DS #: 4945

APN: 125-19-101-003

PROJECT: Agave Moon

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: January 16, 2018
TO: **Land Development Services** Department of Building & Safety				FROM: Jennifer Shinn Flood Control Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for: **Agave Moon**			**COPIES TO:** Slater-Hanifan
Cross Streets:	NEC of Hualapai Way & Dorrell Lane			Richmond American Homes
File Number:	F:\Depot\DSMemos\DS4945A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-19-101-003			
Zoning Action:	TMP-70766			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	12/26/2017	01/16/2018	See Comments Below	$400.00	492313: $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.

1. 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.

2. The site is adjacent to Clark County. Clark County Public Works concurrence is required prior to final approval of the drainage study.

3. A review of the grading plan shows elevation differences of approximately 4 feet of cut/fill adjacent to the developed property to the east. Sites with a grade difference of 2 feet above or below existing grades are required to have approval from the City of Las Vegas Planning and Development Department. The engineer must submit copies of the grading plan and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide City Planning approval with the next submittal.

4. Provide references on the drainage basin maps for the offsite flow of 132 cfs impacting Hualapai Way.

5. Revise all drop inlets to Type "CM". Note that the lengths of "CM" inlets are in multiples of 2.5'. Revise all pertinent calculations, construction notes and callouts accordingly.

6. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All private streets are P.U.E., Public Sewer Easements, and Public Drainage Easements to be privately maintained by HOA."
7. Show the extents of the existing 33' patent easement on Section Detail E/D-1 to demonstrate that grading and construction is maintained within the easement and does not encroach upon the adjacent property. If grading is to occur on the adjacent parcel, secure a notarized letter of permission from the property owner allowing the grading. This letter is required prior to final acceptance of the drainage study.
8. Provide flow line grades to demonstrate how the northern half of Lot 10 drains towards Wittig Avenue.
9. Label Hualapai Way, Dorrell Lane, and Wittig Avenue as Public Right of Way.
10. Revise callout 11 on Lots 1, 4, 6, 8, and 17 to reflect callout 10.
11. Review and revise drainage quantities to include the 8' cross gutter and the Type "CM" drop inlets.

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

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

END OF REMARKS
jks

T/R/S: T20S/R60E/22
AREA L-22

TECHNICAL DRAINAGE STUDY

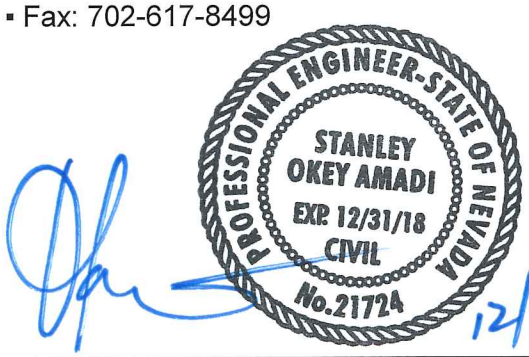
Agave Moon

City of Las Vegas, Nevada

Job No.: RAH1701.000
Date: December 2017

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:
Richmond American Homes
7770 Dean Martin Drive #308
Las Vegas, Nevada 89139
Phone: 702-617-8464 ▪ Fax: 702-617-8499



12/21/17

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

Assisted by: Caitlyn Alcantara, E.I.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Agave Moon Date: December 2017

Location of Development:
a) Descriptive (Cross Streets): North/South: Hualapai Way
East/West: Dorrell Lane
b) Section: 19 Township: 19S Range: 60E
c) APN: 125-19-101-003

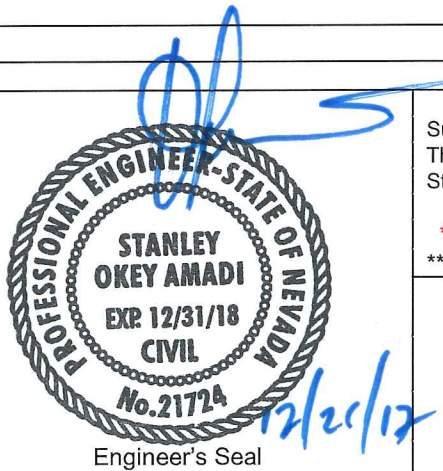
Name of Owner: V F R-Southwest Desert Equities / Richmond American Homes
Telephone No.: 702-6177-8464 Fax No.: 702-617-8499 E-mail Address: brian.walsh@mdch.com
Address: 7770 Dean Martin Drive #308 Las Vegas NV 89139

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 #216 Las Vegas NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 5.3 ac Being Developed/Disturbed: 5.3 ac
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:
6. Has the site drainage been evaluated in the past? ☐ Yes** ☒ No If yes, please identify documentation:
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: All discharge to be routed to Dorrell Lane
8. Briefly describe your proposed schedule for the subject project: ASAP; single phase



Engineer's Seal

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

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

Local Entity File No.

Revision	Date

REFERENCE: STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

I. GENERAL REQUIREMENT		
Yes	No	
-	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
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. S.O.A. 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.
X	-	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	
-	N/A	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
-	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
-	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X	-	Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
-	N/A	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Agave Moon	Map ID:
Firm Name: Slater Hanifan Group	Engineer: Stanley Okey Amadi, P.E.
Address: 5740 S. Arville #216	
City: Las Vegas	State: NV Zip: 89118
Phone Number: (702) 284-5300	Fax Number: (702) 284-5399
Property Owner: V F R-Southwest Desert Equities / Richmond American Homes	
Address: 7770 Dean Martin Drive #308	
City: Las Vegas	State: NV Zip: 89139

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

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

II. MAPS AND EXHIBITS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
-	N/A	Streets with off-set crowns.
X	-	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	-	Property lines.
X	-	Right-of-way lines and widths, existing and proposed.
X	-	Existing improvements and their elevations.
X	-	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X	-	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X	-	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X	-	Location and cross-section of street capacity calculations.
X	-	Cross-sectional detail for channels, including cutoff wall locations.
X	-	Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
-	N/A	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
X	-	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.
-	N/A	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
X	-	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	-	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X	-	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
-	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
-	N/A	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
X	-	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, whichever is greater.
-	N/A	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • 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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1 INTRODUCTION

1.1 Project Overview & Study Purpose

Richmond American Homes is proposing a ±5.3 ac residential subdivision consisting of 17 residential lots identified as Agave Moon (hereinafter referred to as the project site).

The purpose of this study is to provide a detailed hydrologic and hydraulic analysis for the project site in order to protect the property from onsite and offsite runoff in accordance with local storm water management criteria.

1.2 Description of Improvements

The project site is located within APN 125-19-101-003 within Township 19 South, Range 60 East, Section 19, whose location has been shown on Exhibit A, included in Appendix A.

Agave Moon is bound to the south by Dorrell Lane, to the west by Hualapai Way, to the east by existing residential homes, and to the north by undeveloped desert land and Wittig Avenue alignment.

As well as proposed residential lots, the project site proposes half street improvements to the north half of Dorrell Lane and the east half of Hualapai Way. The minimum lot size proposed is more than 7,000 square feet.

The entitlement applications for the site have been approved (VAC-70765, WVR-70763, ZON-70762, TMP-70766). Copies of the notice of final action (NOFA) are provided in Appendix E.

1.3 FEMA Flood Zone Designation

Per the FEMA FIRM Map Panels, 32003C1750E & 32003C1745E, both dated September 27, 2002, the project site is not located within a Special Flood Hazard Area (SFHA). The project site is located within a Zone 'X' (unshaded). Zone 'X' (unshaded) is defined by FEMA as an area determined to be outside the 0.2% annual chance floodplain. The current FEMA FIRM Map, identified as Exhibit B, is included in Appendix B for reference.

1.4 CCRFCD Information

Figure F-13, from the 2013 Las Vegas Valley Flood Control Master Plan Update (MPU, Reference 1), shows that the Project site is adjacent to the existing Beltway Channel - Hualapai (BCHU 0040 & 0042). Exhibit C1 and Exhibit C2 identifying the project site on the MPU figure and providing the facilities inventory, respectively, have been included in Appendix A for reference.

Per the 2008 MPU Hydrology Map, the Project Site is located within Basin NW77-C. This basin is intended to drain east toward Grand Canyon Drive. The CCRFCD 2008 MPU Figure H-13, identified as Exhibit C3, is included in Appendix A for your reference.

1.5 Referenced Studies

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

1. The study entitled *Technical Drainage Study for Dorrell/Hualapai East* (hereinafter referred to as the East Study), DS# 4651C and prepared by Slater Hanifan Group, previously evaluated the project site as an offsite tributary. The proposed condition drainage was utilized as the project site's existing condition drainage. Note that though East Study evaluated a fully developed condition where the project site was developed, Connor Hills 3 did not utilize developed condition flows since the project site for the following reasons: The project site was evaluated as one basin with other, already developed properties. Where the East Study's ultimate condition notes a flow split at Wittig Avenue, the project site has vacated a portion of Wittig Avenue and no longer acknowledges this flow split. Note that the East Study references flow split computations made by the *Technical Drainage Study for Cliffs Edge Infrastructure Phase 1 Study* (HTE #04-53820) and reevaluates provided flow splits. Relevant reference material from the East Study has been included in Appendix F.

2. The study entitled *Technical Drainage Study for Dorrell/Hualapai West* (hereinafter referred to as the West Study), DS #4604C and prepared by Slater Hanifan Group, previously evaluated Hualapai Way and revaluated the flow splits that occur where Hualapai Way intersects with Wittig Avenue, Dorrell Lane and Haley Avenue. Relevant reference material from the West Study has been included in Appendix G.

3. The study entitled *Technical Drainage Study for Cliffs Edge Infrastructure Phase 1* (hereinafter referred to as the Hualapai SD Study), DS #3576D, HTE #04-53820 and prepared by VTN Nevada, was referenced to establish locations of the existing storm drain laterals for nuisance inlets provided in Hualapai Way adjacent to the site.

4. The improvement plan set entitled *Rancho Road System Storm Drain - Elkhorn* (hereinafter referred to as the Elkhorn SD Study), currently under design. The Hualapai SD Study was referenced to establish that the storm drain in Deer Springs Way will continue past the intersection of Deer Springs Way and Hualapai Way in future conditions.

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

New hydrologic analyses were performed for this study. Onsite and offsite drainage basins were delineated and curve numbers as well as travel times were computed for each basin. See below for more discussion of the hydrologic analysis.

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 project site is located outside of the McCarran Airport Rainfall Area. The precipitation values utilized in the HEC-1 models, per CCRFCD Manual Figure 503 and 506, are 1.67 and 3.00 inches for the 10-year and 100-year storm events, respectively. In addition, since the drainage area of the contributing watershed is less than 8 square miles, the SDN 3 design storm distribution as taken from Table 503 in the CCRFCD Manual was used. Reference tables and figures from the CCRFCD Manual are included in Appendix B.

Soil Index: 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 Soil Survey of the Las Vegas Valley Area (Soil Survey, Reference 3). Exhibits D depicts the project site boundary analyzed with this study on the soils map and have been included in Appendix A. Per the Soil Survey, the project site and all tributary areas lie within the following Soil Types:

- Soil 191 – Dalian very cobbly fine sandy loam, 2 to 8 percent slopes. This soil is comprised of 100% Hydrologic Soil Group (HSG) 'A'.

Land Use: The average lot size for this project site is more than 7,000 square feet. An impervious curve number of 98 was used for the roadway areas.

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

Street Flow: Street flows have been analyzed utilizing the FlowMaster Version 7.0 software by Haestad Methods. In accordance with the CCRFCD Manual, the depth times velocity factor (D x V) for street flow for the 10-year storm event must be less than or equal to 6, with a maximum depth of 1-ft. The depth times velocity factor (D x V) for street flow for the 100-year storm event must be less than or equal to 8, with a maximum depth of 2-ft.

Hualapai Way adjacent to the project site has a right-of-way of 80-ft or more. Therefore, Hualapai Way is required to satisfy the 10-year dry lane criteria per the CCRFCD Manual. A 12-ft dry lane, not including the center turn lane, is required per Manual criteria.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Condition

The existing condition considers, residential properties east and south of the project site developed, Dorrell Lane and Hualapai Way are partially improved, and the residential property to the north is considered undeveloped desert shrub typical of Southern Nevada. The project site itself is considered newly graded. Offsite flow impacts the project site through the upstream area impacting Hualapai Way. Note that the CCRFCD storm drain in Hualapai Way is considered existing and functioning.

3.2 Discussion of Existing Condition

Refer to the Exhibit F – Existing Condition Drainage Map, included in Appendix A, for a detailed illustration of the existing condition drainage patterns.

Existing condition basins consist of one onsite basin and two offsite street basins. A summary of the existing drainage basins is provided below:

- Basin ON1E – Runoff generated by Basin ON1E generally drains in a southeasterly direction towards a residence southeast of the project site and Dorrell Lane. A portion of the project site drains through the Platt residence via two existing drainage easements.

- Basin HUA-E – The Hualapai Way basin represents the portion of the east half of Hualapai Way adjacent to the project site that is conveyed south in Hualapai Way. Flow generated by Basin HUA-E is combined with additional upstream flow conveyed in Hualapai Way before the intersection of Hualapai Way and Dorrell Lane. At the intersection with Dorrell Lane, flow in Hualapai Way splits where a portion of the flow turns east onto Dorrell Lane and the rest of the flow continues south in Hualapai Way.

- Basin DOR-E – The Dorrell Lane basin represents the portion of Dorrell Lane adjacent to the project site. Runoff generated by Basin DOR-E combines with flow turning east at the Hualapai Way intersection and Basin ON1E before continuing east on Dorrell Lane.

3.3 Summary of Existing Condition Flows

Existing condition flow rates, as determined by HEC-1 analysis, have been summarized in a table on Exhibit F provided in Appendix A. Refer to Appendix B for review of the applicable HEC-1 analysis.

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Conditions

The proposed condition, like the existing condition considers, residential properties east and south of the project site developed and the property to the north undeveloped. Onsite areas are considered fully developed with half street improvements to both Hualapai Way and Dorrell Lane complete. Lateral extensions of the Hualapai Way storm drain to collect flow along Hualapai Way are also considered complete.

4.2 Discussion of Proposed Condition

Refer to the Exhibit G – Proposed Condition Drainage Map, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns.

Proposed condition basins consist of one onsite basin and two offsite street basins. A summary of the proposed drainage basins is provided below:

- Basin ON1 - Runoff generated by Basin ON1 is collected in Lakota Summit Court and conveyed south towards Dorrell Lane. Flow conveyed in Dorrell Lane is afterwards conveyed east.

- Basin HUA – A half street basin, Basin HUA conveys flow similarly to the existing condition Basin HUA-E. In the proposed condition drainage, the basin increases in size as a result of half street improvements to Hualapai Way.

- Basin DOR – Like the existing condition Basin DOR-E, combines with flow from the eastern flow split at Hualapai Way and the project site to continue east.

Note that with the development of the project site, the right-of-way for Wittig Avenue has been vacated and will terminate in a cul-de-sac at the northeast corner of the site. Therefore, no flow split at the intersection of Hualapai Way and Wittig Avenue will occur. Though, the West Study suggests that future conditions will allow for the flow in Hualapai Way to split at Wittig Avenue and therefore reduce the flow in Hualapai Way downstream, the proposed condition does not anticipate flow splitting at this intersection as the interim condition of the West Study evaluates.

4.3 Summary of Proposed Condition Flows

Proposed condition flow rates, as determined by HEC-1 analysis, have been summarized in a table on Exhibit G included in Appendix A. Refer to Appendix B for review of the applicable HEC-1 analysis.

4.4 Summary of Proposed Condition Street Flows

Refer to Exhibit G, provided in Appendix A, for an illustration and summary of the proposed hydraulic roadway sections.

One onsite section with two variations for minimum and maximum slopes was analyzed to define onsite flow depths and velocities. Section 1 is a 49-ft onsite section with roll curb and sidewalk on both sides.

Hualapai Way: Hualapai Way (Section HUA) begins at the project site's north boundary line as a 100-ft right-of-way and transitions into a 120-ft right-of-way by the project site's south

boundary. Two variations of Sections HUA's 100-Year section have been created to analyze flow depth and velocity. Though Hualapai Way is equal to or greater than 100-ft, 10-year dry lane flows have not been analyzed for the following reasons.

- Much of the upstream flow in Hualapai Way is collected via laterals connecting to the mainline CCRFCD storm drain in Hualapai Way.
- Flow generated by the half street portion of Hualapai Way adjacent to the project site is considered minimal (2 cfs).
- The project site proposes two (2) drop inlets, in conformance with the Cliffs Edge/Providence Infrastructure to collect the flow generated by Basin HUA. Therefore, Hualapai Way adjacent to the site will remain almost entirely dry during the 10-year storm event.

Note that the velocity of flow in Hualapai Way is erosive. It is worthy to note that the flows in Hualapai Way is contained within the western half of the street. However, a conservative analysis assuming that the entire 100-year flow is within the eastern half is provided to be consistent with the prior approved East Study & West Study. Consequently, the resulting flow velocities are erosive. A riprap calculation has been provided to establish that 8-inch riprap be recommended in the landscaping along Hualapai Way.

Dorrell Lane: Dorrell Lane is analyzed by Section DOR to establish a flow depth adjacent to the project site. The flow in Section DOR is also erosive based on the conservative assumption described above for the flows in Hualapai Way which contributes to the flow split into Dorrell Lane. A riprap calculation has been provided for the section for erosion prevention along the project site's southern boundary. Note that although 16-inch riprap is suggested by the riprap calculation, 8-inch riprap has been recommended because the section evaluating Dorrell Lane is considered overly conservative, knowing that the flow split from Hualapai Way is unlikely. Section DOR utilizes a conservative flow that is derived from the flow that impacts Hualapai Way at the intersection of Hualapai Way and Elkhorn Road. The flow splitting at the mentioned intersection, on to Hualapai Way, is not expected to impact the east half of Hualapai Way in its entirety as aforementioned and the majority of the flow splitting south, if not all the flow, will be confined within the western portion of Hualapai Way. Section DOR demonstrates that the entirety of the flow can be contained in a half street section of Hualapai Way.

4.5 Summary of Recommended Facilities

Two drop inlets are recommended at the project site's western boundary along Hualapai Way to collect nuisance flows. One inlet is located in the northern half of the project site while the other is located in the southern half. Both inlets are 4-ft Type "C" inlets. Note that computations were not performed for recommended storm drain facilities since the inlets collect only nuisance flows.

5 ULTIMATE DRAINAGE CONDITION

5.1 Definition of Ultimate Condition

Currently, Hualapai Way is impacted by the flow that bubbles out of the Elkhorn Road storm drain system west of the intersection of Hualapai Way and Elkhorn Road. In the ultimate condition, it is expected that the storm drain in Elkhorn Road will continue through the

intersection cutting off flows that impact Hualapai Way and therefore the project site. The Elkhorn Road SD Study illustrates the expected storm drain currently under design. Relevant reference material is provided in Appendix I.

6 Summary of Proposed Finished Floors

The proposed finished floors have been adequately flood protected above twice the depth of flow in the adjacent street, up to 18-inches, measured at the high side of the lot. Additionally, proposed finished floors have been elevated a minimum vertical distance above the adjacent curb of 6-inches, measured at the high side of the lot. A spreadsheet showing the finished floor analysis and the supplemental drainage perimeter street assessments have been included in Appendix D. Where necessary for flood protection, solid grouting of walls has been proposed.

Note that the Hualapai Way profile is higher than the project site and therefore the respective top-of-curb grades are higher than the finished floors of the adjacent lots. Though two (2) courses of solid grouting is adequate to protect the adjacent finished floors against twice the depth of flow in Hualapai Way, three (3) courses of solid grouting has been recommended for the wall west of Lots 1 through 9. The above also holds true for Lot 1's southern wall along Dorrell Lane, therefore, three (3) courses of solid grouting has also been recommended for Lot 1's southern wall. All finished floor computations are provided in Appendix D.

7 CONCLUSIONS & RECOMMENDATIONS

1. The project site is not located within a FEMA designated SFHA.
2. The project site is located adjacent to the Beltway Channel - Hualapai. Therefore, concurrence from CCRFCD is anticipated for this study.
3. Street flow in onsite and offsite streets meets CCRFCD criteria.
4. The proposed storm drain is for nuisance flows and meets applicable CCRFCD criteria.
5. All proposed finished floor elevations meet or are flood protected to meet the CCRFCD as well as the local City of Las Vegas minimum flood protection criteria.
6. The project's grading plan and detail sheets included in Appendix J of this study support the drainage patterns, conclusions and/or recommendations detailed in this study.

8 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update.* PBS&J, Louis Berger Group and Parsons Brinckerhoff, October 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 Services, August 2016.

4. *Technical Drainage Study for Dorrell/Hualapai East*, by Slater Hanifan Group, July 2014.

5. *Technical Drainage Study for Dorrell/Hualapai West*, by Slater Hanifan Group, November 2013.

6. *Technical Drainage Study for Cliffs Edge Infrastructure Phase 1,* by VTN Nevada, April 2005.

7. 30% Pre-Design Storm Drain Plans & Profiles for the *Rancho Road System Storm Drain – Elkhorn,* by Stantec, September 2017.

LIST OF APPENDICES

Appendix A Drainage Exhibits
- Exhibit A1 – Vicinity Map
- Exhibit B – FEMA FIRM Panel Map
- Exhibit C1 – CCRFCD 2013 MPU Facilities Exhibit
- Exhibit C2 – CCRFCD 2013 MPU Facilities Inventory
- Exhibit C3 – CCRFCD 2008 MPU Hydrologic Facilities
- Exhibit D – Soils Map
- Exhibit E1 – North Neighborhood Maps Existing Condition
- Exhibit E2 – North Neighborhood Maps Future Condition
- Exhibit F – Existing Condition Map
- Exhibit G – Proposed Condition Map

Appendix B Hydrologic Computations
- Precipitation Data
- Soil and Curve Number Data
- Standard Form 4
- HEC-1 Models

Appendix C Hydraulic Computations
- Interior Street Computations
- Adjacent Street Computations

Appendix D Finished Floor Analyses

Appendix E Entitlement Information

Appendix F Reference Material
Technical Drainage Study for Dorrell/Hualapai East,
by Slater Hanifan Group (DS#4651C)
- Approval Letters
- Referenced Drainage Exhibits

Appendix G Reference Material
Technical Drainage Study for Dorrell/Hualapai West,
by Slater Hanifan Group (DS#4604C)
- Approval Letter
- Referenced Report Excerpt
- Referenced Flow Split Calculations
- Referenced Drainage Exhibits

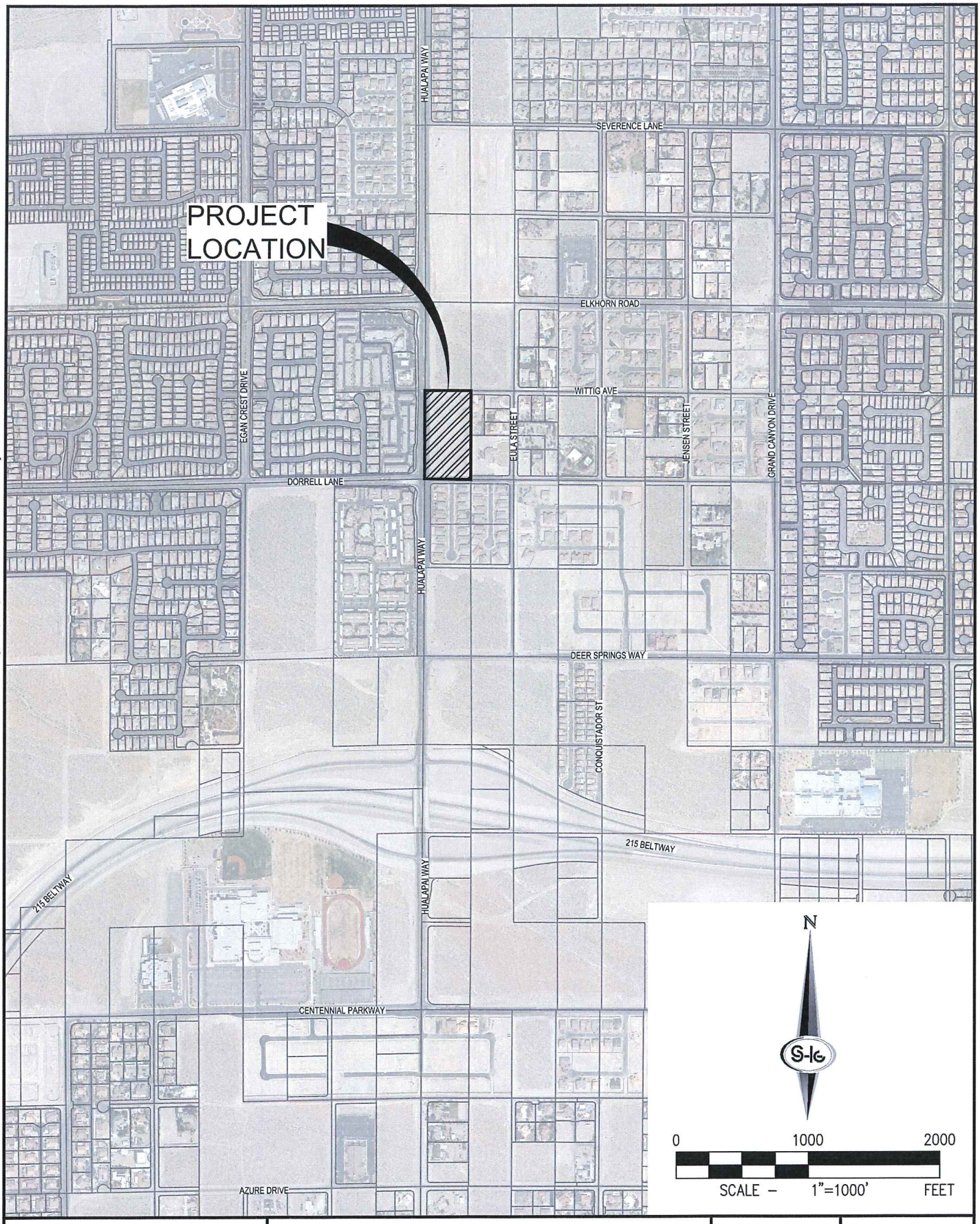
Appendix H Reference Material
Technical Drainage Study for Cliffs Edge Infrastructure Phase 1,
by *VTN Nevada* (DS#3576D, HTE#04-53820)
- Approval Letters
- Referenced Improvement Plans

Appendix I Reference Material
Rancho Road System Storm Drain - Elkhorn
by *Stantec*
- Referenced Improvement Plans

Appendix J CD of Electronic Files & Improvement Plans

APPENDIX A

Drainage Exhibits



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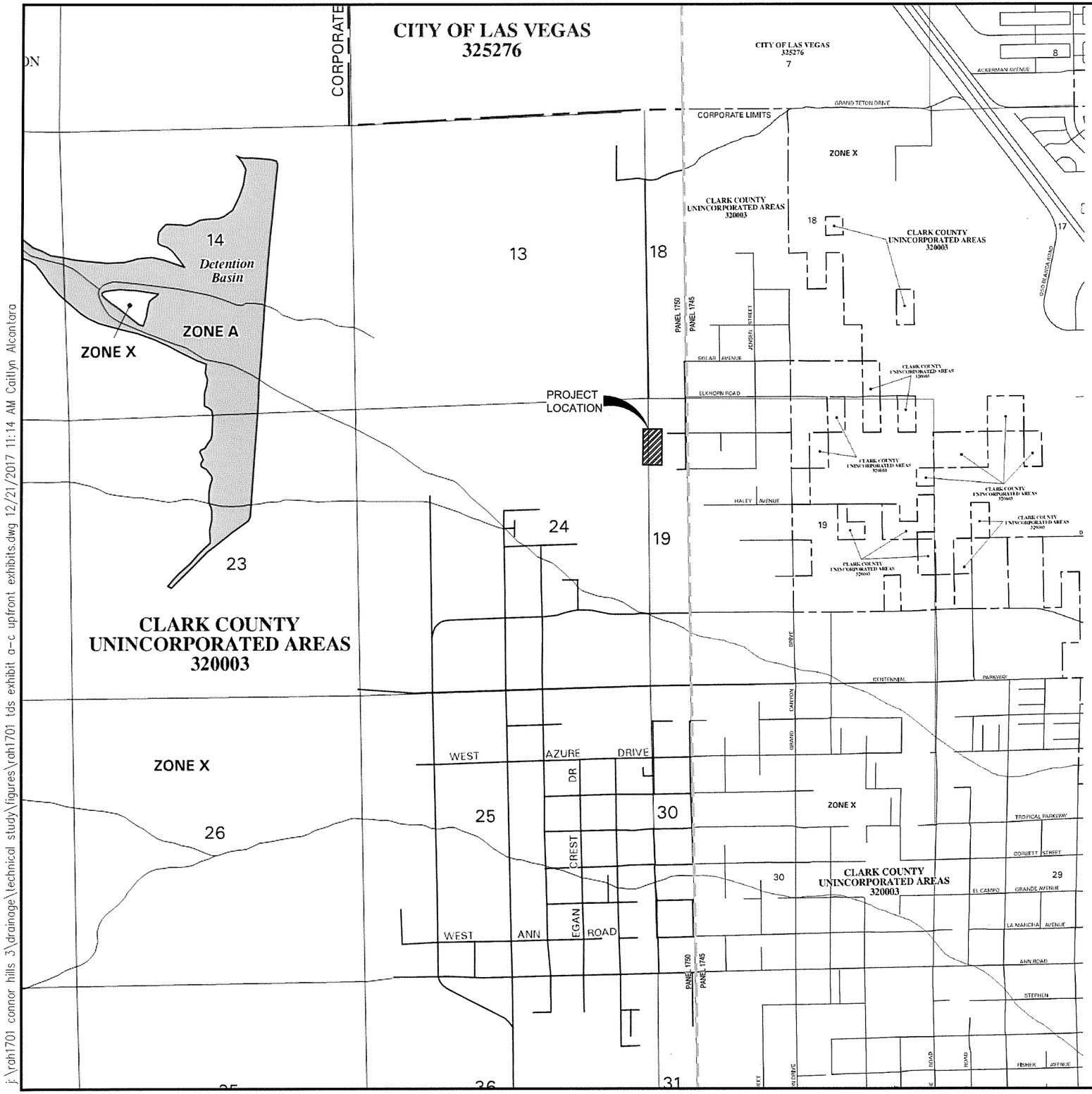
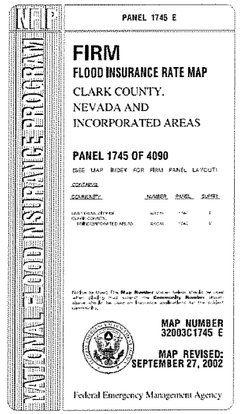
RICHMOND AMERICAN HOMES

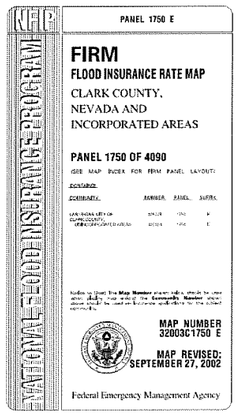
AGAVE MOON

LOCATION MAP

DATE: DEC 2017	PROJECT NO. RAH1701.000
DRAFTER: CAA	
DESIGNER: CAA	EXHIBIT A
CHECKED: SOA	SHEET 1 OF 1









0 2000 4000
SCALE – 1"=2000' FEET

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Coastal Barrier Boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- (A)—(A) Cross Section Line
- (23)—(23) Transect Line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT — 5000-foot grid ticks
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 16, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 27, 2002: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to delete special flood hazard areas, to change zone designations, to add roads and road names, to incorporate previously issued letters of map revision, to incorporate previously issued letters of map amendment, and to change floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

RICHMOND AMERICAN HOMES

AGAVE MOON
FEMA FIRM PANEL MAP

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. RAH1701.000

EXHIBIT B
SHEET 1 OF 1

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REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 13
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin

- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

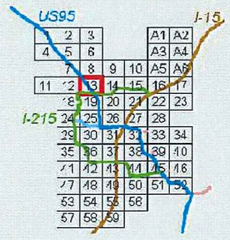
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

Refer to Figure G-2 for Aerial Source(s)



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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

RICHMOND AMERICAN HOMES

AGAVE MOON

CCRFCD MPU FACILITIES EXHIBIT

DATE:	DEC 2017
DRAFTER:	CAA
DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	RAH1701.000

EXHIBIT C1
SHEET 1 OF 1

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ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BCHU		**BELTWAY CHANNEL - HUALAPAI**						
0000	E	12' X 5' RCAP	853	501	CBA3-C	WEST3	0.84	1.11
0017	E	8' X 5' RCAP	1216	501	CBA3-C	WEST3	0.84	1.33
0040	E	66" RCP	60	222	DNW26-C	WEST3	0.51	1.04
0042	E	60" RCP	615	222	DNW26-C	WEST3	0.51	1.42
0054	E	54" RCP	770	222	DNW26-C	WEST3	0.51	1.23
BRDB		**BRENT DRAINAGE SYSTEM**						
0000	E	36" RCP with 18" Orifice Plate	2170	37	BRDB	WEST3	2.48	0.40
0031	E	45,080 cfs PMF Spillway		45080	CBRDB	WEST3	2.48	
0032	E	450 ac-ft South Environmental Enhancement Area		1902	CBRDB	WEST3	2.48	
0033	E	Energy Dissipator	100	957	CNW113-C	WEST3	1.58	
0043	P1	8' X 6' RCB	2920	957	CNW113-C	WEST3	1.58	2.10
0107	P1	8' X 6' RCB	2690	957	CNW113-C	WEST3	1.58	2.40
0157	P1	12' X 6' RCB	1280	741	CNW96-C	WEST3	0.95	0.25
CN95		**CENTENNIAL PKWY CHANNEL WEST / U.S 95 BRANCH**						
0000	P1	Conc Chnl 22'W 10'D 0:1 SS	2690	3340	CNWBB3-C	WEST3	3.36	2.17
0068	P1	3: 8' X 7' RCB	3380	3216	CNW103-C	WEST3	3.05	2.12
0102	P1	3: 8' X 6' RCB	1710	2888	2CNW89-C	WEST3	2.66	2.09
0167	P1	2: 10' X 6' RCB	1580	2160	2CNW71-E	WEST3	1.64	1.50
0199	E	2: 10' X 6' RCB	320	1423	2CNW72-C	WEST3	1.14	0.82
0218	E	15' X 9' RCB	1127	1423	2CNW72-C	WEST3	1.14	0.82
0257	E	Transition Structure	59	1423	2CNW72-C	WEST3	1.14	0.77
0259	E	15' X 9' RCB	290	653	CNW74-C	WEST3	0.44	0.77
0313	E	10' X 6' RCB	2680	653	CNW74-C	WEST3	0.44	2.50
0318	E	Transition Structure	60	653	CNW74-C	WEST3	0.44	1.50
0333	E	5' X 5' RCB	670	339	NW62-S	WEST3	0.22	1.50
CNGT		**CENTENNIAL PKWY CHANNEL WEST / GRAND TETON BRANCH**						
0000	E	10' X 5' RCB	2376	600	CNW71-E	WEST3	0.47	2.58
0043	P0	6' X 6' RCB	3980	600	CNW71-E	WEST3	0.47	3.00
0118	E	6' X 5' RCAP	5472	363	KYLEDET*	KYLEDB	57.73	3.72
CNKC		**CENTENNIAL PKWY CHANNEL WEST / KYLE CANYON BRANCH**						
0000	E	12' X 4' RCB	377	999	CNW72-C	WEST3	0.71	4.58
0007	E	10' X 5' RCB	874	999	CNW72-C	WEST3	0.71	3.28
0024	E	8' X 5' RCB	1385	999	CNW72-C	WEST3	0.71	2.40
0050	P0	84" RCP	2610	854	CNW72-C	WEST3	0.71	3.60
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0150	E	Conc Chnl 40'W 9.5'D 0:1 SS	2279	4233	CNW3B3-C	WEST3	5.64	0.42
0173	E	3: 18' X 8' RCBC @ Torrey Pines	200	4233	CNW3B3-C	WEST3	5.64	0.42
0176	E	Conc Chnl 40'W 9'D 0:1 SS	150	4233	CNW3B3-C	WEST3	5.64	0.41
0189	E	Conc Chnl 36'W 10'D 0:1 SS	1200	4067	CNW2D4-C	WEST3	5.15	0.42
0200	E	Conc Chnl 36'W 9'D 0:1 SS	2470	4067	CNW2D4-C	WEST3	5.15	1.00
0226	E	2: 18' X 8.5' RCBC @ Rio Vista	100	4067	CNW2D4-C	WEST3	5.15	0.51
0241	E	Conc Chnl 36'W 9.5'D 0:1 SS	405	3951	CNW2D3-C	WEST3	4.65	0.51
0251	E	Conc Chnl 36'W 9'D 0:1 SS	575	3951	CNW2D3-C	WEST3	4.65	0.51
0271	E	Conc Chnl 32'W 10'D 0:1 SS	229	3951	CNW2D3-C	WEST3	4.65	0.51
0274	E	32' X 10' RCBC @ Tonaya	142	3951	CNW2D3-C	WEST3	4.65	0.51
0277	E	Conc Chnl 32'W 9'D 0:1 SS	579	3951	CNW2D3-C	WEST3	4.65	0.64
0287	E	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	3259	3593	CNW2B2-C	WEST3	3.84	1.79
0314	E	22' X 7' RCB	785	3593	CNW2B2-C	WEST3	3.84	1.79
0325	P1	32' X 10' RCB	2200	3593	CNW2B2-C	WEST3	3.84	1.75
EKBU		**ELKHORN SPRINGS AND BUFFALO**						
0000	E	60" RCP	1048	375	NW134-C	WEST3	0.48	1.00
EKDB		**ELKHORN SPRINGS DETENTION BASIN**						
0000	E	Grass Chnl 15'W 5.8'D 3.5:1 SS	2575	238	CNW150-C	WEST3	1.41	0.39
0025	E	4' X 3' RCB	160	120	ELKBASIN	WEST3	0.84	0.50
0026	E	48" RCP	1270	120	ELKBASIN	WEST3	0.84	1.23
0049	E	60" RCP	1095	120	ELKBASIN	WEST3	0.84	0.13
0070	E	48 ac-ft Elkhorn Springs Detention Basin		629	CNW133-C	WEST3	0.84	

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
EKHU		**ELKHORN AND HUALAPAI**						
0000	E	6' X 5' RCB Overflow Structure	48	638	CNW26-C	WEST3	0.51	0.91
0001	E	6' X 5' RCAP	72	638	CNW26-C	WEST3	0.51	0.91
0003	E	6' X 4' RCAP	980	638	CNW26-C	WEST3	0.51	3.61
0020	E	6' X 5' RCAP	150	638	CNW26-C	WEST3	0.51	3.61
0023	E	8' X 5' RCAP	1200	638	CNW26-C	WEST3	0.51	0.90
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0176	P1	78" RCP	1320	363	CCPFR-C	ALLGOW3	0.46	1.15
GONO		**GOWAN NORTH SYSTEM**						
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
LVMD		**LAS VEGAS WASH - MIDDLE**						
2490	E	2: 13' X 7' RCB	2555	2278	CNW168-C	CWEST3	4.69	0.40
2507	E	2: 13' X 9' RCB	2831	2278	CNW168-C	CWEST3	4.69	0.36
2525	E	24' X 8' RCB	1140	1913	CNW159-C	CWEST3	3.91	0.40
2550	E	24' X 8' RCB	1445	1664	CD161-C	CWEST3	3.41	0.40
2574	E	24' X 8' RCB	1430	1664	CD161-C	CWEST3	3.41	0.40
2599	E	Conc Chnl 24'W 7'D 2:1 SS	1577	1585	CNW162-C	CWEST3	3.08	0.50
2632	E	18' X 5' RCB	1580	968	CNW138-C	WEST3	1.16	0.46
2661	E	18' X 5' RCB	2640	968	CNW138-C	WEST3	1.16	0.46
2711	E	10' X 5' RCB	1320	968	CNW138-C	WEST3	1.16	1.54
2737	E	10' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	2.22
2763	E	6' X 5' RCB	1320	818	CNW139-C	WEST3	0.93	1.79
2789	E	6' X 5' RCB	1470	818	CNW139-C	WEST3	0.93	2.17
MOHU		**MOCCASIN - HUALAPAI BRANCH**						
0000	P0	14' X 8' RCB	1920	761	2CNW45-N	LOWER3	2.10	0.50
0036	P0	10' X 8' RCB	2590	368	CNW45-N	LOWER3	1.15	0.50
0085	P0	72" RCP	790	368	CNW45-N	LOWER3	1.15	3.00
0100	P0	Natural Wash	850	65	DMODB1	LOWER3	0.81	3.00
0116	P0	60" RCPC	12	65	DMODB1	LOWER3	0.81	3.00
0118	P0	Natural Wash	3485	65	DMODB1	LOWER3	0.81	3.00
MOIR		**MOCCASIN - IRON MOUNTAIN BRANCH**						
0000	P0	66" RCP	2770	446	2CNW33-C	LOWER3	1.76	3.60
MOKC		**MOCCASIN AND KYLE CANYON**						
0000	P1	11' X 8' RCB	5450	2662	CNW35-C	LOWER3	2.69	3.40
MOSM		**MOCCASIN AND SHEEP MOUNTAIN PARKWAY**						
0000	P0	14' X 9' RCB	3370	3778	CNW64-C	LOWER3	5.32	2.40
0064	P0	14' X 8' RCB	880	3505	CNW50-C	LOWER3	4.99	3.00
0080	P0	14' X 8' RCB	710	3325	2CNW35-C	LOWER3	4.80	3.00
MSNV		**MOUNTAIN SPAVISTA RANCH**						
0000	E	6: 12' X 5' RCBC @ Grand Teton	273	679	CNW163-C	CWEST3	1.67	0.40
0005	E	Grass Chnl 100'W 4.5'D 10:1 SS	6325	679	CNW163-C	CWEST3	1.67	0.40
0125	E	Grass Chnl 100'W 4.5'D 10:1 SS	1300	116	CNW147E	WEST3	1.54	0.40
RACO		**RACEL STREET COLLECTOR**						
0000	E	66" RCP Baffled Energy Dissipator	54	497	CNW111S	WEST3	0.55	4.20
0001	E	78" RCP	3245	497	CNW111S	WEST3	0.55	2.46
0064	E	78" RCP	2650	423	DNW111S	WEST3	0.44	2.09
RCBC		**RANCHO ROAD SYSTEM - BELTWAY CHANNEL**						
0000	E	6' X 5' RCB	1062	222	FADB	WEST3	1.60	1.04
0002	E	54" RCP Outlet with 41" Orifice	503	222	FADB	WEST3	1.60	2.38
0003	E	2,341 cfs PMF Spillway		2341	FADBIN	WEST3	1.60	
0004	E	76 ac-ft Fort Apache Detention Basin		1255	FADBIN	WEST3	1.60	
0007	E	Energy Dissipator	100	1255	FADBIN	WEST3	1.60	
0009	E	12' X 6' RCBC @ Fort Apache Detention Basin	133	1255	FADBIN	WEST3	1.60	1.79
0012	E	Conc Chnl 12'W 6'-7'D 0:1 SS	1937	1255	FADBIN	WEST3	1.60	3.15
0048	E	12' X 6' RCBC @ Grand Canyon	140	1040	CMNA1	WEST3	1.32	3.15
0051	E	Conc Chnl 12'W 6'-8'D 0:1 SS	2660	1040	CMNA1	WEST3	1.32	3.44
0096	E	1: 10' X 6' and 1: 6' X 6' RCBC @ Hualapai Way	190	1040	CMNA1	WEST3	1.32	1.93
0100	E	Conc Chnl 12'W 5.5'D 0:1 SS	2085	598	CDMNA1	WEST3	0.48	2.88
0140	E	Conc Chnl 10'W 5'D 0:1 SS	2155	598	CDMNA1	WEST3	0.48	1.65

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		**RANCHO ROAD SYSTEM - BELTWAY**						
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.68	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	85	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P1	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P1	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P1	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P1	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.87
0149	P1	Conc Chnl 16'W 6'-7'D 0:1 SS	87	1888	CNWBC3	WEST3	3.75	2.27
0151	P1	Conc Chnl 16'W 7'D 0:1 SS	1255	1888	CNWBC3	WEST3	3.75	2.65
0171	E	16' X 6' RCBC @ El Capitan Way	234	1888	CNWBC3	WEST3	3.75	1.75
0175	E	Conc Chnl 14'W 7'D 0:1 SS	1220	1888	CNWBC3	WEST3	3.75	2.93
0198	E	Conc Chnl 14'W 7'D 0:1 SS	225	1402	CNWBA6-C	WEST3	3.61	2.93
0227	E	12' X 6' RCB	1885	1402	CNWBA6-C	WEST3	3.61	1.02
0250	E	12' X 6' RCB	3200	1402	CNWBA6-C	WEST3	3.61	1.00
0275	P1	7' X 6' RCB	2650	973	CNW66-C	WEST3	1.75	3.30
0295	P1	7' X 6' RCB	2875	973	CNW66-C	WEST3	1.75	3.30
TSDB		**TULE SPRINGS DRAINAGE SYSTEM**						
0000	E	2: 10' X 4' RCBC @ Echo Grande	100	26	TULEDB	WEST3	1.35	1.04
0002	E	36" RCP with 22" Orifice Plate	320	26	TULEDB	WEST3	1.35	0.33
0010	E	14,013 cfs PMF Spillway		14013	CTULEDB	WEST3	1.35	
0011	E	117 ac-ft North Environmental Enhancement Area		804	CTULEDB	WEST3	1.35	
0012	E	Energy Dissipator	260	376	CNW148-C	WEST3	0.52	
0023	P1	84" RCP	1320	376	CNW148-C	WEST3	0.52	0.80
0059	P1	78" RCP	2640	376	CNW148-C	WEST3	0.52	1.03

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 13

LEGEND

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

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
Category B..... P0
Master Plan..... P1
Preliminary Design..... P2
Design..... P3

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

Construction Features

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

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

RICHMOND AMERICAN HOMES

AGAVE MOON

CCRFCD MPU FACILITIES INVENTORY

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. RAH1701.000

EXHIBIT C2
SHEET 1 OF 1

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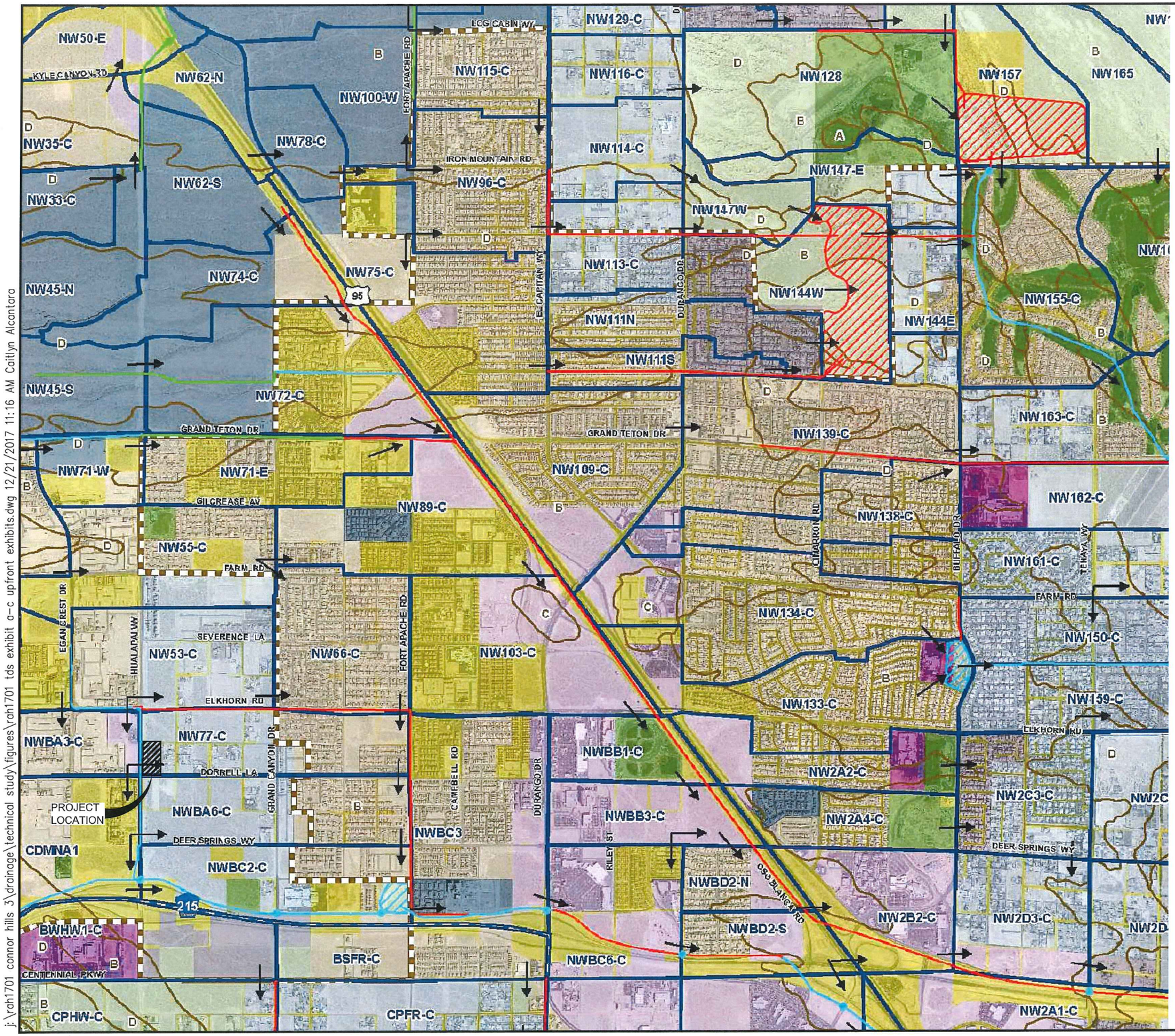

REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H-13
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

1	Undeveloped Land Open Desert
2	Parks, Golf Courses
3	Rural
4 / 14*	Low Density Residential
5 / 15*	Medium Density Residential
6 / 16*	High Density Residential
7 / 17*	Public Facility, Resicental
8 / 18*	Very High Density Residential
9 / 19*	Commerical, Retail, Casino, High Rise Condominiums
10 / 20*	Light Industrial
11 / 21*	Heavy Industrial
12 / 22*	Schools
13	Lakes

* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000 Feet

Scale: 1 inch = 2,000 feet

Refer to Figure G-2 for Aerial Source(s)



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RICHMOND AMERICAN HOMES
AGAVE MOON
CCRFCD MPU HYDROLOGIC FACILITIES

DATE:	DEC 2017
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DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	RAH1701.000

EXHIBIT C3
SHEET 1 OF 1

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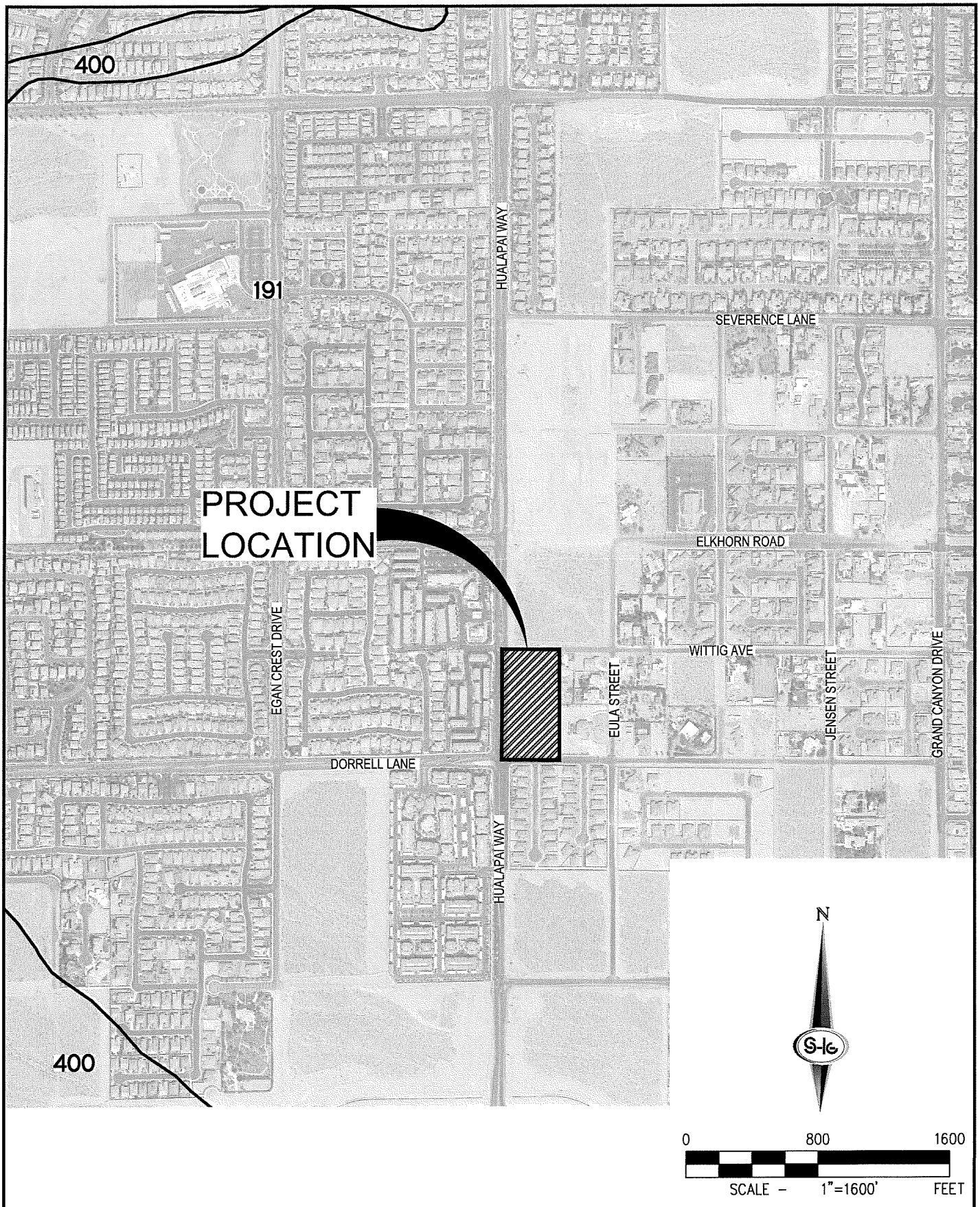

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RICHMOND AMERICAN HOMES

AGAVE MOON

SOILS MAP

DATE: DEC 2017	PROJECT NO. RAH1701.000
DRAFTER: CAA	
DESIGNER: CAA	EXHIBIT D
CHECKED: SOA	SHEET 1 OF 1

PROJECT LOCATION

ELKHORN RD

GD28BA8 — 291 / 923 — 2 / 8

GD28BA2 (24 / 89) — 239 / 657 — 55 / 146 — DORRELL LN

GD28BA3 (18 / 71) — 76 / 226 — WITTIG AVE — 89 / 288

GD28BA9 (4 / 15)

GD28BA4 (29 / 93) — 92 / 299

GD28BB1 (70 / 160) — 109 / 374

GD28BB2 (91 / 184)

HUALPAI WY

HALEY AVE

GD28BA5

TEE PEE LN

GD28BA6 (24 / 93) — 35 / 119

GD28BA7 (32 / 106) — 54 / 204

74 / 291

RILEY ST

DEER SPRINGS WAY

GD28BC1

JENSEN ST

CHIEFTAIN ST

FORT APACHE RD

CAMPBELL

EL CAPITAN WAY

CDMNA1

BATH DR

GD28BC2 (24 / 102) — 11 / 42

GD28BC3 — 30 / 139

GD28BC4 (93 / 187) — 58 / 258

ROME BLVD

BELTWAY ALIGNMENT

CONQUISTADOR

GRAND CANYON DR

53 / 223

0 / 0

GD28BC5

DARLING RD

236 / 529 — BWHW2 (19 / 84)

271 / 614 — BWJS (13 / 59)

280 / 562 — BSFR (14 / 59)

289 / 518 — GD28BC6

CENTENNIAL PKWY

CHE RD

0 / 82

0 / 156

0 / 101

0 / 91

CPHW

GD28BE1

CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY

LEGEND

SUB-BASIN BOUNDARY

FLOW ARROW

250	10-YEAR STREET FLOW
500	100-YEAR STREET FLOW
300	10-YEAR FACILITY FLOW
800	100-YEAR FACILITY FLOW

(FLOWS IN CFS)

BWJS — Basin-ID

(13 / 59) — Contributing flow (10-Year / 100-Year) from the basin (cfs)

PHOTO DATE: APRIL 1996

0 800 1600

SCALE – 1"=800' FEET

N

FIGURE E-1

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

RICHMOND AMERICAN HOMES

AGAVE MOON

NORTHWEST NEIGHBORHOOD STUDY EXISTING CONDITION

DATE:	DEC 2017
DRAFTER:	CAA
DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	RAH1701.000

EXHIBIT E1

SHEET 1 OF 1

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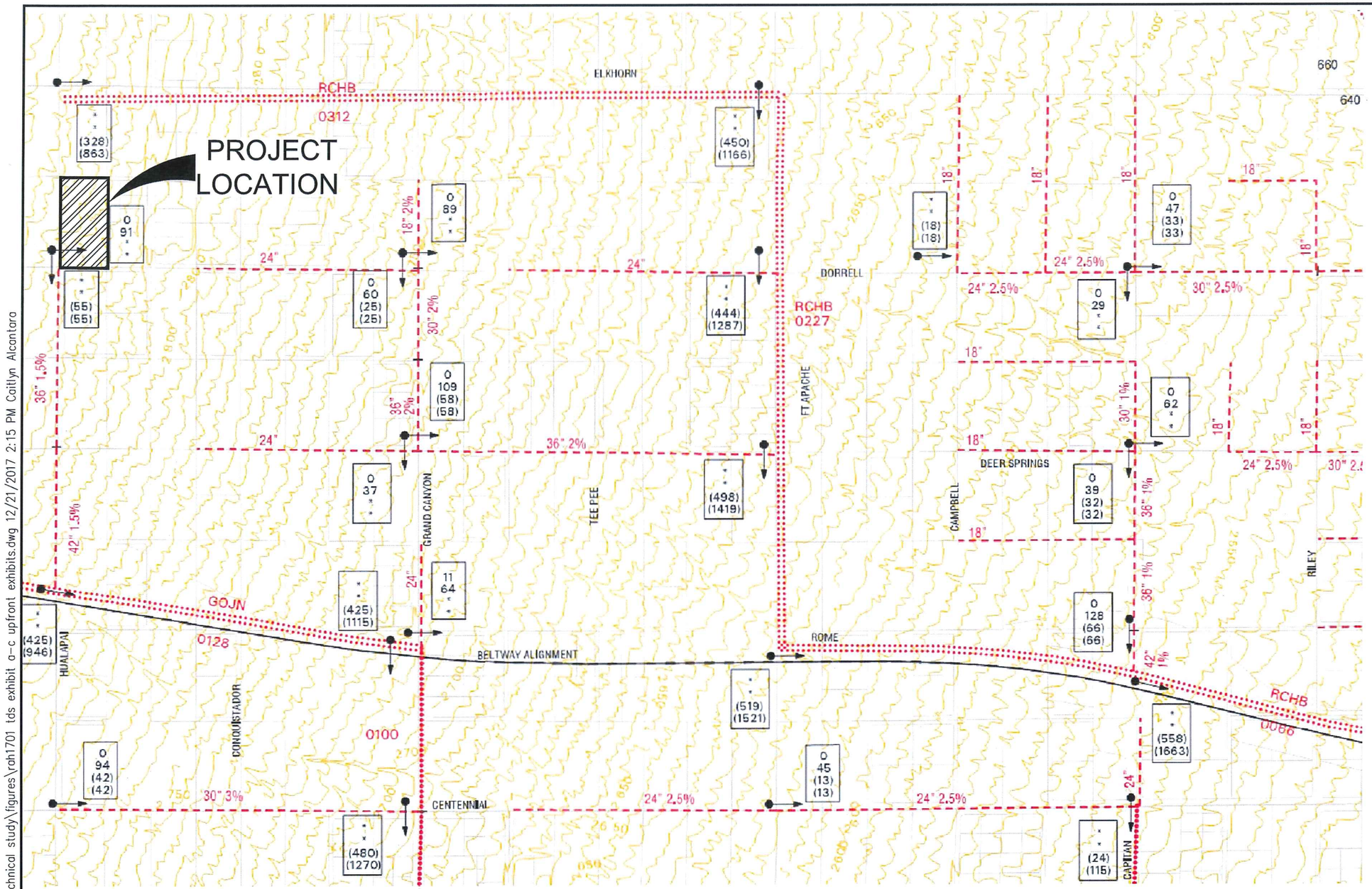

0 800 1600

SCALE – 1"=800' FEET

→ FLOW ARROW

250	10-YEAR STREET FLOW
500	100-YEAR STREET FLOW
(300)	10-YEAR FACILITY FLOW
(800)	100-YEAR FACILITY FLOW

(FLOWS IN CFS)

NOTE:

Ultimate drainage conditions are based on future CN values with all flood control facilities in place

See the "September 1999 City of Las Vegas Northwest Neighborhood Study Phase 2" for proposed facilities in and north of Elkhorn.

N

CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS
- EXISTING LOCAL DETENTION BASINS
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- EXISTING LOCAL BRIDGES
- EXISTING REGIONAL CULVERT
- PROPOSED REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- EXISTING LOCAL PIPELINE
- PROPOSED LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- PROPOSED REGIONAL PIPELINE (Not Included In 1999 MPU)
- PROPOSED REGIONAL CHANNEL (Not Included In 1999 MPU)
- EXISTING REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE
- EXISTING LOCAL DIKE/LEVEE
- EXISTING STORM WATER PUMPING STATION
- PROPOSED BELTWAY ALIGNMENT

FIGURE F-1

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

RICHMOND AMERICAN HOMES

AGAVE MOON

NORTHWEST NEIGHBORHOOD STUDY FUTURE CONDITION

DATE:	DEC 2017
DRAFTER:	CAA
DESIGNER:	CAA
CHECKED:	SOA
PROJECT NO.	RAH1701.000

EXHIBIT E2

SHEET 1 OF 1

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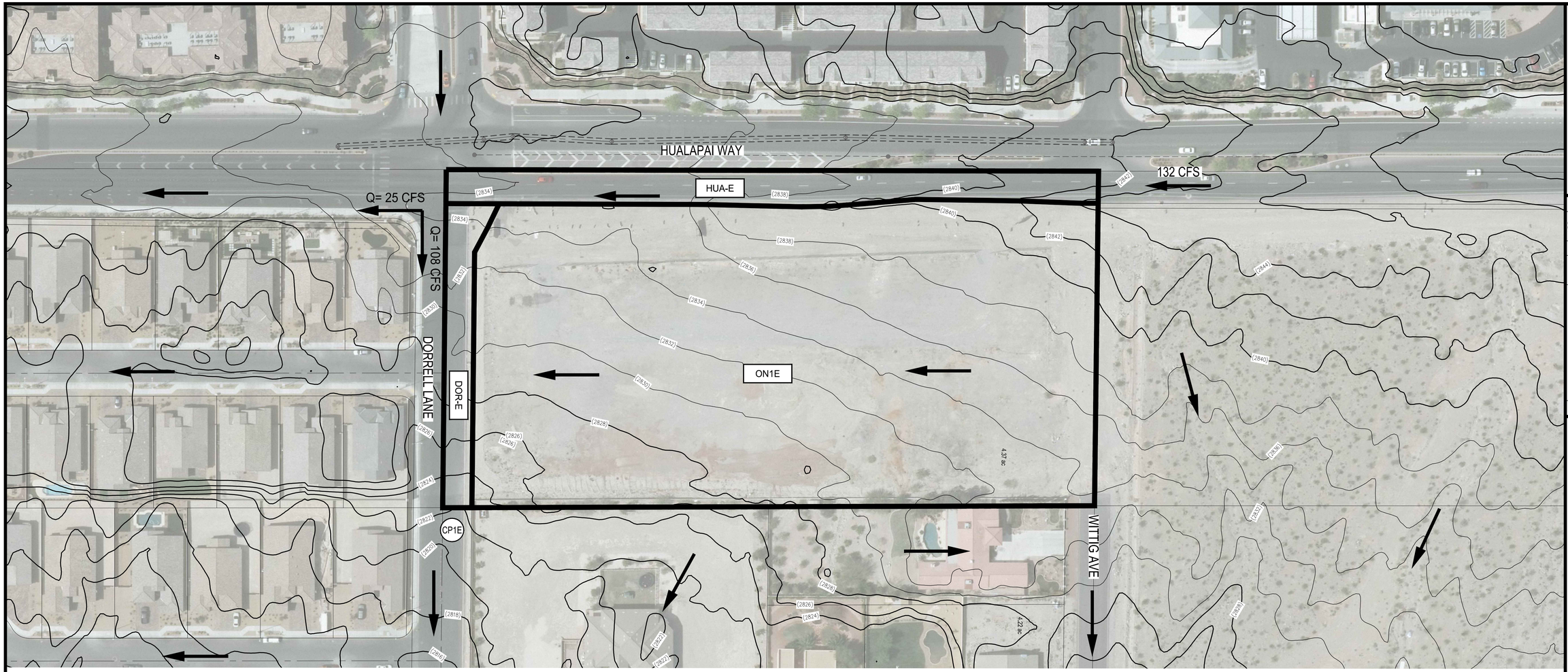

Existing Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1E	4.5	6	1
HUA-E	0.5	2	1
DOR-E	0.2	1	1
CP1E Q = ON1E + HUA-E + DOR-E	N/A	8	3

LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- Q= CFS — FLOW SPLIT

N

0 50 100

SCALE – 1"=50' FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.
####					

RICHMOND AMERICAN HOMES

AGAVE MOON

EXISTING CONDITION MAP

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO. RAH1701.000

EXHIBIT F

SHEET 1 OF ####

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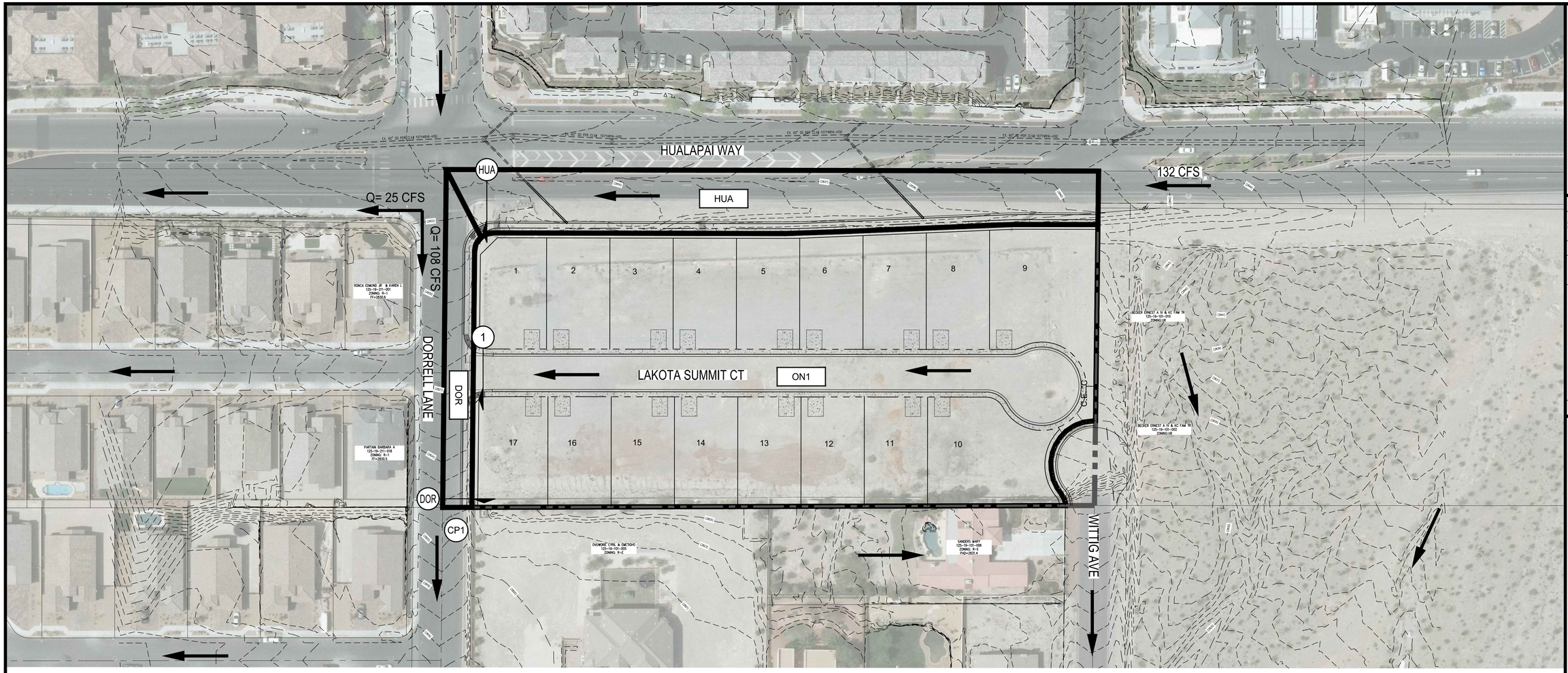

LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- ID — CONCENTRATION POINT ID
- FLOW DIRECTION
- Q= CFS — FLOW SPLIT
- Q= CFS
- ID — FLOWMASTER SECTION

Proposed Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
ON1	4.1	6	1
HUA	0.9	4	2
DOR	0.2	1	<1
CP1 Q = ON1 + HUA + DOR	N/A	9	3

N

0 50 100

SCALE – 1"=50' FEET

Proposed Condition 100-Year Street Flow Summary

Section ID	Q_{100} (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
1	6	1.70	0.27	3.2	0.9
(Q = ON1)		1.00	0.30	2.5	0.8
HUA	136	1.18	1.02	6.2	6.3
(Q = Flow Split South + HUA)		1.06	1.03	6.0	6.1
DOR	117	4.93	0.68	8.7	5.9
(Q = Flow Split East + CP1)		3.26	0.72	7.61	5.5

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CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 234-5300 FAX (702) 234-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP

RICHMOND AMERICAN HOMES

AGAVE MOON

PROPOSED CONDITION MAP

DATE: DEC 2017
DRAFTER: CAA
DESIGNER: CAA
CHECKED: SOA
PROJECT NO.
RAH1701.000

EXHIBIT G
SHEET 1 OF 1

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APPENDIX B

Hydrologic Computations

Precipitation Data

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rainfall and Precipitation Computation

Project Name: Connor Hills 3
Date: 12/5/2017
File Name: RAH1701 Precipitation Calcs.xls
By: CAA

Data:

Reference:

Project is located in: Township: 19 S. Range: 60 E. Section: 19 — APN Map

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

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.35 inches — Figure 503*

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

Precipitation Adjustment Ratios:

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

Six Hour Depth Area Reduction Factors (DARF):
Area (gross acres): 5.3 = 0.0083 square miles — Table 502*
DARF = 1.00

Calculations:

P_{10} = 1.67 10-Year Precipitation (in)
P_{100} = 3.00 100-Year Precipitation (in)

P10/P100= 0.56 HEC-1 Multiple Ratio Value

Equations:

P=(Rainfall)*(Precipitation Adjustment Ratio)*(Depth Area Reduction Factor)

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

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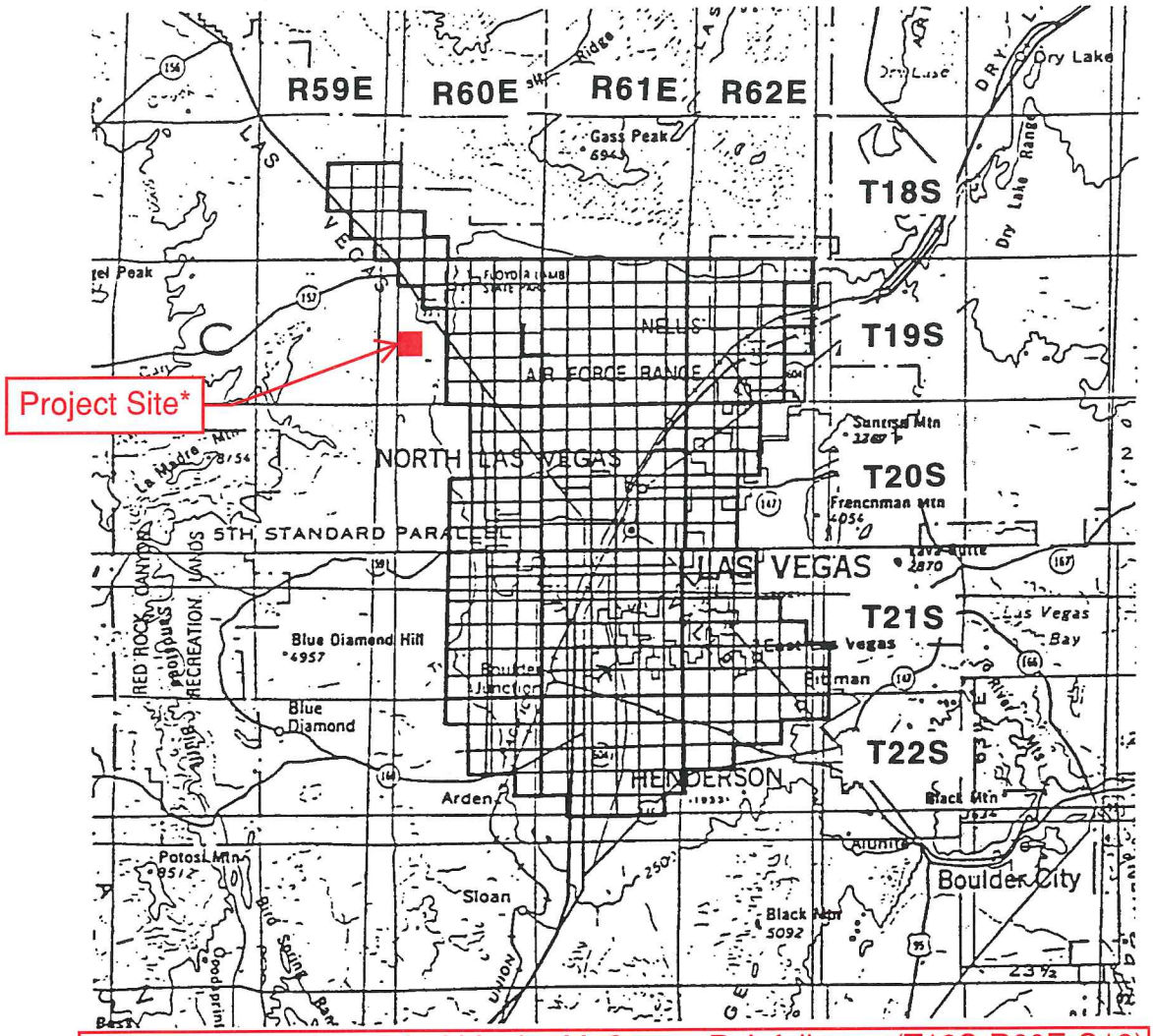
McCARRAN AIRPORT RAINFALL AREA



*Project site not located within the McCarran Rainfall area (T19S-R60E-S19)

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

TOWNSHIP	RANGE	SECTIONS
20 South	62 East	4-9,16-20,29-32
21 South	60 East	1-4,9-16,21-28,33-36
21 South	61 East	ALL SECTIONS
21 South	62 East	4-9,15-23, 25-36
22 South	60 East	1-4,10-15,24
22 South	61 East	1-24,26-29
22 South	62 East	1-10,17-18

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

Revision	Date

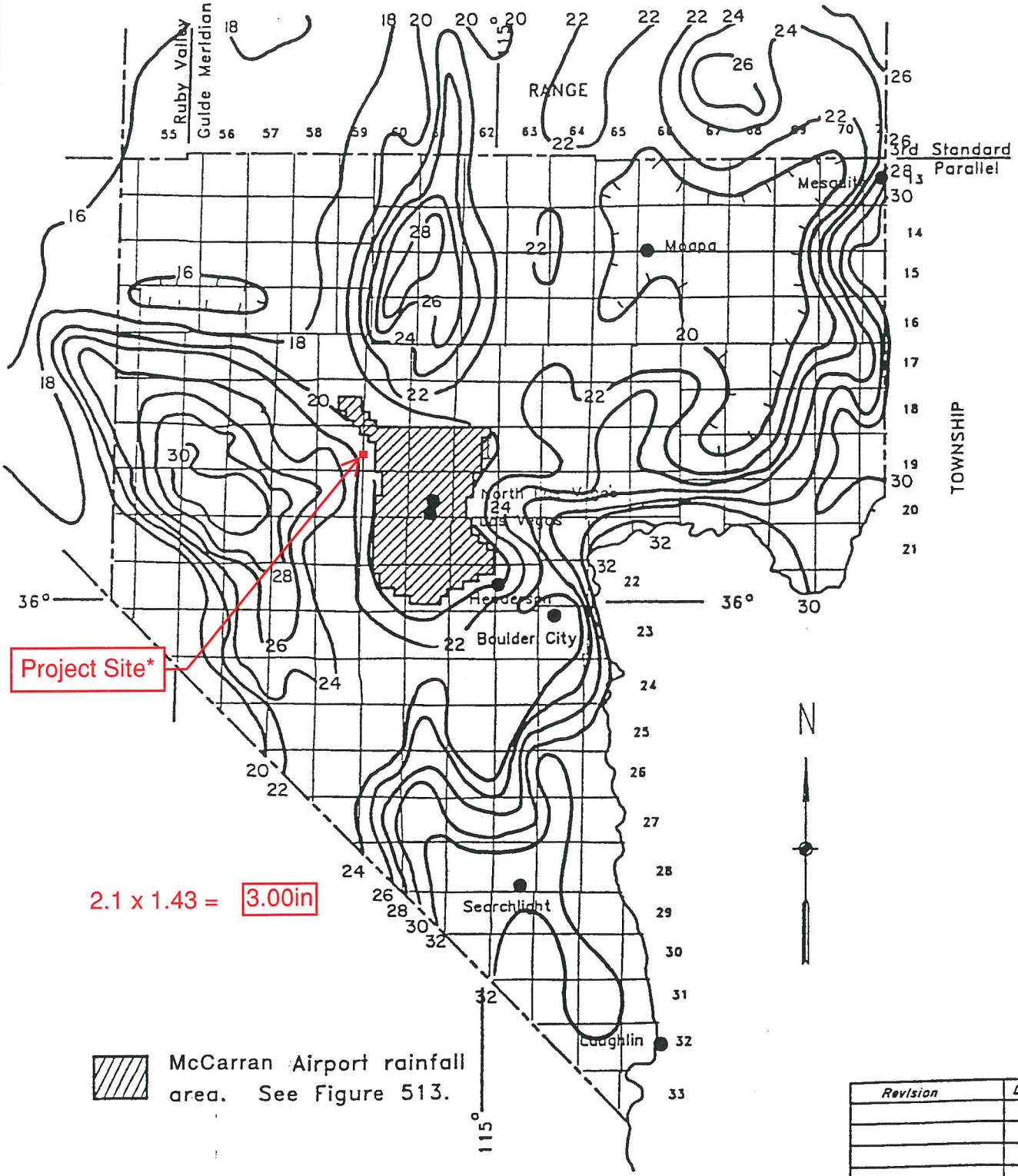
WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

RAINFALL DEPTH-DURATION-FREQUENCY 100-YEAR, 6-HOUR

(DEPTHS IN TENTHS OF INCHES)



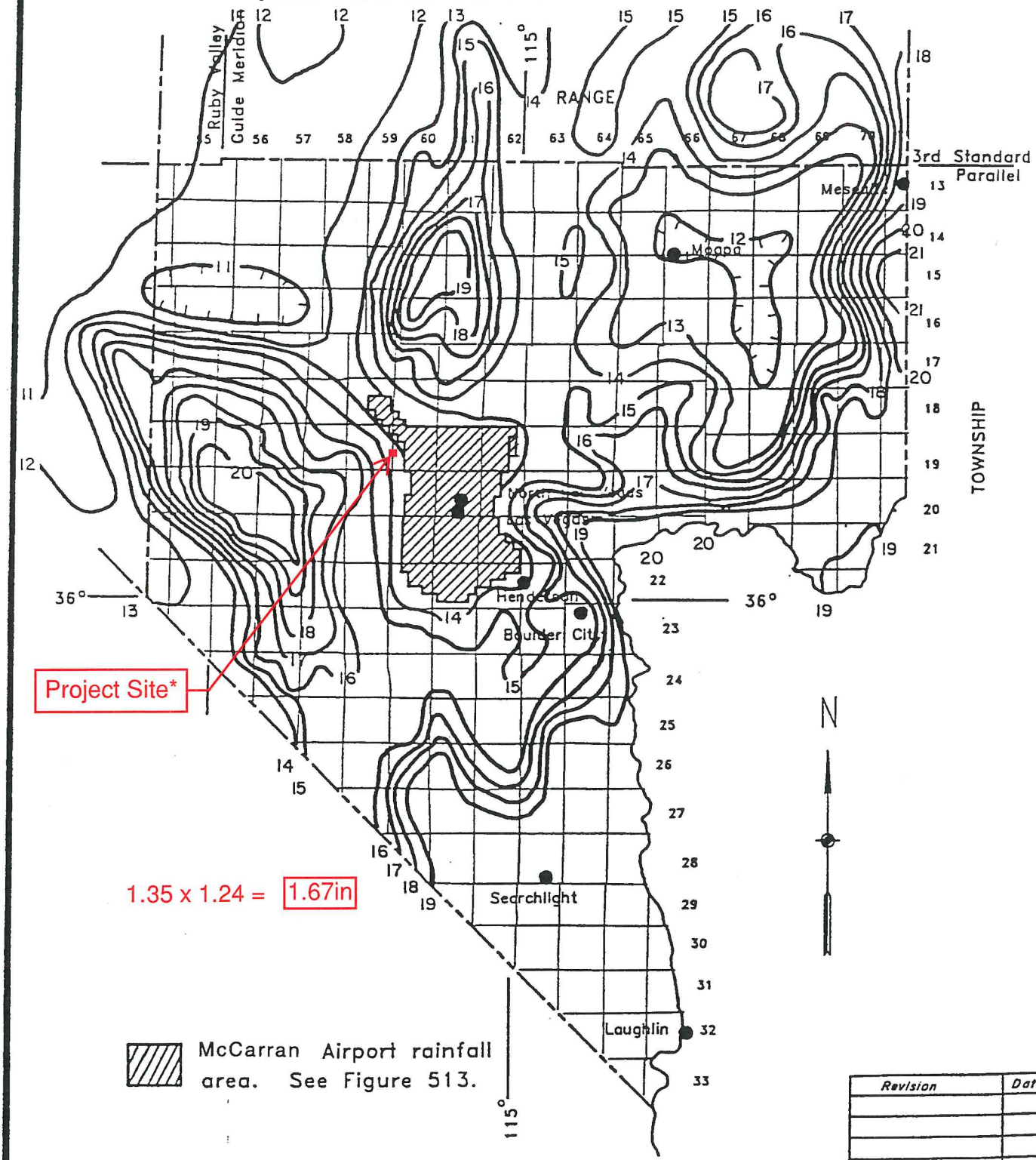
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

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



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

PRECIPITATION ADJUSTMENT RATIOS

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

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

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

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

NOTES:
1. A graphical representation of these factors is presented in Figure 514.
2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

Soils and Curve Number Data

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Soil Data & Curve Number Computation

Project Name & Number: RAH1701: Agave Moon
Date: 12/20/2017
By: CAA

Data:

Reference: Exhibit D NRCS Soil Data

Soil Type - Soil Survey Area & Version, Soil Description				A	B	C	D
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
Roadway	98	98	98	98
Newly Graded	77	86	91	94
Residential (7,000 sf)	76	84	89	91

*Commercial land use per Note 3

EXISTING CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON1E	LV	191	98.5%	Newly Graded	100%	0%	0%	0%	77	86	91	94	4.49	75.82
		TOTAL PERCENT	98.5%		TOTAL AREA & COMPOSITE CURVE NUMBER:								4.56	**75.8**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
HUA-E	LV	191	100.0%	Roadway	100%	0%	0%	0%	98	98	98	98	0.52	98.00
		TOTAL PERCENT	100.0%		TOTAL AREA & COMPOSITE CURVE NUMBER:								0.52	**98.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
DOR-E	LV	191	100.0%	Roadway	100%	0%	0%	0%	98	98	98	98	0.23	98.00
		TOTAL PERCENT	100.0%		TOTAL AREA & COMPOSITE CURVE NUMBER:								0.23	**98.0**

PROPOSED CONDITION

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
ON1	LV	191	100.0%	Residential (7,000 sf)	100%	0%	0%	0%	76	84	89	91	4.09	76.00
		TOTAL PERCENT	100.0%		TOTAL AREA & COMPOSITE CURVE NUMBER:								4.09	**76.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
HUA	LV	191	100.0%	Roadway	100%	0%	0%	0%	98	98	98	98	0.93	98.00
		TOTAL PERCENT	100.0%		TOTAL AREA & COMPOSITE CURVE NUMBER:								0.93	**98.0**

BASIN ID	SURVEY AREA	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CURVE NUMBER
					A	B	C	D	A	B	C	D		
DOR	LV	191	100.0%	Roadway	100%	0%	0%	0%	98	98	98	98	0.22	98.00
		TOTAL PERCENT	100.0%		TOTAL AREA & COMPOSITE CURVE NUMBER:								0.22	**98.0**

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RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size: **See Table 602A**					
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

1 Average runoff condition, and $I_a = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

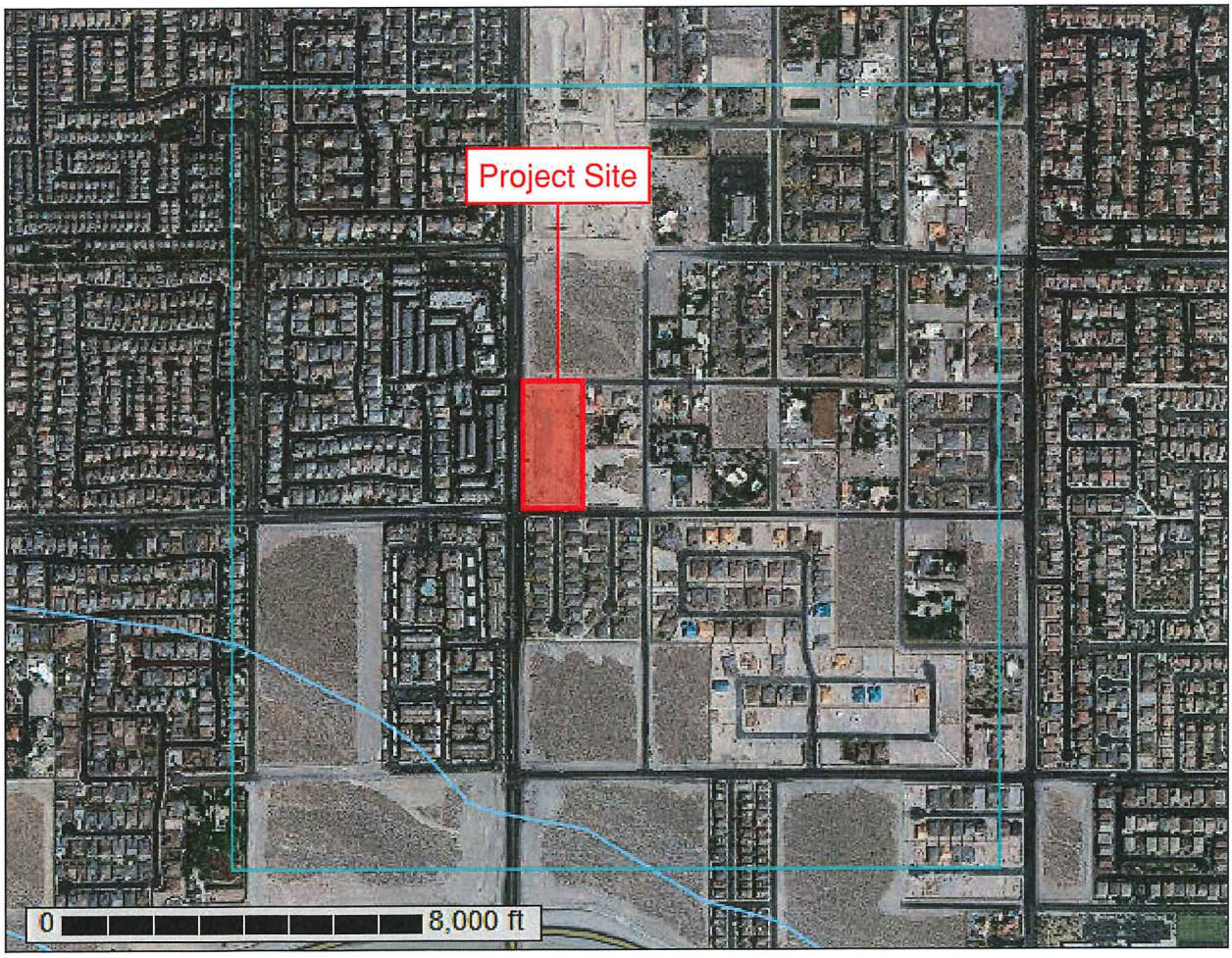
United States Department of Agriculture

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



December 5, 2017

Preface

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

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

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

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

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

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

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

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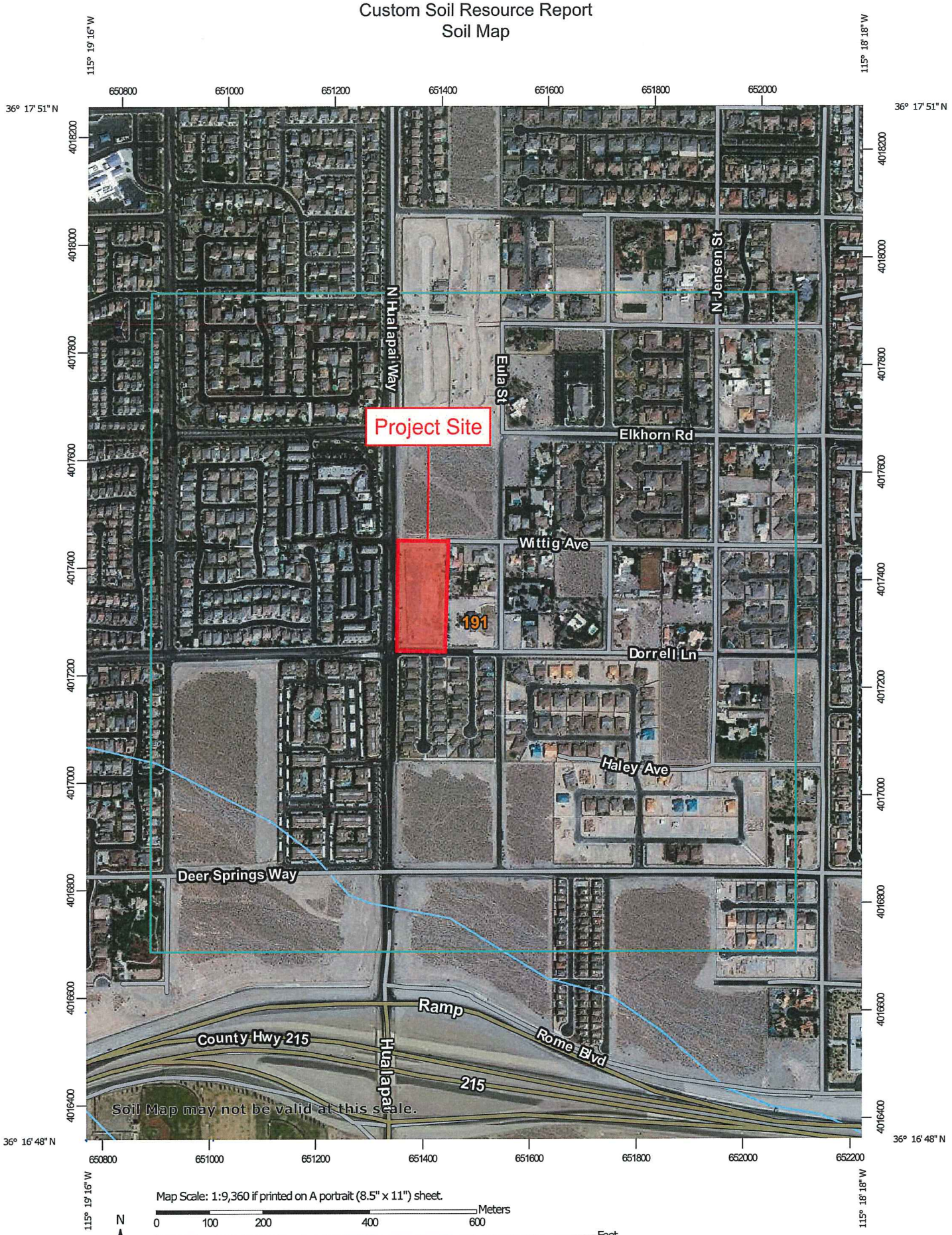
Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:9,360 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 100 200 400 600

Feet: 0 450 900 1800 2700

N

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
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 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: May 7, 2011—Feb 27, 2017

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
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	367.0	100.0%
Totals for Area of Interest		**367.0**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Las Vegas Valley Area, Nevada, Part of Clark County

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

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

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Standard Form 4

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Project Name & Number: RAH1701: Agave Moon
Description: Existing and Proposed Condition
By: CAA
Date: 12/21/2017

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
EXISTING CONDITION																	
ON1E	E	75.8	0.611	4.56	0.0071	100	2.00	6.99	700	1.21	1.63	3.23	6.15	13.14			0.131
HUA-E	D	98.0	0.904	0.52	0.0008	30	2.00	1.54	660	1.21	2.22	3.37	4.54	6.08	690	13.833	0.061
DOR-E	D	98.0	0.904	0.23	0.0004	30	2.00	1.54	300	3.33	3.69	5.59	1.36	2.89	330	11.833	0.050
PROPOSED CONDITION																	
ON1	D	76.0	0.613	4.09	0.0064	155	1.00	10.91	630	1.29	2.29	3.48	4.26	15.16	785	14.361	0.144
HUA	D	98.0	0.904	0.93	0.0015	60	2.00	2.17	660	1.21	2.22	3.37	4.54	6.71	720	14.000	0.067
DOR	D	98.0	0.904	0.22	0.0003	30	2.00	1.54	300	3.33	3.69	5.59	1.36	2.89	330	11.833	0.050

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

Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

REFERENCE : STANDARD FORM 4

HEC-1 Models

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   21DEC17  TIME  13:54:39   *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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

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

1 HEC-1 INPUT PAGE 1

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

                        *DIAGRAM
            1           ID     SLATER HANIFAN GROUP
            2           ID     AGAVE MOON
            3           ID     TECHNICAL DRAINAGE STUDY
            4           ID     EXISTING DRAINAGE CONDITION
            5           ID
            6           ID     RETURN PERIOD ------- 100 & 10-YEAR
            7           ID     DISTRIBUTION -------- 6-HOUR SDN3
            8           ID     PROJECT NO. --------- RAH1701.000
            9           ID     FILENAME ------------ EX.H1
           10           ID     DATE ---------------- DEC 2017
           11           ID     MODELED BY ---------- CAA
           12           ID
           13           ID        PRECIPITATION STORM EVENT RATIOS
           14           ID        STORM EVENT             RATIO
           15           ID        100-YR                  1.00
           16           ID        10-YR                   0.56
           17           ID
           18           IT       5       0       0     300
           19           IO       5       0       0
           20           IN       5       0       0
           21           JR    PREC    1.00    0.56
                        *

           22           KK    ON1E
           23           BA  0.0071
           24           PB    3.00
           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    75.8
           34           UD   0.131
                        *

           35           KK   HUA-E
           36           BA  0.0008
           37           LS       0    98.0
           38           UD   0.061
                        *

           39           KK   DOR-E
           40           BA  0.0004
           41           LS       0    98.0
           42           UD   0.050
                        *
```

1 HEC-1 INPUT PAGE 2

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

           43           KK    CP1E
           44           HC       3
                        *
           45           ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    22        ON1E
```

```
                .
   35           .       HUA-E
                .         .
                .         .
   39           .         .       DOR-E
                .         .         .
                .         .         .
   43        CP1E.......................

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   21DEC17  TIME  13:54:39   *
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*                                       *
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SLATER HANIFAN GROUP
AGAVE MOON
TECHNICAL DRAINAGE STUDY
EXISTING DRAINAGE CONDITION

RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- RAH1701.000
FILENAME ------------ EX.H1
DATE ---------------- DEC 2017
MODELED BY ---------- CAA

PRECIPITATION STORM EVENT RATIOS

STORM EVENT	RATIO
100-YR	1.00
10-YR	0.56

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    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						
+	ON1E	.01	1	FLOW	6.	1.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HUA-E	.00	1	FLOW	2.	1.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	DOR-E	.00	1	FLOW	1.	1.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP1E	.01	1	FLOW	8.	3.
				TIME	3.50	3.50

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

```
1*****************************************
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*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
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*           (916) 756-1104              *
*                                       *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

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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

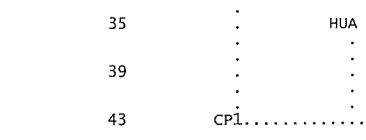
```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     AGAVE MOON
    3         ID     TECHNICAL DRAINAGE STUDY
    4         ID     PROPOSED DRAINAGE CONDITION
    5         ID
    6         ID     RETURN PERIOD ------- 100 & 10-YEAR
    7         ID     DISTRIBUTION -------- 6-HOUR SDN3
    8         ID     PROJECT NO. --------- RAH1701.000
    9         ID     FILENAME ------------ PRO.H1
   10         ID     DATE ---------------- DEC 2017
   11         ID     MODELED BY ---------- CAA
   12         ID
   13         ID        PRECIPITATION STORM EVENT RATIOS
   14         ID        STORM EVENT            RATIO
   15         ID        100-YR                  1.00
   16         ID        10-YR                   0.56
   17         ID
   18         IT       5       0       0     300
   19         IO       5       0       0
   20         IN       5       0       0
   21         JR    PREC    1.00    0.56
              *
   22         KK     ON1
   23         BA  0.0064
   24         PB    3.00
   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    76.0
   34         UD   0.144
              *
   35         KK     HUA
   36         BA  0.0015
   37         LS       0    98.0
   38         UD   0.067
              *
   39         KK     DOR
   40         BA  0.0003
   41         LS       0    98.0
   42         UD   0.050
              *
```

1 HEC-1 INPUT PAGE 2

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

   43         KK     CP1
   44         HC       3
              *
   45         ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    22        ON1
              .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   20DEC17  TIME  10:23:40   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP
AGAVE MOON
TECHNICAL DRAINAGE STUDY
PROPOSED DRAINAGE CONDITION

RETURN PERIOD ------- 100 & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- RAH1701.000
FILENAME ------------ PRO.H1
DATE ---------------- DEC 2017
MODELED BY ---------- CAA

PRECIPITATION STORM EVENT RATIOS

STORM EVENT	RATIO
100-YR	1.00
10-YR	0.56

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

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

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    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 1.00	RATIO 2 .56
HYDROGRAPH AT						
+	ON1	.01	1	FLOW	6.	1.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HUA	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	DOR	.00	1	FLOW	1.	0.
				TIME	3.50	3.50
3 COMBINED AT						
+	CP1	.01	1	FLOW	9.	3.
				TIME	3.50	3.50

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

APPENDIX C

Hydraulic Computations

Interior Street Computations

Section 1: Interior Street (Max Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section 1: Interior Street (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.70	%
Discharge	6.00	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	0.013	
Water Surface Elevation	0.27	ft
Elevation Range	0.00 to 0.48	
Flow Area	1.9	ft²
Wetted Perimeter	19.30	ft
Top Width	19.12	ft
Actual Depth	0.27	ft
Critical Elevation	0.33	ft
Critical Slope	0.50	%
Velocity	3.17	ft/s
Velocity Head	0.16	ft
Specific Energy	0.43	ft
Froude Number	1.78	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.50	0.013
0+07.50	0+41.50	0.016
0+41.50	0+49.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+24.50	0.46
0+41.50	0.12
0+41.50	0.08

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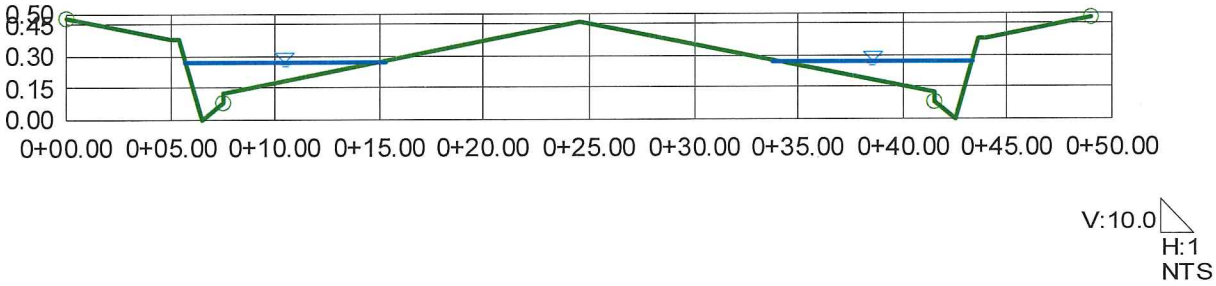
Section 1: Interior Street (Max Slope)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+42.50	0.00
0+43.62	0.38
0+44.00	0.38
0+49.00	0.48

Section 1: Interior Street (Max Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section 1: Interior Street (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.70	%
Water Surface Elevation	0.27	ft
Elevation Range	0.00 to 0.48	
Discharge	6.00	cfs



Section 1: Interior Street (Min Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section 1: Interior Street (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.00	%
Discharge	6.00	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	0.013	
Water Surface Elevation	0.30	ft
Elevation Range	0.00 to 0.48	
Flow Area	2.4	ft²
Wetted Perimeter	21.78	ft
Top Width	21.59	ft
Actual Depth	0.30	ft
Critical Elevation	0.33	ft
Critical Slope	0.53	%
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.40	ft
Froude Number	1.35	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.50	0.013
0+07.50	0+41.50	0.016
0+41.50	0+49.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.48
0+05.00	0.38
0+05.38	0.38
0+06.50	0.00
0+07.50	0.08
0+07.50	0.12
0+24.50	0.46
0+41.50	0.12
0+41.50	0.08

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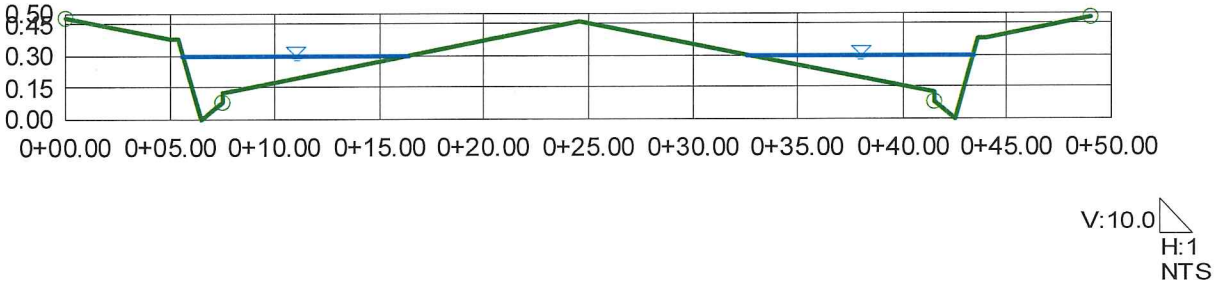
Section 1: Interior Street (Min Slope)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+42.50	0.00
0+43.62	0.38
0+44.00	0.38
0+49.00	0.48

Section 1: Interior Street (Min Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section 1: Interior Street (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.00	%
Water Surface Elevation	0.30	ft
Elevation Range	0.00 to 0.48	
Discharge	6.00	cfs



Adjacent Street Computations

Section DOR: Dorrell Lane - 100-Year (Max Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section DOR: Dorrell Lane - 100-Year (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	4.93	%
Discharge	117.00	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	0.68	ft
Elevation Range	0.00 to 0.80	
Flow Area	13.5	ft²
Wetted Perimeter	55.36	ft
Top Width	54.21	ft
Actual Depth	0.68	ft
Critical Elevation	0.96	ft
Critical Slope	0.42	%
Velocity	8.70	ft/s
Velocity Head	1.18	ft
Specific Energy	1.86	ft
Froude Number	3.08	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.08419060 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+05.00	0.013
0+05.00	0+10.00	0.020
0+10.00	0+12.00	0.013
0+12.00	0+53.00	0.016
0+53.00	0+60.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.80
0+05.00	0.70
0+10.00	0.60
0+10.50	0.58
0+10.50	0.10
0+12.00	0.23
0+12.00	0.27

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Section DOR: Dorrell Lane - 100-Year (Max Slope)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

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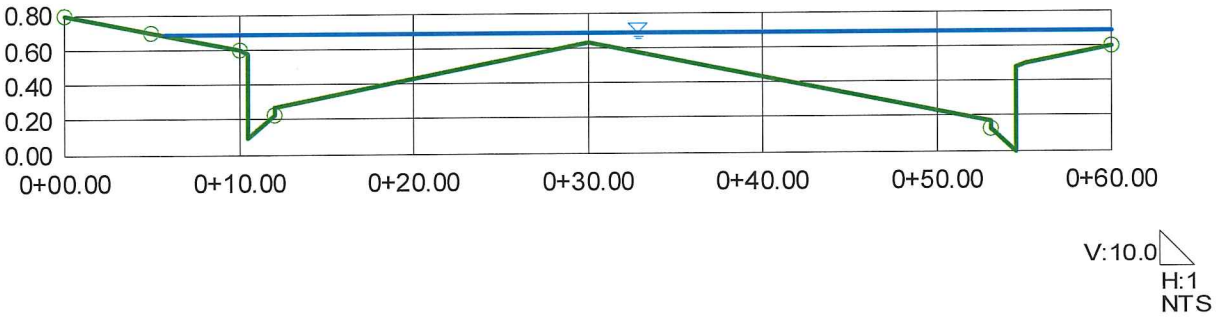
Section DOR: Dorrell Lane - 100-Year (Max Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section DOR: Dorrell Lane - 100-Year (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	4.93	%
Water Surface Elevation	0.68	ft
Elevation Range	0.00 to 0.80	
Discharge	117.00	cfs



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Rip Rap Sizing Computation

Project Name & Number: RAH1701: Agave Moon
Date: 12/21/2017
By: CAA

Location: Dorrell Lane

Known Information: **Reference:**

Rip Rap protection at

V =	Velocity (fps)	8.7	WSPG Hydraulic / Flowmaster Calculations
S_g =	Specific Gravity of Rock (typ=2.5)	2.5	Use Typical
s =	Longitudinal Channel Slope (ft/ft)	0.0493	Grading Plan

Solve For:

d_{50} = 1.34 ft - Average Rock Size

d_{50} =	**16**	**in**	**- Average Rock Size**
Thickness =	**32**	**in**	**- Thickness of Rip Rap protection**
Manning's 'n' =	**0.041**		**- Roughness Coefficient**

Equations:

Based upon a Stable Channel Lining

$d_{50} = ((vel*S^{0.17})/(3*(S_g-1)))^2$ Equation 734*

$n = 0.0395(d_{50})^{1/6}$ Equation 732*

Recommendations:

* Provided 8-in Riprap

Note that though 16-inch riprap is suggested by the calculation, 8-inch riprap is recommended because the section evaluating Dorrell Lane is considered conservative. The Dorrell Lane section (Section DOR) utilizes a conservative flow derived from the flow split that occurs at the intersection of Hualapai Way and Elkhorn Road. The entirety of the flow splitting at this intersection is not expected to impact Dorrell Lane.

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

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Section DOR: Dorrell Lane - 100-Year (Min Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section DOR: Dorrell Lane - 100-Year (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	3.26	%
Discharge	117.00	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	0.72	ft
Elevation Range	0.00 to 0.80	
Flow Area	15.4	ft²
Wetted Perimeter	57.13	ft
Top Width	55.95	ft
Actual Depth	0.72	ft
Critical Elevation	0.96	ft
Critical Slope	0.41	%
Velocity	7.61	ft/s
Velocity Head	0.90	ft
Specific Energy	1.62	ft
Froude Number	2.56	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.11893731 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+05.00	0.013
0+05.00	0+10.00	0.020
0+10.00	0+12.00	0.013
0+12.00	0+53.00	0.016
0+53.00	0+60.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.80
0+05.00	0.70
0+10.00	0.60
0+10.50	0.58
0+10.50	0.10
0+12.00	0.23
0+12.00	0.27

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Section DOR: Dorrell Lane - 100-Year (Min Slope)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+30.00	0.63
0+53.00	0.17
0+53.00	0.13
0+54.50	0.00
0+54.50	0.48
0+55.00	0.50
0+60.00	0.60

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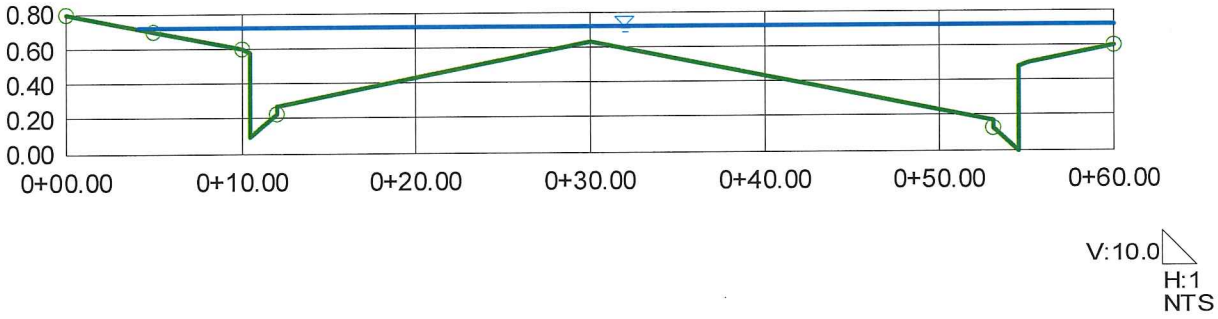
Section DOR: Dorrell Lane - 100-Year (Min Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section DOR: Dorrell Lane - 100-Year (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	3.26	%
Water Surface Elevation	0.72	ft
Elevation Range	0.00 to 0.80	
Discharge	117.00	cfs



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Section HUA: Hualapai Way - 100-Year (Max Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section HUA: Hualapai Way - 100-Year (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.18	%
Discharge	136.00	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	1.02	ft
Elevation Range	0.00 to 1.50	
Flow Area	22.0	ft²
Wetted Perimeter	49.47	ft
Top Width	48.50	ft
Actual Depth	1.02	ft
Critical Elevation	1.19	ft
Critical Slope	0.41	%
Velocity	6.17	ft/s
Velocity Head	0.59	ft
Specific Energy	1.61	ft
Froude Number	1.61	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.41875489 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.013
0+07.00	0+48.50	0.016
0+48.50	0+50.00	0.013

Natural Channel Points	
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+48.50	1.00
0+48.50	1.50
0+50.00	1.50

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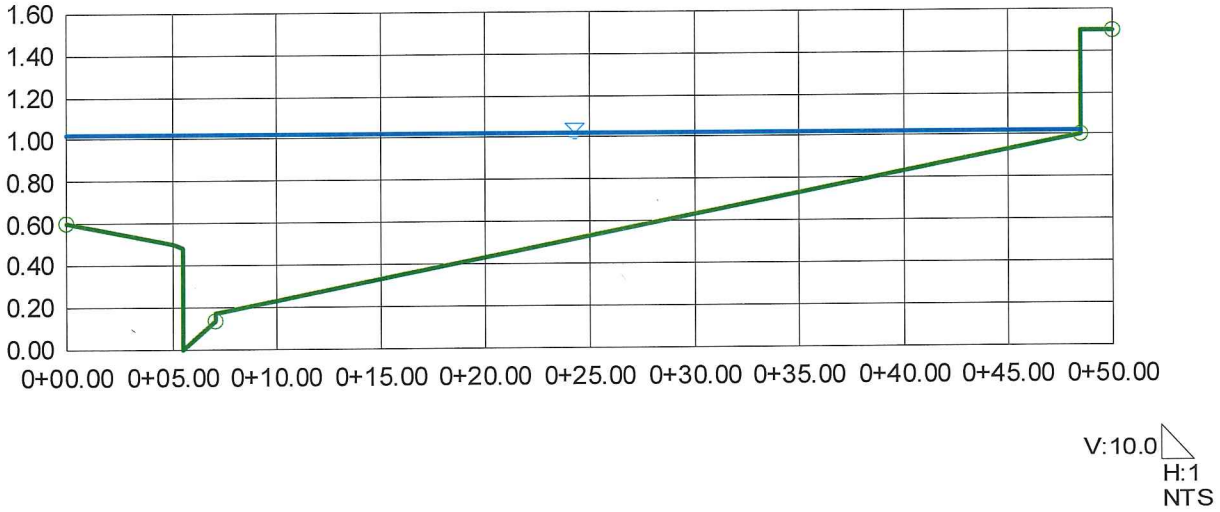
Section HUA: Hualapai Way - 100-Year (Max Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section HUA: Hualapai Way - 100-Year (Max Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	1.18 %
Water Surface Elevation	1.02 ft
Elevation Range	0.00 to 1.50
Discharge	136.00 cfs



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SLATER HANIFAN GROUP
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Rip Rap Sizing Computation

Project Name & Number: RAH1701: Agave Moon
Date: 12/21/2017
By: CAA

Location: Hualapai Way

Known Information: **Reference:**

Rip Rap protection at

V =	Velocity (fps)	6.17	WSPG Hydraulic / Flowmaster Calculations
S_g =	Specific Gravity of Rock (typ=2.5)	2.5	Use Typical
s =	Longitudinal Channel Slope (ft/ft)	0.0118	Grading Plan

Solve For:

d_{50} = 0.42 ft - Average Rock Size

d_{50} = 5 in - Average Rock Size
Thickness = 10 in - Thickness of Rip Rap protection
Manning's 'n' = 0.034 - Roughness Coefficient

Equations:

Based upon a Stable Channel Lining

$d_{50} = ((vel*S^{0.17})/(3*(S_g-1)))^2$ Equation 734*

$n = 0.0395(d_{50})^{1/6}$ Equation 732*

Recommendations:

* Provided 8-in Riprap

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

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Section HUA: Hualapai Way - 100-Year (Min Slope)
Worksheet for Irregular Channel

Project Description	
Worksheet	Section HUA: Hualapai Way - 100-Year (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.06	%
Discharge	136.00	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	1.03	ft
Elevation Range	0.00 to 1.50	
Flow Area	22.8	ft²
Wetted Perimeter	49.50	ft
Top Width	48.50	ft
Actual Depth	1.03	ft
Critical Elevation	1.19	ft
Critical Slope	0.41	%
Velocity	5.97	ft/s
Velocity Head	0.55	ft
Specific Energy	1.59	ft
Froude Number	1.54	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.43394049 ft.

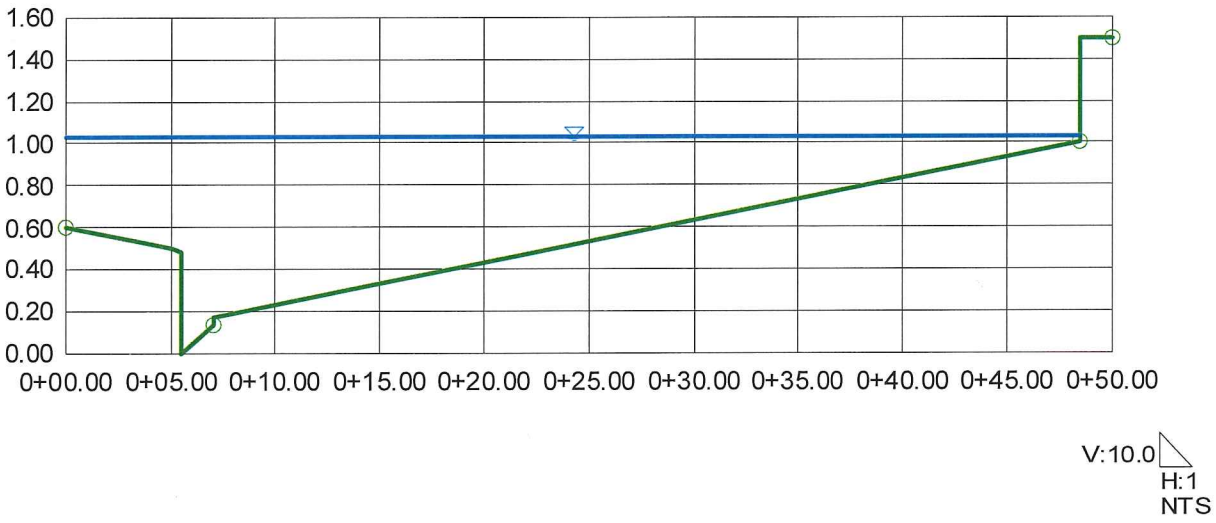
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+07.00	0.013
0+07.00	0+48.50	0.016
0+48.50	0+50.00	0.013

Natural Channel Points	
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+48.50	1.00
0+48.50	1.50
0+50.00	1.50

Section HUA: Hualapai Way - 100-Year (Min Slope)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section HUA: Hualapai Way - 100-Year (Min Slope)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	1.06	%
Water Surface Elevation	1.03	ft
Elevation Range	0.00 to 1.50	
Discharge	136.00	cfs



APPENDIX D

Finished Floor Analyses

AGAVE MOON
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	1	3828.19	3827.81	0.3	3828.41	3828.69	3830.1	OK	OK	
2	1	3828.84	3828.46	0.3	3829.06	3829.34	3830.8	OK	OK	
3	1	3829.49	3829.11	0.3	3829.71	3829.99	3831.4	OK	OK	
4	1	3830.14	3829.76	0.3	3830.36	3830.64	3832.1	OK	OK	
5	1	3830.79	3830.41	0.3	3831.01	3831.29	3832.7	OK	OK	
6	1	3831.44	3831.06	0.3	3831.66	3831.94	3833.4	OK	OK	
7	1	3832.09	3831.71	0.3	3832.31	3832.59	3834.1	OK	OK	
8	1	3833.16	3832.78	0.3	3833.38	3833.66	3835.2	OK	OK	
9	1	3835.16	3834.78	0.3	3835.38	3835.66	3836.7	OK	OK	
10	1	3833.54	3833.16	0.3	3833.76	3834.04	3835.0	OK	OK	
11	1	3832.10	3831.72	0.3	3832.32	3832.60	3834.0	OK	OK	
12	1	3831.45	3831.07	0.3	3831.67	3831.95	3833.4	OK	OK	
13	1	3830.80	3830.42	0.3	3831.02	3831.30	3832.7	OK	OK	
14	1	3830.15	3829.77	0.3	3830.37	3830.65	3832.1	OK	OK	
15	1	3829.50	3829.12	0.3	3829.72	3830.00	3831.4	OK	OK	
16	1	3828.85	3828.47	0.3	3829.07	3829.35	3830.8	OK	OK	
17	1	3828.20	3827.82	0.3	3828.42	3828.70	3830.1	OK	OK	

Where:

1: Top of Curb at High Side of Lot

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

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

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

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

City of Las Vegas Finished Floor Criteria:

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

-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

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	Dorrell Lane	2832.99	2832.61	DOR	0.72	2834.05	2830.1	CHECK	Yes
1	Hualapai Way	2831.43	2831.05	HUA	1.03	2833.11	2830.1	CHECK	Yes
2	Hualapai Way	2833.46	2833.08	HUA	1.03	2835.14	2830.8	CHECK	Yes
3	Hualapai Way	2834.22	2833.84	HUA	1.03	2835.90	2831.4	CHECK	Yes
4	Hualapai Way	2835.11	2834.73	HUA	1.03	2836.79	2832.1	CHECK	Yes
5	Hualapai Way	2836.04	2835.66	HUA	1.03	2837.72	2832.7	CHECK	Yes
6	Hualapai Way	2836.98	2836.60	HUA	1.03	2838.66	2833.4	CHECK	Yes
7	Hualapai Way	2837.92	2837.54	HUA	1.03	2839.60	2834.1	CHECK	Yes
8	Hualapai Way	2838.86	2838.48	HUA	1.03	2840.54	2835.2	CHECK	Yes
9	Hualapai Way	2840.34	2839.96	HUA	1.03	2842.02	2836.7	CHECK	Yes
17	Dorrell Lane	2826.18	2825.80	DOR	0.72	2827.24	2830.1	OK	No

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

2: 0.50-ft is subtracted from the High TC to obain the High FL elevation

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

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

APPENDIX E

Entitlement Information

LAS VEGAS CITY COUNCIL

CAROLYN G. GOODMAN
Mayor

LOIS TARKANIAN
Mayor Pro Tem

RICKI Y. BARLOW
STAVROS S. ANTHONY
BOB COFFIN
STEVEN G. SEROKA
MICHELE FIORE

SCOTT D. ADAMS
City Manager

November 16, 2017

Mr. David Saltman
VFR - Southwest Desert Equities
8215 South Eastern Avenue, Suite #205
Las Vegas, Nevada 89123

RE: VAC-70765 [PRJ-70527] - VACATION RELATED TO ZON-70762, WVR-70763 AND TMP-70766
CITY COUNCIL MEETING OF NOVEMBER 15, 2017

Dear Mr. Saltman:

The City Council at a regular meeting held on November 15, 2017 voted to ***APPROVE*** a request for a Petition to Vacate U.S. Government Patent Easements on 5.24 acres located at the northeast corner of Dorrell Lane and Hualapai Way (APN 125-19-101-003), R-E (Residence Estates) Zone [PROPOSED: R-1 (Single Family Residential)], Ward 6 (Fiore) [PRJ-70527].

This approval is subject to the following conditions:

1. The limits of this Petition of Vacation shall be the U.S. Government Patent Easements located adjacent to Assessor Parcel Number 125-19-101-003 as shown on the submitted exhibit for property generally located on the north side of Dorrell Lane, east of Hualapai Way.

2. The Order of Vacation shall record immediately before and in conjunction with the associated Final Map, such as Connor Hills 3.

3. All public improvements, if any, adjacent to and in conflict with this vacation application are to be modified, as necessary, at the applicant's expense prior to the recordation of an Order of Vacation.

DEVELOPMENT SERVICES CENTER
DEPARTMENT OF PLANNING
333 N. RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NV 89106
702.229.6301 | VOICE
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711 | TTY

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4. The Order of Relinquishment of Interest shall not be recorded until all of the conditions of approval have been met provided, however, the conditions requiring modification of public improvements may be fulfilled for purposes of recordation by providing sufficient security for the performance thereof in accordance with the Subdivision Ordinance of the City of Las Vegas. City Staff is empowered to modify this application if necessary because of technical concerns or because of other related review actions as long as current City right-of-way requirements are still complied with and the intent of the vacation application is not changed. If applicable, a five foot wide easement for public streetlight and fire hydrant purposes shall be retained on all vacation actions abutting public street corridors that will remain dedicated and available for public use. Also, if applicable and where needed, public easement corridors and sight visibility or other easements that would/should cross any right-of-way being vacated must be retained.

5. All development shall be in conformance with code requirements and design standards of all City Departments.

6. If the Order of Vacation (or Order of Relinquishment of Interest if a Patent Reservation) is not recorded within one (1) year after approval by the City of Las Vegas or an Extension of Time is not granted by the Planning Director, then approval will terminate and a new petition must be submitted.

The Notice of Final Action was filed with the Las Vegas City Clerk on November 16, 2017.

Sincerely,

Peter Lowenstein, AICP
Acting Director
Department of Planning

PL:RTS:clb

cc: Mr. Brian Walsh
Richmond American Homes
7770 South Dean Martin Drive, Suite #308
Las Vegas, Nevada 89139

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

LAS VEGAS CITY COUNCIL

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Mayor

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MICHELE FIORE

SCOTT D. ADAMS
City Manager

November 16, 2017

Mr. David Saltman
VFR - Southwest Desert Equities
8215 South Eastern Avenue, Suite #205
Las Vegas, Nevada 89123

RE: WVR-70763 [PRJ-70527] - WAIVER RELATED TO ZON-70762, VAC-70765 AND TMP-70766
CITY COUNCIL MEETING OF NOVEMBER 15, 2017

Dear Mr. Saltman:

The City Council at a regular meeting held on November 15, 2017 voted to ***APPROVE*** a request for a Waiver TO ALLOW A 208-FOOT AND A 214-FOOT STREET OFFSET WHERE 220 FEET IS REQUIRED on 5.24 acres located at the northeast corner of Dorrell Lane and Hualapai Way (APN 125-19-101-003), R-E (Residence Estates) Zone [PROPOSED: R-1 (Single Family Residential)], Ward 6 (Fiore) [PRJ-70527].

This approval is subject to the following conditions:

Planning

1. This approval shall be void (2) two years from the date of final approval, unless exercised pursuant to the provisions of LVMC Title 19.16. An Extension of Time may be filed for consideration by the City of Las Vegas.

2. All necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Department of Building and Safety.

3. A Waiver of Title 19.02.140 is hereby approved, to allow s street offset of 214 feet, where 220 feet is required.

4. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

DEVELOPMENT SERVICES CENTER
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5. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

The Notice of Final Action was filed with the Las Vegas City Clerk on November 16, 2017.

Sincerely,

Peter Lowenstein, AICP
Acting Director
Department of Planning

PL:RTS:clb

cc: Mr. Brian Walsh
Richmond American Homes
7770 South Dean Martin Drive, Suite #308
Las Vegas, Nevada 89139

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

LAS VEGAS CITY COUNCIL

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SCOTT D. ADAMS
City Manager

November 16, 2017

Mr. David Saltman
VFR - Southwest Desert Equities
8215 South Eastern Avenue, Suite #205
Las Vegas, Nevada 89123

RE: ZON-70762 [PRJ-70527] - REZONING RELATED TO WVR-70763, VAC-70765 AND TMP-70766
CITY COUNCIL MEETING OF NOVEMBER 15, 2017

Dear Mr. Saltman:

The City Council at a regular meeting held on November 15, 2017 voted to ***APPROVE*** a request for a Rezoning FROM: R-E (RESIDENCE ESTATES) TO: R-1 (SINGLE FAMILY RESIDENTIAL) on 5.24 acres located at the northeast corner of Dorrell Lane and Hualapai Way (APN 125-19-101-003), Ward 6 (Fiore) [PRJ-70527].

The Notice of Final Action was filed with the Las Vegas City Clerk on November 16, 2017.

Sincerely,

Peter Lowenstein, AICP
Acting Director
Department of Planning

PL:RTS:clb

cc: Mr. Brian Walsh
Richmond American Homes
7770 South Dean Martin Drive, Suite #308
Las Vegas, Nevada 89139

Ms. Chelsea Jensen
Slater Hanifan Group
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LAS VEGAS
CITY COUNCIL

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November 16, 2017

Mr. David Saltman
VFR - Southwest Desert Equities
8215 South Eastern Avenue, Suite #205
Las Vegas, Nevada 89123

RE: TMP-70766 [PRJ-70527] – TENTATIVE MAP RELATED TO ZON-70762, WVR-70763 AND TMP-70766
CITY COUNCIL MEETING OF NOVEMBER 15, 2017

Dear Mr. Saltman:

The City Council at a regular meeting held on November 15, 2017 voted to ***APPROVE*** a request for a Tentative Map FOR AN 18-LOT SINGLE-FAMILY RESIDENTIAL SUBDIVISION on 5.24 acres located at the northeast corner of Dorrell Lane and Hualapai Way (APN 125-19-101-003), R-E (Residence Estates) Zone [PROPOSED: R-1 (Single Family Residential)], Ward 6 (Fiore) [PRJ-70527].

This approval is subject to the following conditions:

Planning

1. All lots shall be limited to single-story homes.
2. Rooftop patios are prohibited.
3. Two story accessory structures are prohibited within the subdivision.
4. 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.
5. Approval of and conformance to Rezoning (ZON-70762), Waiver (WVR-70763) and Vacation (VAC-70765) shall be required.
6. Street names must be provided in accordance with the City's Street Naming Regulations.
7. 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.

8. 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.

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

Public Works

10. A Petition of Vacation, such as VAC-70765, shall record immediately prior to (concurrent with) the recordation of a Final Map for this site to eliminate U.S. Government Patent Easements.

11. Dedicate 50 feet of right-of-way adjacent to this site on Hualapai Way, 30 feet for Dorrell Lane, and a 25-foot radius at the northeast corner of Hualapai Way and Dorrell Lane. In addition coordinate with the property owner to the north to determine the location and geometric configuration of a cul-de-sac meeting current City Standards for Wittig Avenue and dedicate or obtain dedication of public right of way as appropriate on Wittig Avenue. Additionally, dedicate additional right-of way per Standard Drawing #201.1 on Hualapai Way and grant a Traffic Signal Chord Easement at the northeast corner of Hualapai Way and Dorrell Lane.

12. Grant Public Pedestrian Access Easements for all public sidewalks located outside of the public right-of-way.

13. Construct half street improvements on Dorrell Lane, Hualapai Way, and appropriate improvements for a cul-de-sac on Wittig Avenue meeting complete street standards adjacent to this site concurrent with the development of this site. All existing paving damaged or removed by this development shall be restored at its original location and to its original width concurrent with development of this site.

14. 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.

15. A working sanitary sewer connection shall be in place prior to final inspection of any units within this development. Full permanent improvements on all major access streets, including all required landscaped areas between the perimeter wall and adjacent public street, shall be constructed and accepted by the City prior to issuance of any building permits beyond 50% of all units within this development. All off-site improvements adjacent to this site, including all required landscaped areas between the perimeter walls and adjacent public streets, shall be constructed and accepted prior to issuance of building permits beyond 75%. The above thresholds notwithstanding, all required Improvements shall be constructed in accordance with Title19.02.130.D.

16. Meet with the Fire Protection Engineering Section of the Department of Fire Services to discuss fire requirements for the proposed use of this facility. The design and layout of all onsite private circulation and access drives shall meet the approval of the Department of Fire Services.

17. Submit a License Agreement for landscaping and private improvements in the Dorrell Lane, Hualapai Way, and Wittig Avenue public rights-of-way, if any, prior to the issuance of permits for these improvements. The applicant must carry an insurance policy for the term of the License Agreement and add the City of Las Vegas as an additionally insured entity on this insurance policy. If requested by the City, the applicant shall remove property encroaching in the public right-of-way at the applicant's expense pursuant to the terms of the City's License Agreement. The installation and maintenance of all private improvements in the public right of way shall be the responsibility of the applicant and any successors in interest to the property and assigns pursuant to the terms of the License Agreement. Coordinate all requirements for the License Agreement with the Land Development Section of the Department of Building and Safety (229-4836).

18. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or submittal of any construction drawings, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

19. As per Unified Development Code (UDC) 19.16.060.G, all requirements must be complied with or such future compliance must be guaranteed by an approved performance security method in accordance with UDC sections 19.02.130.C and 19.02.130.E.

20. The approval of all Public Works related improvements shown on this Tentative Map is in concept only. Specific design and construction details relating to size, type and/or alignment of improvements, including but not limited to street, sewer and drainage improvements, shall be resolved prior to approval of the construction plans by the City. No deviations from adopted City Standards shall be allowed unless specific written approval for such is received from the City Engineer prior to the recordation of a Final Map or the approval of subdivision-related construction plans, whichever may occur first. Approval of this Tentative Map does not constitute approval of any deviations. If such approval cannot be obtained, a revised Tentative Map must be submitted showing elimination of such deviations.

The Notice of Final Action was filed with the Las Vegas City Clerk on November 16, 2017.

Sincerely,

Peter Lowenstein, AICP
Acting Director
Department of Planning

PL:RTS:clb

cc: Mr. Brian Walsh
Richmond American Homes
7770 South Dean Martin Drive, Suite #308
Las Vegas, Nevada 89139

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

APPENDIX F

Reference Material

Technical Drainage Study for Dorrell/Hualapai East,
(DS#4651C, by Slater Hanifan Group)

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 14, 2014
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: **Dorrell / Hualapai East**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	SWC of Dorrell Land & Eula Street			D.R. Horton, Inc.
File Number:	F:\Depot\DSMemos\DS4651C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-19-201-002 & -004			CCPW
Zoning Action:	ANX-50680 & VAC-51781			
FEMA Flood Zone	YES	NO	**X**	
Proposed Storm Drain	YES	NO	**X**	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	1/23/2014	2/6/2014	Not Approved	$400.00	345875: $400
2nd Submittal	4/24/2014	5/8/2014	Conditional Approval	$400.00	354877: $400
Supplement	7/10/2014	7/14/2014	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	**$800.00**	----

REMARKS:

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

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

1. **Sheet D-1**: Revise *Detail Section 4* to provide all concrete in the proposed public drainage easement.
2. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the Final Map.
3. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.

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

T/R/S: T19S/R60E/19
AREA G-19

Department of Public Works

500 S Grand Central Pky • Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

Denis Cederburg, P.E., Director • E-Mail: dlc@ClarkCountyNV.gov

Drainage Study Approval Letter

Date: June 27, 2014
Firm: SHG
Engineer: Steve Jones, P.E.
Address: 5740 S. Arville Street, Suite 216, Las Vegas, NV 89118
Phone: (702) 284-5300
Fax: (702) 284-5399
E-mail: sjones@shg-inc.com

Subject: Technical Drainage Study for Dorrell/Hualapai - East
Location: SWC of Dorrell Lane and Eula Street
APN: 125-19-201-002, -004
Sec, Township, Range: S19, T19S, R60E
Flood Zone & Panel: Zone X, 1750E, Dated September 27, 2002
Application Tracking #: 13-28378

HTE13-28378

Submittals	Date Received	Date Returned	Reviewer	Miscellaneous
Technical	07/11/2013	08/14/2013	WG	
Addendum #1	05/19/2014	06/27/2014	WG	

Concurrence Required: (Must be obtained prior to permit issuance)		Reason Concurrence is required
	City of Henderson	Adjacent to or Impacts Henderson
X	City of Las Vegas	Adjacent to or Impacts Las Vegas
	City of North Las Vegas	Adjacent to or Impacts North Las Vegas
	Nevada Department of Transportation	Adjacent to or Impacts NDOT Facility
	Union Pacific Rail Road	Adjacent to or Impacts a UPRR Facility
	US Army Corp of Engineers	Impacts a USACE Facility
	Clark County Regional Flood Control District	Regional Significance, Adjacent to or Impacts CCRFCD MPU Facility or in a SFHA

BOARD OF COUNTY COMMISSIONERS
STEVE SISOLAK, Chairman • LARRY BROWN, Vice Chairman

13-28378

The referenced **Technical Drainage Study** has been reviewed and is accepted as complying with minimum improvement standards. As set forth in the subject drainage study, the following measures will be taken to mitigate flood hazards.

The site shall be graded with respect to drainage as shown on "Dorrell/Hualapai East", grading plan sheets C-1, C-2, G-1, D-1, D-2, P-1, P-2, signed and sealed by Efraim Balizan, P.E., on April 24, 2014.

Check appropriate conditions

	Retaining/screen wall combination may be in excess of current **Clark County Unified Development Code, Chapter 30.64.050.**
	A FEMA Elevation Certificate, completed by a licensed surveyor, must be submitted to and approved by CCPW Development Review Plan Check prior to the issuance of Certificates of Occupancy for those structures.
X	Mylars of the grading plan must be submitted to the CCPW Development Review Plan Check for approval signatures prior to map recordation (residential) or permit issuance (commercial).
	An administrative variance to allow the finished floor elevation(s) to be set below the current Clark County criteria must be approved. The finished floor variance must be submitted to CCPW Development Review front counter after drainage study approval and prior to offsite final review.
	The grading plan will be reviewed by the Building Office Operations Division to ensure compliance with the ADA access requirements. Revisions to the grading plan may be required if the site accessibility design does not comply with the requirements set forth in the Accessibility Chapter of the Clark County Building Code.
	The plans show work is proposed outside of the project boundary. Notarized written permission must be obtained **prior to grading plan approval.**
X	Right-of-way dedication must be verified.
	Any previously approved drainage easements that are not being used must be vacated.
	Per *Regional Flood Control District policies and Procedures manual, Section VIII. D. 13. Uniform Regulations for the Control of Drainage*, the Engineer of Record shall provide As-Built plans or record drawings to the District after completion and final inspection of such privately installed flood control facilities that have regional flood control significance.
	Structural calculations are required. The structural calculations, plans, and details must be approved prior to "Offsite" submittal and prior to CCRFCD submittal, if applicable.
X	Plan revisions can be found on the red-lined plans and must be addressed.
	Prepare drainage easement documents as shown on the grading plans.

Additional Conditions:

1. The above-referenced project is located within the **City of Las Vegas** adjacent to Clark County unincorporated areas. The County has received the City of Las Vegas acceptance letter dated May 12, 2014 for the Technical Drainage Study (File# DS4651B).

2. The County concurs with the acceptance of this Drainage Study by the City of Las Vegas. Please note that the County's review of this development is limited to drainage issues significant to Clark County unincorporated areas.

3. There is proposed pavement, cutoff walls and grading being constructed within Clark County ROW. Therefore, the engineer must submit to CCPW for offsite plan review and permits.

4. Provide Clark County signature blocks and notes on plans.

5. Provide 3-ft deep cutoff walls at EP at the two valley gutters in Eula.

The County's review is solely based on the information submitted by the Engineer of Record. The County's review is strictly limited to compliance with minimum County Codes and Standards. The Engineer of Record is responsible for researching and addressing situations that may require designs above and beyond the minimum codes for issues of public safety and impacts to upstream, downstream and adjacent properties. The County assumes no liability for information data, designs or conclusions of the Engineer of Record.

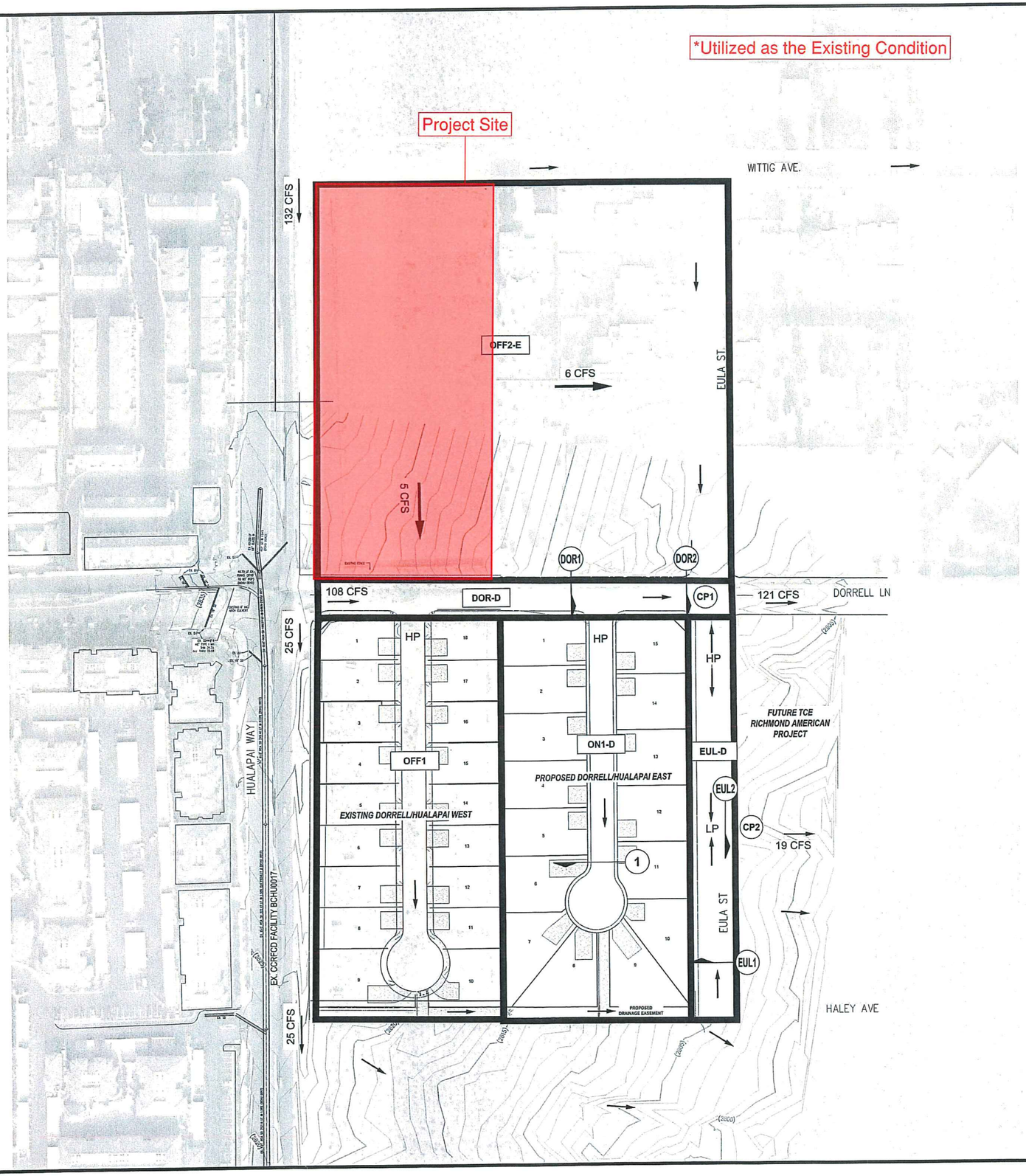
By _____

W. Layne Weber, P.E., CFM
Principal Engineer
Clark County Public Works
Development Review

cc: DR Horton
Albert Sung, P.E., City of Las Vegas

Referenced Drainage Exhibits

*Utilized as the Existing Condition



N

0 80 160
SCALE – 1"=80' FEET

LEGEND

- BASIN BOUNDARY
- ID — BASIN ID
- FLOW DIRECTION
- ID — FLOWMASTER SECTION
- XX CFS — 100-YR FLOW RATE
- ID — CONCENTRATION POINT

FLOW RATE SUMMARY TABLE
PROPOSED CONDITION

Basin ID/ Concentration Point ID	Area (acres)	Q_{100} (cfs)	Q_{10} (cfs)
OFF1	4.5	10	4
OFF2-E	9.5	11	2
DOR-D	0.9	3	2
ON1-D	4.4	6	1
EUL-D	0.9	3	2
CP1 *(OFF2-E + DOR-D)*	N/A	121[1]	3
CP2 *(OFF1 + ON1-D + EUL-D)*	N/A	19	6

1 - Includes flow split from Hualapai, 108 cfs to Dorrell, 25 cfs maintained in Hualapai.

Hydraulic Street Flow Summary
Proposed Condition - 100-Yr Storm Flows

Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$D_{100} \times V_{100}$
1	0.84	6	0.35	2.36	0.8
Q = ON1-D	4.00	6	0.29	4.39	1.3
DOR1	2.52	116	0.70	6.67	4.7
Q = CP1 - 1/2(OFF2-E)	4.24	116	0.66	7.80	5.1
DOR2 *Q = CP1*	2.52	121	0.71	6.78	4.8
EUL1	0.50	19	0.54	2.21	1.2
Q = CP2	3.67	19	0.39	5.45	2.1
EUL2 *Q = CP2*	1.00	19	0.32	2.84	0.9

Drainage Easement Hydraulic Summary
Proposed Condition - 100-Yr Storm Flows

Easement Width (ft)	Contributing Flow	Q_{100} (cfs)	Type of Analysis	Flow Depth (ft)	Min. Adjacent FF (ft)[1]
20	ON1-D	6	Weir	0.22	2611.0
	CP2 - EUL-D	34	Normal Depth	0.82	2609.5

1 - Minimum criteria is 18-inches above Water Surface Elevation in adjacent Drainage Easement.

NOTE:
HIGH POINT PROVIDED IN SITE ENTRY DOES NOT MEET REQUIRED 6-INCHES ABOVE FLOW DEPTH IN DORRELL LANE TO PREVENT OFFSITE FLOWS FROM BEING CONVEYED THRU THE SITE. THEREFORE, AN EMERGENCY OVERFLOW CONDITION ASSESSED AND SUMMARIZED BELOW. ALL FINISHED FLOORS ARE ELEVATED ABOVE SUMMARIZED EMERGENCY OVERFLOW DEPTHS.

Hydraulic Street Flow Summary
Emergency Overflow Condition - 100-Yr Storm Flows

Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$D_{100} \times V_{100}$
1	0.84	122	0.85	5.42	4.6
Q = ON1-D + (CP1 - 1/2(OFF2-E))	4.00	122	0.67	8.68	5.8

Drainage Easement Hydraulic Summary
Emergency Overflow Condition - 100-Yr Storm Flows

Easement Width (ft)	Contributing Flow	Q_{100} (cfs)	Type of Analysis	Flow Depth (ft)	Min. Adjacent FF (ft)[1]
20	ON1-D + (CP1 - 1/2(OFF2-E))	122	Weir	1.60	2610.9
	(OFF1 + ON1-D) + (CP1 - 1/2(OFF2-E))	150	Normal Depth	1.82	2609.0

1 - Minimum criteria is at or above Emergency Overflow Water Surface Elevation in adjacent Drainage Easement.

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

DR HORTON

DORRELL/HUALAPAI EAST

PROPOSED CONDITION DRAINAGE MAP

DATE: MARCH 2014
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SMJ
PROJECT NO.
DRH1230.002

EXHIBIT F
SHEET 1 OF 1

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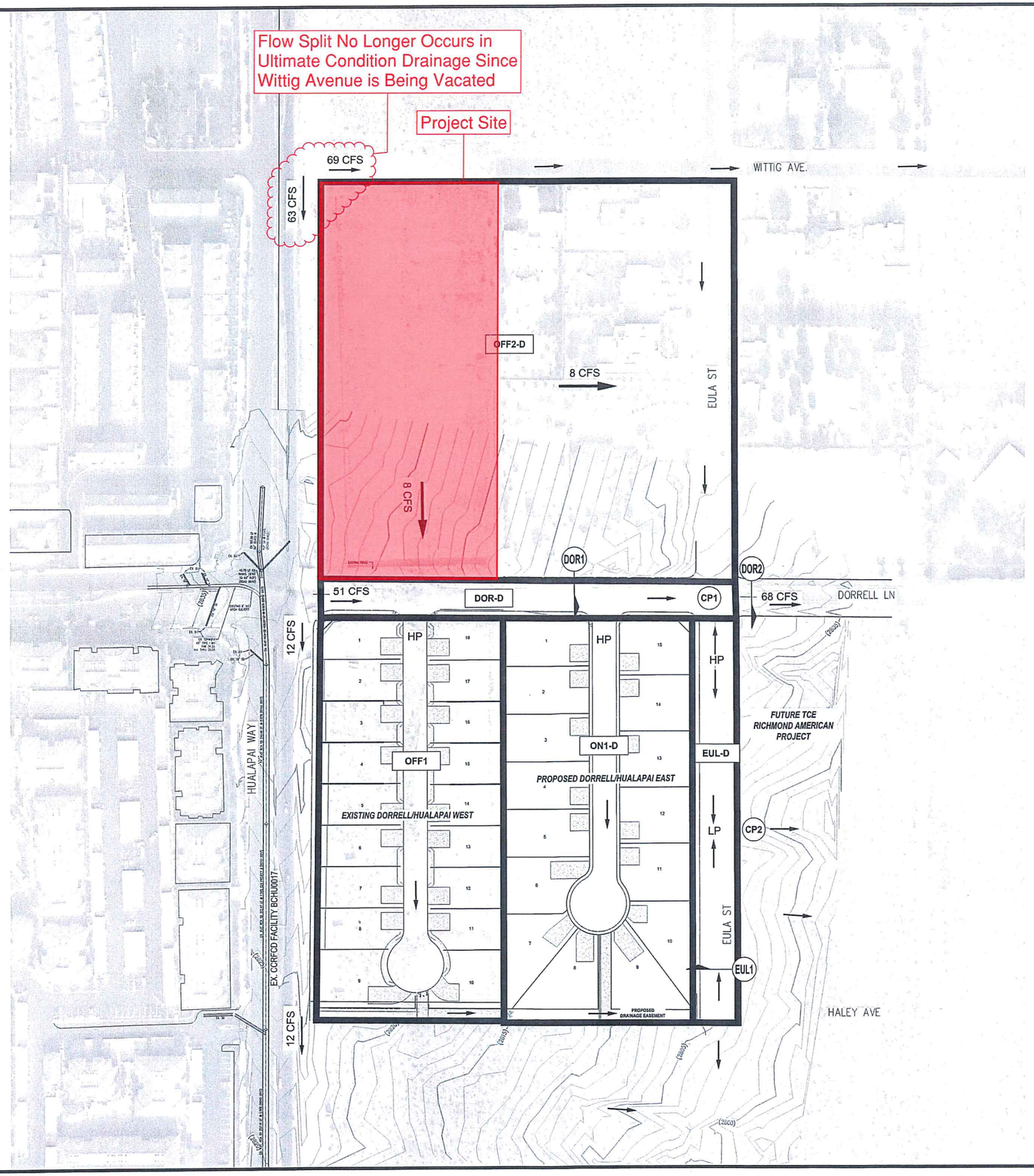

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SCALE - 1"=80' FEET

LEGEND

	BASIN BOUNDARY
ID	BASIN ID
	FLOW DIRECTION
ID	FLOWMASTER SECTION
XX CFS	100-YR FLOW RATE
ID	CONCENTRATION POINT

FLOW RATE SUMMARY TABLE
ULTIMATE CONDITION

Basin ID/ Concentration Point ID	Area (acres)	Q_{100} (cfs)	Q_{10} (cfs)
OFF1	4.5	10	4
OFF2-D	9.5	16	4
DOR-D	0.9	3	2
ON1-D	4.4	6	1
EUL-D	0.9	3	2
CP1 *(OFF2-D + DOR-D)*	N/A	68[1]	5
CP2 *(OFF1 + ON1-D + EUL-D)*	N/A	19	6

1 - Includes flow split from Hualapai, 51 cfs to Dorrell, 12 cfs maintained in Hualapai.

NOTE:
ALL FLOW SPLITS FROM HUALAPAI WAY REFERENCED FROM *TECHNICAL DRAINAGE STUDY FOR CLIFFS EDGE INFRASTRUCTURE - PHASE 1.*

Hydraulic Street Flow Summary
Ultimate Condition - 100-Yr Storm Flows

Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$D_{100} \times V_{100}$
DOR1 *Q = CP1 - 1/2(OFF2-D)*	4.24	60	0.56	6.49	3.6
DOR2 *Q = CP1*	2.52	68	0.62	5.44	3.4
EUL1 *Q = CP2*	0.50	19	0.54	2.21	1.2

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

DR HORTON

DORRELL/HUALAPAI EAST
ULTIMATE CONDITION DRAINAGE MAP

DATE: MARCH 2014
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SMJ
PROJECT NO.
DRH1230.002

EXHIBIT G
SHEET 1 OF 1

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APPENDIX G

Reference Material

Technical Drainage Study for Dorrell/Hualapai West,
(DS#4604C, by Slater Hanifan Group)

Approval Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: December 2, 2013
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Dorrell / Hualapai West**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	SEC of Dorrell Lane & Hualapai Blvd.			D.R. Horton, Inc.
File Number:	F:\Depot\DSMemos\DS4604C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	125-19-201-001 & -003			CCRFCD
Zoning Action:	TMP-49164; VAC-49184 & WVR-49163			CCPW
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/23/2013	6/6/2013	Not Approved	$400.00	320845: $400
2nd Submittal	10/23/2013	11/6/2013	Conditional Approval	$400.00	337011: $400
CCRFCD	11/25/2013	12/2/2013	Concurrence Recv'd	N/C	N/C
			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:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
X	is conditionally approved subject to Clark County Public Works Department concurrence.

1. The site is adjacent to the Clark County jurisdictional area. The engineer must coordinate with Clark County Public Works Department (CCPW) and incorporate any concerns for boundary conditions along all impacted borders. CCPW concurrence is required prior to final acceptance of the study.

2. The grading plan indicates offsite grading to the east. Secure a notarized letter of permission from the property owner adjacent to the east allowing the proposed grading. This letter is required prior to the final approval of the improvement plans.

3. **Second Request**: Label an existing storm drain system in *Hualapai Way* with ***City of Las Vegas*** recorded drawing number on the grading plan.

4. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.

5. The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.

Referenced Report Excerpt

8. **Comment:** *Label an existing storm drain system in Hualapai Way with City of Las Vegas recorded drawing number on the grading plan.*

   Response: Appropriate labels have been added.

9. **Comment:** *All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.*

   Response: Acknowledged.

10. **Comment:** *The engineer must provide a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.*

    Response: Quantity table has been provided on Sheet C-2.

Referenced Report Excerpt for Hualapai Flow Splits

Additional Revisions

1. After a recent site visit was completed, it was determined that a flow split previously assumed into Wittig Avenue from Hualapai Way does not currently occur because of the existing ground in Wittig being considerably higher than Hualapai. As a result, further analysis of street flow in Hualapai was performed and a supplemental Interim Condition Drainage Exhibit has been added to illustrate an interim flow condition in Dorrell Lane. A table has been produced below that summarizes the interim condition and developed condition flow rates in Hualapai and flow split quantities. Note that as demonstrated in the previous submittal, all 10-year flow in Hualapai is collected into the existing regional storm drain facility and the only flow subject to flow splits are 100-year flows. Also note that the methodology of balancing water surface elevations has been utilized to determine the flow splits summarized below.

Revised Hualapai Flow Splits (Developed Condition vs. Interim Condition)		
Location – Direction	**Developed Condition Q_{100} (cfs)**	**Interim Condition Q_{100} (cfs)**
@ Wittig – East	69	0
@ Wittig – South	63	132
@ Dorell - East	51	108
@ Dorrell - South	12	25
@ Haley - East	0	0
@ Haley - South	15	28

Note that the site entry has been raised above the interim condition flow depth to maintain drainage in Dorrell as discussed in this study. Resulting from establishing larger interim condition flows compared to the developed condition, the street flow hydraulic computations have been re-assessed for the interim condition flows and the finished floor analysis has been revised. Please see Appendix E for the supporting interim condition hydraulic computations. Note that Exhibit G – Interim Condition Drainage Map has been included in Appendix B.

Referenced Flow Split Calculations

Dorrel/@ Hualapai - Flow Split Section
Worksheet for Irregular Channel

Project Description	
Worksheet	Dorrell @ Hualapai - Flow Split Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	2.23	%
Discharge	108.00	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	0.016	
Water Surface Elevation	0.71	ft
Elevation Range	0.00 to 0.63	
Flow Area	17.8	ft²
Wetted Perimeter	61.28	ft
Top Width	60.00	ft
Actual Depth	0.71	ft
Critical Elevation	0.88	ft
Critical Slope	0.50	%
Velocity	6.08	ft/s
Velocity Head	0.57	ft
Specific Energy	1.28	ft
Froude Number	1.97	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.10596023 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.0	0+60.0	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.48
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+30.0	0.63
0+53.0	0.17
0+53.0	0.13
0+54.5	0.00
0+54.5	0.48

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Dorrell@ Hualapai - Flow Split Section
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+55.0	0.50
0+60.0	0.60

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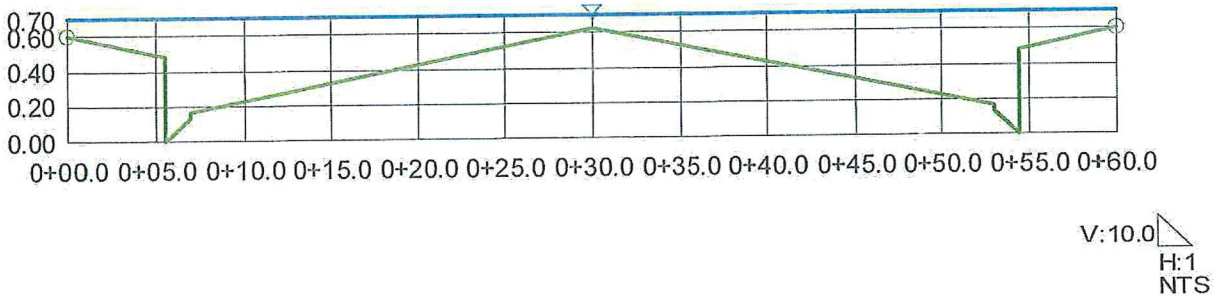
Dorrell @ Hualapai - Flow Split Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Dorrell @ Hualapai - Flow Split Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.23 %
Water Surface Elevation	0.71 ft
Elevation Range	0.00 to 0.63
Discharge	108.00 cfs



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Hualapai @ Dorrell - Flow Split Section
Worksheet for Irregular Channel

Project Description	
Worksheet	Hualapai @ Dorrell - Flow Split Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.50	%
Discharge	25.00	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	0.016	
Water Surface Elevation	0.71	ft
Elevation Range	0.00 to 2.32	
Flow Area	9.2	ft²
Wetted Perimeter	34.72	ft
Top Width	34.07	ft
Actual Depth	0.71	ft
Critical Elevation	0.69	ft
Critical Slope	0.60	%
Velocity	2.71	ft/s
Velocity Head	0.11	ft
Specific Energy	0.83	ft
Froude Number	0.92	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.11143483 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.0	1+00.0	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.0	0.60
0+05.0	0.50
0+05.5	0.48
0+05.5	0.00
0+07.0	0.13
0+07.0	0.17
0+93.0	1.89
0+93.0	1.85
0+94.5	1.72
0+94.5	2.22
0+95.0	2.22

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Hualapai @ Dorrell - Flow Split Section
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
1+00.0	2.32

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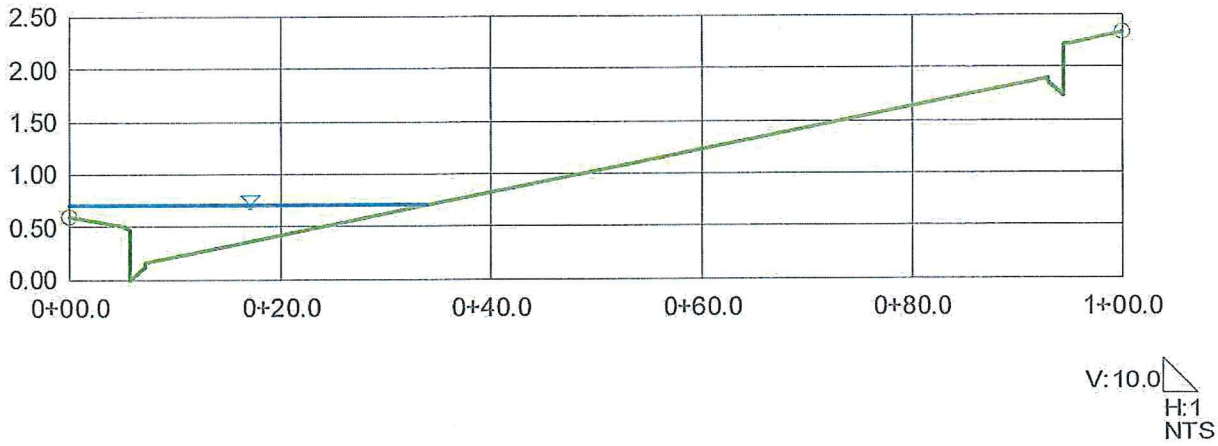
Hualapai @ Dorrell - Flow Split Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Hualapai @ Dorrell - Flow Split Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	0.50 %
Water Surface Elevation	0.71 ft
Elevation Range	0.00 to 2.32
Discharge	25.00 cfs



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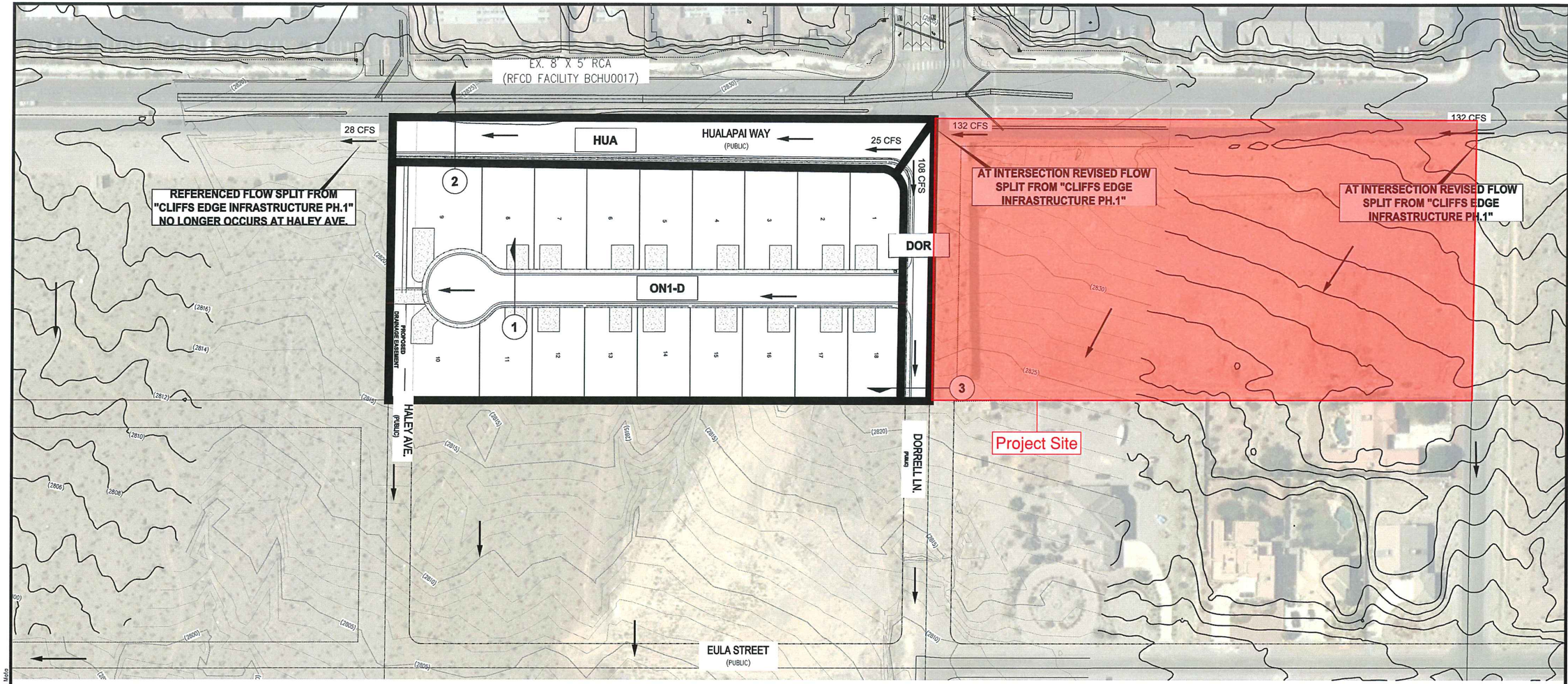
Referenced Drainage Exhibits



Flow Rate Summary Table Interim Condition			
Basin ID/ Concentration Point ID	Area (acres)	Q_{100} (cfs)	Q_{10} (cfs)
ON1-D	4.5	8	3
DOR	0.2	109 [1]	1
HUA	0.7	28 [1]	2

[1] Includes flow split established by Hualapai Storm Drain Study. 108 cfs into Dorrell, 25 cfs into Hualapai.

NOTE:

HIGH POINT PROVIDED IN SITE ENTRY DOES NOT MEET REQUIRED 6-INCHES ABOVE FLOW DEPTH IN DORRELL LANE TO PREVENT OFFSITE FLOWS FROM BEING CONVEYED THRU THE SITE. THEREFORE, AN EMERGENCY OVERFLOW CONDITION ASSESSED AND SUMMARIZED BELOW. ALL FINISHED FLOORS ARE ELEVATED ABOVE SUMMARIZED EMERGENCY OVERFLOW DEPTHS.

0 60 120
SCALE – 1"=60' FEET

Hydraulic Street Flow Summary Interim Condition - 100Yr Storm Flows					
Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$V_{100} \times D_{100}$
1 (Q = ON1-D)	1.07	8	0.38	2.45	0.9
2* (Q = HUA)	1.50	28	0.63	4.27	2.7
3 (Q = DOR)	4.91	109	0.64	7.73	4.9

*Half street section

Hydraulic Steert Flow Summary Emergency Overflow Condition - 100yr Storm Flows					
Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$V_{100} \times D_{100}$
1 (Q = DOR + ON1-D)	1.07	117	0.80	5.03	4.0

LEGEND	
	BASIN BOUNDARY
ID	BASIN ID
	FLOW DIRECTION
ID	FLOWMASTER SECTION
XX CFS	100-YR FLOW RATE

Drainage Easement Hydraulic Summary Interim Condition - 100Yr Storm Flows				
Section	Flow (cfs)	Width (ft)	Type of Analysis	Depth Above FL (ft)
1 (Q = ON1-D)	8	20	Normal Depth	0.24
			Weir	0.26

Drainage Easement Hydraulic Summary Emergency Overflow Condition - 100Yr Storm Flows				
Section	Flow (cfs)	Width (ft)	Type of Analysis	Depth Above FL (ft)
1 (Q = DOR + ON1-D)	117	20	Normal Depth	0.65
			Weir	1.56

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

DR HORTON

DORRELL/HUALAPAI WEST
INTERIM CONDITION DRAINAGE MAP

DATE: AUGUST 2013
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SMJ
PROJECT NO.
DRH1230.001

EXHIBIT G
SHEET 1 OF 1

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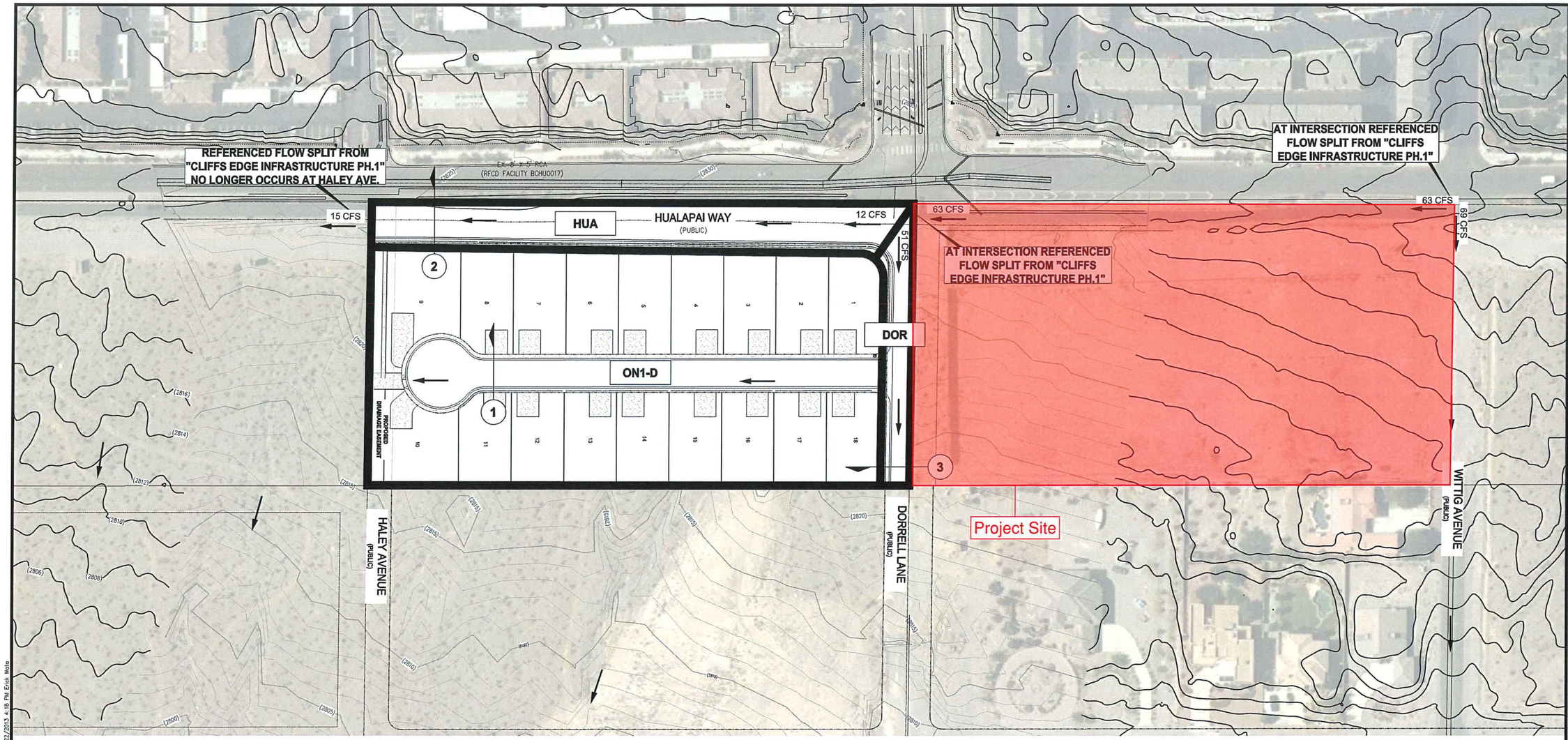

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

DR HORTON
DORRELL/HUALAPAI WEST
DEVELOPED CONDITION DRAINAGE MAP

Flow Rate Summary Table
Developed Condition

Basin ID/ Concentration Point ID	Area (acres)	Q_{100} (cfs)	Q_{10} (cfs)
ON1-D	4.5	8	3
DOR	0.2	52 [1]	1
HUA	0.7	15 [1]	2

[1] Includes flow split established by Hualapai Storm Drain Study, 51 cfs into Dorrell, 12 cfs into Hualapai.

NOTE:
HIGH POINT PROVIDED IN SITE ENTRY DOES NOT MEET REQUIRED 6-INCHES ABOVE FLOW DEPTH IN DORRELL LANE TO PREVENT OFFSITE FLOWS FROM BEING CONVEYED THRU THE SITE. THEREFORE, AN EMERGENCY OVERFLOW CONDITION ASSESSED AND SUMMARIZED BELOW. ALL FINISHED FLOORS ARE ELEVATED ABOVE SUMMARIZED EMERGENCY OVERFLOW DEPTHS.

Hydraulic Street Flow Summary
Developed Condition - 100-Yr & 10-Yr Storm Flows

Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$V_{100} \times D_{100}$	Q_{10} (cfs)	D_{10} (ft)	V_{10} (fps)	$V_{10} \times D_{10}$	12 Dry Lane (ft)
1 (Q = ON1-D)	1.07	8	0.38	2.45	0.9	n/a	n/a	n/a	n/a	n/a
2* (Q = HUA)	1.50	15	0.53	3.79	2.0	2	0.30	2.46	0.74	29.5
3 (Q = DOR)	4.91	52	0.63	6.57	3.5	n/a	n/a	n/a	n/a	n/a

*Half street section

Hydraulic Street Flow Summary
Emergency Overflow Condition - 100Yr Storm Flows

Section	Slope (%)	Q_{100} (cfs)	D_{100} (ft)	V_{100} (fps)	$V_{100} \times D_{100}$
1 (Q = DOR + ON1-D)	1.07	60	0.67	3.86	2.6

Drainage Easement Hydraulic Summary
Developed Condition - 100Yr Storm Flows

Section	Flow (cfs)	Width (ft)	Type of Analysis	Depth Above FL (ft)
1 (Q = ON1-D)	8	20	Normal Depth	0.24
			Weir	0.26

Drainage Easement Hydraulic Summary
Emergency Overflow Condition - 100Yr Storm Flows

Section	Flow (cfs)	Width (ft)	Type of Analysis	Depth Above FL (ft)
1 (Q = DOR + ON1-D)	60	20	Normal Depth	0.48
			Weir	1.00

SCALE – 1"=60' (0, 60, 120 FEET)

LEGEND
- BASIN BOUNDARY
- ID — BASIN ID
- FLOW DIRECTION
- (ID) — FLOWMASTER SECTION
- XX CFS — 100-YR FLOW RATE

DATE: AUGUST 2013
DRAFTER: ETM
DESIGNER: ETM
CHECKED: SMJ
PROJECT NO. DRH1230.001

EXHIBIT F
SHEET 1 OF 1

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APPENDIX H

Reference Material

Technical Drainage Study for Cliffs Edge Infrastructure Phase 1
(HTE#04-53820, by VTN Nevada)

Approval Letters

Department of Development Services
Civil Engineering Division

500 S Grand Central Pky 1st Fl • PO Box 551799 • Las Vegas NV 89155-1799
(702) 455-4600 • Fax (702) 388-2550

Phil Rosenquist, Director

April 18, 2005

Ltr 04-53820

VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89146

TECHNICAL DRAINAGE STUDY FOR CLIFFS EDGE INFRASTRUCTURE PHASE 1- SEC. 13 & 24, T. 19 S., R. 59 E. - HTE 04 - 53820

The above-referenced site is located in the City of Las Vegas adjacent to Clark County unincorporated areas. The drainage study was submitted to the County for the second concurrence. The County has reviewed the Addendum #3, dated February 3, 2005, addressing Clark County Regional Flood Control District comments, and Supplement #1 to Addendum #3, dated March 23, 2005, addressing City of Las Vegas comments. In addition, the County has received the conditional approval letter dated March 24, 2005 from the City of Las Vegas.

The County concurs with the acceptance of this drainage study by the City of Las Vegas. Please note that the County's review of this development is limited to drainage issues significant to Clark County unincorporated areas.

No liability is assumed by the County for information, data, and conclusions of the consulting engineer.

DEPARTMENT OF DEVELOPMENT SERVICES

BY: _____

Todd L. Myers, P.E.
Senior Civil Engineer
Civil Engineering Division

TM: pts/pe

cc: Greg McDermott, P.E., Flood Control Project Manager
City of Las Vegas Department of Public Works

BOARD OF COUNTY COMMISSIONERS
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THOM REILLY, County Manager

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: March 24, 2005

TO:
Land Development Services
Department of Public Works

FROM:
Greg McDermott, P.E.
Flood Control Project Manager
Department of Public Works

SUBJECT:	Drainage Study for: **Cliff's Edge Infrastructure Phase 1**
Cross Streets:	Grand Teton Drive and Hualapai Way
File Number:	F:\Depot\DSMemos\DS3576D.doc
Parcel Number:	126-13-101-001; All of Section 13 and portions of Section 24
Zoning Action:	
FEMA Flood Zone	YES NO X
Proposed Storm Drain	YES X NO

COPIES TO:
VTN
Focus Commercial Group
Bart Anderson, P.E., DevCo
Clark County Department of Development Services
CCRFCD
CNLV Public Works
Leni Skaar, Ward 6

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. No.
1st Submittal	5/11/2004	5/25/2004	See Comments Below	$400.00	124837: $400
2nd Submittal	7/9/2004	7/23/2004	See Comments Below	$400.00	6740: $400
3rd Submittal	9/28/2004	10/26/2004	Conditionally Approved	$400.00	
4th Submittal & Supplemental	2/4/2005 & 3/23/2005	2/18/2005 & 3/24/2005	Conditionally Approved	$400.00	
			TOTAL FEES (LDDRS):	**$1600.00**	—

REMARKS: 4th Submittal to address CCRFCD comments

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:
X	must have Clark County Department of Development Services concurrence:
	must have Clark County Public Works concurrence:
	must have City of North Las Vegas Public Works concurrence:

The fourth submittal addressed CCRFCD comments and those responses must be approved by CCRFCD. In addition, the supplemental information addressed design modifications to Hualapai Way and Grand Teton Drive. Clark County Department of Development Services concurrence is required for the supplemental information.

The following comments pertain to all improvement plans for the Phase 1 improvements:

1. A complete revised set of civil improvement and structural plans incorporating all redlines must be submitted to the Flood Control Section prior to submittal to Land Development.

2. On the improvement plans, Type I and Type II manholes are being proposed throughout the storm drain system; however numerous inconsistencies exist between plan, profile, and lateral profiles. Review the plans carefully and ensure that references to Type I and Type II manholes are consistent with each other.

3. On the Type "CM2" drop inlet details revise the notes as appropriate for this project, specifically notes 5 and 6. Also, Type "CM2" drop inlets with depths greater than 6 feet require a special design Provide a detail for drop inlets being proposed with depths greater than 6 feet.

4. Provide a detail for the Bilco Access Panel being utilized at the various access points along the RCA.

5. Add the drainage study number, **DS3576**, to the end of the drainage compliance note on all sheets.

6. The structural plans should include the stationing of the storm drain segments that require higher concrete strength and the additional sacrificial concrete. Also, provide an additional detail that shows the additional sacrificial concrete required when velocities exceed 25 feet per second. It should be noted that the structural plans must be included with the civil improvement plan set submittal to Land Development.

The following comments pertain to the Kyle Canyon Outfall Improvements:

7. On Sheet SD4, provide a transition from the 12' wide gravel maintenance road to the pavement at the Pull/Grand Teton intersection and include an access gate at the end of the maintenance road.

8. Provide cross-sections for the 12-foot wide access road above the alignment of the Kyle Canyon Outfall Pipe and include finish grade elevations of the access road on the profile. The improvement plans must be revised accordingly.

The following comments pertain to the Grand Teton Drive improvements:

9. Show the proposed 12" water line on Sheets SD1 through SD4.

10. On Sheet SD4, the plan view shows the proposed 36" water line in Egan Crest Way being concrete encased at the 6'x5' RCA crossing; however, the profile does not reflect encasement. Review the plan and revise accordingly.

11. On Sheet SD7 and DT1, the daylight channel east of Hualapai Way must have a 6-foot concrete bottom. Also, appropriate traffic control (i.e., jersey rail) must be provided along the south side of the daylight channel where the riprap lies within 10 feet of the 14-foot over pavement. Revise the plan and details accordingly.

12. On Sheet SD7, the existing 18" storm drain must be extended to the west in the profile as shown in the plan and labeled that it will be removed. In addition, the beehive drop inlet being proposed at Sta. 95+22.75 must be revised to a 2'x2' area inlet. The City of Las Vegas does not allow beehive drop inlets. Revise the plan and profile accordingly.

13. On Sheet SD7, the profile for Lateral #1 shows that the future 12" water line has a vertical separation of 1.05' from the 48" RCP. If 18" of vertical separation cannot be maintained, concrete encasement is required. Review the plan and revise accordingly.

14. Profile the existing 12" sanitary sewer line on Sheet SD7 per the improvement plans for Grand Teton Village Unit 2 and ensure that the required vertical clearance is maintained at the 18" RCP storm drain crossing.

The following comments pertain to the Hualapai Way improvements:

15. All storm drain plan and profiles sheets contain numerous inconsistencies relating to sheet references, linear footage of storm drains, slopes, elevations, and storm drain sizes. Review redlined sheets and revise accordingly.

16. The CLV Plan number for the existing street and storm drain improvements for Hualapai Way and Farm Road provided on Sheets ST6 and ST7 should read **107Y4803-w.** Revise plans accordingly.

17. For the Hualapai/Grand Teton plan and profile on Sheet SD2, provide the information for Lateral #34 in the plan located on the west side of Hualapai Way just south of Grand Teton Drive. In the profile show the junction structure at Sta. 21+66.70 as well as the 18" RCP storm drain lateral, and provide the vertical separation between the future 12" sanitary sewer line and the 6'x4' RCA.

18. For the Hualapai/Farm plan and profile on Sheet SD2, label the existing storm drain in Farm Road south of Hualapai Way. Show the future 12" sanitary sewer line crossing the 42" RCP storm drain in the profile as well as the existing 36" RCP storm drain tying into the junction structure.

19. On Sheet SD3, remove the proposed Riprap Channel and extend the 12'x5' RCA to the 10'x'8' RCB and provide transition structure. Revise plan, profile, and details accordingly as well as structural plans.

20. On Sheet SD14, the lateral shown on the farthest right side should be labeled "LATERAL #21". In addition, the 18" RCP storm drain lateral must match the crown of the round RCP.

21. On Sheet SD18, in the profile extend the future 54" RCP storm drain to the south beginning at Sta. 11+88.53. Less than one foot of cover is being provided for the 54" RCP storm drain; revise the profile to provide 18 inches minimum cover. Ensure that all storm drains have a minimum 18-inch cover throughout the system.

22. On Sheet SD18, the 42" RCP must match the crown of the 54" RCP. Also, label the future 42" RCP storm drain at the north end with the linear footage and slope. Revise the plans accordingly.

The following comments will be repeated until the conditions are satisfied:

23. The submitted improvement plans to Streets & Sanitation Department for review of Maintenance and Access concerns must be approved prior to drainage study approval.

24. The Engineer must provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the Building Department for processing. The engineer must provide Building Department approval of the structures prior to final approval of drainage study. Additionally, special inspections of all RCA improvements are required prior to the improvement bond release for the project. The special inspections must be paid for and coordinated by the Master developer.

25. The improvement plans indicate grading and flood control improvements within the north half of Grand Teton Drive. Secure a notarized letter of permission or right-of-way from BLM allowing the grading and drainage improvements. The letter or right-of-way is required prior to final acceptance of the improvement plans.

26. The grading plan indicates grading within the east half of Hualapai Way. Secure a notarized letter of permission from each of the impacted property owners allowing the grading. These letters are required prior to final acceptance of the improvement plans.

27. 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.

28. The site is adjacent to property within Clark County jurisdiction. The approval letter for the Master Drainage Study from the Clark County Department of Development Services (CCDDS) stated that construction activity of any kind is not permitted without an approved technical drainage study. Therefore, Clark County Department of Development Services (CCDDS) concurrence is required prior to final approval of this drainage study.

29. The site includes improvements within the City of North Las Vegas (CNLV) right-of-way grant for the Kyle Canyon Detention Basin. Therefore, CNLV concurrence is required prior to final approval of the drainage study.

30. The site is adjacent to the ongoing Clark County Beltway project. The engineer must coordinate with Clark County Public Works (CCPW) and incorporate any concerns for boundary conditions along the south border. CCPW concurrence is required prior to final acceptance of the study.

31. The proposed alignment for the Outer Beltway is shown on the appropriate improvement plans and exhibits included with the Technical Drainage Study for the Cliff's Edge Infrastructure Phase 1. Any impacts to the overall site drainage patterns due to the Mountain Edge Parkway will require an update to the Master Drainage Study.

32. The Engineer has submitted a master exhibit showing the phasing of the Cliff's Edge master plan development. The exhibit identifies the major streets and flood control infrastructure to be constructed with each phase. A drainage study update will be required for each phase addressing the interim condition flows impacting the streets, flood control facilities, and proposed POD development. Any changes to the phasing or POD discharge locations will require that the master exhibit be revised and resubmitted. Flood Control will not issue final approval of the master drainage study and future updates without the associated master-phasing exhibit.

33. The Infrastructure Study Phase 1 identifies the size and locations storm drain facilities in Grand Teton Drive, Hualapai Way, Elkhorn Road, and the Kyle Canyon Outfall Structure for the Cliff's Edge Master Plan Development. Any changes to the size, alignment, and discharge locations of the flood control facilities will require an update to the Infrastructure Study Phase 1.

34. The Cliff's Edge Master Plan Development encompasses an area that includes the alignments of regional and local flood control facilities that are identified in the City of Las Vegas *Northwest Neighborhood Study Phase 2* and the *2002 Las Vegas Valley Flood Control Master Plan Update.* These facilities must be constructed as part of the master plan development to ensure that down stream properties are not adversely impacted with development of the site. The facilities to be constructed with each phase of the master plan must be identified on the master-phasing exhibit. Permits for the development of the each POD will not be issued until the flood control infrastructure upstream of the development is substantially complete.

35. This drainage study assumes that each infrastructure 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
AJJ/rac

T/R/S: T19S/R59E/13 & 24
AREA F-13

Referenced Improvement Plans

IMPROVEMENT PLANS

FOR

CLIFF'S EDGE / PROVIDENCE

HUALAPAI WAY STORM DRAIN

FROM BELT WAY TO ELKHORN

CITY OF LAS VEGAS STATE OF NEVADA

DEVELOPED BY:

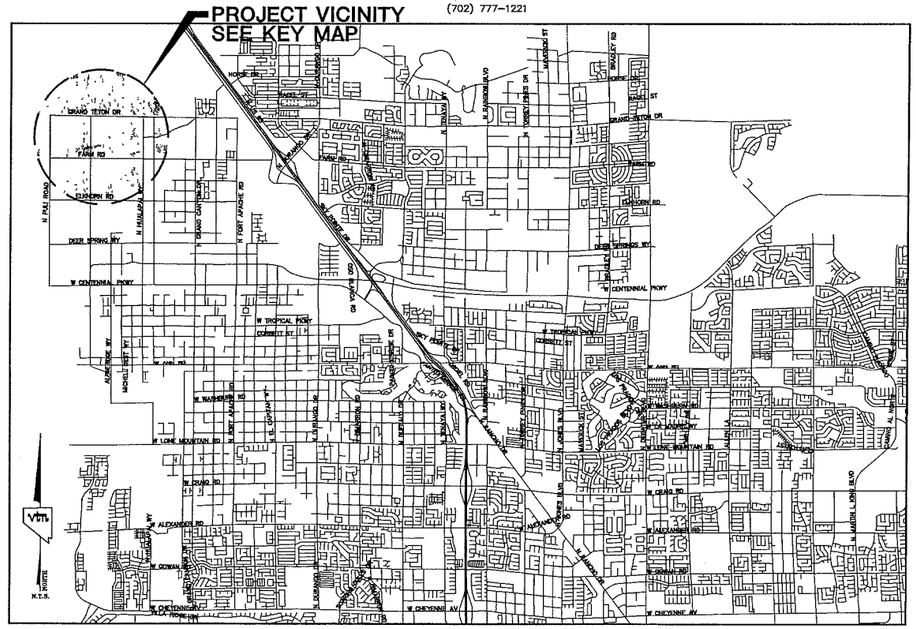
CLIFF'S EDGE LLC

3455 Cliff Shadows Parkway Ste. 290
Las Vegas, Nevada 89129
(702) 777-1221

SHEET INDEX

1.	C1	COVER SHEET
2.	C2	KEY MAP AND QUANTITIES
3.	C3	GENERAL NOTES SHEET
4.	SD1	STORM DRAIN PLAN AND PROFILE - STA. 9+22.84 18+00.00
5.	SD2	STORM DRAIN AND PROFILE - STA. 18+00.00 TO 25+00.00
6.	SD3	STORM DRAIN AND PROFILE - STA. 25+00.00 TO 34+00.00
7.	SD4	STORM DRAIN AND PROFILE - STA. 34+00.00 TO 43+95.72
8.	SD5	STREET PLAN AND PROFILE - LATERALS # 1 THRU # 4
9.	SD6	STREET PLAN AND PROFILE - LATERALS # 5 THRU # 8
10.	SD7	STREET PLAN AND PROFILE - LATERALS # 9 THRU # 12
11.	SD8	STREET PLAN AND PROFILE - LATERALS # 13 THRU # 16
12.	DT1	DETAIL SHEET

PROJECT VICINITY
SEE KEY MAP



VICINITY MAP

SID PROJECT #607
SID SUBPROJECT #3.9

Call before you Underground
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
AND
1-702-229-6611
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

Avoid cutting underground utility lines it's costly
Call before you Dig
1-800-227-2600

Avoid overhead power line contact it's costly
Call before you Overhead
1-702-227-2929

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°08'18" EAST BEING THE EAST LINE OF THE NORTHWEST QUARTER (NE 1/4)' OF THE SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY ON FILE IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 123 AT PAGE 32.

PROJECT BENCHMARK

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CLARK COUNTY VERTICAL CONTROL: 1000-6N6
NAVD88 ELEVATION: 787.794 METERS (2584.62 FEET)

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE CYLINDER, LOCATED 25' SOUTH & 50' EAST OF GRAND CANYON DRIVE AND RED COACH AVENUE, 1' WEST OF ELECTRICAL VAULT.

CITY OF LAS VEGAS BENCHMARK

DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CITY OF LAS VEGAS BENCHMARK: BLV99:13SES
NAVD88 ELEVATION: 869.606 METERS (2853.03 FEET)

RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER OF HUALAPAI AND ELKHORN

NOTE: ADD 0.34' TO ABOVE CITY OF LAS VEGAS BENCHMARK BLV99:13SES TO MATCH ORIGINAL PROJECT BENCHMARK, CLARK COUNTY BENCHMARK 1000-6N6 (2584.62 FEET) AS SHOWN ON RECORD OF SURVEY FILE 124 PAGE 94.

80208

APPROVALS

CHARLES KAJKOWSKI,JR. PE#4784 — 5/5/2005
CITY ENGINEER — DATE

APPROVAL OF THESE PLANS IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHT-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY LISTED UNDER DEVIATIONS FROM STANDARD. 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.

N/A (FIRE PROTECTION) PROVIDED WITH HUALAPAI WAY IMP.)
CITY FIRE MARSHAL — DATE

N/A
LAS VEGAS VALLEY WATER DISTRICT — DATE

4/19/05
NEVADA POWER COMPANY — DATE

NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY 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 COMMISION'S RULES AND REGULATIONS.

HEIDI AQUINO 04.19.05
SOUTHWEST GAS CORPORATION — DATE

10/5/2005
SPRINT COACH T. WHITTEMAN — DATE

"THE AFFIXED SPRINT NEVADA 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."

04.25.05
M. MARGO WHEELER, AICP — DATE
DIRECTOR OF PLANNING AND DEVELOPMENT
CITY OF LAS VEGAS
THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT

~~PRE-DEVELOPMENT MEETING WITH DEPARTMENT OF DEVELOPMENT SERVICES, CIVIL ENGINEERING DIVISION, OFF-SITE INSPECTOR REQUIRED. CONTACT CIVIL ENGINEERING INSPECTOR AT 455-7610~~

CLIFF'S EDGE LLC.
3455 CLIFF SHADOWS PARKWAY, SUITE 290
LAS VEGAS, NEVADA 89129
(702) 777-1221

CITY OF LAS VEGAS, NEVADA

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7500 FAX (702) 362-2697
vtn nevada CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

NO	DATE	BY	REVISION
1			
2			
3			
4			
5			
6			
7			

COVER SHEET
CLIFFS EDGE / PROVIDENCE

HUALAPAI WAY
STORM DRAIN IMPROVEMENTS
BELT WAY TO ELKHORN

DRAWN BY: RSM — MAR. '04
DESIGNED BY: B.FISK / N. HALL — MAR.'04
CHECKED BY: L.M. — MAR. '04
PROJECT NO: 2959
SCALE: HORIZ. NA, VERT. NA

EXPIRES 06-30-05
PROFESSIONAL ENGINEER STATE OF NEVADA
DANIEL J. HOOB
CIVIL
No. 12811
5-4-05

SHEET
C1
1 OF 12 SHEETS

DRAWING NO.
1074816-HST

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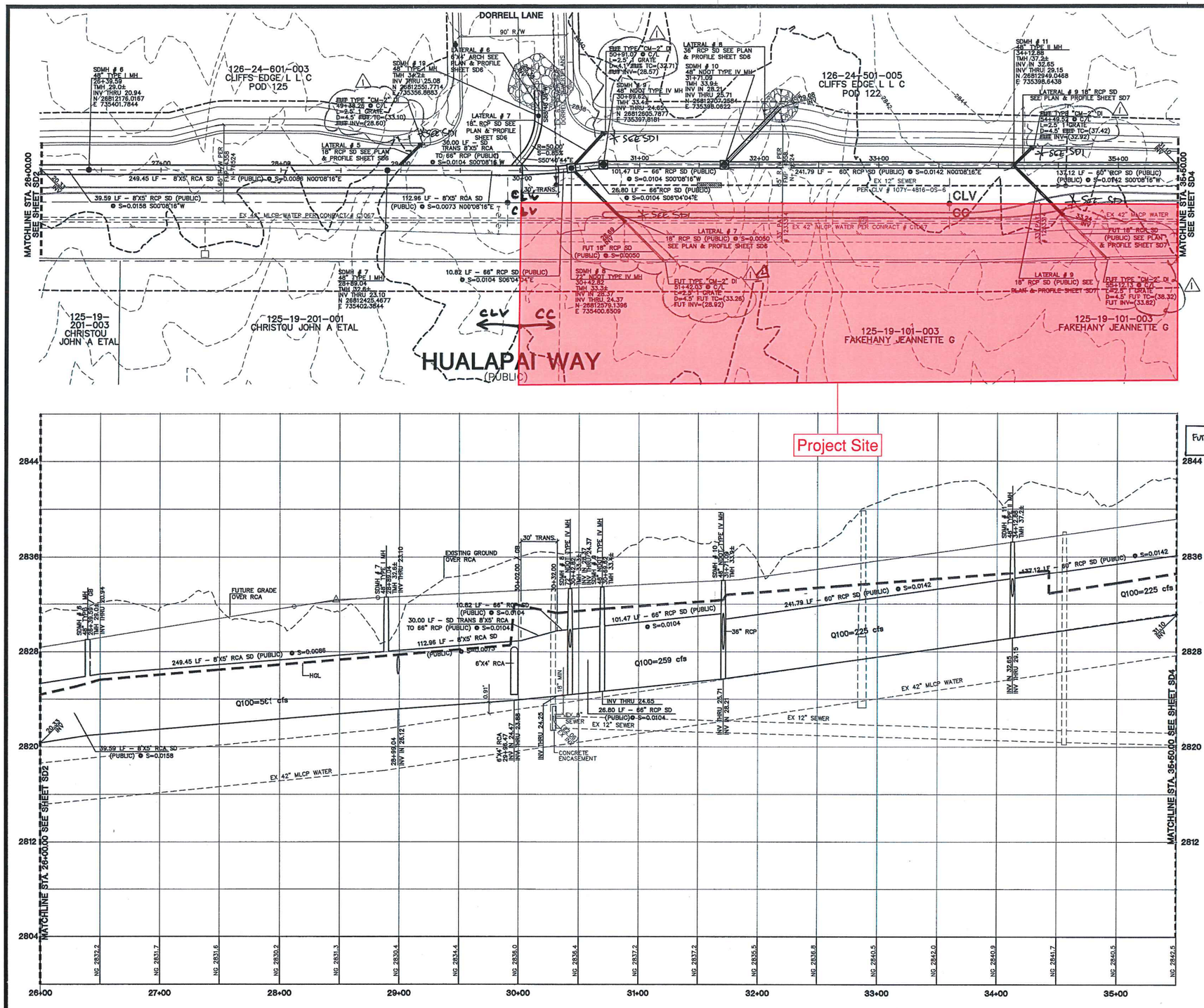

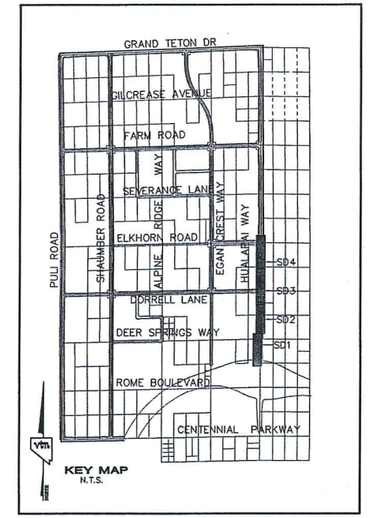

FUTURE HUALAPAI WAY ROAD PLANS PER HTE # 05.19169

NORTH

GRAPHIC SCALE
40 0 20 40 80
1" = 40'

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

NOTE :

STRUCTURAL CALCULATIONS FOR ALL NON-STANDARD DRAINAGE FACILITIES, SUCH AS JUNCTION BOXES AND OVERFLOW STRUCTURES, WILL BE PROVIDED WITH THE STRUCTURAL CALCULATIONS FOR THE RCA STORM DRAINS.

Avoid hitting underground traffic signal systems and street light system conduits it's costly
Call before you Dig Underground
1-702-455-7511
CLARK COUNTY TRAFFIC OPERATIONS
AND
1-702-229-6611
LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

Avoid cutting underground utility lines it's costly.
Call before you Dig
1-800-227-2600

Avoid overhead power line contact. It's costly.
Call before you Overhead
1-702-227-2929

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°08'16" EAST BEING THE EAST LINE OF THE NORTHWEST QUARTER (NE 1/4)' OF THE SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY ON FILE IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 123 AT PAGE 32.

PROJECT BENCHMARK

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CLARK COUNTY VERTICAL CONTROL: 1C00-6N8
NAVD88 ELEVATION: 787.794 METERS (2584.62 FEET)

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE CYLINDER, LOCATED 25' SOUTH & 50' EAST OF GRAND CANYON DRIVE AND RED COACH AVENUE, 1' WEST OF ELECTRICAL VAULT.

CITY OF LAS VEGAS BENCHMARK

DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CITY OF LAS VEGAS BENCHMARK: BLV99:133ES
NAVD88 ELEVATION: 869.606 METERS (2853.03 FEET)

RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER OF HUALAPAI AND ELKHORN

NOTE: ADD 0.34' TO ABOVE CITY OF LAS VEGAS BENCHMARK BLV99:133ES TO MATCH ORIGINAL PROJECT BENCHMARK, CLARK COUNTY BENCHMARK 1C00-6N6 (2584.62 FEET) AS SHOWN ON RECORD OF SURVEY FILE 124 PAGE 94.

"I CERTIFY THAT THIS PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY (#DS3576) ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT."

DANIEL J. HOOD NO. 12811 — DATE 5-2-24

HTE-05-8074

NOTE: REPLACE ALL TRAFFIC CONTROL DEVICES (SIGNS OR PAVEMENT MARKINGS), UNDER CLARK COUNTY'S JURISDICTION, THAT ARE DISTURBED, DESTROYED, MOVED OR MODIFIED BY TRENCHING ACTIVITY TO CLARK COUNTY'S SATISFACTION. ALL MATERIAL USED SHALL MEET CLARK COUNTY'S SPECIFICATIONS OR WILL BE AN APPROVED EQUIVALENT.

80213 ℄ 82761 ℄ 83835

REV	DATE	BY	REVISION
1	6-25-06	KFF	ADD P.I. TO PRESENT CONSTRUCTION
2	10-23-06	LAH	REMOVE CAVEALLS TO CLARK COUNTY
3			
4			
5			
6			
7			

H:\0999\HUALAPAI\SD\0999HUAL-SD01.DWG 10:41:38 PM, mlee, 10/30/2006

CLIFFS EDGE LLC
3455 CLIFF SHADOWS PARKWAY, SUITE 280
LAS VEGAS, NEVADA 89129
(702) 777-1221

CITY OF LAS VEGAS, NEVADA

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7550 FAX (702) 362-2597
nevada CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

STORM DRAIN PLAN & PROFILE
HUALAPAI WAY STORM DRAIN
STA. 26+00.00 TO 34+00.00

CLIFFS EDGE / PROVIDENCE
HUALAPAI WAY STORM DRAIN
BELT WAY TO ELKHORN

DRAWN BY: RDM — MAR. '04
DESIGNED BY: N. HALL — MAR. '04
CHECKED BY: L.M. — MAR. '04
PROJECT NO: 5969 — SCALE: 1"=40' HORIZ. 1"=4' VERT.

EXPIRES 06-30-05
PROFESSIONAL ENGINEER STATE OF NEVADA
No. 12811
DANIEL J. HOOD
CIVIL
5-2-24

SHEET
SD3
6 OF 12 SHEETS

DRAWING NO.
10TY4816-HSD

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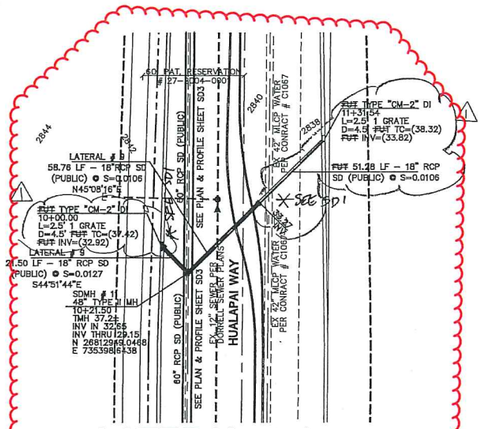
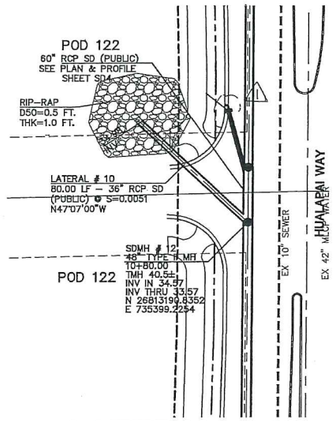


LATERAL # 9
(SD 3)



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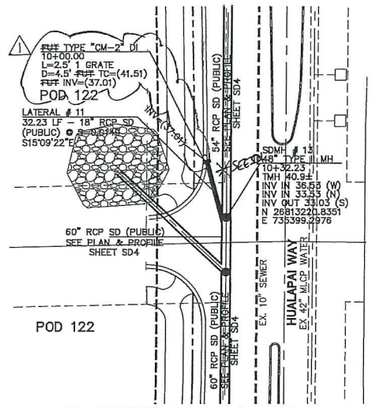

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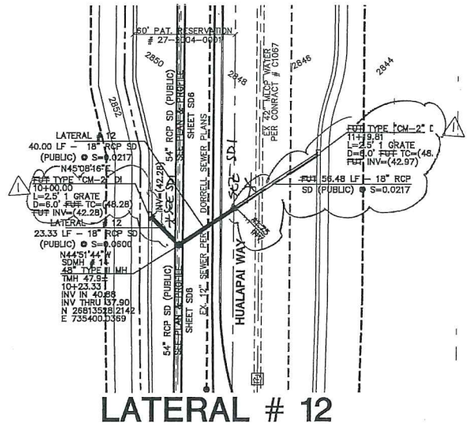
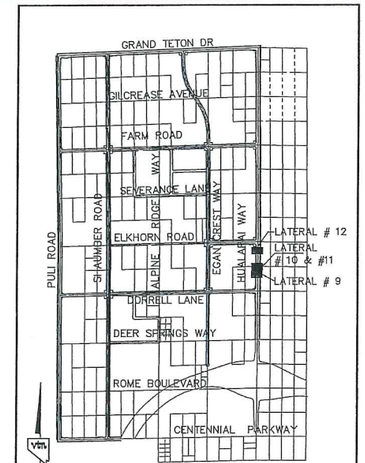
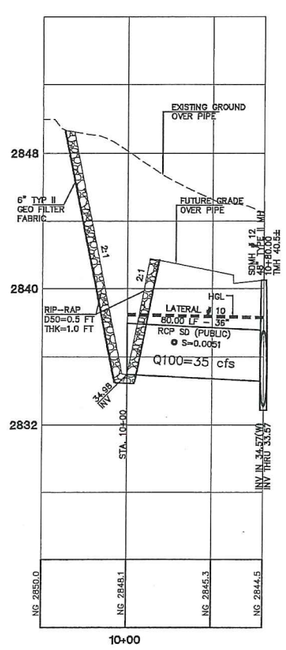
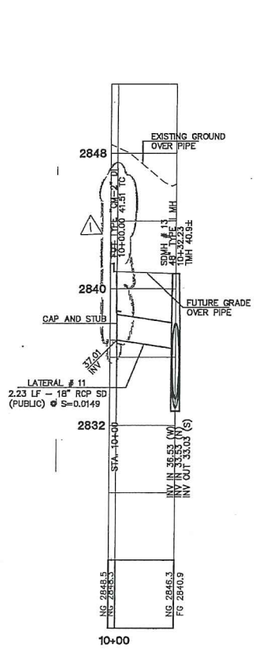
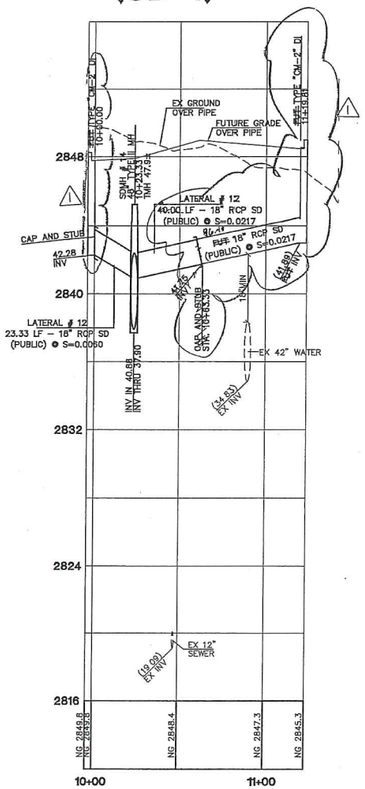


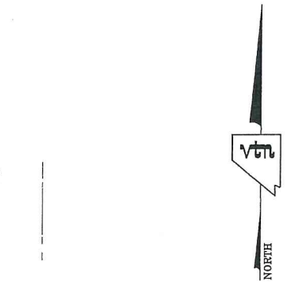
LATERAL # 12
(SD 4)





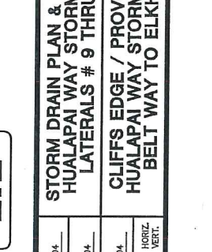












Lateral adjacent to the project site

80217 sf 82765

CONTRACTOR NOTE:

CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

NOTE :

STRUCTURAL CALCULATIONS FOR ALL NON-STANDARD DRAINAGE FACILITIES, SUCH AS JUNCTION BOXES AND OVERFLOW STRUCTURES, WILL BE PROVIDED WITH THE STRUCTURAL CALCULATIONS FOR THE RCA STORM DRAINS.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°08'16" EAST BEING THE EAST LINE OF THE NORTHWEST QUARTER (NE 1/4) OF THE SECTION 24, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON A RECORD OF SURVEY ON FILE IN THE CLARK COUNTY, NEVADA, RECORDER'S OFFICE IN FILE 123 AT PAGE 32.

PROJECT BENCHMARK

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CLARK COUNTY VERTICAL CONTROL: 1C00:6N6
NAVD88 ELEVATION: 787.794 METERS (2584.62 FEET)

RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE CYLINDER, LOCATED 25' SOUTH & 50' EAST OF GRAND CANYON DRIVE AND RED COACH AVENUE, 1' WEST OF ELECTRICAL VAULT.

CITY OF LAS VEGAS BENCHMARK

DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

CITY OF LAS VEGAS BENCHMARK: BLV99:13SES
NAVD88 ELEVATION: 869.606 METERS (2853.03 FEET)

RIVET AND PLATE IN CONCRETE CYLINDER NW CORNER OF HUALAPAI AND ELKHORN

NOTE: ADD 0.34' TO ABOVE CITY OF LAS VEGAS BENCHMARK BLV99:13SES TO MATCH ORIGINAL PROJECT BENCHMARK, CLARK COUNTY BENCHMARK 1C00-6N6 (2584.62 FEET) AS SHOWN ON RECORD OF SURVEY FILE 124 PAGE 94.

"I CERTIFY THAT THIS PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY (#DS3576) ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT."

DANIEL J. HOOD NO. 12811 DATE

REV	DATE	BY	REVISION
1	8-22-05	KFF	ADD D'S & LATERALS FOR FREIGHT CAR'S JUNCTION BOX & LAC
2			
3			
4			
5			
6			
7			

CLIFFS EDGE LLC
3455 CLIFF SHADOWS PARKWAY, SUITE 230
LAS VEGAS, NEVADA 89129
(702) 777-7221

CITY OF LAS VEGAS, NEVADA

vtn nevada
2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7550 FAX (702) 362-2597
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

STORM DRAIN PLAN & PROFILE
HUALAPAI WAY STORM DRAIN
LATERALS # 9 THRU # 12

CLIFFS EDGE / PROVIDENCE
HUALAPAI WAY STORM DRAIN
BELT WAY TO ELKHORN

DRAWN BY: DMB — MAR. '04
DESIGNED BY: N. HALL — MAR. '04
CHECKED BY: LM — MAR. '04
PROJECT NO: 5969
SCALE: 1"=40' HORIZ. 1"=4' VERT.

EXPIRES 06-30-05
PROFESSIONAL ENGINEER STATE OF NEVADA DANIEL J. HOOD CIVIL No. 12811

SHEET
SD7
10 OF 12 SHEETS
DRAWING NO.
5969-HUALAPAI-SD7

5969\HUALAPAI\SD\5969HUAL-SD07.DWG

APPENDIX I

Reference Material

Rancho Road System Storm Drain - Elkhorn

Referenced Improvement Plans

DEPARTMENT OF PUBLIC WORKS

Mayor:
CAROLYN G. GOODMAN

City Council:
STEVEN D. ROSS (Mayor Pro-Tem)
LOIS TARKANIAN
RICKI Y. BARLOW
STAVROS S. ANTHONY
BOB COFFIN
BOB BEERS

City Manager:
SCOTT ADAMS

Director of Public Works:
DAVID N. BOWERS, P.E., P.T.O.E.

City Engineer:
ALLEN E. PAVELKA, P.E.

Funded By:
CLARK COUNTY REGIONAL
FLOOD CONTROL DISTRICT

RANCHO ROAD SYSTEM
STORM DRAIN - ELKHORN

30% DESIGN SUBMITTAL
(NOT FOR CONSTRUCTION)

Reviewed By:

CLV CITY ENGINEER DATE

CLV PROJECT MANAGER DATE

CLV CITY TRAFFIC ENGINEER DATE

CLV CONSTRUCTION MANAGER DATE

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT DATE

REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA DATE

SOUTHWEST GAS CORPORATION DATE

CENTRAL TELEPHONE COMPANY d/b/a CENTURYLINK DATE

THE AFFIXED CENTURYLINK NEVADA 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 STANDARD REGULATIONS.

COX COMMUNICATIONS LAS VEGAS, INC. DATE

NV ENERGY – DISTRIBUTION 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.

NV ENERGY - TRANSMISSION DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: PROJECT# XXXX
SHEETS: CV, GN, ...

THE SIGNATURE ABOVE ACKNOWLEDGES THAT THE UTILITY COMPANY REPRESENTATIVE HAS REVIEWED THE PLANS, AND THAT TO THE BEST OF HIS OR HER KNOWLEDGE THE UTILITY LINES ARE SHOWN IN THE CORRECT LOCATIONS AND ARE THE CORRECT SIZES. WHILE SUCH DATA HAS BEEN COLLECTED WITH REASONABLE CARE, THERE IS NO EXPRESSED OR IMPLIED GUARANTEE THAT THE LOCATIONS ARE EXACT. THE CONTRACTOR SHALL BEAR THE RESPONSIBILITY OF OBTAINING THE ACTUAL FIELD LOCATIONS.

THE SIGNATURE ABOVE FURTHER ACKNOWLEDGES THAT THE UTILITY COMPANY DOES NOT ANTICIPATE CONSTRUCTION OR MAINTENANCE IN THE PROJECT AREA FOR FIVE (5) YEARS IN CONFORMANCE WITH THE CLV NO-CUT POLICY.

NO.	DATE	SHEET	REVISIONS

PREPARED BY Stantec 3011 W. CHARLESTON BLVD. SUITE 100 LAS VEGAS, NV 89102

PREPARED FOR CITY OF LAS VEGAS

BID# XX.XXXXX	
DESIGNED BY: RVV	
DRAWN BY: ED	
CHECKED BY: XXX	
H# 170149	
DATE: JULY 2017	
SUBMITTAL STAGE: 30% - PRELIMINARY	

TITLE: RANCHO ROAD SYSTEM STORM DRAIN - ELKHORN

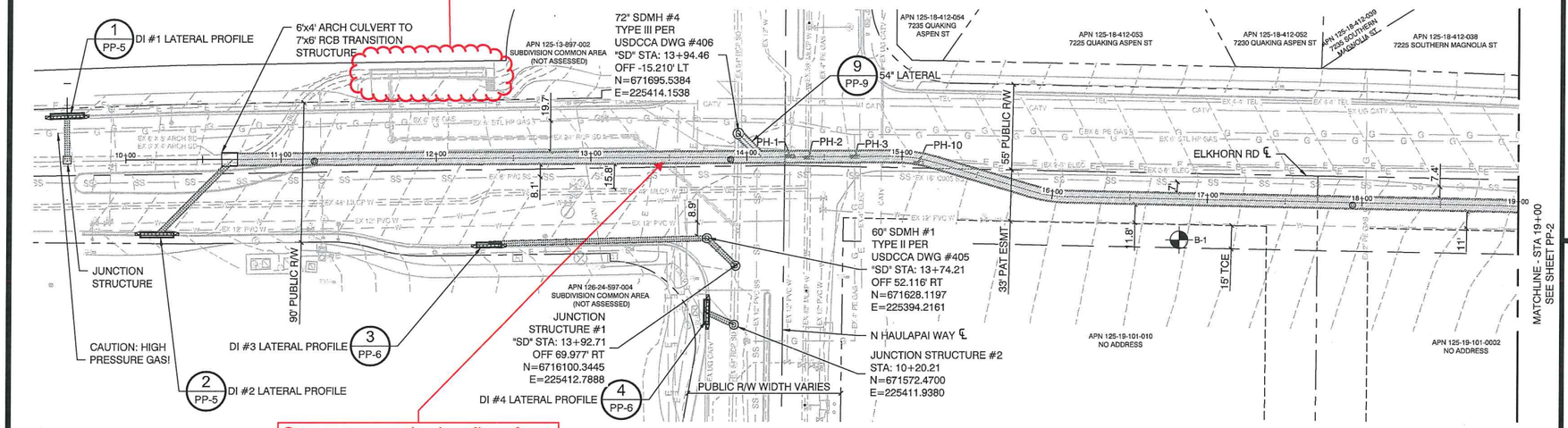
SHEET: GENERAL COVER SHEET

NOT FOR CONSTRUCTION

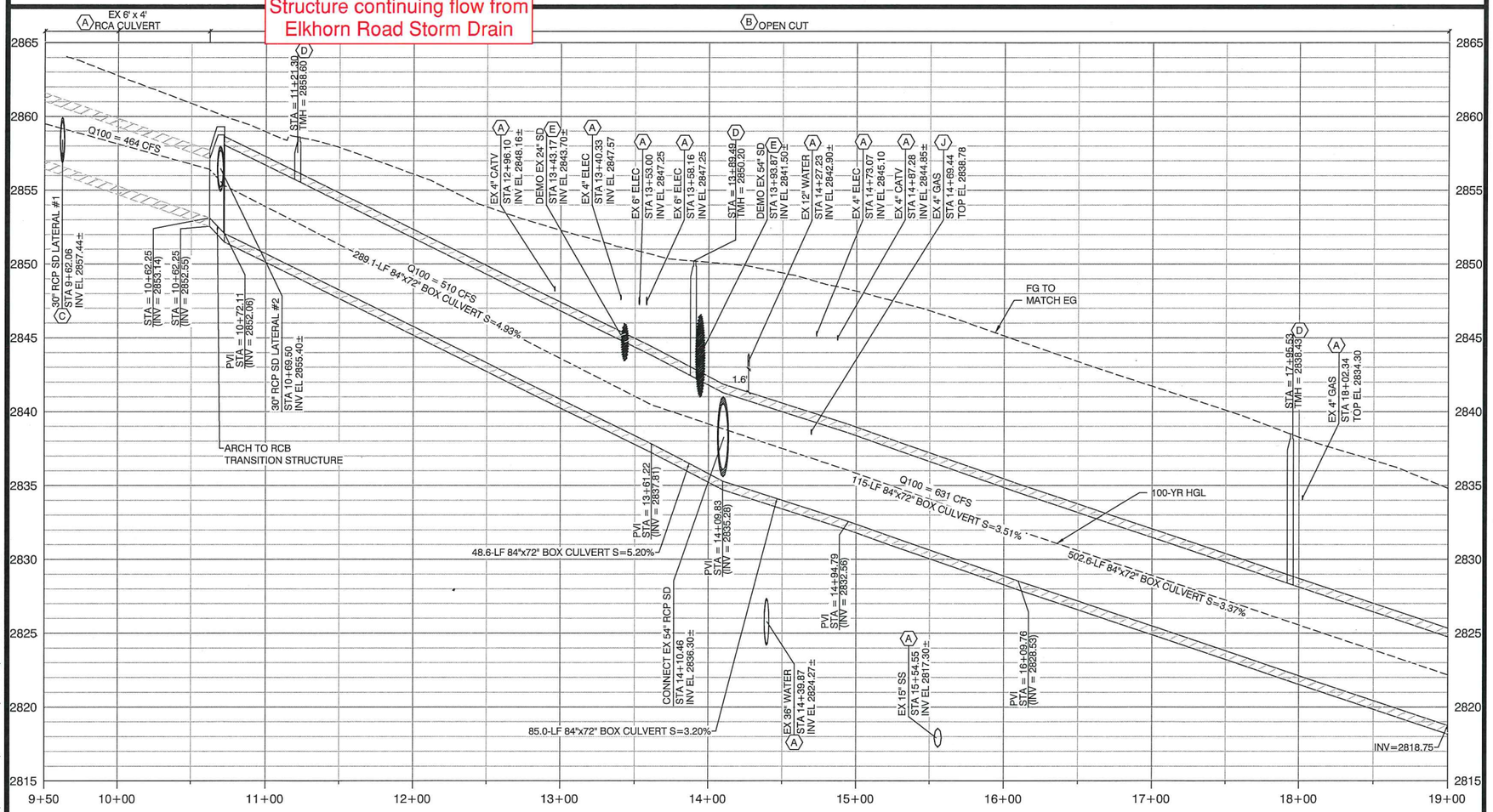
SHEET CV
1 OF 22
DRAWING NO. XXX-XXXX

C:\PWWORKDIR\D032428\JH170149-CV.DWG
7/5/17

Structure that currently bubbles out flow from Elkhorn Storm Drain



Structure continuing flow from Elkhorn Road Storm Drain



NORTH

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

CALL BEFORE CONSTRUCTION

BEFORE YOU DIG	USA NORTH	811 OR 800-227-2600
BEFORE YOU UNDERGROUND	F.A.S.T.	702-432-5300
	CLARK COUNTY TRAFFIC OPERATIONS	702-455-7511
	CITY OF LAS VEGAS T.E.F.O.	702-229-6611
BEFORE YOU OVERHEAD	NV ENERGY	702-227-2929

GENERAL NOTES

1. REFER TO SHEET GN-2 FOR OVERALL SHEET INDEX LIST.
2. ALL UTILITIES DEPICTED THROUGHOUT DRAWINGS ARE APPROXIMATE ONLY AND ALL UTILITIES MAY NOT BE SHOWN. CONTRACTOR MUST FIELD VERIFY AND PERFORM POTHOLES PRIOR TO CONSTRUCTION.
3. ALL EXISTING UTILITIES SHALL BE PROTECTED IN PLACE UNLESS SHOWN OTHERWISE.
4. REFER TO USDCCA DWG # 501.1 FOR TYPICAL UNDERGROUND UTILITY LOCATIONS, IF RESIDENTIAL SERVICE LATERALS ARE NOT SHOWN.
5. REPLACE ALL TRAFFIC CONTROL DEVICES (SIGNALS, LOOPS, CONDUITS, SIGNS, AND PAVEMENT MARKINGS), UNDER CITY OF LAS VEGAS AND NDOT JURISDICTION THAT ARE DISTURBED DURING CONSTRUCTION.
6. REFER TO RD SHEETS FOR LIMITS OF SAWCUT PAVEMENT REPLACEMENT.
7. RESTORE EXISTING GRADES TO ORIGINAL CONDITIONS.
8. SEE ADDITIONAL LVVWD PROJECT SPECIFIC NOTES ON SHEET GN-1.
9. CONTACT NV ENERGY BEFORE EXCAVATING NEAR POWER POLES FOR TEMPORARY POLE SUPPORT.

CONSTRUCTION KEY NOTES

A. PROTECT IN PLACE.
B. INSTALL RCB STORM DRAIN PER TRENCH DETAIL C-901 / SHEET DT-1.
C. CONNECT TO EXISTING STORM DRAIN WITH JUNCTION BOX.
D. INSTALL 48" DIAMETER RISER TYPE MANHOLE ON RCB MAIN STORM DRAIN PER DETAIL C-905 / SHEET DT-2.
E. DEMOLISH AND REMOVE EX SD LINE, REFER TO DEMOLITION AND REMOVAL (DR) SHEETS FOR LIMITS.
J. CONTRACTOR SHALL COORDINATE WITH DRY UTILITY COMPANIES TO ADJUST EXISTING UTILITY LINE AROUND IMPROVEMENTS.

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

APPROVED FOR CONSTRUCTION
SOUTHWEST GAS CORPORATION
DATE:

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
DATE: PROJECT# XXXXX

NO.	DATE	REVISIONS

PREPARED BY Stantec
3010 W. CHARLESTON BLVD. SUITE 100 LAS VEGAS, NV 89102

PREPARED FOR CITY OF LAS VEGAS
H# 170149 BID# XX.XXXXX
DATE: JULY 2017 DESIGNED BY: RVV
SUBMITTAL STAGE: 30% - PRELIMINARY DRAWN BY: ED CHECKED BY: XXX

TITLE
RANCHO ROAD SYSTEM STORM DRAIN - ELKHORN

SHEET
STORM DRAIN PLAN AND PROFILE STA 9+50 TO 19+00

NOT FOR CONSTRUCTION

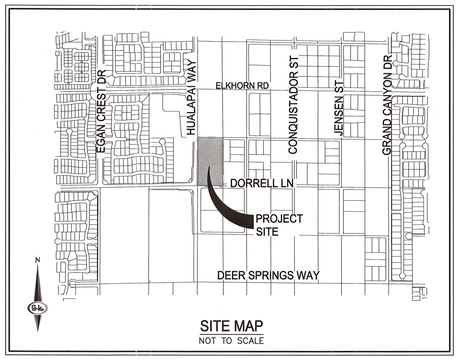
SHEET
PP-1
9 OF 22
DRAWING NO.
XXX-XXXX

C:\PW\WORK\DIR\D0324248\JH170149-PP-01-PP-09.DWG
7/6/17

APPENDIX J

CD of Electronic Files & Improvement Plans





RICHMOND AMERICAN HOMES

IMPROVEMENT PLANS FOR AGAVE MOON

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
APN: 125-19-101-003

SHEET LIST TABLE		
SHEET	NO.	TITLE
1	1	COVER SHEET
2	2	GENERAL NOTES
3	3	QUANTITIES AND ABBREVIATIONS
4	4	GRADING PLAN I
5	5	GRADING PLAN II
6	6	DETAIL SHEET
7	7	DETAIL SHEET II
8	8	PLAN AND PROFILE – SD LATERAL

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 FORM 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 DATE

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 STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT No.: _____ FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
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

VFR SOUTHWEST DESERT EQUITIES
8215 S. EASTERN AVE. SUITE 205
LAS VEGAS, NV 89123

DEVELOPER

RICHMOND AMERICAN HOMES
7770 DEAN MARTIN DR #308
LAS VEGAS, NV 89139
PH: 702-617-8464
FX: 702-617-8499
CONTACT: BRIAN WALSH

ENGINEER

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET, SUITE 216
LAS VEGAS, NV 89118
PH: (702) 284-5300
FX: (702) 284-5399
CONTACT: KEVIN M. BROSS

LEGAL DESCRIPTION

GOVERNMENT LOT 9, LYING WITHIN THE NORTHWEST QUARTER (NW1/4) OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 19, TOWNSHIP 19, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.

BASIS OF BEARINGS

NORTH 00°08'16" EAST, BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 123, PAGE 32 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

BENCHMARK NUMBER: 6LV9019NWW6

RIVET AND PLATE IN A LVVWD CONCRETE PAD AT THE NORTHEAST CORNER OF DORRELL LANE & HUALAPAI WAY.

ELEVATION = 2834.10 FEET, 863.834 METERS
N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARKS – 2008 ADJUSTMENT (UPDATED 05/24/2010)

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745E & 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PROJECT INFORMATION

ACREAGE (GROSS):	= 5.31 AC
ACREAGE (NET):	= 4.16 AC
DENSITY (LOTS/NET ACRE):	= 4.09 DU/NET AC
ZONING:	= R-E
TOTAL NO. OF RESIDENTIAL LOTS	= 17
TOTAL NO. OF COMMON ELEMENTS	= 3
MINIMUM LOT SIZE	= 7,288 SF±
MAXIMUM LOT SIZE	= 12,927 SF±
PROVIDED OPEN SPACE	= 5,234 SF±

EARTHWORK SUMMARY (UNADJUSTED)

CUT	13,574 CY.
FILL	6,970 CY.
NET	6,604 CY.

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/SWPC/STORMOI.HTM PROJECTS THAT DISTURB MORE THEN 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.

GEOTECHNICAL ENGINEER

PREPARED BY: ANGLE ENGINEERING
ADDRESS: 5995 SOUTH EDMUND ST.
PHONE: 702-382-6453
PROJECT No. 26202-1
DATED: JUNE 7, 2017

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

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

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

RICHMOND AMERICAN HOMES

AGAVE MOON

COVER SHEET

S19 T19S R60E

DATE: 12/21/17
DRAFTER: SS
DESIGNER: SS
CHECKED: KMB

PROJECT NO.
RAH1701

PROFESSIONAL ENGINEER – STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2018
CIVIL
No. 24572
12/21/17

C-1
SHEET 1 OF 8

J:\rah1701 connor hills 3\dwg\improv\rah1701 cvr.dwg 12/21/2017 3:41 PM Sandy Solares

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 WAYS 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 NVR10000Q, 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 NVR10000Q, 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 II 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 01/09/2017)

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 GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
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 PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES. LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (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.

    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.

15 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 USED.

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 ANGLE ENGINEERING, PROJECT NO. 26202-1, DATED JUNE 7, 2017.
6. EARTHWORK QUANTITIES (RAW):
   -CUT = 13,574 CUBIC YARDS.
   -FILL = 6,970 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 DISTRICT'S – **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 CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK [IFC 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 IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC 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. [IFC 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 LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC 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. [IFC 507.2.1, NFPA 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. [IFC 507]
9. PRIVATE HYDRANTS SHALL BE PANTED RED. [IFC 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. [IFC 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC C102]
    - RESIDENTIAL- 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    - COMMERCIAL- 300 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. [IFC C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER 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. [IFC C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC 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. [IFC C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC 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. [IFC 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. [IFC 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC 503.2.7, 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FT 6 INS. [IFC 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 FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC 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. [IFC 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) 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. [IFC 503.1.2]
26. ALL DEAD-END FIRE APPARATUS 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. [IFC 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 ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS 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. [IFC 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 IFC 503.6 AND IFC 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: 1 (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 CODES 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 INTERFERENCE'S 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.
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 (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS 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 TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY ANGLE ENGINEERING, REPORT #26202-1, JUNE 7, 2017 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF 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. 625.380 & 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 APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.

WALL NOTES:

16. 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 AND 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 F

ABBREVIATIONS

AC	ASPHALTIC CONCRETE OR ACRE
AGG	AGGREGATE BASE
APN	ASSESSORS PARCEL NUMBER
APPROX OR ~	APPROXIMATE
AVE	AVENUE
@	AT
BC	BEGIN CURVE OR BACK OF CURB
BCR	BEGINNING OF CURB RETURN
BHW	BOTTOM OF HEADWALL
BLDG	BUILDING
BLVD	BOULEVARD
BM	BENCHMARK
BVC	BEGIN VERTICAL CURVE
BWV	BACK WATER VALVE
CC	CLARK COUNTY
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS
CCPW	CLARK COUNTY PUBLIC WORKS
CCRFCD	CLARK COUNTY REGIONAL FLOOD DISTRICT
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CE	COMMON ELEMENT
CL/C/L,C	CENTERLINE
CLR	CLEAR OR CLEARANCE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CLV	CITY OF LAS VEGAS
CML&C	CEMENT MORTAR LINED AND COATED
CMU	CONCRETE MASONRY UNIT
CNLV	CITY OF NORTH LAS VEGAS
COH	CITY OF HENDERSON
CONC	CONCRETE
CT	COURT
CY OR CU YD	CUBIC YARD
DCWCS	DESIGN AND CONSTRUCTION FOR WASTEWATER COLLECTION SYSTEMS
DET	DETAIL
DI	DUCTILE IRON OR DRAIN INLET
DIA, ø	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE
DWG(S)	DRAWING
DWY	DRIVEWAY
EA	EACH
ECR	END CURB RETURN
EG	EXISTING GROUND
EL	ELEVATION
ESMT	EASEMENT
EP	EDGE OF PAVEMENT
ERU	EQUIVALENT RESIDENTIAL UNIT
EVC	END VERTICAL CURVE
EX OR EXIST	EXISTING
FC	FACE OF CURB
FF	FINISHED FLOOR
FG	FINISHED GRADE
FGH	FINISHED GRADE, HIGH SIDE
FGL	FINISHED GRADE, LOW SIDE
FH	FIRE HYDRANT
FL	FLOWLINE
FT	FEET OR FOOT
FUT	FUTURE
GRD	GRADE OR GROUND
GB	GRADE BREAK OR GRADE CHANGE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HOA	HOME OWNERS ASSOCIATION
HORZ	HORIZONTAL
HP	HIGH POINT
HWL	HIGH WATER LEVEL
HDWL OR HW	HEADWALL
HYD	HYDRAULIC OR HYDRANT
ID	INSIDE DIAMETER
IN	INCH
INT	INTERSECTION
INV	INVERT ELEVATION
IP	IRON PIPE
IRRG	IRRIGATION
LF	LINEAR FEET
LP	LOW POINT
LT OR L	LEFT
LVWD	LAS VEGAS VALLEY WATER DISTRICT
LWL	LOW WATER LEVEL
MAX	MAXIMUM
MECH	MECHANICAL
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MUE	MUNICIPAL UTILITY EASEMENT
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NPC	NEVADA POWER COMPANY
NTS	NOT TO SCALE
NUE	NONEXCLUSIVE UTILITY EASEMENT
OC	ON CENTER
OD	OUTSIDE DIAMETER OR OVERALL DIMENSION
OFF	OFFSET
ORIG	ORIGINAL
PAE	PUBLIC OR PEDESTRIAN ACCESS EASEMENT
PB	PULL BOX
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PDE	PUBLIC DRAINAGE EASEMENT
℄ OR PL	PROPERTY LINE
POB	POINT OF BEGINNING
POC	POINT OF CURVATURE
POE	POINT OF ENDING
PRC	POINT OF REVERSE CURVATURE
PRELIM	PRELIMINARY
PROP	PROPOSED
PRV	PRESSURE REDUCING VALVE
PUE	PUBLIC UTILITY EASEMENT
PT	POINT OF TANGENT OR POINT
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
QTY	QUANTITY
R	RADIUS
RCA	REINFORCED CONCRETE ARCH
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY ESMT	ROADWAY EASEMENT
REQD	REQUIRED
REV	REVISION
RG	ROUGH GRADE
RT OR R	RIGHT
R/W, ROW	RIGHT OF WAY
SCH	SCHEDULE
SD	STORM DRAIN
SDDI	STORM DRAIN DROP INLET
SDMH	STORM DRAIN MANHOLE
SEC	SECTION
SF	SQUARE FEET
SHT	SHEET
SNWA	SOUTHERN NEVADA WATER AUTHORITY
SPECS	SPECIFICATIONS
ST	STREET
SSMH	SANITARY SEWER MANHOLE
STA	STATION
STD	STANDARD
STL	STEEL OR STREET LIGHT
SW	SIDEWALK
SWG	SOUTHWEST GAS
SWR OR SS	SANITARY SEWER
SY	SQUARE YARD
TAN	TANGENT
TC	TOP OF CURB
TF	TOP OF FLOOR OR TOP OF FOOTING
TG	TOP OF GRATE
THRU	THROUGH
THW	TOP OF HEADWALL
TP	TOP OF PIPE
TW	TOP OF WALL
TRW	TOP OF RETAINING WALL
TSW	TOP OF SCREEN WALL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
VC	VERTICAL CURVE
VERT	VERTICAL
WC	VALLEY GUTTER
	WROUGHT IRON
WL	WATER LINE
WPZ	WATER PRESSURE ZONE
WT	WEIGHT
WTR	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
(1900)	1900	5' CONTOUR
		1' CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
EX 8" PVC SS	8" PVC SS	SANITARY SEWER PIPE AND FLOW ARROW
EX 8" PVC WTR	8" PVC WTR	WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
PAD= XXX.X FF = XXX.X	PAD= XXX.X FF = XXX.X	PAD ELEVATION FINISHED FLOOR ELEVATION
(00.00) TC	(00.00) TC	ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE

	EXISTING GAS GATE VALVE
@MH	EXISTING UNKNOWN MANHOLE
GAS	EXISTING GAS, SIZE PER PLAN
	EXISTING POWER POLE
(XXX)	EXISTING TRAFFIC SIGNAL
	EXISTING WALL
	WATER PIPE FITTING
POC	WATER POINT OF CONNECTION
POC	SEWER POINT OF CONNECTION
	DAYLIGHT LINE
	STREET CENTERLINE
	RIGHT-OF-WAY
	MATCHLINE
	BOUNDARY LINE
	PHASE LINE
℄	PROPERTY LINE
	FLOWLINE
	SAWCUT
V FILL CUT V	CUT/FILL TRANSITION LINE
	SIDEWALK
	EX STRIPING TO BE OBLITERATED
	GRADE BREAK LINE
ID	REFLECTIVE RAISED PAVEMENT MARKERS
BWV	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

	PROPOSED SCARP AREA
	DRIVEWAY
	PROPOSED RIP RAP
	SIGHT VISIBILITY ZONE PER STD DWG NO. 201.2
	HANDICAP RAMP

QUANTITIES

			PRIVATE	PUBLIC
DRAINAGE				
1.	4.0' TYPE "C" DROP INLET	EA	–	2
2.	18" RCP CLASS III STORM DRAIN	LF	–	116
3.	RIP RAP D50=8" THICKESS=18" WITH FELTER FABRIC OVER 6" TYPE II	SF	–	3,970
4.	SIDEWALK UNDER DRAIN	EA	–	1
5.	8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	EA	–	–
6.		LF	–	–
7.		LF	–	–
8.		LF	–	–
9.		LF	–	–
10.		SF	–	–
11.		SF	–	–
12.		SF	–	–
13.				
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	–	–
		EA	–	
STREET IMPROVEMENTS				
1.	2" A.C. PAVEMENT W/ 4" TYPE II OVER 6" TYPE I AGGREGATE BASE	SY	–	–
2.	STANDARD 18" TYPE "L" ISLAND CURB & 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) #8 CONDUCTORS	LF	–	–
3.	NO. 3-1/2 PULL BOX W/METAL COVER	EA	–	–
4.	150 AMP SERVICE PEDESTAL (IRR)	EA	–	–
5.	200 AMP SERVICE PEDESTAL (STLT)	EA	–	–
6.				

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT No. _____ FIRST APPROVED DATE: _____







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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

RICHMOND AMERICAN HOMES

AGAVE MOON

QUANTITIES AND ABBREVIATIONS

S 19
T 19 S
R 60 E

DATE: 12/21/17

DRAFTER: SS

DESIGNER: SS

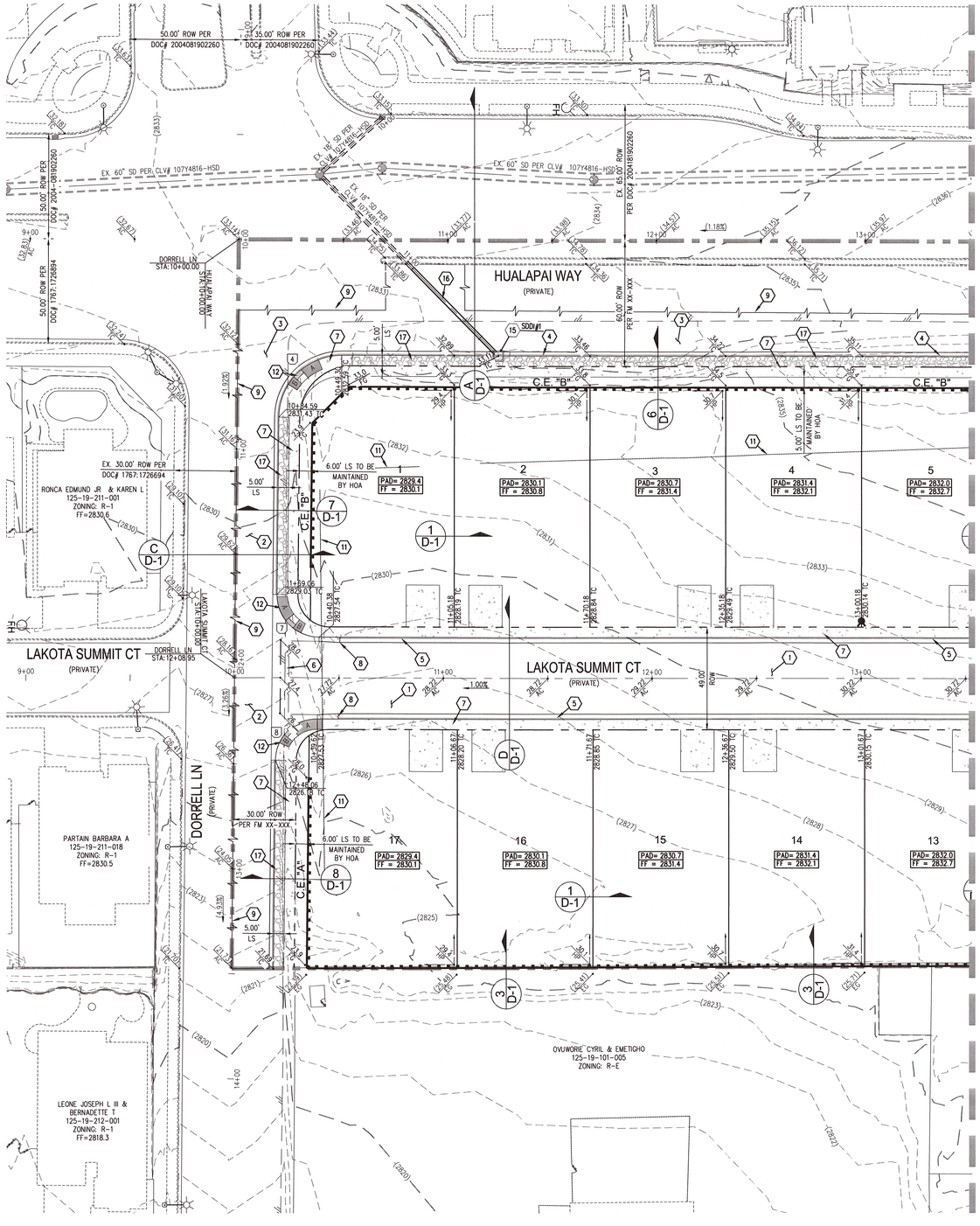
CHECKED: KMB

PROJECT NO.
RAH1701

PROFESSIONAL ENGINEER STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2018
CIVIL
No. 24572
12/21/17

C-3
SHEET 3 OF 8

J:\rah1701 connor hills 3\dwg\improv\rah1701 cvr.dwg 12/21/2017 3:37 PM Sandy Solores



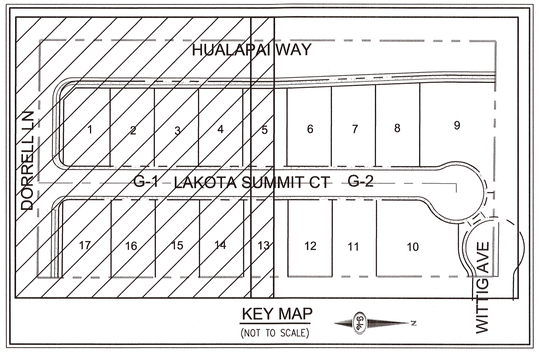


SURVEY NOTE

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

ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 1801.00)



GRADING CONSTRUCTION NOTES

1. CONSTRUCT 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 3" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
3. CONSTRUCT 5" ASPHALT PAVEMENT OVER 5.5" TYPE II AGGREGATE BASE
4. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. INSTALL 30" ROLL TYPE CURB AND GUTTER PER CCAUSD NO. 217.51
6. CONSTRUCT 6' CROSS GUTTER PER CCAUSD NO. 228
7. CONSTRUCT 5.0' WIDE SIDEWALK PER CCAUSD NO. 234
8. INSTALL 10' CURB TRANSITION FROM "L" CURB TO MODIFIED ROLL CURB PER DETAIL 11 ON SHEET D-1
9. SAWCUT AND MATCH EXISTING PAVEMENT PER CCAUSD NO. 500.3, 500.4, & 500.5
10. EXISTING FENCE TO BE REMOVED
11. INSTALL EMERGENCY ACCESS DRIVEWAY AND CURB TRANSITIONS PER CCAUSD NO. 224 WITH CRASH GATE
12. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1 & 235.1 AND DETAIL 12 ON SHEET D-1
13. INSTALL 6' WROUGHT IRON GATE PER DETAIL 13 SHEET D-1
14. INSTALL CMU BLOCK WALL OPENING PER DETAIL 14 ON SHEET D-1
15. INSTALL 4' TYPE 'C' STORM DRAIN DROP INLET PER CCAUSD #413 & 421
16. INSTALL 18" CLASS III RCP STORM DRAIN LATERAL
17. INSTALL RIP RAP D50=8" THICKNESS=18" WITH FELTER FABRIC OVER 6" TYPE II
18. INSTALL SIDEWALK UNDER DRAIN PER CCAUSD NO. 236

GRADING NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2012, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CLARK COUNTY BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LEGEND

- BOUNDARY LINE
- MATCHLINE
- ROADWAY CENTERLINE
- RIGHT-OF-WAY
- PROPERTY LINE
- CURB AND GUTTER
- EXISTING CURB AND GUTTER
- FLOWLINE
- EDGE OF PAVEMENT (EP)
- EXISTING EDGE OF PAVEMENT
- SAWCUT LINE PER CCAUSD NO. 503
- 00.00 TC / (00.00) TC — PROPOSED ELEVATION
- EXISTING ELEVATION
- [5.01%] — DESIGN SLOPE IN VERTICAL CURVE
- (2800) — EXISTING CONTOUR (5-FT)
- EXISTING CONTOUR (1-FT)
- FILL / CUT — CUT/FILL TRANSITION LINE
- FIRE HYDRANT ASSEMBLY
- SIGHT VISIBILITY ZONE
- TUBULAR STEEL FENCE
- RETAINING WALL
- DECORATIVE PERIMETER WALL
- DECORATIVE PERIMETER RETAINING WALL

SEE SHEET C-3 FOR ABBREVIATIONS AND QUANTITIES

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.

SIDEWALK RAMP TABLE

RAMP NUMBER	GRADE (%) "B" TO "A"	"A" (FT) MIN.	"B" (FT) MIN.
1	-6 TO -5.01	4.5	21.5
2	-5 TO -4.01	4.5	15.0
3	-4 TO -3.01	4.5	12.0
4	-3 TO -2.01	4.5	9.5
5	-2 TO 2	8.0	8.0
6	2.01 TO 3	9.5	4.5
7	3.01 TO 4	12.0	4.5
8	4.01 TO 5	15.0	4.5
9	5.01 TO 6	21.5	4.5

SOILS REPORT

SOILS REPORT BY ANGLE ENGINEERING

PROJECT NO. 26202-1 DATED JUNE 7, 2017

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 13,574 CU YDS
FILL= 6,970 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745E & 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.
2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

BENCHMARK

BENCHMARK NUMBER: 6LV9019NWW6

RIVET AND PLATE IN A LVVWD CONCRETE PAD AT THE NORTHEAST CORNER OF DORRELL LANE & HUALAPAI WAY.

ELEVATION = 2834.10 FEET, 863.834 METERS
N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARKS - 2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

NORTH 00°08'16" EAST, BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 123, PAGE 32 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XX-XXX ON FILE AT CITY OF LAS VEGAS AND CCFW HTE #XX-XXXXX FOR THE SUBJECT PROJECT.

KEVIN M. BROSS, P.E. 24572 DATE

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

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

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

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, NEVADA

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

RICHMOND AMERICAN HOMES

AGAVE MOON
GRADING PLAN I

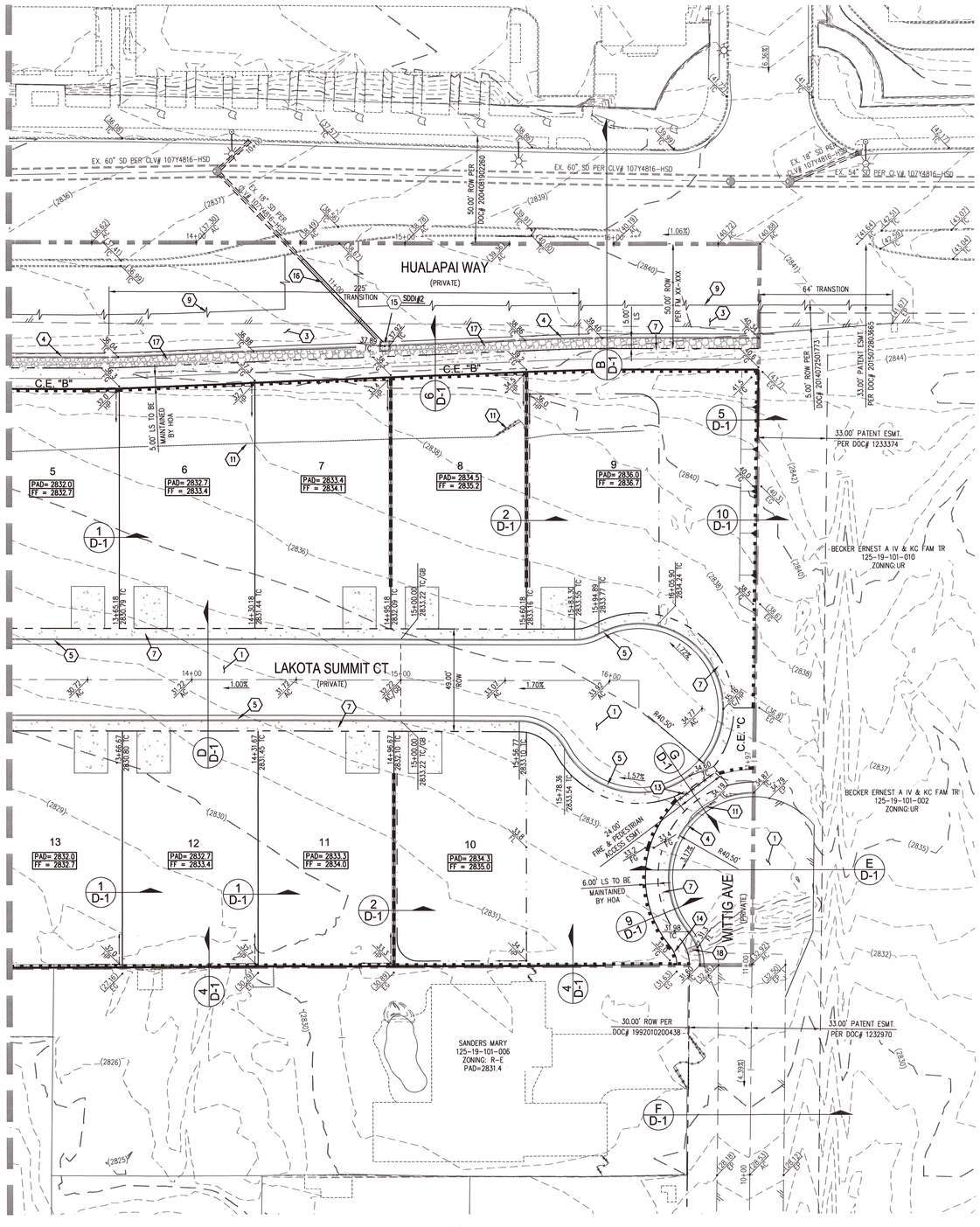
S:19 T:19 S R:60 E

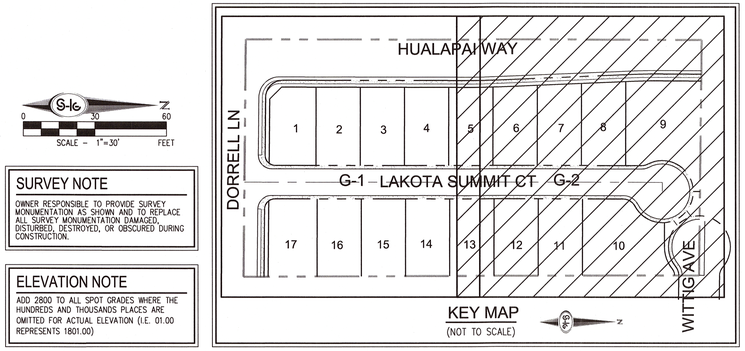
DATE: 12/21/17
DRAFTER: SS
DESIGNER: SS
CHECKED: KMB
PROJECT NO. RAH1701

PROFESSIONAL ENGINEER - STATE OF NEVADA - KEVIN M. BROSS - Exp. 12/31/2018 - CIVIL - NO. 24572 - PROF
12/21/17

G-1
SHEET 4 OF 8

S:\civil\1701 connor hills 3\dwg\improv\civil1701 grd.dwg 12/21/2017 3:38 PM Sandy Soares





SCALE = 1"=30' FEET

SURVEY NOTE

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ELEVATION NOTE

ADD 2800 TO ALL SPOT GRADES WHERE THE HUNDREDS AND THOUSANDS PLACES ARE OMITTED FOR ACTUAL ELEVATION (I.E. 01.00 REPRESENTS 1801.00)

GRADING CONSTRUCTION NOTES

1. CONSTRUCT 2" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
2. CONSTRUCT 3" ASPHALT PAVEMENT OVER 4" TYPE II AGGREGATE BASE
3. CONSTRUCT 5" ASPHALT PAVEMENT OVER 5.5" TYPE II AGGREGATE BASE
4. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
5. INSTALL 30" ROLL TYPE CURB AND GUTTER PER CCAUSD NO. 217.51
6. CONSTRUCT 8' CROSS GUTTER PER CCAUSD NO. 228
7. CONSTRUCT 5.0' WIDE SIDEWALK PER CCAUSD NO. 234
8. INSTALL 10' CURB TRANSITION FROM "L" CURB TO MODIFIED ROLL CURB PER DETAIL 11 ON SHEET D-1
9. SAWCUT AND MATCH EXISTING PAVEMENT PER CCAUSD NO. 500.3, 500.4, & 500.5
10. EXISTING FENCE TO BE REMOVED
11. INSTALL EMERGENCY ACCESS DRIVEWAY AND CURB TRANSITIONS PER CCAUSD NO. 224 WITH CRASH GATE
12. CONSTRUCT ADA SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1 & 235.1 AND DETAIL 12 ON SHEET D-1
13. INSTALL 6' WROUGHT IRON GATE PER DETAIL 13 SHEET D-1
14. INSTALL CMU BLOCK WALL OPENING PER DETAIL 14 ON SHEET D-1
15. INSTALL 4' TYPE 'C' STORM DRAIN DROP INLET PER CCAUSD #413 & 421
16. INSTALL 18" CLASS III RCP STORM DRAIN LATERAL
17. INSTALL RIP RAP D50=8" THICKNESS=18" WITH FELTER FABRIC OVER 6" TYPE II
18. INSTALL SIDEWALK UNDER DRAIN PER CCAUSD NO. 236

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3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEET FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE CLARK COUNTY BUILDING DEPARTMENT.
8. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLEPING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.

LEGEND

- BOUNDARY LINE
- MATCHLINE
- ROADWAY CENTERLINE
- RIGHT-OF-WAY
- PROPERTY LINE
- CURB AND GUTTER
- EXISTING CURB AND GUTTER
- FLOWLINE
- EDGE OF PAVEMENT (EP)
- EXISTING EDGE OF PAVEMENT
- SAWCUT LINE PER CCAUSD NO. 503
- 00.00 TC / (00.00) TC — PROPOSED ELEVATION
- (00.00) — EXISTING ELEVATION
- 15.01% — DESIGN SLOPE IN VERTICAL CURVE
- (2800) — EXISTING CONTOUR (5-FT)
- EXISTING CONTOUR (1-FT)
- FILL / CUT — CUT/FILL TRANSITION LINE
- FIRE HYDRANT ASSEMBLY
- SIGHT VISIBILITY ZONE
- TUBULAR STEEL FENCE
- RETAINING WALL
- DECORATIVE PERIMETER WALL
- DECORATIVE PERIMETER RETAINING WALL

SEE SHEET C-3 FOR ABBREVIATIONS AND QUANTITIES

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.

SIDEWALK RAMP TABLE

RAMP NUMBER	GRADE (%) "B" TO "A"	"A" (FT) MIN.	"B" (FT) MIN.
1	−6 TO −5.01	4.5	21.5
2	−5 TO −4.01	4.5	15.0
3	−4 TO −3.01	4.5	12.0
4	−3 TO −2.01	4.5	9.5
5	−2 TO 2	8.0	8.0
6	2.01 TO 3	9.5	4.5
7	3.01 TO 4	12.0	4.5
8	4.01 TO 5	15.0	4.5
9	5.01 TO 6	21.5	4.5

SOILS REPORT

SOILS REPORT BY ANGLE ENGINEERING

PROJECT NO. 26202-1 DATED JUNE 7, 2017

EARTHWORKS

EARTHWORK QUANTITIES (RAW):
CUT= 13,574 CU YDS
FILL= 6,970 CU YDS

EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1745E & 32003C1750E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

DISCLAIMER NOTE

1) EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.
2) FOR ROADWAY WIDENING AND HALF STREET IMPROVEMENTS THE CONTRACTOR SHALL VERIFY CROSS SLOPES FROM EXISTING PAVEMENT SAWCUT LINE TO PROPOSED EDGE OF PAVEMENT OR PROJECTED LIP OF CURB PRIOR TO SUBGRADE PREPARATION AND CONSTRUCTION OF PROPOSED CURB LINE. IF MINIMUM OR MAXIMUM CROSS SLOPES DO NOT MEET AGENCY STANDARDS THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

BENCHMARK

BENCHMARK NUMBER: 6LV9019NWW6

RIVET AND PLATE IN A LVVWD CONCRETE PAD AT THE NORTHEAST CORNER OF DORRELL LANE & HUALAPAI WAY.

ELEVATION = 2834.10 FEET, 863.834 METERS
N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS BENCHMARKS – 2008 ADJUSTMENT (UPDATED 05/24/2010)

BASIS OF BEARINGS

NORTH 00°08'16" EAST, BEING THE BEARING OF THE WEST LINE OF THE NORTHWEST QUARTER (NW1/4) OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 60 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN FILE 123, PAGE 32 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY XX-XXX ON FILE AT CITY OF LAS VEGAS AND CCFW HTE #XX-XXXXX FOR THE SUBJECT PROJECT.

KEVIN M. BROSS, P.E. 24572 DATE

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

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

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

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

NO.	DESCRIPTION	DATE	BY	APP DATE	APP

CITY OF LAS VEGAS, NEVADA

RICHMOND AMERICAN HOMES

AGAVE MOON

GRADING PLAN II

S:19 T:19 S R:60 E

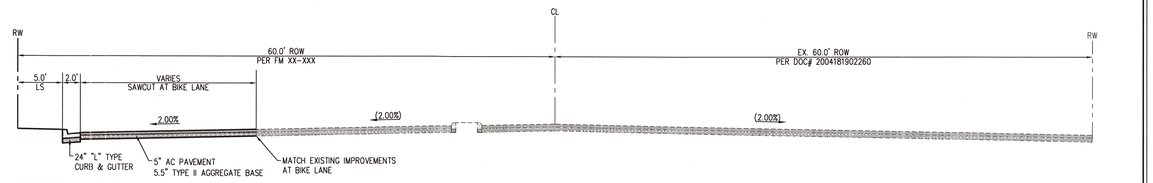
DATE: 12/21/17
DRAFTER: SS
DESIGNER: SS
CHECKED: KMB

PROJECT NO.
RAH1701

PROFESSIONAL ENGINEER STATE OF NEVADA — KEVIN M. BROSS — Exp. 12/31/2018 — CIVIL — No. 24572 — 12/21/17

G-2
SHEET 5 OF 8

I:\rah1701 connor hills 3\dwg\improv\rah1701 grd.dwg 12/21/2017 3:51 PM Sandy Solores



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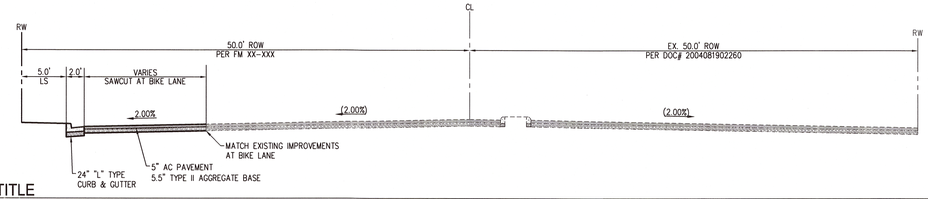
NOT TO SCALE

HUALAPAI WAY



B. SECTION TITLE

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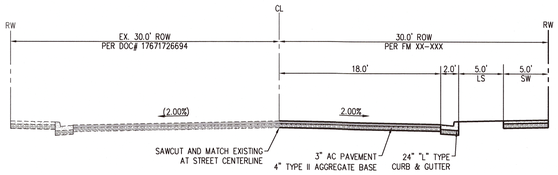
HUALAPAI WAY



C. STREET SECTION

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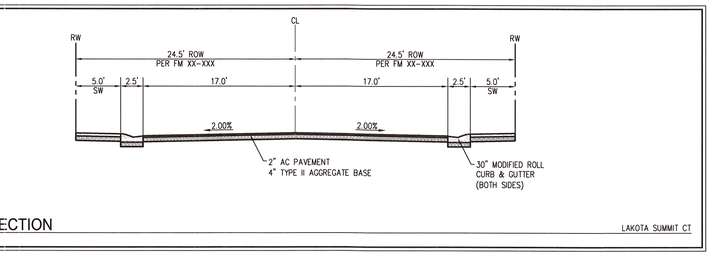
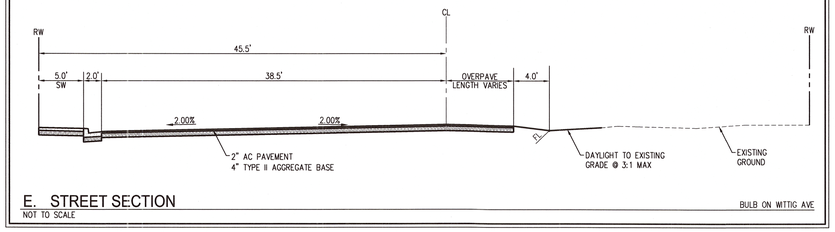
DORRELL LN



D. STREET SECTION

NOT TO SCALE

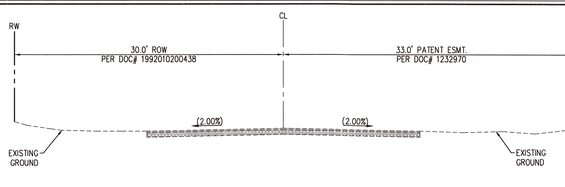
LAKOTA SUMMIT CT



E. STREET SECTION

NOT TO SCALE

BULB ON WITTIG AVE



F. STREET SECTION

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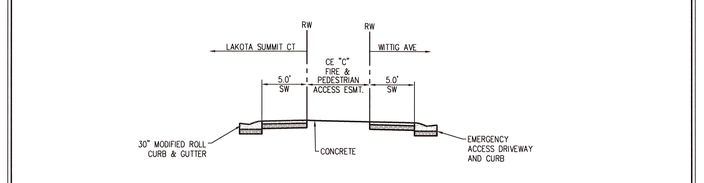
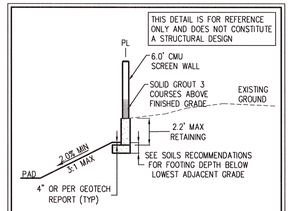
WITTIG AVE



G. EASEMENT SECTION

NOT TO SCALE

FIRE & PEDESTRIAN ACCESS ESMT.



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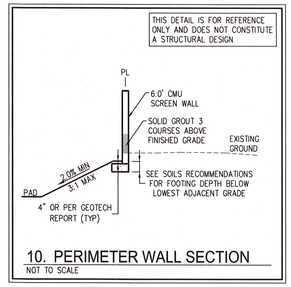

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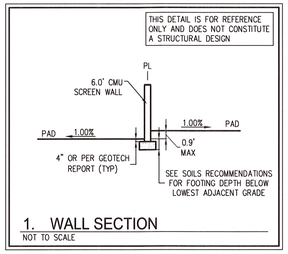

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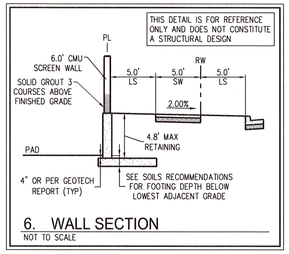

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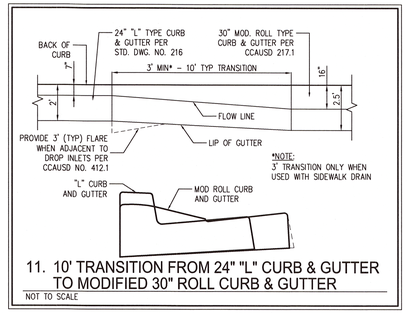
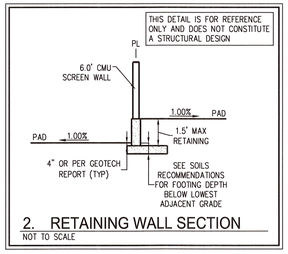
NOT TO SCALE



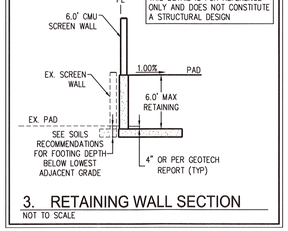
11. 10' TRANSITION FROM 24" "L" CURB & GUTTER TO MODIFIED 30" ROLL CURB & GUTTER

NOT TO SCALE



3. RETAINING WALL SECTION

NOT TO SCALE



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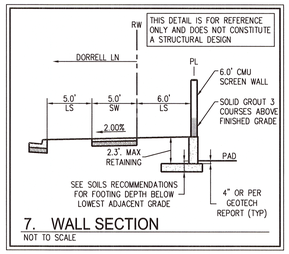

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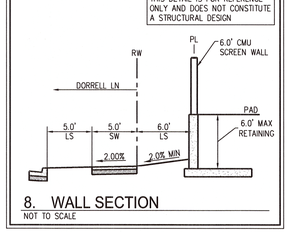

8. WALL SECTION

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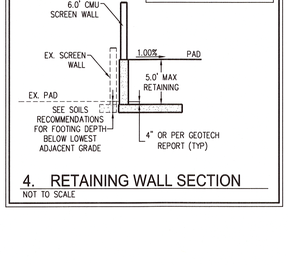

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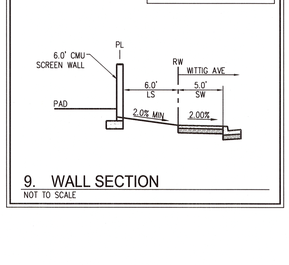

9. WALL SECTION

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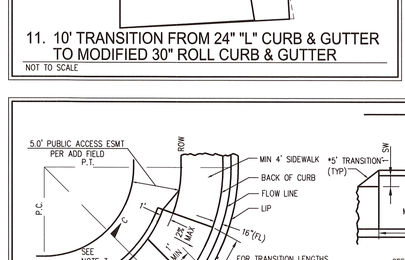
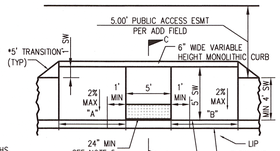
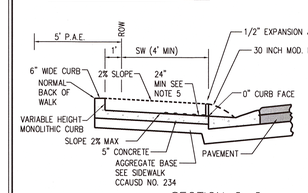


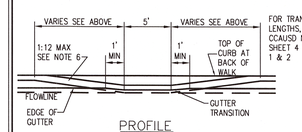
RAMP IN CURB RETURN



RAMP OUTSIDE CURB RETURN



SECTION C-C



PROFILE

12. SIDEWALK RAMP W/ MODIFIED ROLL CURB

NOT TO SCALE

NOTES:

1. SIDEWALK RAMPS WITHIN CURB RETURN SHALL BE LOCATED AT THE MIDPOINT OF CURB RETURN UNLESS OTHERWISE APPROVED.
2. SIDEWALK RAMPS OUTSIDE OF THE CURB RETURN SHALL BE LOCATED ADJACENT TO THE RETURN UNLESS OTHERWISE APPROVED.
3. RAMPS SHALL BE CONSTRUCTED WITH A ROUGH BROOM FINISH TRANSVERSE TO THE SLOPE OF THE RAMP.
4. WHEN CONSTRUCTING RAMP WHERE CURB & GUTTER EXISTS, COMPLETELY REMOVE INTERFERING PORTIONS OF EXISTING CURB & GUTTER.
5. DETECTABLE WARNING CONSISTING OF RAISED TRUNCATED DOMES WHICH COMPLY WITH DETAILS ON SHEET 4 OF CCAUSD NO. 235 AND CONTRASTING VISUALLY WITH ADJOINING SURFACES SHALL BE PLACED ON BOTTOM PORTION OF RAMP EXTENDING THE FULL WIDTH OF THE RAMP AND EXTENDING A MINIMUM DISTANCE OF 24 INCHES UP THE RAMP. COLOR SHALL BE "FEDERAL YELLOW" UNLESS OTHERWISE APPROVED.
6. A 5' PAD AT 2% MAX SLOPE SHALL BE PROVIDED ON THE DOWNHILL SIDE WHEN STREET SLOPE EXCEEDS 2% SLOPE.
7. "A" AND "B" ARE EQUAL TO 8' WHEN FLOWLINE GRADES IS BETWEEN -2% AND +2% FOR ALL OTHER TRANSITION LENGTHS, SEE CCAUSD NO. 235 SHEET 4 TABLE 1.
8. ALL CURB FLOW LINES SHALL BE WATER TESTED. ANY CURB THAT DOES NOT FLOW SHALL BE REMOVED AND REPLACED AS DIRECTED BY AGENCY AT THE SOLE EXPENSE OF THE CONTRACTOR.

* TRANSITION ONLY WHEN LESS THAN 5' WIDE SIDEWALK

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

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

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

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

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

RICHMOND AMERICAN HOMES

AGAVE MOON

DETAIL SHEET

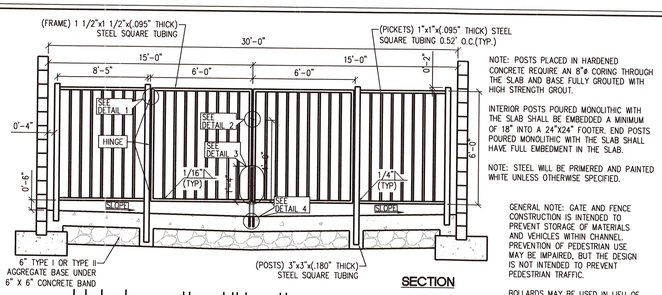
S19 T19S R60E

DATE: 12/21/17
DRAFTER: SS
DESIGNER: SS
CHECKED: KMB
PROJECT NO.
RAH1701

PROFESSIONAL ENGINEER - STATE OF NEVADA - KEVIN M. BROSS - Exp. 12/31/2018 - CIVIL - No. 24572 - 12/21/17

D-1
SHEET 6 OF 8

X:\rah1701 connor hills 3\dwg\improv\rah1701 dtl.dwg 12/21/2017 3:56 PM Sandy Solares



SECTION

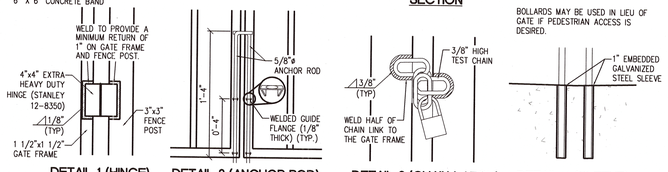
NOTE: POSTS PLACED IN HARDENED CONCRETE REQUIRE AN 8"ø CORING THROUGH THE SLAB AND BASE FULLY GROUTED WITH HIGH STRENGTH GROUT.

INTERIOR POSTS POURED MONOLITHIC WITH THE SLAB SHALL BE EMBEDDED A MINIMUM OF 18" INTO A 24"X24" FOOTER. END POSTS POURED MONOLITHIC WITH THE SLAB SHALL HAVE FULL EMBEDMENT IN THE SLAB.

NOTE: STEEL WILL BE PRIMERED AND PAINTED WHITE UNLESS OTHERWISE SPECIFIED.

GENERAL NOTE: GATE AND FENCE CONSTRUCTION IS INTENDED TO PREVENT STORAGE OF MATERIALS AND VEHICLES WITHIN CHANNEL. PREVENTION OF PEDESTRIAN USE MAY BE IMPAIRED, BUT THE DESIGN IS NOT INTENDED TO PREVENT PEDESTRIAN TRAFFIC.

BOLLARDS MAY BE USED IN LIEU OF GATE IF PEDESTRIAN ACCESS IS DESIRED.



DETAIL 1 (HINGE) SEEN FROM OUTSIDE

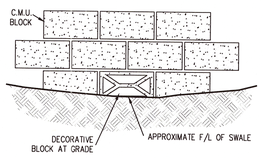
DETAIL 3 (ANCHOR ROD)

DETAIL 2 (CHAIN LATCH) SEEN FROM OUTSIDE

DETAIL 4 (SLEEVE)

13. WROUGHT IRON FENCE W/ GATE DETAIL

NOT TO SCALE



14. BLOCK WALL OPENING

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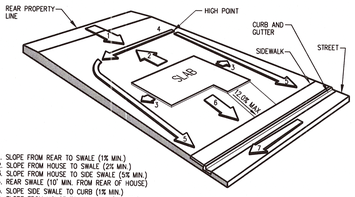

PERSPECTIVE

15. TYPE "A" LOT GRADING

NOT TO SCALE

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AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
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OR
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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
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SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CITY OF LAS VEGAS, NEVADA

RICHMOND AMERICAN HOMES

AGAVE MOON

DETAIL SHEET II

S 19
T 19 S
R 60 E

DATE: 12/21/17

DRAFTER: SS

DESIGNER: SS

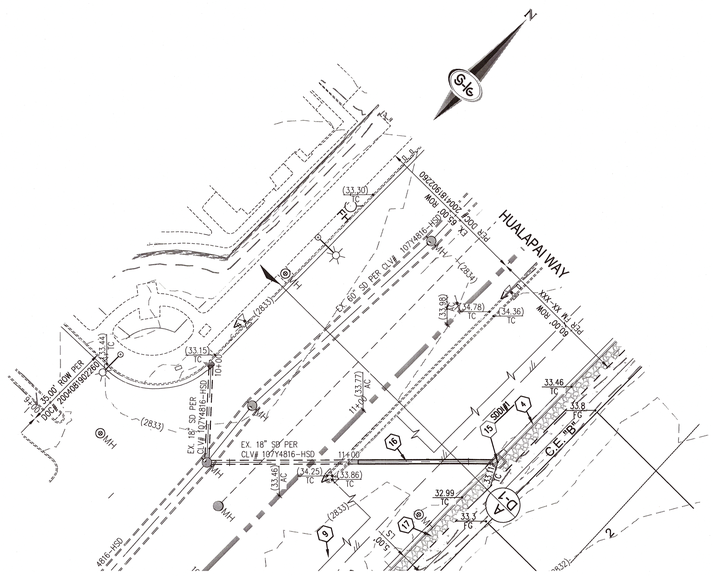
CHECKED: KMB

PROJECT NO.
RAH1701

PROFESSIONAL ENGINEER STATE OF NEVADA
KEVIN M. BROSS
Exp. 12/31/2018
CIVIL
No. 24572
12/21/17

D-2
SHEET 7 OF 8

J:\rah1701 conner hills 3\dwg\Improv\rah1701 dt1.dwg 12/21/2017 3:38 PM Sandy Solores


HUALAPAI WAY
EX. 60' SD PER CLV# 107Y4816-HSD
EX. 18" SD PER CLV# 107Y4816-HSD
11+00 TRANSITION
CE 18"
EX. 18" SD PER CLV# 107Y4816-HSD
EX. 30" SDW PER CLV# 107Y4816-HSD
EX. 24" SDW PER CLV# 107Y4816-HSD
EX. 30" SDW PER CLV# 107Y4816-HSD
EX. 18" SD PER CLV# 107Y4816-HSD
EX. 18" SD PER CLV# 107Y4816-HSD
EX. 18" SD