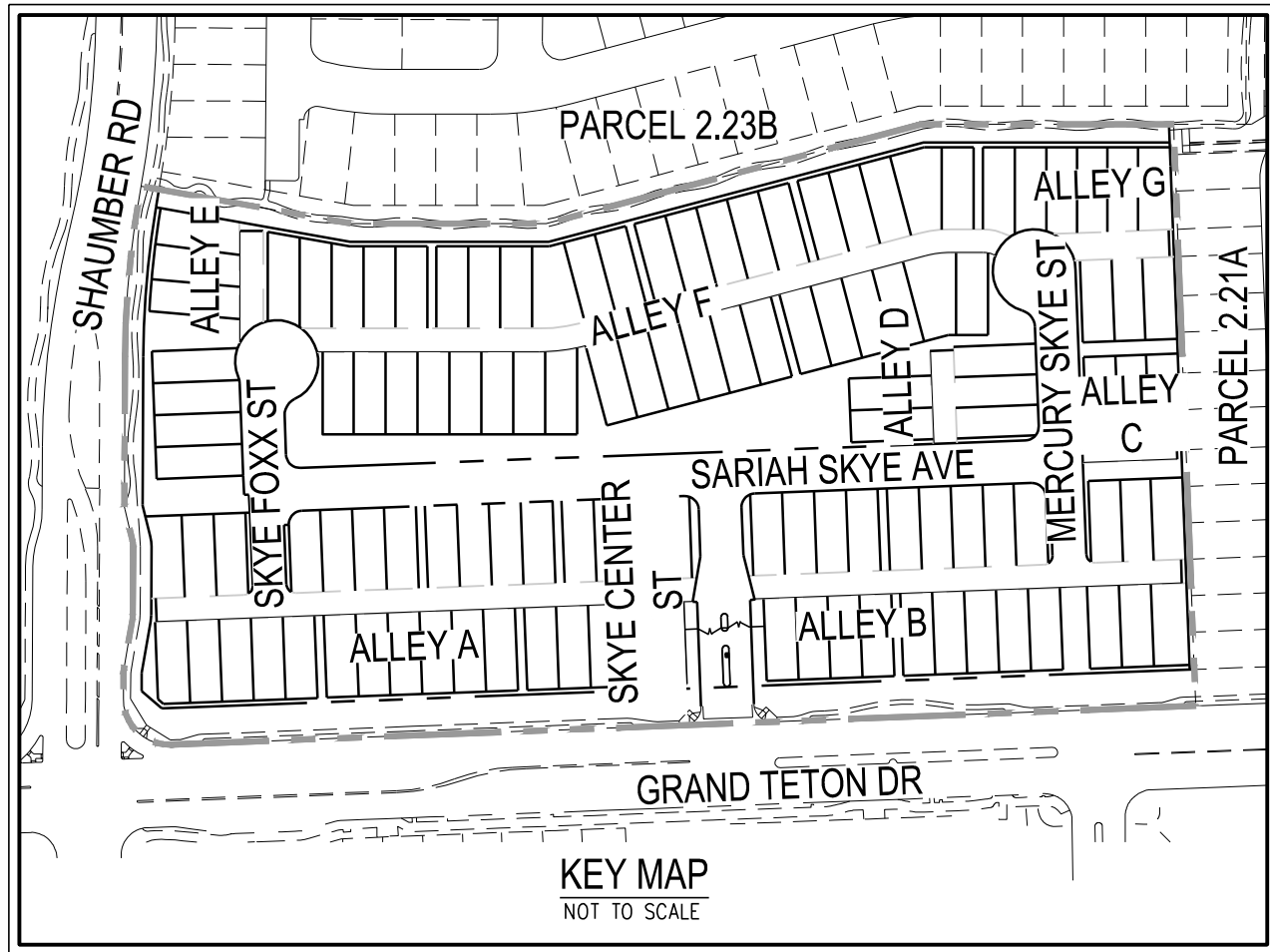
Improvement Plans and CD of Electronic Files



IMPROVEMENT PLANS FOR SKYE CANYON PARCEL 2.21B

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION

APN: 126-12-410-001



SHEET INDEX		
NO.	SHEET	TITLE
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	C-3	LEGEND, ABBREVIATIONS, AND 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	D-1	DETAIL SHEET I
11	D-2	DETAIL SHEET II
12	D-3	DETAIL SHEET III

APPROVALS	
CITY ENGINEER-ALLEN PAVELKA PE, #9029	DATE
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 FROM STANDARDS. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS, CLARK COUNTY AREA, NEVADA.	
LAS VEGAS FIRE AND RESCUE	DATE
CITY OF LAS VEGAS - PLANNING DEPARTMENT	
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.	
CENTRAL TELEPHONE CO. DBA CENTURYLINK	DATE
THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.	
APPROVED FOR CONSTRUCTION	
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES	
PROJECT NO. -----	FIRST APPROVED DATE: -----
LYVWD APPROVED FIRE FLOW ----- GPM AT 20 PSI RESIDUAL	MAXIMUM AVAILABLE FIRE SPRINKLER FLOW ----- GPM
SHEETS: -----	
APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.	
NV ENERGY	DATE
NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.	
SOUTHWEST GAS CORPORATION	DATE
COX COMMUNICATIONS LAS VEGAS, INC.	DATE

OWNER	DEVELOPER	ENGINEER
X & C DEVELOPMENT WEST, LLC OLYMPIA COMPANIES 11411 SOUTHERN HIGHLANDS #300 LAS VEGAS, NV 89141 PH: 702-220-6565	NINETY-FIVE MANAGEMENT, LLC 11411 SOUTHERN HIGHLANDS #300 LAS VEGAS, NV 89141 PH: 702-220-6565	SLATER HANIFAN GROUP, INC. 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: (702) 284-5300 FK: (702) 284-5399 CONTACT: TIMOTHY MULROONEY

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST M.D.M. CLARK COUNTY, NEVADA

BENCHMARK

BM 7LV90 7NWS CITY OF LAS VEGAS RIVET AND ROUND PLATE IN CONCRETE CYLINDER, SOUTHEAST CORNER OF HUALAPAI WAY AND IRON MOUNTAIN ROAD.
ELEV: 2840.13 FEET (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°08'59" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 153, PAGE 24 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE 'X' (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 52003C0750E, DATED SEPTEMBER 2, 2002. A ZONE 'X' (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

DEVIATIONS FROM STANDARDS

NONE

SWPPP NOTE

NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (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/NWPC/STORMWATER.HTM](http://www.state.nv.us/nwpc/stormwater.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 FILLING FEE.

PROJECT INFORMATION

ACREAGE (GROSS) INCLUDING ARROYO: = 16.01 AC
ACREAGE (NET): = 14.16 AC
DENSITY (LOTS/NET ACRE): = 7.49 DU/NET AC
EXISTING ZONING: = R-CL
TOTAL NO. OF RESIDENTIAL LOTS = 120
TOTAL NO. OF COMMON ELEMENTS * = 18
MINIMUM LOT SIZE = 3,003 SF±
MAXIMUM LOT SIZE = 4,302 SF±
PROVIDED OPEN SPACE = 88,900 SF±

EARTHWORK SUMMARY (UNADJUSTED)

CUT 19,144 CY.
FILL 25,842 CY.
NET 6,698 CY. (FILL)

GEOTECHNICAL ENGINEER

PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES, LLC
ADDRESS: 4480 W. HACIENDA AVE.
PHONE: 702-873-3478
PROJECT NO. G-18-027
DATED: MARCH 2, 2018



SLATER HANIFAN GROUP

CONSULTING ENGINEERS & PLANNERS

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

CITY OF LAS VEGAS, NV

NINETY-FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.21B

COVER SHEET

DATE: 07/03/18

DRAFTER: CP

DESIGNER: CP

CHECKED: DSP

PROJECT NO.
OLY1725-000

7/3/18

C-1

SHEET 1 OF 12

H# _____

CLV# _____

STORMWATER RUNOFF MANAGEMENT

(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 ACCUMULATE 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 TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES 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 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 ANY ACTUAL 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 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.

LEGAL DESCRIPTION

BEING A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

BM 71900 TWSV CITY OF LAS VEGAS RIVET AND ROUND PLATE IN CONCRETE CYLINDER, SOUTHWEST CORNER OF HUALAPAI WAY AND IRON MOUNTAIN ROAD.

ELEV. 2840.13 FEET (865.67 METERS) (NAVD 1988)

BASIS OF BEARINGS

SOUTH 00°08'59" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY THEREOF IN BOOK 153, PAGE 24 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

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.

2.2 CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS, ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE I AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" "S" SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # - - - - - (REVISED 08/01/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS), THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB CURBS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.2.2 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCTS LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.
15. ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.

IS NO LEAD COMPLIANCE NOTE TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1" OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY NOVA GEOTECHNICAL & INSPECTION SERVICES, LLC, PROJECT NO. G-18-027, DATED MARCH 2, 2018.
6. EARTHWORK QUANTITIES (RAW):
- CUT = 19,144 CUBIC YARDS
- FILL = 25,842 CUBIC YARDS
A) THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B) THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE I GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C) THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6325, FOR HYDRANT SPECIFICATIONS, AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS - APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR ALL INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST ORDINANCE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK [JFC 105.7.12]
4. ON ANT RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE CONSIDERED WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [JFC 3310, 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [JFC 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOCATION IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [JFC 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [JFC 507.2.1, NPSA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [JFC 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [JFC 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [JFC 507]
11. FIRE HYDRANT SACING SHALL BE AS FOLLOWS: [JFC C102]
• RESIDENTIAL - 500 FT UNSPRINKLERED, 600 FT SPRINKLERED.
• COMMERCIAL - 500 FT UNSPRINKLERED, 400 FT SPRINKLERED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1,000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS, WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [JFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [JFC C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [JFC C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [JFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [JFC C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [JFC C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [JFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.80 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [JFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [JFC 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT, FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW LINE TO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [JFC 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THE DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [JFC 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, 100 ROOMS WITH DEAD-ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT, COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [JFC 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ACCESS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [JFC 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE. ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FEET ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING OR SHORT CUTS. THE PREPARED SIGNS SHALL BE INSTALLED NO HIGHER THAN 6 FT FROM THE ROADWAY LEVEL, THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [JFC 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE JFC 503.6 AND JFC APPENDIX M.

2.5 CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION, ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL	COMPACTION	
A. PAVEMENT AREA SUBGRADE	0.1"	+0.0" TO -0.1"	SEE SOILS REPORT	
B. ENGINEERED FILL	0.5"	+0.1" TO -0.1"	SEE SOILS REPORT	

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

UTILITY LOCATION NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: "811" (800) 227-2600, SOUTHWEST GAS CORPORATION. 702-400-1789 (STANDBY CONTACT NUMBER)

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE, THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY ORDINANCES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS, EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER AND/OR THE UTILITY COMPANY.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM & 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE UP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPES AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITION SHALL BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY NOVA GEOTECHNICAL & INSPECTION SERVICES, LLC, REPORT JG-18-027, MARCH 2, 2018, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL EASEMENTS MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER. LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.80 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APPROXS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
16. WALL NOTES:
ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AT THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTES OF ±0.09 METERS (±0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
2. THERE SHALL BE A MINIMUM HORIZONTAL AND VERTICAL CLEARANCE OF 12-INCHES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC
3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION.
4. IN THE EVENT OF NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099

CAUTION: HIGH PRESSURE GAS

CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION



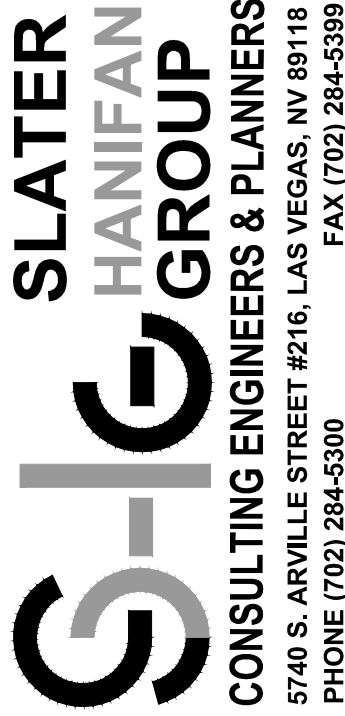
DEVIATIONS FROM STANDARDS

NONE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. - - - - - FIRST APPROVED DATE: - - - - -
LVVWD APPROVED FIRE FLOW - - - - - GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW - - - - - GPM



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ABBREVIATIONS					
AC	ASPHALTIC CONCRETE OR ACRE	FL	FLOWLINE	PVI	POINT OF VERTICAL INTERSECTION
AGG	AGGREGATE BASE	FT	FEET OR FOOT	QTY	QUANTITY
APN	ASSESSOR'S PARCEL NUMBER	FUT	FUTURE	R	RADIUS
APPROX OR ~	APPROXIMATE	GRO	GRADE OR GROUND	RCA	REINFORCED CONCRETE ARCH
AVE	AVENUE	GR	GRADE BREAK OR GRADE CHANGE	RCCB	REINFORCED CONCRETE BOX
Ø	AT	GV	GATE VALVE	RCP	REINFORCED CONCRETE PIPE
BC	BEIGN CURVE OR BACK OF CURB	HOPE	HIGH DENSITY POLYETHYLENE	RD	
BCR	BEGINNING OF CURB RETURN	HOA	HOME OWNERS ASSOCIATION	RDWY ESMT	ROADWAY EASEMENT
BHW	BOTTOM OF HEADWALL	HORZ	HORIZONTAL	REQD	REQUIRED
BLDG	BUILDING	HP	HIGH POINT	REV	REVISION
BLVD	BOULEVARD	HWL	HIGH WATER LEVEL	RG	ROUGH GRADE
BM	BENCHMARK	HWML OR HW	HEADWALL	RT OR R	RIGHT OF WAY
BVC	BEIGN VERTICAL CURVE	HYD	HYDRAULIC OR HYDRANT	R/W, ROW	
BWV	BACK WATER VALVE	ID	INSIDE DIAMETER	S	SCHEDULE
CC	CLARK COUNTY	IN	INTERSECTION	SCH	SCHEDULE
CCAUO	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS	INT	INVERT ELEVATION	SD	STORM DRAIN
CCFW	CLARK COUNTY PUBLIC WORKS	INV	IRON PIPE	SDD	STORM DRAIN DROP INLET
CCRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT	IRG	IRRIGATION	SDMH	STORM DRAIN MANHOLE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	IRRG	IRRIGATION	SEC	SECTION
CE	COMMON ELEMENT	LF	LINEAR FEET	SF	SQUARE FEET
CL/C/L/C	CL/C	L	LANDSCAPE MAINTENANCE CORPORATION	SH	SHEET
CLR	CLEAR OR CLEARANCE	LP	LOW POINT	SLC	STREET LIGHT & TRAFFIC CONTROL ESMT
CLSM	CONTROLLED LOW STRENGTH MATERIAL	LT OR L	LEFT	SNWA	SOUTHERN NEVADA WATER AUTHORITY
CLV	CITY OF LAS VEGAS	LWVWD	LAS VEGAS VALLEY WATER DISTRICT	SPECS	SPECIFICATIONS
CM	CEMENT PORTLAND LINED AND COATED	LWL	LOW WATER LEVEL	ST	STREET
CMU	CONECRETE MASONRY UNIT	MAX	MAXIMUM	SSMH	SANITARY SEWER MANHOLE
ONLY	CITY OF NORTH LAS VEGAS	MECH	MECHANICAL	STA	STATION
COH	CITY OF HENDERSON	MH	MANHOLE	STD	STANDARD
CONC	CONCRETE	MIN	MINIMUM	STL	STEEL
CT	COURT	MISC	MISCELLANEOUS	STLT	STEEL LIGHT
CU OR CU YD	CUBIC YARD	MUE	MUNICIPAL UTILITY EASEMENT	SW	SIDEWALK
DWMS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	SWH	SOUTHWEST GAS
		NTS	NOT TO SCALE	SWR OR SS	SANITARY SEWER
DET	DETAIL	NUE	NONEXCLUSIVE UTILITY EASEMENT	SY	SQUARE YARD
DI	DIMETER IRON OR DRAIN INLET	NVE	NO ENERGY	TAN	TANGENT
DIA Ø	DIAMETER	ON CENTER	ON CENTER	TOP OF CURB	TOP OF CURB
DP	DUCTILE IRON PIPE	OD	OUTSIDE DIAMETER OR OVERALL DIMENSION	TF	TOP OF FLOOR OR TOP OF FOOTING
DR	DRIVE	OFF	OFFSET	TG	TOP OF GRATE
DWG(S)	DRAWING	ORIG	ORIGINAL	THRU	THROUGH
DWY	DRAINWAY	PAC	PUBLIC OR PEDESTRIAN ACCESS EASEMENT	THW	TOP OF HEADWALL
EA	EACH	PB	PULL BOX	TP	TOP OF PIPE
ECR	END CURB RETURN	PC	POINT OF CURVE	TW	TOP OF WALL
EG	EXISTING GROUND	PCC	POINT OF COMPOUND CURVE	TW	TOP OF RETAINING WALL
ELEV	ELEVATION	PDE	PUBLIC DRAINAGE EASEMENT	TSW	TOP OF SCREEN WALL
ESMT	EASEMENT	P, R OR PL	PROPERTY LINE	TPY	TYPICAL
EP	EDGE OF PAVEMENT	PGB	POINT OF BEGINNING	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
ERU	EQUIVALENT RESIDENTIAL UNIT	POB	POINT OF CURVATURE		
EV	EVIDENCE	POE	POINT OF ENDING	VC	VERTICAL CURVE
EX OR EXIST	EXISTING	PRC	POINT OF REVERSE CURVATURE	VERT	VERTICAL
FC	FACE OF CURB	PRELIM	PRELIMINARY	VG	VALLEY GUTTER
FF	FINISHED FLOOR	PROP	PROPOSED	WI	WROUGHT IRON
FG	FINISHED GRADE	PRV	PRESSURE REDUCING VALVE	WATER LINE	WATER LINE
FQH	FINISHED GRADE, HIGH SIDE	PUP	PUBLIC UTILITY EASEMENT	WP2	WATER PRESSURE ZONE
FGL	FINISHED GRADE, LOW SIDE	PWT	POINT OF TANGENT OR POINT	WT	WEIGHT
FH	FIRE HYDRANT	PVC	POLYVINYL CHLORIDE	WIR	WATER LINE

SPECIAL NOTE

IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED WHICH IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CLARK COUNTY DEPT. OF PUBLIC WORKS. TEMPORARY CONSTRUCTION ITEMS INCLUDE: PAVEMENT TRANSITIONS, PROTECTIVE DITCHES AND BERMS, ROAD SIGNS AND BARRICADES, ETC.

NOTICE TO CONTRACTOR

-QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

- EXISTING UTILITY LOCATIONS SHOWN HEREIN 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG: (800) 227-2600

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		5' CONTOUR
		1" CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
		8" PVC SS
		8" PVC WTR
		SANITARY SEWER PIPE AND FLOW ARROW
		WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
		PAD ELEVATION
		FINISHED FLOOR ELEVATION
		ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE

EXISTING	PROPOSED	DESCRIPTION
		EXISTING GAS GATE VALVE
		EXISTING UNKNOWN MANHOLE
		EXISTING GAS, SIZE PER PLAN
		EXISTING POWER POLE
		EXISTING TRAFFIC SIGNAL
		EXISTING WALL
		WATER PIPE FITTING
		WATER POINT OF CONNECTION
		SEWER POINT OF CONNECTION
		DAYLIGHT LINE
		STREET CENTERLINE
		RIGHT-OF-WAY
		MATCHLINE
		BOUNDARY LINE
		PHASE LINE
		PROPERTY LINE
		FLOWLINE
		SAWCUT
		CUT/FILL TRANSITION LINE
		SIDEWALK
		EX STRIPING TO BE OBLITERATED
		GRADE BREAK LINE
		REFLECTIVE RAISED PAVEMENT MARKERS
		BACK WATER VALVE
		WROUGHT IRON FENCE
		PONY WALL
		DECORATIVE PERIMETER WALL
		DECORATIVE PERIMETER RETAINING WALL
		PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB

QUANTITIES

DRAINAGE				
1.	8" WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	1,643	--
2.	SIDEWALK UNDER DRAIN	EA	2	--
3.	3" WIDE CONCRETE VALLEY GUTTER W/4" CONCRETE & 5" TYPE II AGGREGATE BASE	SF	1,643	--

SEWER SYSTEM

1.	4" PVC SEWER LATERAL (PRIVATE)	LF	--	--
2.	8" PVC SEWER PIPE (PUBLIC)	LF	--	--
3.	STANDARD 48" SEWER MANHOLE (PUBLIC)	EA	--	--
4.	8" SEWER PIPE CAP	EA	--	--
5.	BACK WATER VALVE	EA	--	--
6.	8" C-900 WATER QUALITY SEWER PIPE (PUBLIC)	EA	--	--
7.				

WATER SYSTEM

1.	FIRE HYDRANT ASSEMBLY W/6" GATE VALVE PER UDACS PLATE NO. 40	EA	-	-
2.	6" PVC WATER PIPE (CLASS 150)	LF	-	-
3.	8" PVC WATER PIPE (CLASS 150)	LF	-	-
4.	8" DIP WATER PIPE (CLASS 53)	LF	-	-
5.	8" GATE VALVE WITH VALVE BOX PER UDACS PLATE NO. 30 & 39	EA	-	-
6.	8" X 6" TEE PER UDACS PLATE NO. 31	EA	-	-
7.	8" X 8" TEE PER UDACS PLATE NO. 31	EA	-	-
8.	8" 5 DEGREE BEND WITH RESTRAINED JOINTS	EA	-	-
9.	8" 11.25 DEGREE BEND PER UDACS PLATE NO. 31	EA	-	-
10.	8" 22.5 DEGREE BEND PER UDACS PLATE NO. 31	EA	-	-
11.	8" 45 DEGREE BEND PER UDACS PLATE NO. 31	EA	-	-
12.	8" 90 DEGREE BEND PER UDACS PLATE NO. 31	EA	-	-
13.	CAP AND 2" BLOW-OFF ASSEMBLY W/CAP PER UDACS PLATE NO. 36	EA	-	-
14.	1" COPPER SERVICE W/ 3/4" METER PER UDACS PLATE NO. 2	EA	-	-
15.	1" COPPER SERVICE W/ 1" METER PER UDACS PLATE NO. 4	EA	-	-
16.	1" COPPER SERVICE W/ 3/4" METER & 1" RPPA PER UDACS PLATE NO. 4 & 8	EA	-	-

STREET IMPROVEMENTS

1.	2" A.C. PAVEMENT W/ 4" ISLAND TIE OVER 6" TYPE I AGGREGATE BASE	SY	-	-
2.	STANDARD 18" TYPE "L" TYPE II CUREB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	-	-
3.	STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	-	-
4.	STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	-	-
5.	4" WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	-	-
6.				-
7.				-

TRAFFIC SIGNALS

1.	30" STOP SIGN WITH POST (R1-1)	EA	-	-
2.	9" STREET NAME SIGN (D-3, BROWN W/ WHITE LETTERS)(6 POLES x 2 PER POLE=12)	EA	-	-
3.	BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKER	EA	-	-
4.	CROSSWALK MARKINGS	LF	-	-
5.				
6.				
7.				
8.				

DRY UTILITIES

1.	100W H.P.S. LUMINAIRE STREET LIGHT W/DECORATIVE POLE	EA	-	-
2.	1-1/4" PVC STREET LIGHT CONDUIT WITH (2) #4 AND (1) #6 CONDUCTORS	LF	-	-
3.	NO. 3-1/2 PULL BOX W/METAL COVER			
4.	150 AMP SERVICE PEDESTAL (RR)	EA	-	-
5.	200 AMP SERVICE PEDESTAL (STLT)	EA	-	-
6.				

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. _____ FIRST APPROVED DATE: _____
 LVWD APPROVED FIRE FLOW _____ GPM AT 20 PSI RESIDUAL
 MAXIMUM AVAILABLE FIRE SPRINKLER FLOW _____ GPM

CITY OF LAS VEGAS, NV

NINETY-FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.21B

LEGEND, ABBREVIATIONS, AND QUANTITIES

S 12 S
T 19 S
R 59 E

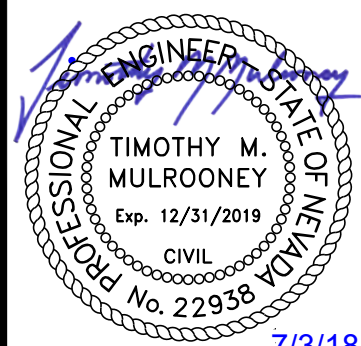
DATE: 07/03/18

DRAFTER: CP

DESIGNER: CP

CHECKED: DSF

PROJECT NO.
OLY1725-000



C-3

SHEET 3 OF 12

H_{II}_____

LV# _____



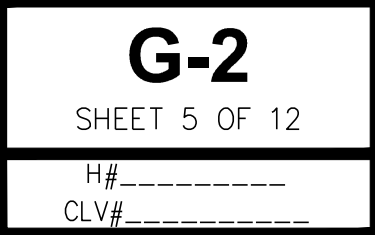
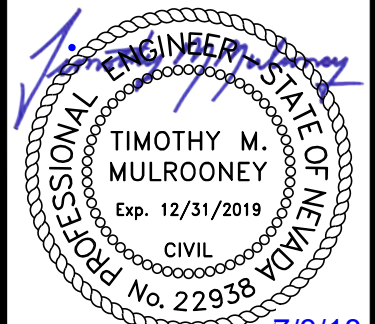
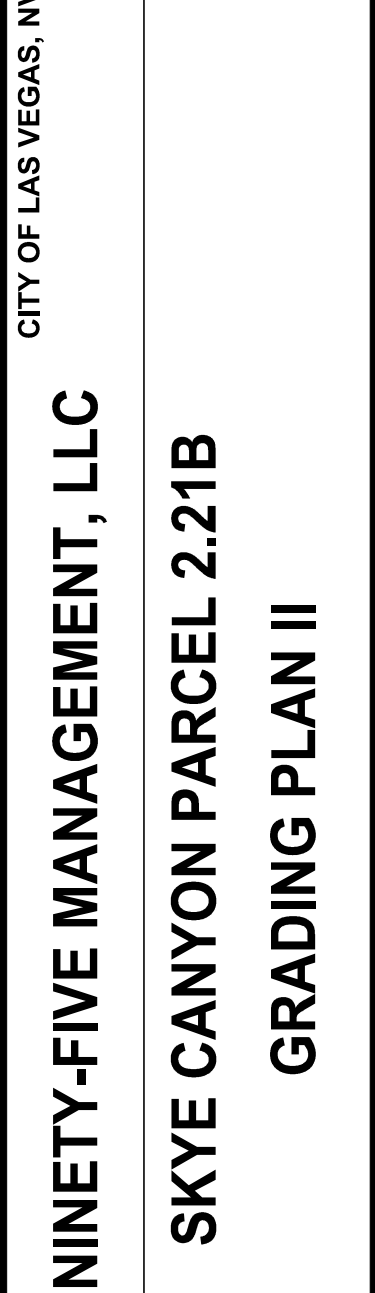
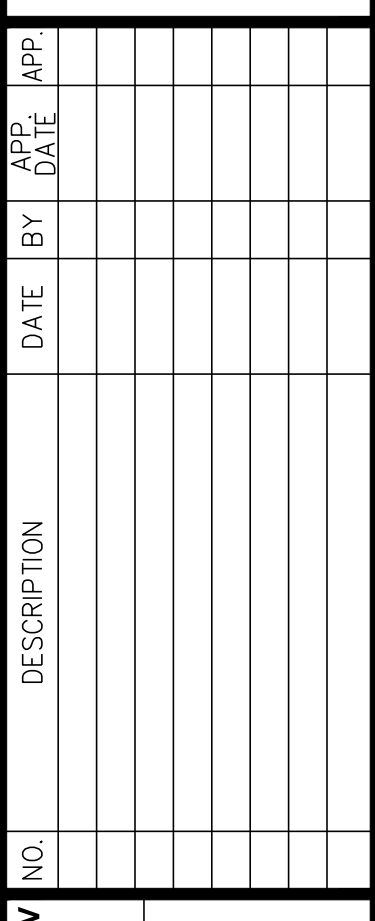
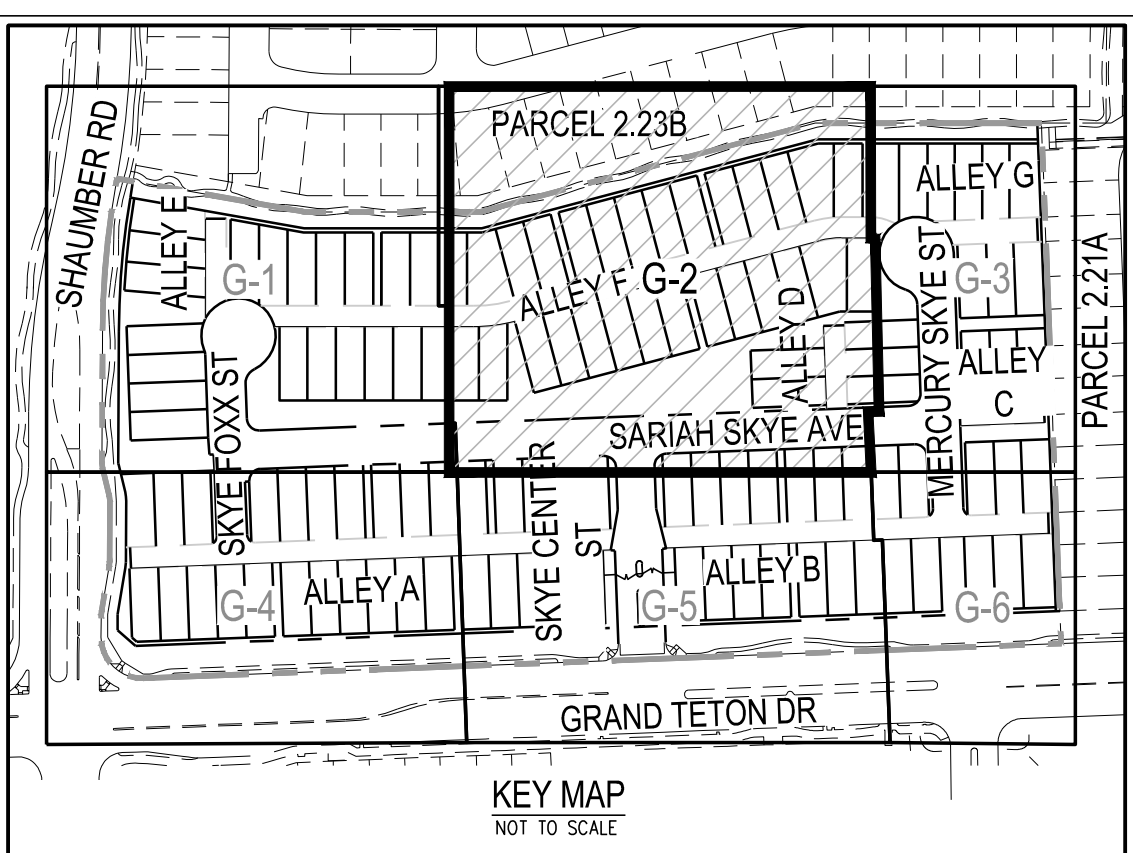
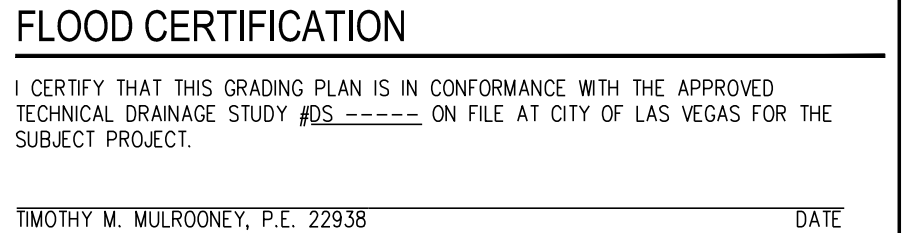
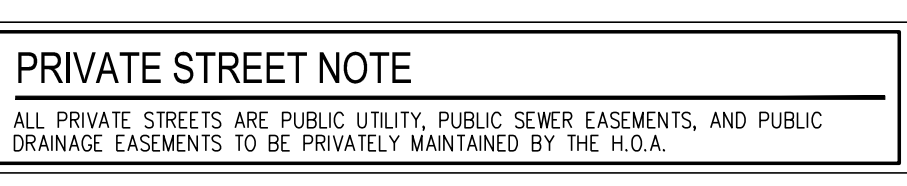
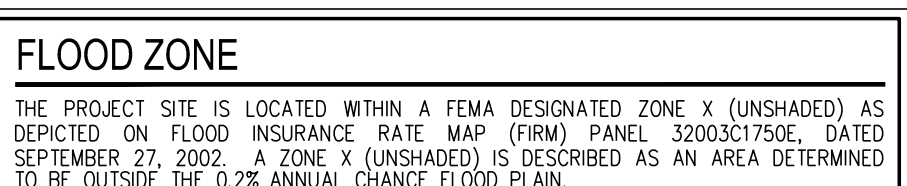
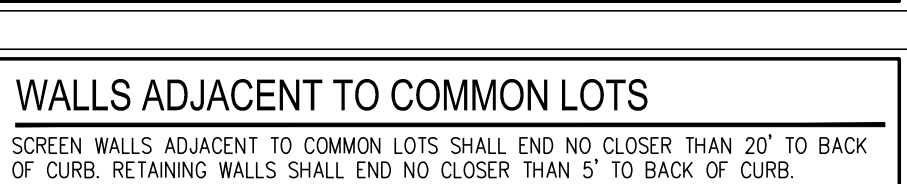
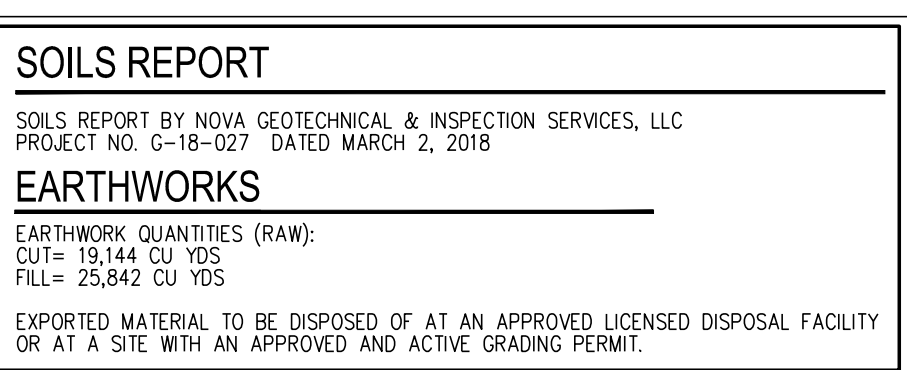
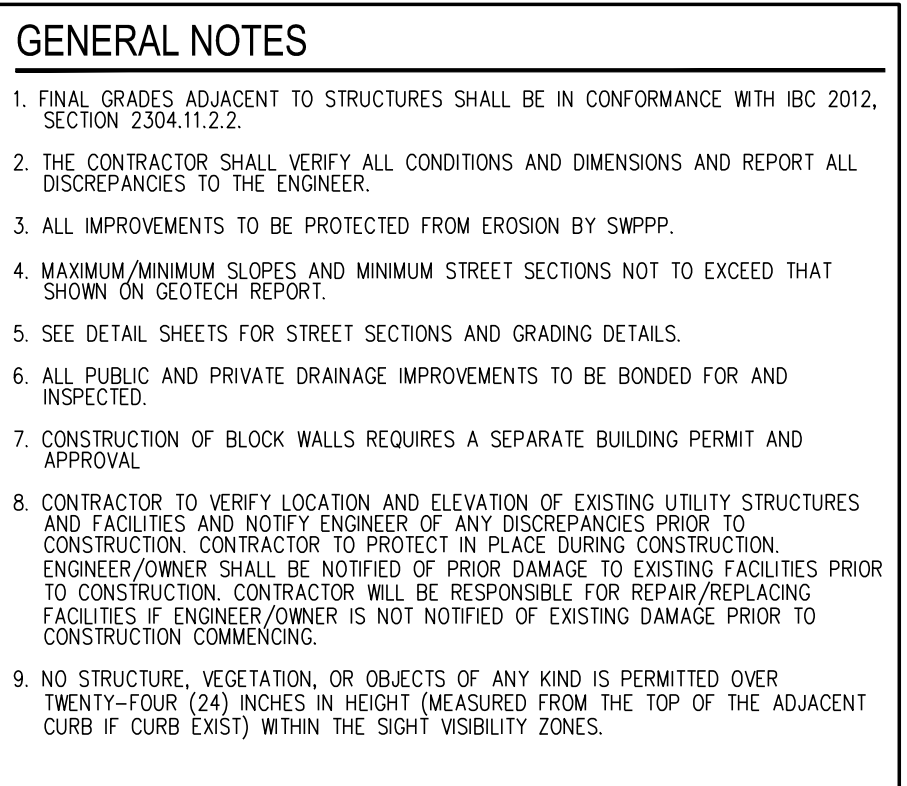
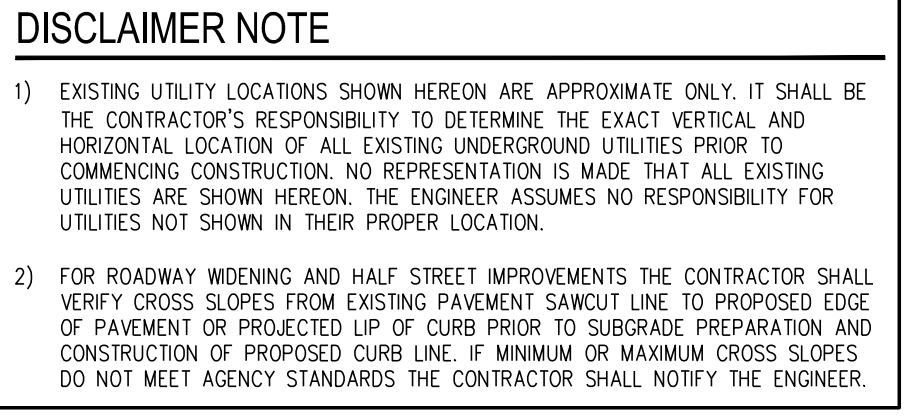
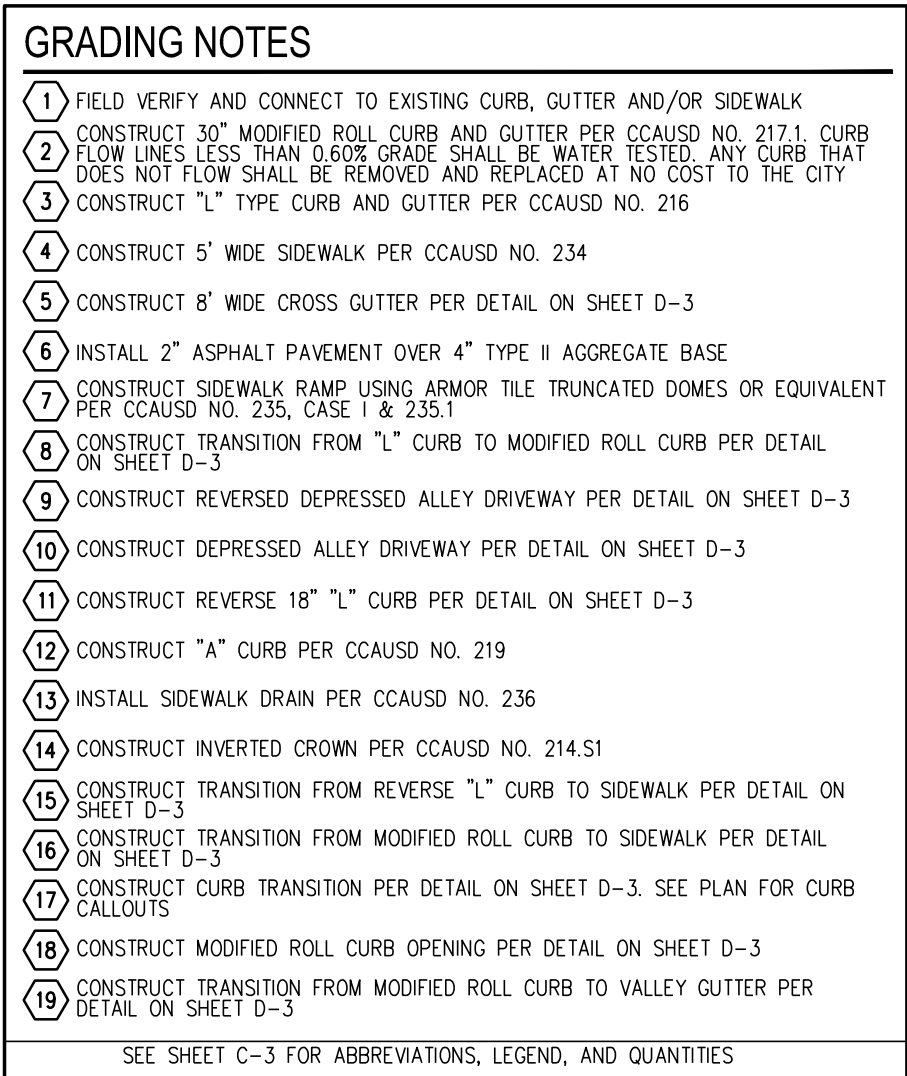
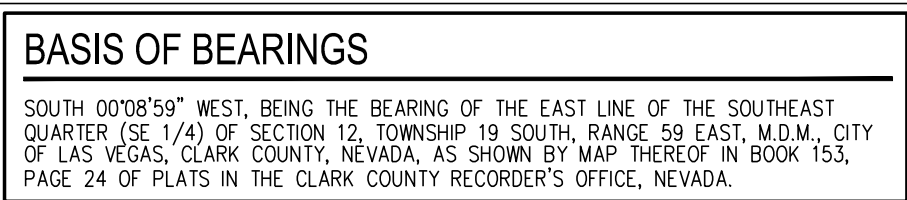
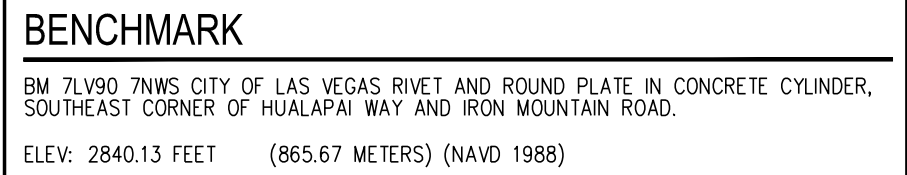
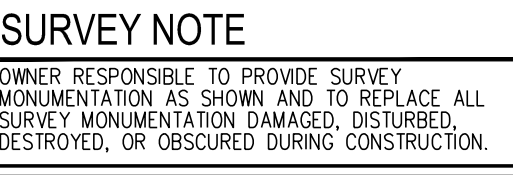
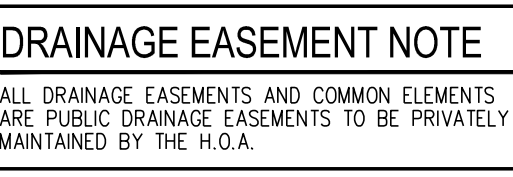
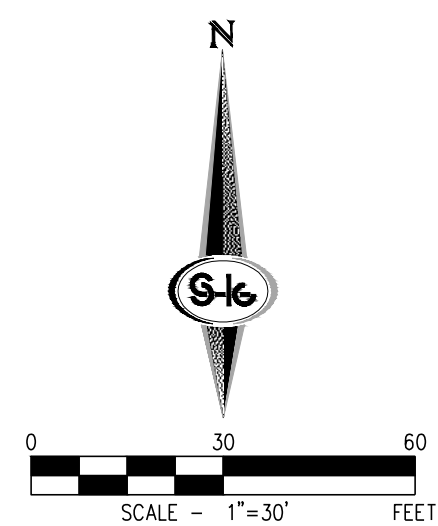
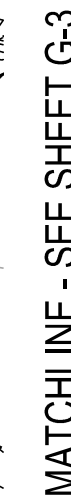
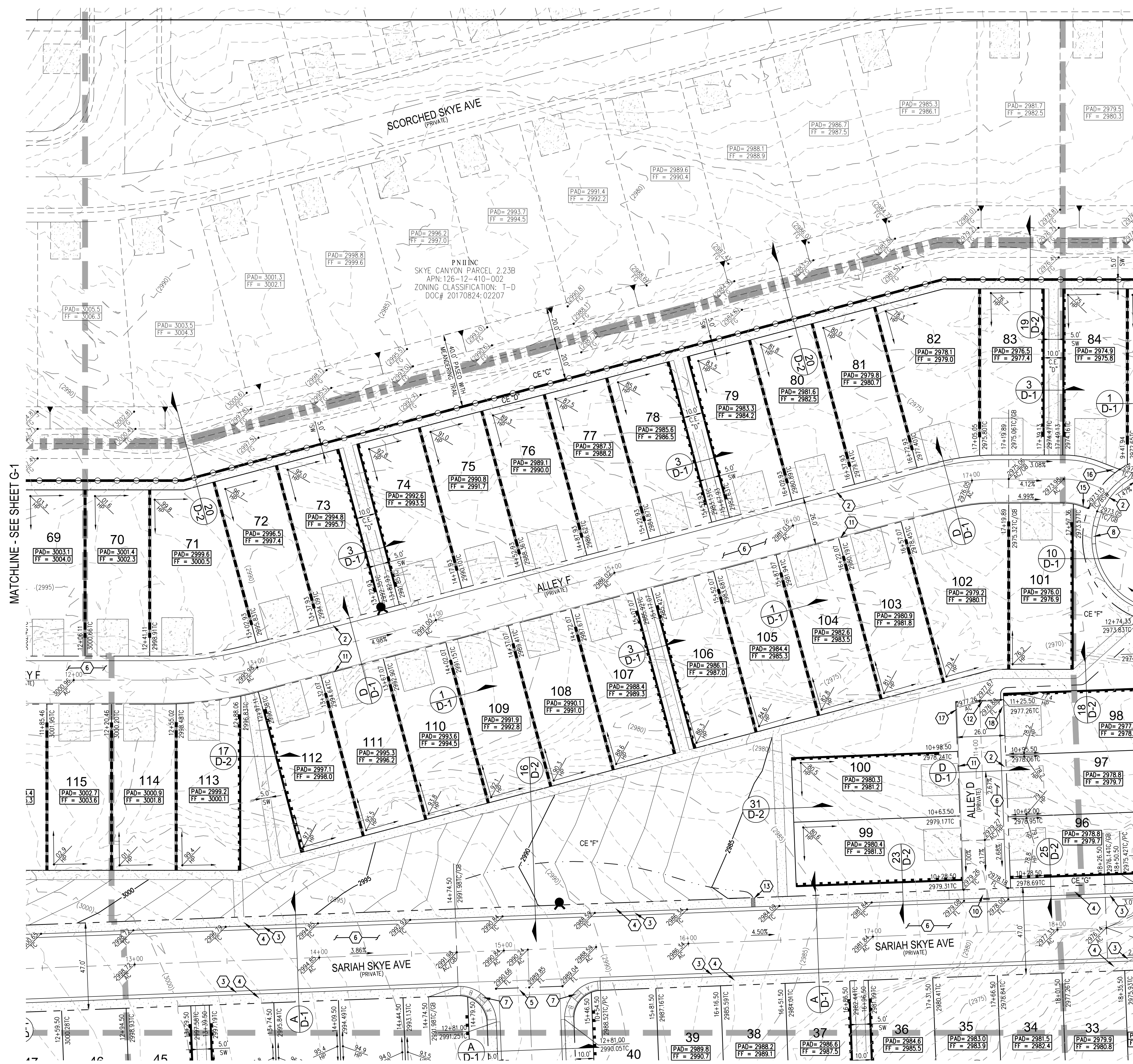


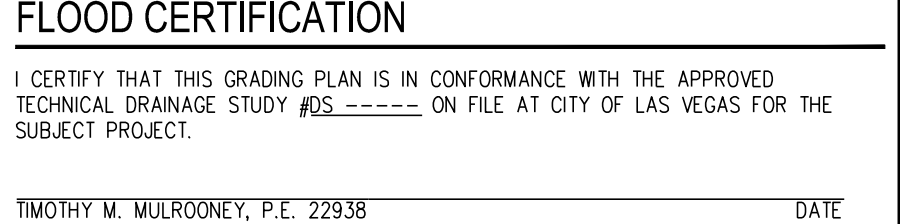
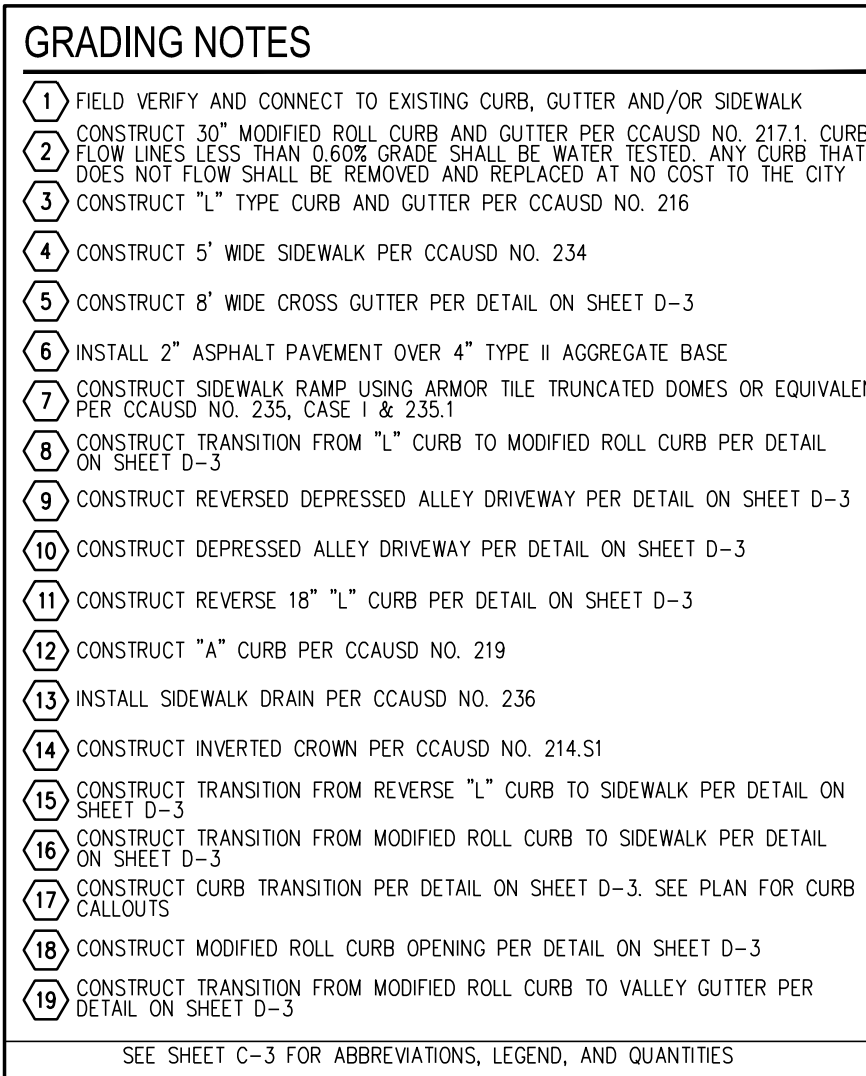
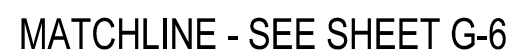
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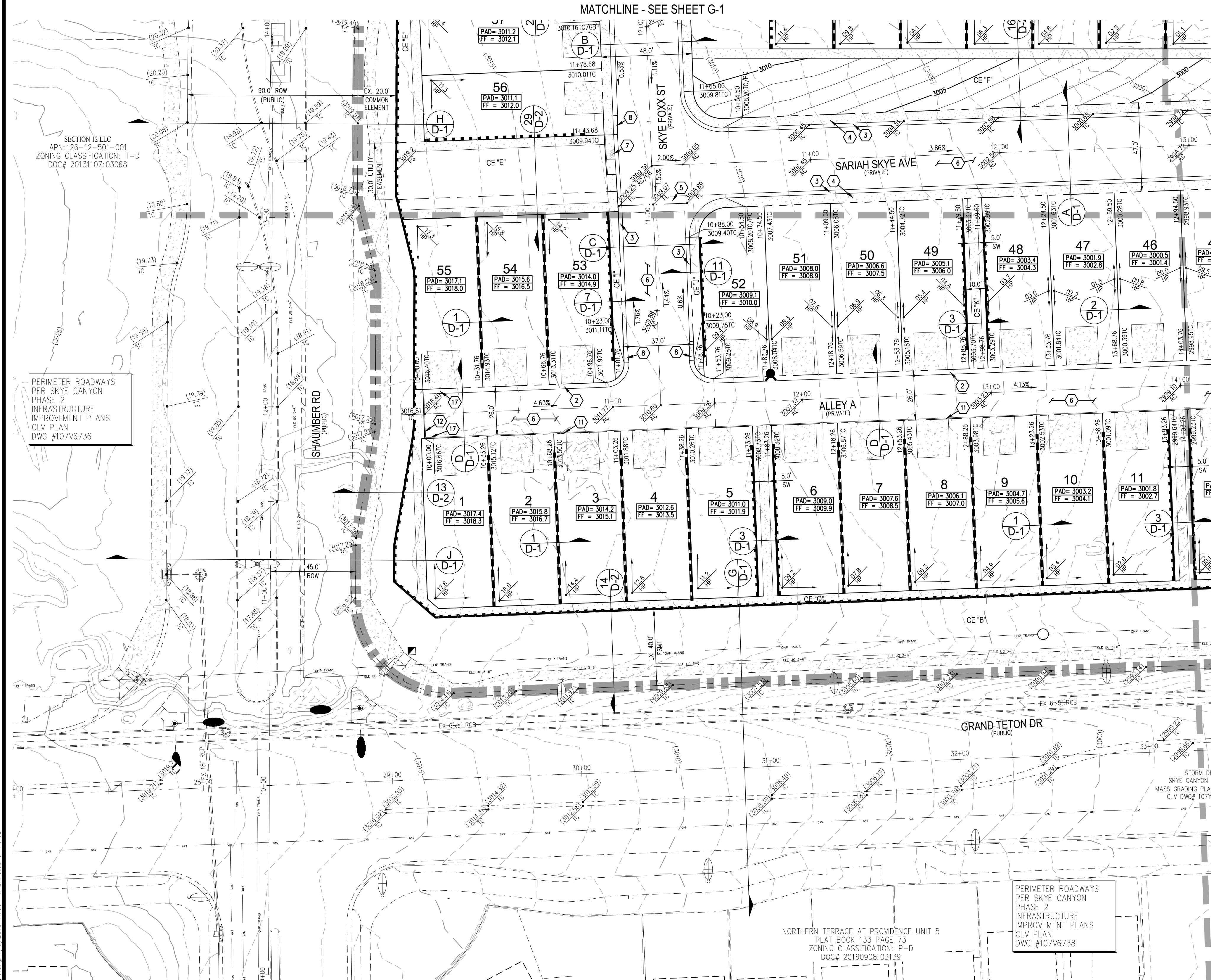
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APN: 126-12-501-001
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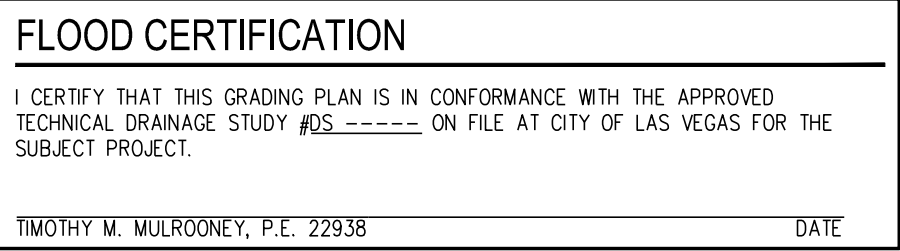




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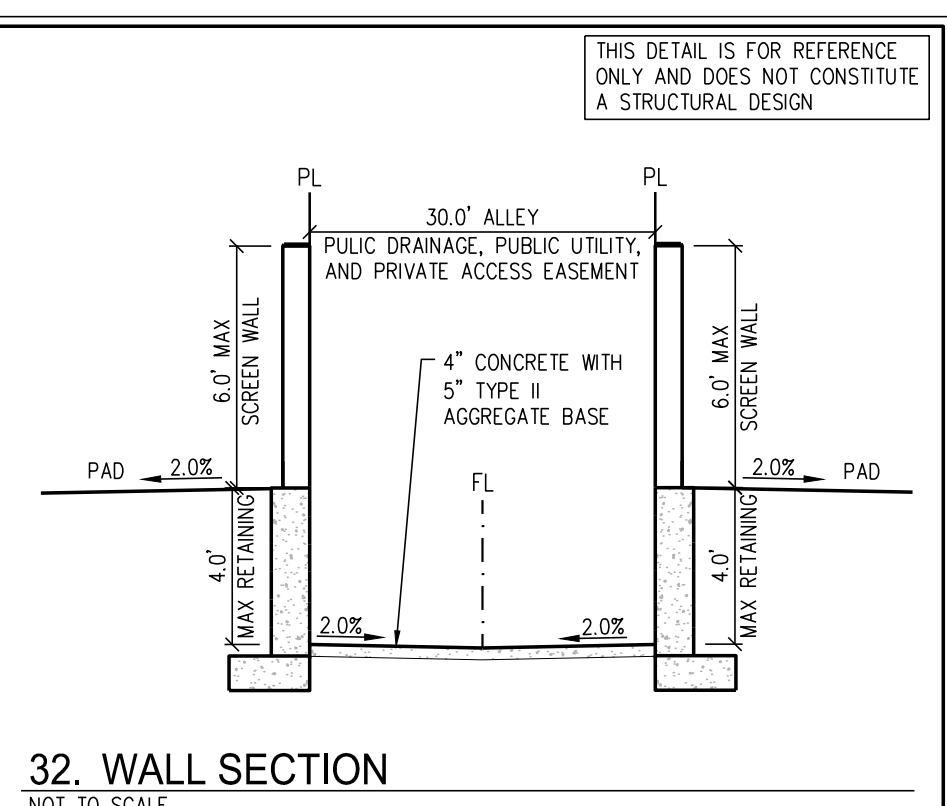
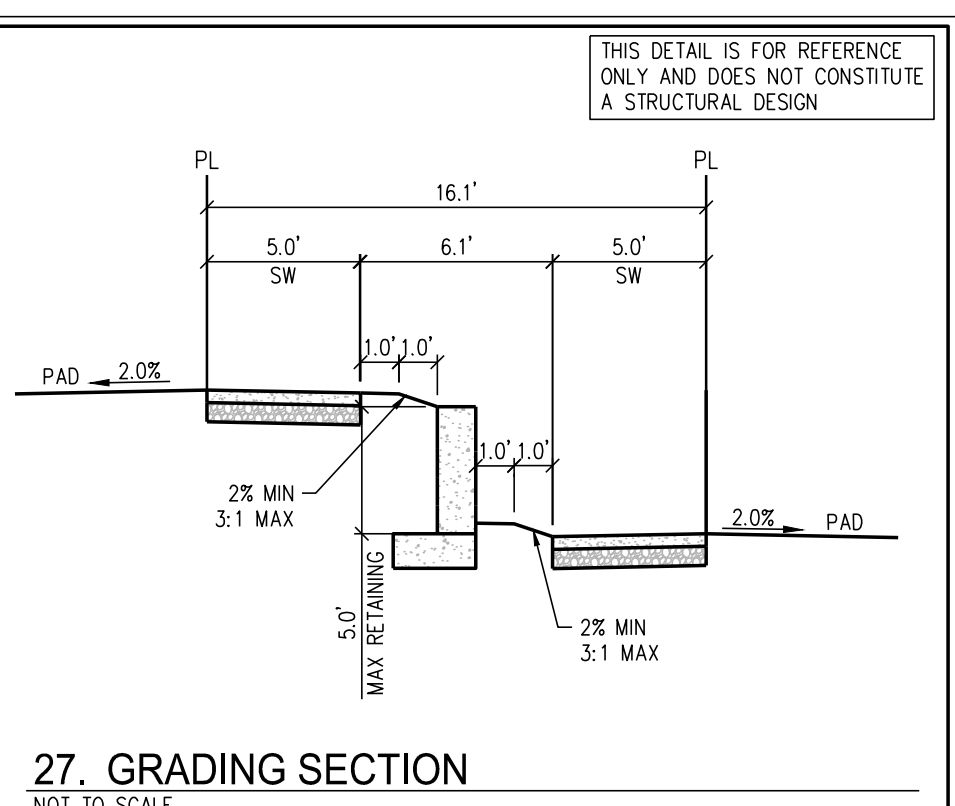
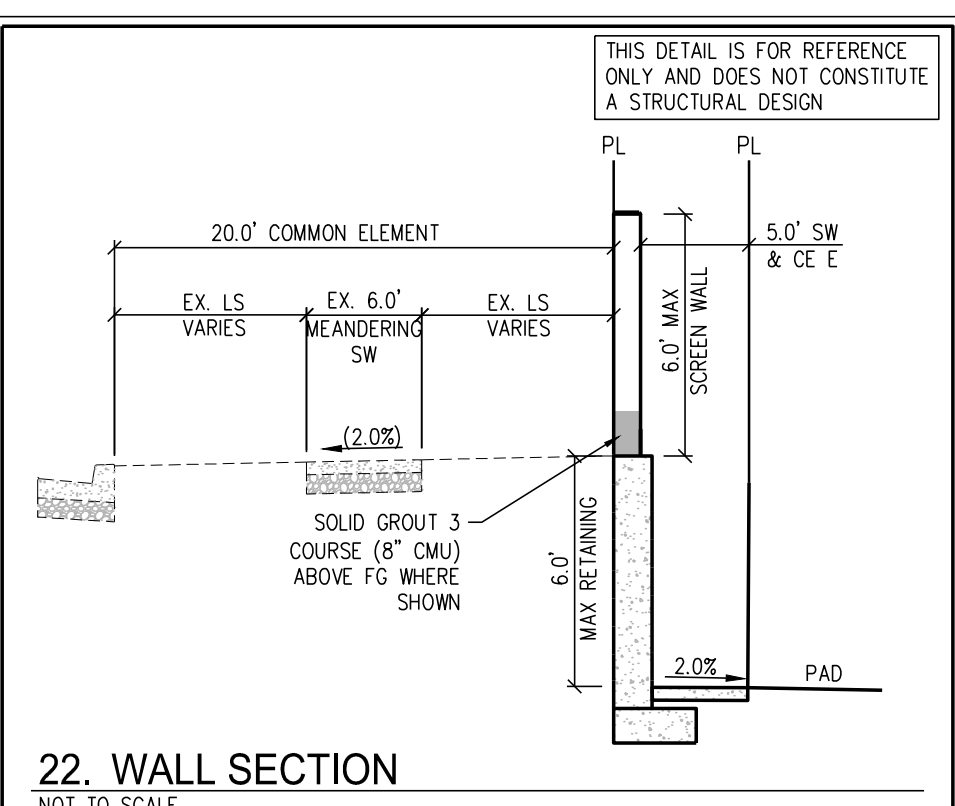
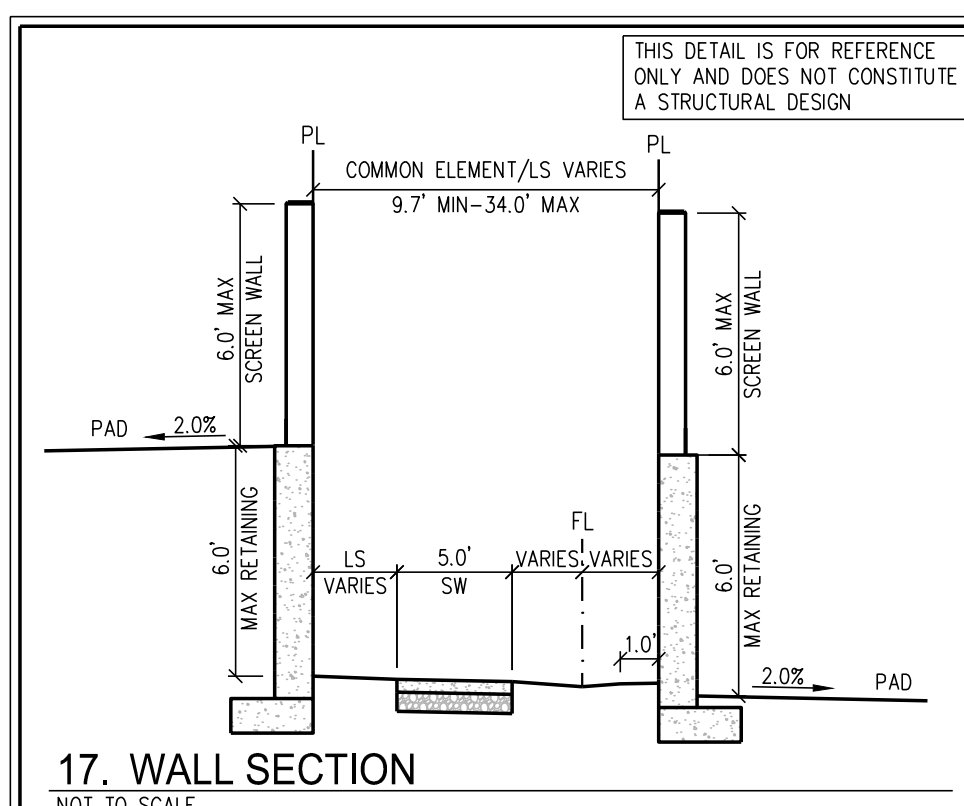
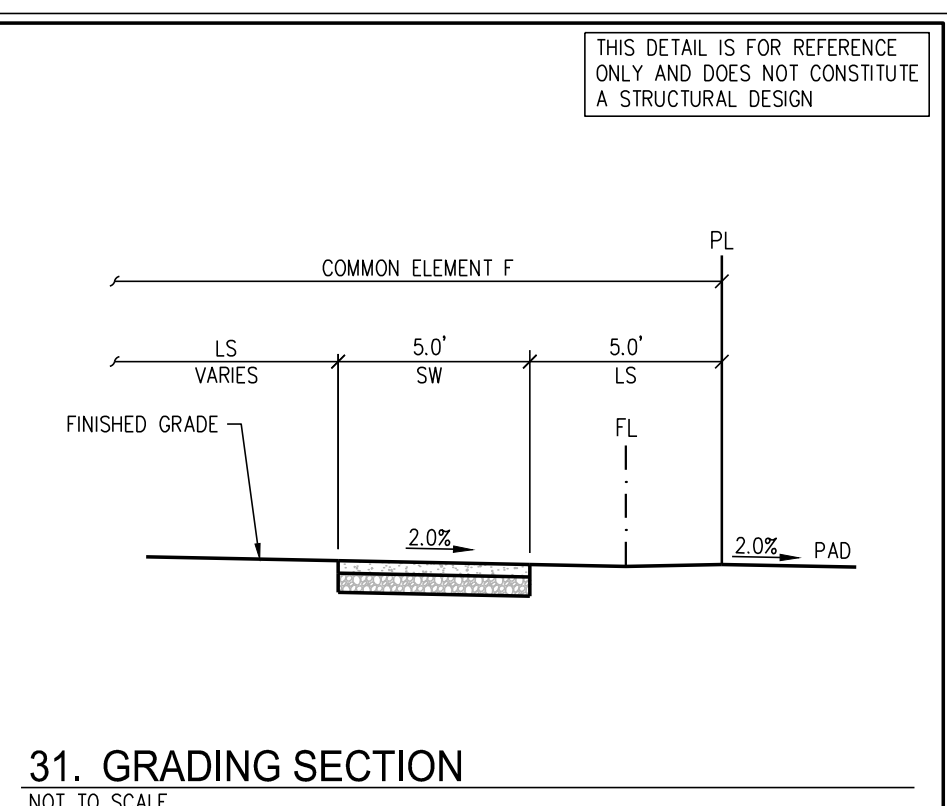
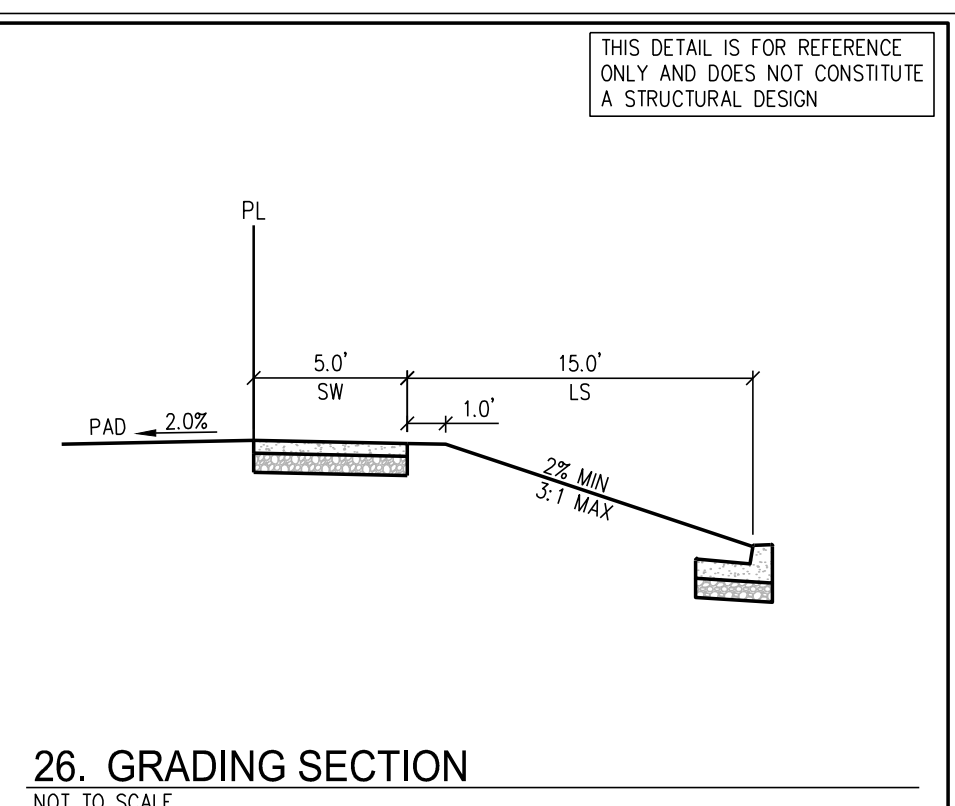
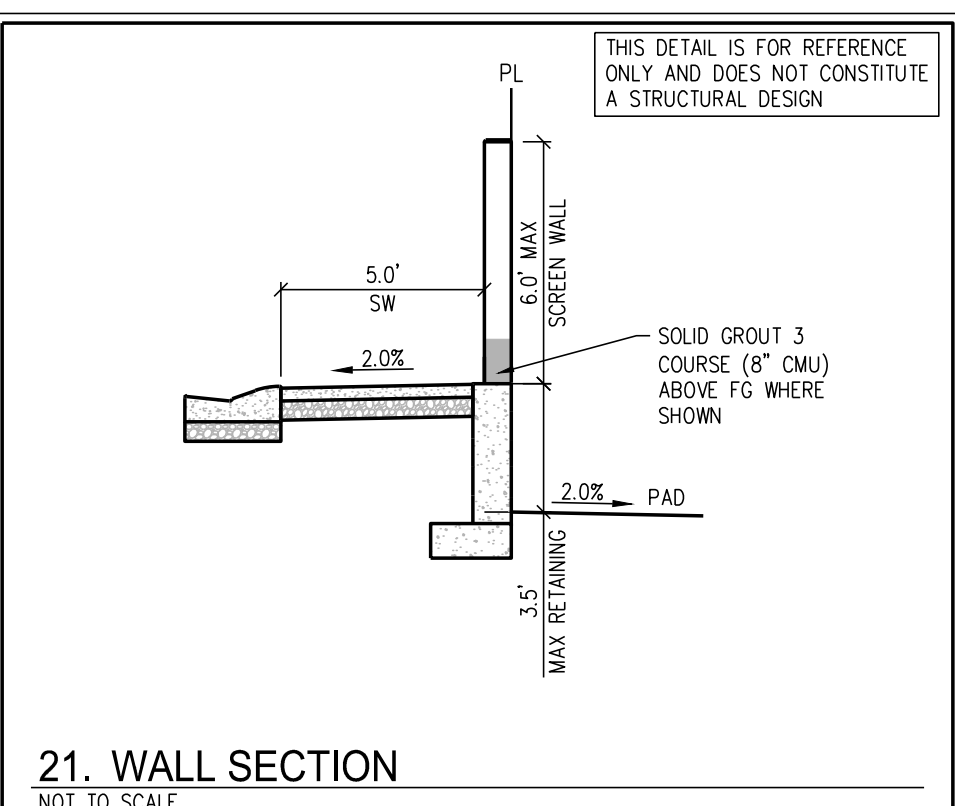
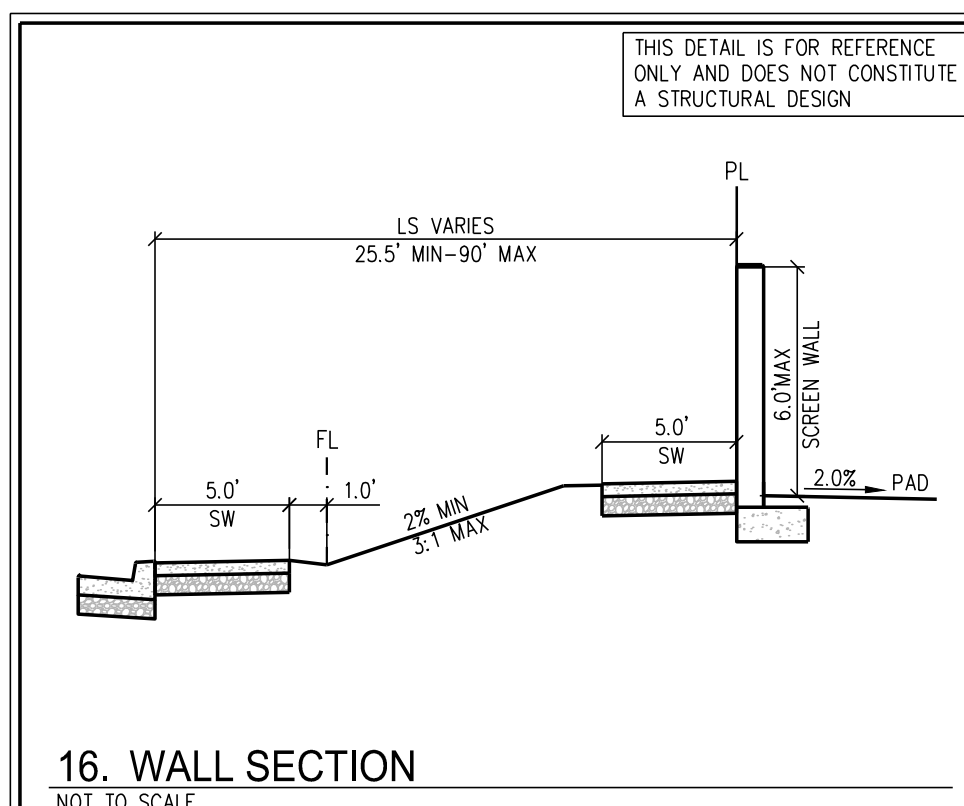
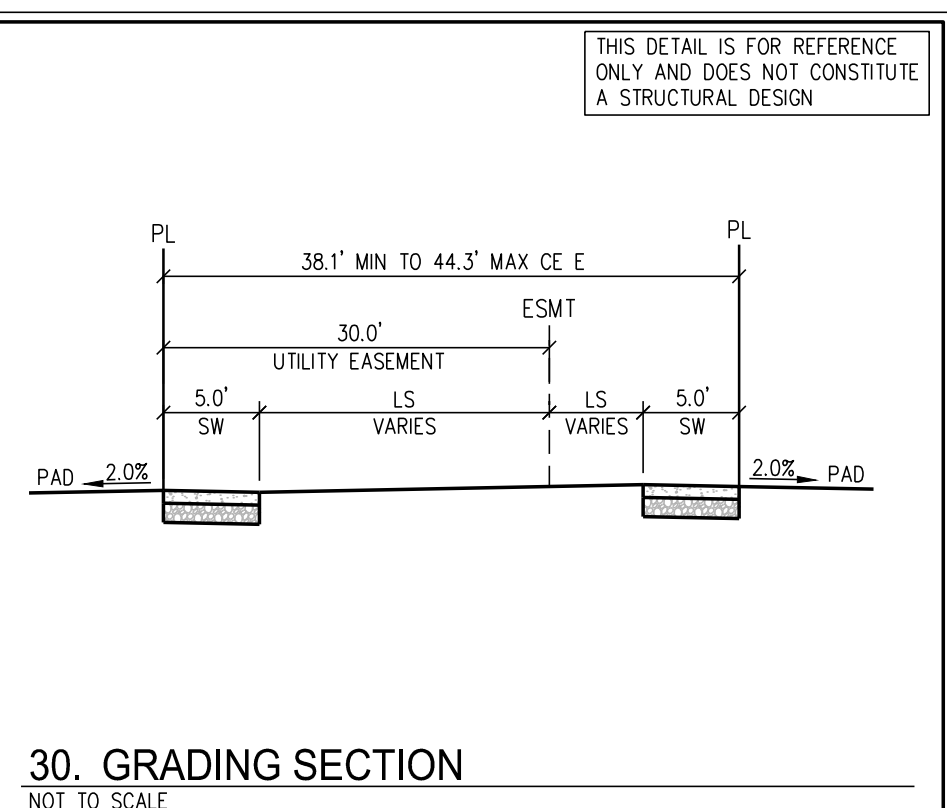
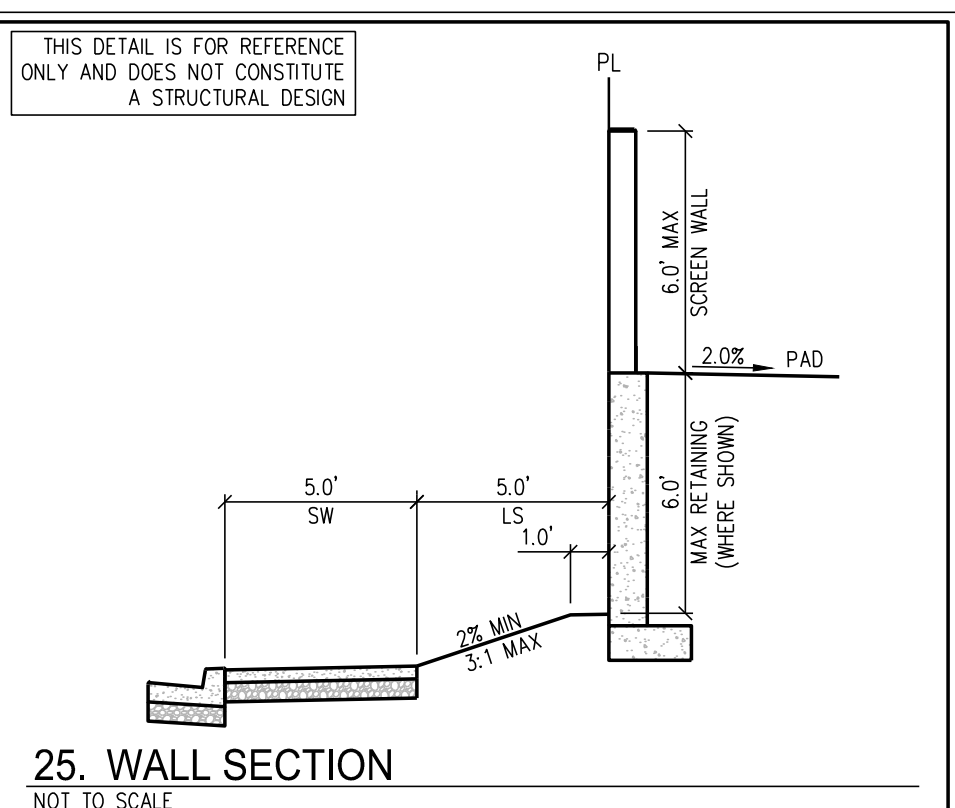
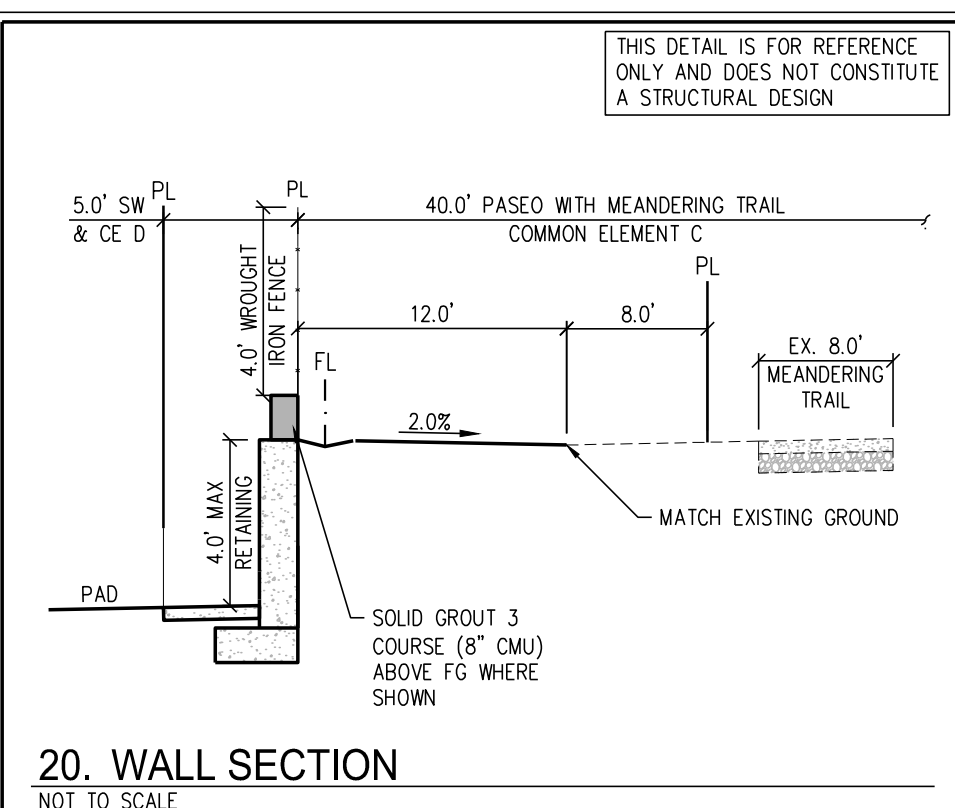
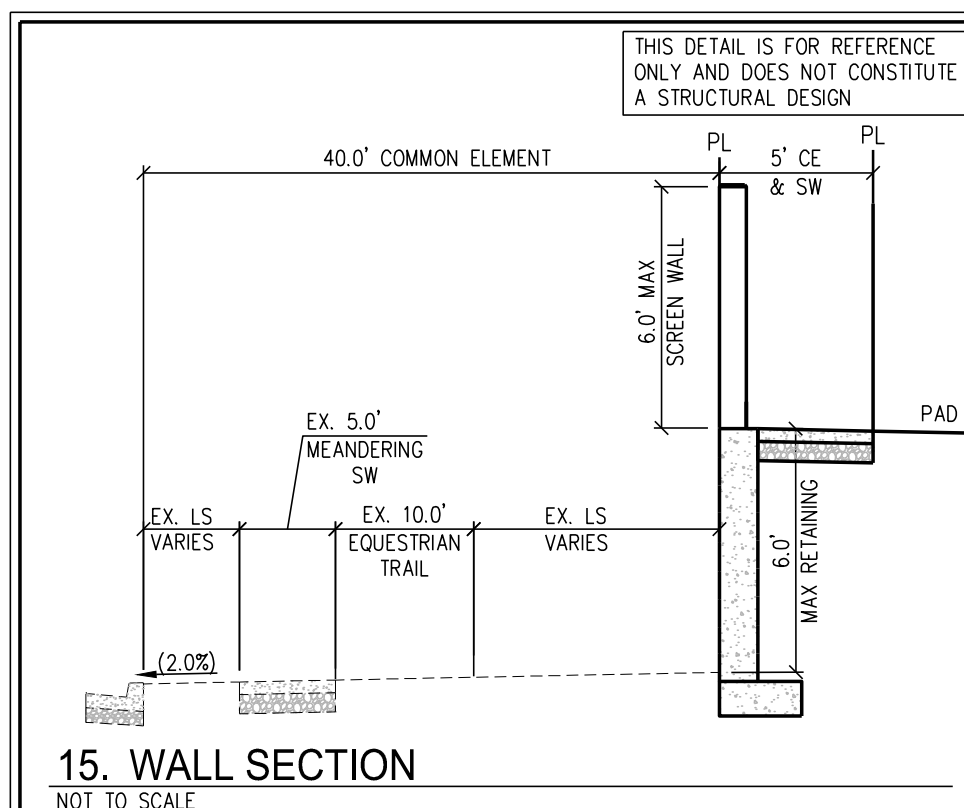
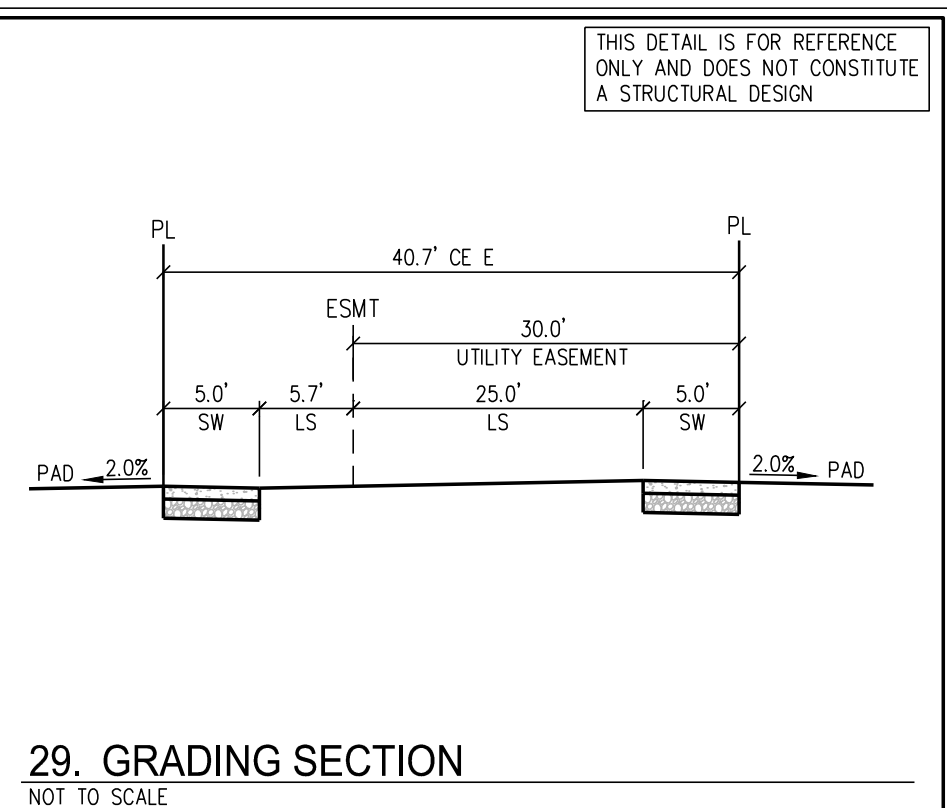
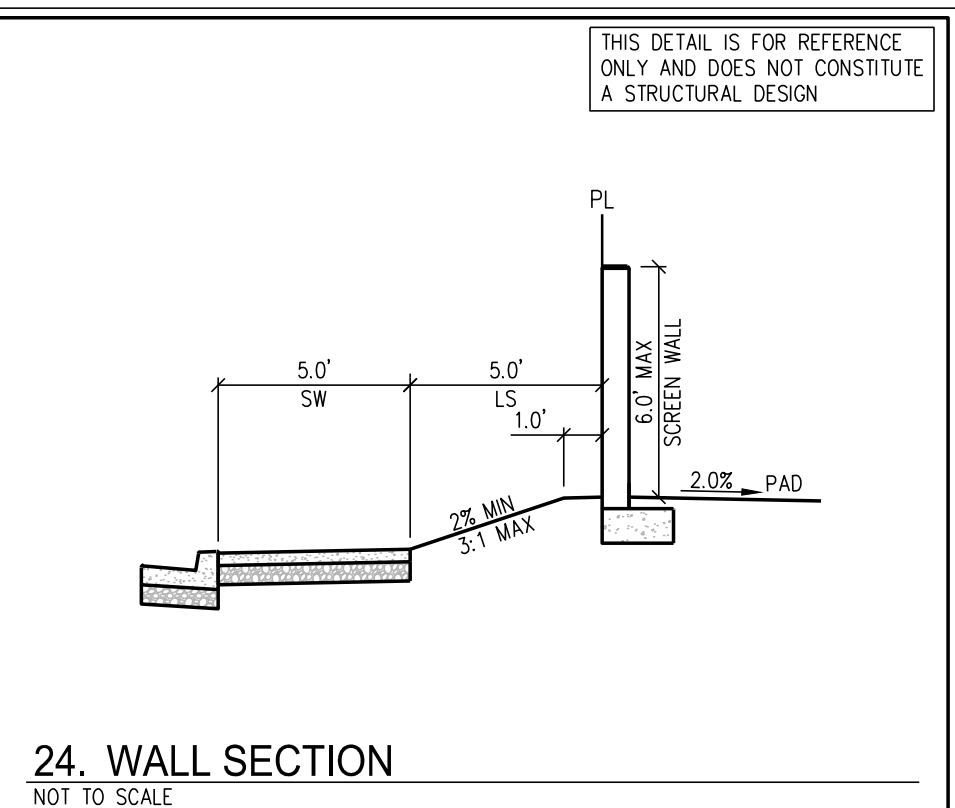
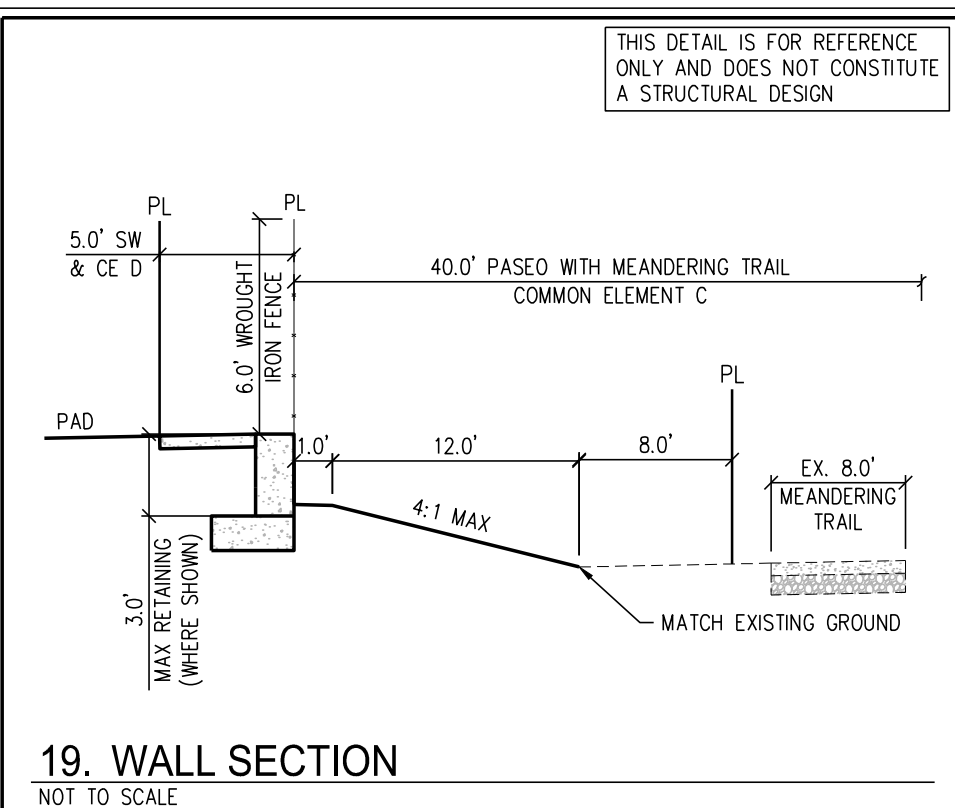
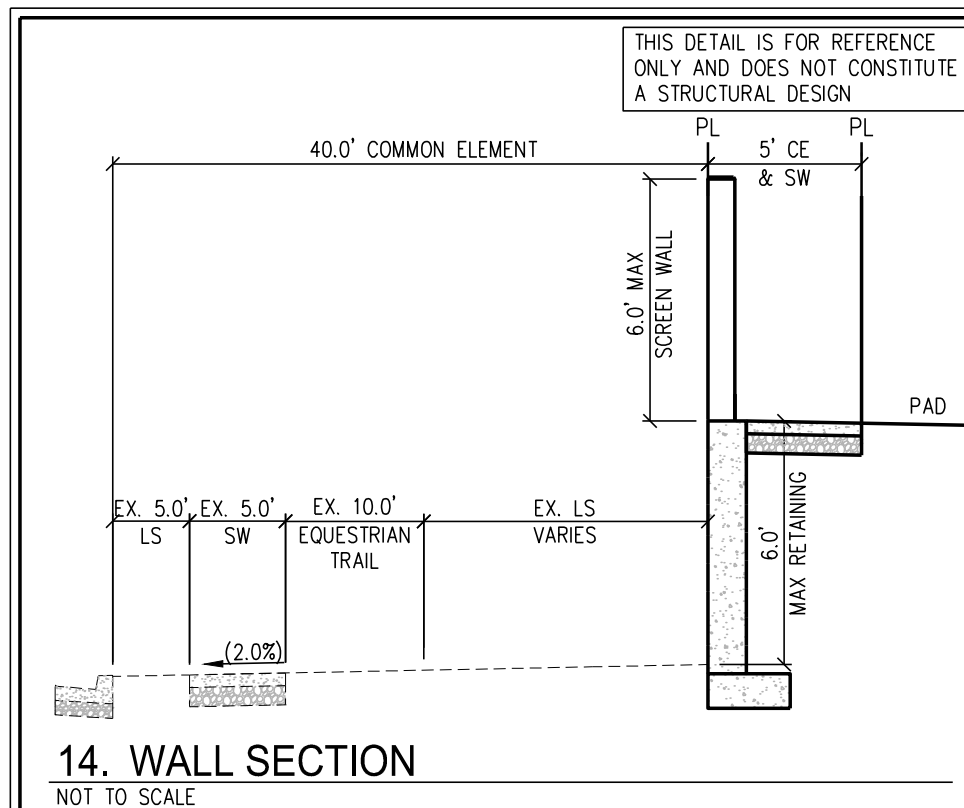
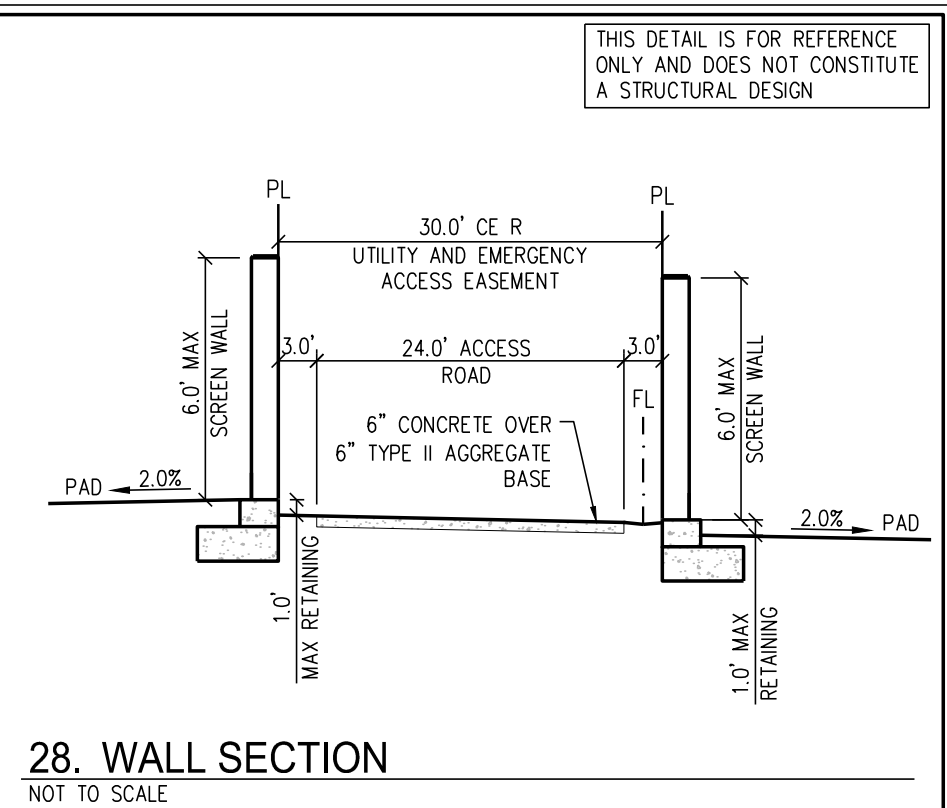
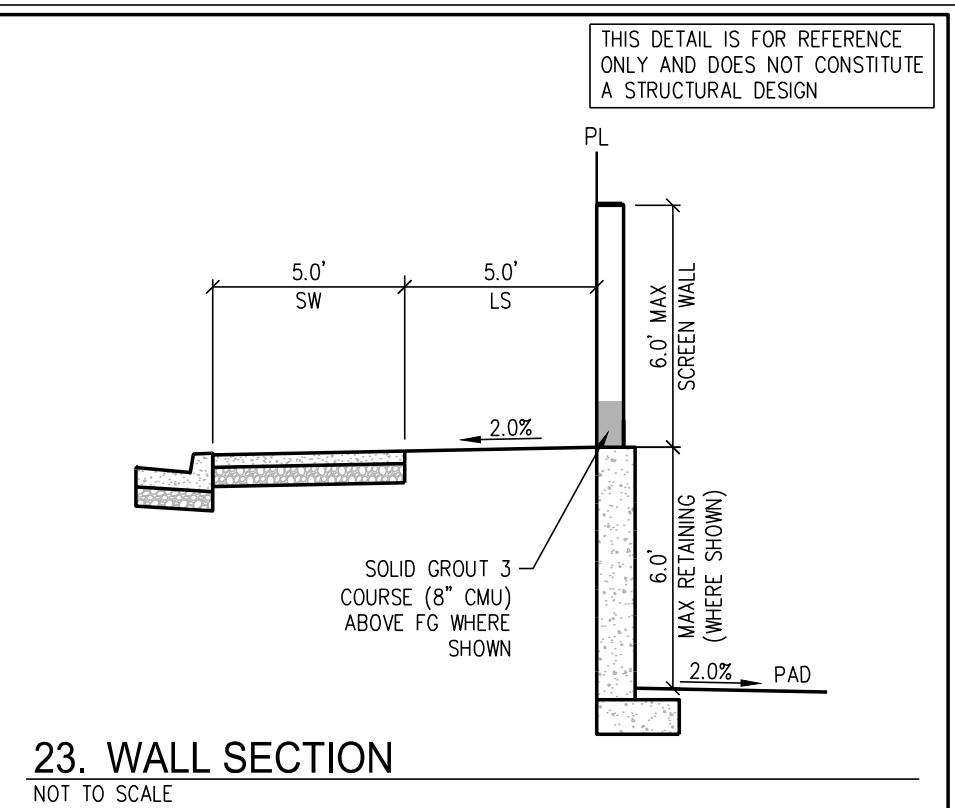
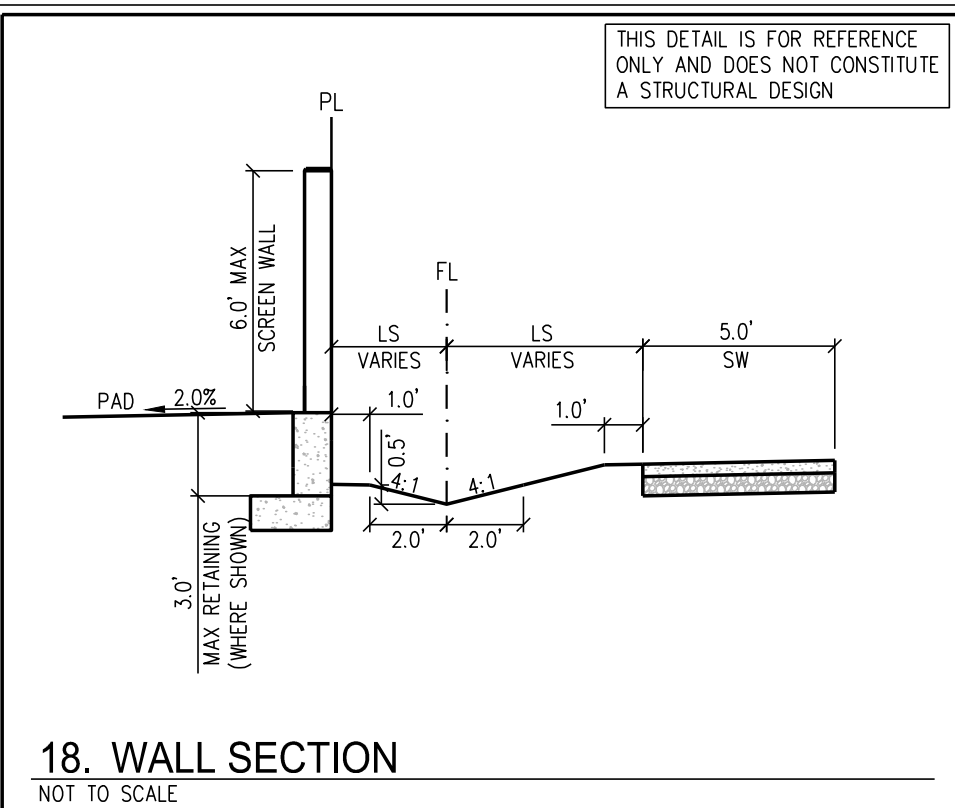
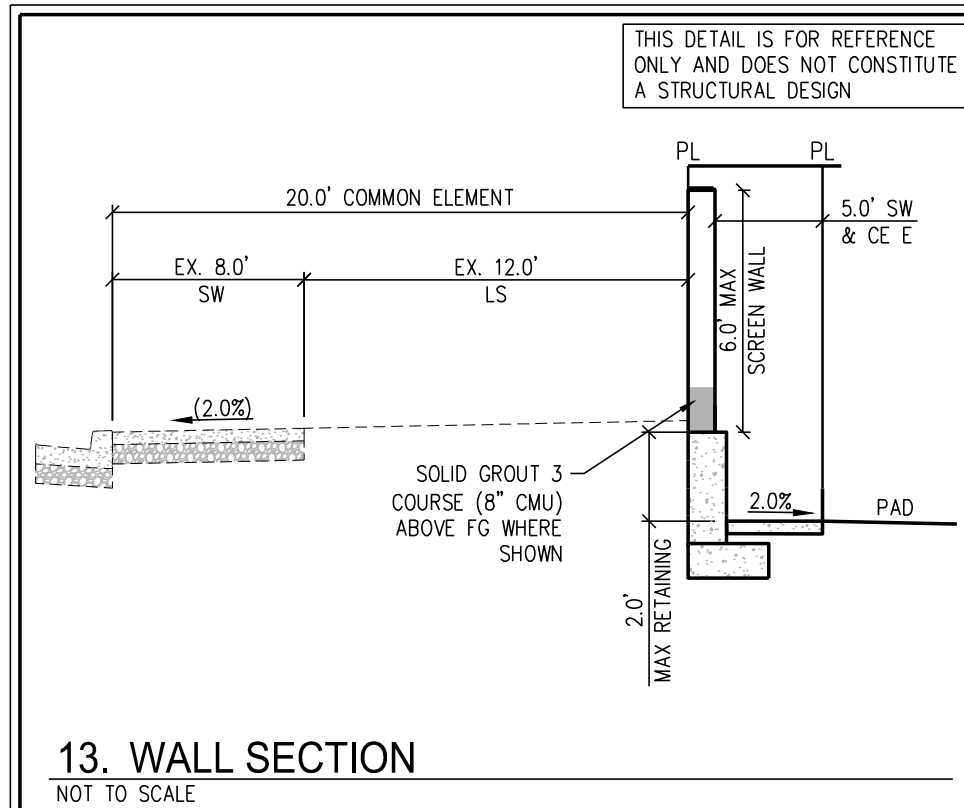


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[illegible]

NINETY-FIVE MANAGEMENT, LLC

SKYE CANYON PARCEL 2.21B

DETAIL SHEET II

DATE:	07/03/18
DRAFTER:	CP
DESIGNER:	CP
CHECKED:	DSP
PROJECT NO.	OLY1725-000
A circular professional seal for Timothy M. Mulrooney, a Professional Engineer in the State of New York. The seal includes his name, title, license number (No. 26295), and expiration date (Exp. 12/31/2019). A blue ink signature is written across the seal.	
7/3/18	
D-2	
SHEET 11 OF 12	
H# _____ CI# _____	

