

DS #:

5182

APN:

137-26-112-003

PROJECT:

Summitin Village 21 - Parcel K (aka Moro Rock)

SUBMITTAL:

1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		September 23, 2019
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:	
	Summerlin Village 21 - Parcel K (aka Moro Rock)	
Cross Streets:	SEC Desert Foothill Dr. & Kindle Corner Ave.	
File Number:	F:\Depot\DSMemos\DS5182A.doc	
Parcel Number:	137-26-112-003	
Zoning Action:	TMP-76950	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
COPIES TO:		
		Slater Hanifan Group
		The Howard Hughes Corporation
		Bart Anderson, P.E., DevCo
		CCRFCD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/26/2019	9/20/2019	See Comments Below	\$400.00	3542401: \$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. Provide a copy of the zoning/planning conditions associated with this site (**TMP-76950**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.
2. 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.

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

3. The subject development is under the premise of flood protection by the surrounding perimeter streets and the associated storm drain systems, ie, *Desert Foothills Boulevard* and *Kindle Corner Avenue*. No occupancy permit of the houses will be issued prior to the substantial buildout of the perimeter streets.

4. 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 plans 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.
5. **Exhibit E (Proposed Drainage Map):** The proposed drainage pattern deviates from the approved *Summerlin West Village 21* master drainage study. For example, Subbasin K*(h) of the southern portion of the subject development drains to the adjacent wash and Subbasin K*(i) of the northern portion drains individually through the sidewalk and common area to *Kindle Corner Avenue* directly. The master study of Village 21, however, proposed to drain the whole *Parcel K* to a stub at the northeast corner.

The engineer of the subject drainage study must coordinate with *VTN Nevada* to amend the *Village 21* master study or revise the subject drainage pattern to comply with the original approved pattern. This must be addressed and resolved in the next submittal.

6. The proposed drainage pattern will produce numerous point discharge to the wash to the south and to the amenity common area to the north creating erosion and maintenance problem in the future. Note that the wash and the common amenity zone are to be privately maintained by the *Howard Hughes Company* or the *Summerlin Master Association*. If the proposed drainage pattern is the final design, obtain acknowledgment and approval from *Howard Hughes Company* or the *Summerlin Master Association* prior to the final approval of the subject drainage study.
7. All storm drain inlets that are more than 10'-deep require a special structure detail and structural calculation. Submit structural calculations to *City Building & Safety Department* for review and approval prior to the final approval of the drainage study.
8. The PVC pipes shown in *Section Details 10/D2*, and *15/D2* may not outlet onto the sidewalk and will require sidewalk underdrain to outlet flow into the street.
9. The swale in the common element located within *Subbasin C* must be designated as a public drainage easement and must follow the requirements of a drainage easement.
10. 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.
11. 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."
12. 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: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

END OF REMARKS
HDR/AYS

T/R/S: T20S/R59E/26
AREA K-26

TECHNICAL DRAINAGE STUDY

Summerlin Village 21 Parcel K (Aka: Moro Rock)

City of Las Vegas, Nevada

Job No.: RAH1908.000

Date: August 2019

Prepared By:

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

Prepared For:

Richmond America Homes
7770 Dean Martin Dr., Suite #308
Las Vegas, Nevada 89139
Phone: 702-617-84 • Fax: 702-348-5964



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

Assisted by: Caitlyn Alcantara, E.I.



RAH1908-000

July 18, 2019

Jennifer Shinn, P.E.– Flood Control Engineering Associate
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Technical Drainage Study for Summerlin Village 21 Parcel K (Aka: Moro Rock)

Ms. Shinn:

This letter certifies that all items provided on the *Technical Drainage Study for Summerlin Village 21 Parcel K (Aka: Moro Rock)* submittal CD match the paper version bound into the study.

Respectfully Submitted,
SLATER HANIFAN GROUP, A Westwood Team

Stanley Okey Amadi, P.E., CFM
Project Manager – Flood Control Division

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin Village 21 Parcel K Date: August 2019
Location of Development: a) Descriptive (Cross Streets): North/South: Kindle Corner Way/Redpoint Drive
East/West: Carriage Hill Drive/Desert Foothills Drive
b) Section: 26 Township: 20 S Range: 59 E
c) APN: 137-26-112-003

Name of Owner: Owner: Hughes Howard Company LLC Developer: Richmond American Homes
Telephone No.: 702-617-8464 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., CFM Telephone No.: (702) 284-5300
*E-mail Address: Stanley.amadi@westwoodps.com Fax No.: (702) 284-5399
Firm: Slater Hanifan Group, A Westwood Team
Address: 5740 S. Arville #216 Las Vegas NV 89118

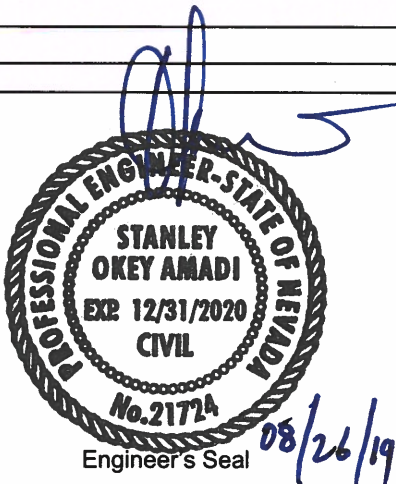
Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 8.2 acres Being Developed/Disturbed: 8.2 acres
2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☐ Yes** ☒ No
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
4. Proposed type of development (Residential, Commercial, Etc.): Single Family Residential
5. Approximate upstream land area which drains to the subject site: 0
6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation: Summerlin West Planning Area MPU Update DS4926

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Project will discharge flows to storm drain in Kindle Corner.

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



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

***Newly Required Field**

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

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

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
-	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.
X	-	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

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

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

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Summerlin Village 21 Parcel K		Map ID:	
Firm Name: Slater Hanifan Group, A Westwood Team		Engineer: Stanley Okey Amadi, P.E., CFM	
Address: 5740 S. Arville #216			
City: Las Vegas		State: NV	Zip: 89118
Phone Number: (702) 284-5300		Fax Number: (702) 284-5399	
Property Owner: Owner: Hughes Howard Company LLC Developer: 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	
<u>X</u>	<u>-</u>	Design Manual Standard Form 1 with the engineer's seal and signature.
<u>X</u>	<u>-</u>	Design Manual Standard Form 4 .
<u>X</u>	<u>-</u>	2 copies of the 24" x 36" Drainage Plan.
<u>-</u>	<u>N/A</u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
<u>X</u>	<u>-</u>	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
<u>X</u>	<u>-</u>	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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
<u>-</u>	<u>N/A</u>	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.
<u>X</u>	<u>-</u>	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.
<u>X</u>	<u>-</u>	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
<u>-</u>	<u>N/A</u>	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
-	N/A	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X	-	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. $Q_{100} d \times v \leq 8$. $Q_{10} d \times v \leq 6$ and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X	-	A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
-	N/A	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
-	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.
X	-	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X	-	Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X	-	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
-	N/A	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	<i>Project Overview & Study Purpose.....</i>	<i>1</i>
1.2	<i>Site Description</i>	<i>1</i>
1.3	<i>FEMA Flood Zone Designation.....</i>	<i>1</i>
1.4	<i>CCRFCD Facility Information</i>	<i>1</i>
1.5	<i>CCRFCD Hydrology Information.....</i>	<i>2</i>
1.6	<i>Referenced Studies.....</i>	<i>2</i>
2	METHODOLOGY	2
2.1	<i>Compliance</i>	<i>2</i>
2.2	<i>Hydrologic Modeling</i>	<i>2</i>
2.3	<i>Hydraulic Modeling.....</i>	<i>3</i>
3	EXISTING DRAINAGE CONDITION	3
3.1	<i>Definition of Existing Condition</i>	<i>3</i>
4	DEVELOPED DRAINAGE CONDITION.....	3
4.1	<i>Definition of Developed Condition.....</i>	<i>3</i>
4.2	<i>Discussion of Developed Condition</i>	<i>3</i>
5	HYDRAULIC COMPUTATIONS.....	4
5.1	<i>Summary of Developed Condition Street Flows.....</i>	<i>4</i>
5.2	<i>Summary of Recommended Facilities</i>	<i>4</i>
5.3	<i>Summary of Proposed Finished Floors.....</i>	<i>5</i>
6	CONCLUSIONS & RECOMMENDATIONS.....	5
7	REFERENCES.....	5

LIST OF APPENDICES

Appendix A Drainage Exhibits

- Exhibit A – Location Map
- Exhibit B – FEMA FIRM Panel Map
- Exhibit C1 – CCRFCD MPU Facilities Map
- Exhibit C2 – CCRFCD MPU Facility Inventory
- Exhibit C3 – CCRFCD MPU Hydrology Map
- Exhibit D – Soils Map
- Exhibit E – Proposed Condition Drainage Map

Appendix B FlowMaster Hydraulic Computations

- Interior Street Sections
- Perimeter Street Sections
- Other Sections

Appendix C Drop Inlet & Storm Drain Computations

- Drop Inlet Computations
- Standard Form 6 (SF-6) Calculations

Appendix D Finished Floor Analyses

Appendix E Reference Material

Technical Drainage Study Update for the Flood Control Master Plan Update – Summerlin West Area, by VTN Nevada (DS 4926)

- Approval Letters
- Hydrologic Computations
- Drainage Exhibits

Appendix F City of Las Vegas NOFA

Appendix G E-mail Correspondence Howard Hughes Corporation

Appendix H CD of Electronic Files & Improvement Plans

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Richmond American Homes is proposing a single-family residential development on approximately 8.2 acres, located south of the undeveloped roadway, Kindle Corner Avenue, and east of undeveloped roadway, Desert Foothills Drive, within the Summerlin Village 21 Master Planned Community in the City of Las Vegas, Nevada. The project site is identified on the included improvement plans as *Summerlin Village 21 Parcel K* (hereinafter referred to as the project site). Please note that the project site will be constructed in a single phase.

The purpose of this study is to provide a detailed hydrologic and hydraulic analyses for the project site, and to substantiate the hydraulic design in order to protect the property from onsite and offsite runoff in accordance with local storm water management criteria. It is also the purpose of this study to show conformance with the drainage patterns established and master planned by prior approved drainage studies. This study also provides an inventory of the existing drainage facilities in the vicinity of the site, as well as recommends site specific facilities necessary to control runoff impacting the project sites.

1.2 Site Description

The project site is identified by Assessor's Parcel Number (APN) 137-26-112-003 within Township 20 South, Range 59 East, and Sections 26. The project site is bound by Desert Foothills Drive to the west, Kindle Corner Avenue to the north and undeveloped property to the south and east. The location of the project site, relative to the surrounding streets, is identified on the Location Map (Exhibit A), included in Appendix A for reference.

The project site currently consists of existing desert shrub, generally draining in an easterly direction. The project site proposes 86 attached single-family residential lots with a typical lot size of 2,500 square feet. The tentative map has been approved and the conditions of approval are included in Appendix F for reference.

The project site is within the Summerlin Village 21 Master Plan area and was most recently addressed in the Update #1 to the Flood Control Master Plan Update – Summerlin West Planning Area. This master study established overall drainage patterns and drainage infrastructure required for the Village 21 area. It is assumed that the future perimeter streets around the project site will be in place with their associated storm drain facilities per the Master Study and follow-up infrastructure studies in all of the developed conditions for this study.

1.3 FEMA Flood Zone Designation

The project site is located on Flood Insurance Rate Map (FIRM) Panel 32003C2150E, dated September 27, 2002. The project site is located within FEMA designated unshaded Zone X. Zone X (unshaded) is described by FEMA as an area determined to be outside the 0.2% annual chance floodplain. Exhibit B identifying the project sites on the FIRM Panel has been included in Appendix A for reference.

1.4 CCRFCD Facility Information

The project site has been identified on the current 2018 CCRFCD MPU Figure F-22, which is included as Exhibit C1 in Appendix A for reference. Per the 2018 CCRFCD MPU

(Reference 1), the Angel Park- Desert Foothills Branch (APDF) is the closest regional facility adjacent to the site. This facility is located west of the project site and is identified as a Category B Proposed Facility. The facility is adjacent to the project site with no direct impact from the project site. Refer to Exhibit C2 for the facility inventory.

1.5 CCRFCD Hydrology Information

Figure W-4, from the 2018 Las Vegas Valley Flood Control Master Plan Update (MPU, Reference 1), shows that the project site lies within MPU subbasin SWFH-13. This subbasin appears to drain south into subbasin SWFH-14. Exhibit C3 identifying the project site on the MPU figure has been included in Appendix A for reference.

1.6 Referenced Studies

The following approved studies and improvement plans have been reviewed and deemed acceptable for reference by this study. Slater Hanifan Group concurs with the referenced and adopted hydrologic and hydraulic analyses from the studies and the results established therein.

1. *Technical Drainage Study Update #1 for the Flood Control Master Plan Update – Summerlin West Planning Area* (hereinafter referred to as the Master Study, DS 4926; Reference 4), prepared by VTN Nevada. The Master Study has been utilized to establish the flow rate in generated by the developed site as well as the flows conveyed within the adjacent perimeter street. Relevant reference material from the Master Study has been included in Appendix E.
2. *Technical Drainage Study for Summerlin Village 21 – Street B Improvements (Carriage Hill Drive to Desert Foothill Drive)* (hereinafter referred to as the Kindle Corner Study, DS 5086; Reference 4), prepared by VTN Nevada. The Kindle Corner Study addressed the street and utilities in the street adjacent to the site including a 24" RCP storm drain stub for the project site to tie into. Revisions to the mainline storm drain design and stub location is ongoing and currently being coordinated with VTN Nevada. Therefore, the Kindle Corner Study has only been listed for informational purposes. No relevant reference material from the study has been included.

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

No hydrologic basins are being analyzed with this study. The site is within a master plan area where the developed condition drainage patterns, discharge points and allowable peak flow rates have been determined by the Master Study. The proposed land use is the same as master planned and analyzed by the Master Study. Therefore, a revised analysis is not necessary and have not been provided. The developed condition hydrologic analysis for the site and the tributary areas have been referenced from the Master Study. The referenced developed condition hydrologic computations have been included in Appendix E.

2.3 Hydraulic Modeling

Street Flow: Street flows have been analyzed utilizing the FlowMaster Version 8i software by Bentley Systems. In accordance with the CCRFCD Manual, the depth times velocity factor ($D \times V$) 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 ($D \times V$) for street flows during the 100-year storm event must be less than or equal to 8, with a maximum depth of 2-ft.

Note that per coordination with Summerlin Planning and Review, the flow depths along the interior streets will be allowed to exceed curb height due to the narrow street widths and to avoid unnecessary utility conflicts or inadequate clearances.

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

Storm Drains: The hydraulic analysis for the existing storm drain stub has been performed utilizing the Standard Form 6 (SF-6). As outlined in the CCRFCD Manual, storm drain facilities are required to maintain the hydraulic gradient line (HGL) a minimum 1-ft below above finished grade and limit the flow velocities in the facility to less than 25 ft/s.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Condition

The existing drainage condition of the project site has been addressed by the Master Study and will not be revisited by this study. Note that the Master Study has set the developed condition drainage patterns and allowable flow rates for the entire master plan area; therefore, a site-specific existing condition hydrologic analysis is not necessary and has not been provided.

4 DEVELOPED DRAINAGE CONDITION

4.1 Definition of Developed Condition

The developed condition considers that the site and the entire Summerlin Village 21 including the roadway and drainage infrastructures are fully installed and operational. Therefore, no offsite flows will directly impact or convey thru the site.

4.2 Discussion of Developed Condition

The developed condition hydrologic analysis of the site has been referenced from the Master Study. The site was analyzed as drainage basin K and is planned to surface flow to the northeast corner of the site and be captured by a proposed storm drain stub that ties into the system in Kindle Corner Avenue. The onsite basin has been prorated into several sub-basins for the purpose of street flows and swale computations and finished floor evaluations. Note that the existing storm drain stub at the northeast corner of the site was designed to capture the entire 100-year flow of approximately 30 cfs generated by the site. However, based on the proposed grading, subbasin K (g, h & i) which generates a combined prorated 100-year flow of 9 cfs will drain away from the site into the perimeter streets and the adjacent arroyo

as opposed to the storm drain stub as master planned. Hence the total onsite flows conveyed to the storm drain is reduced by 9 cfs. The discharge to the adjacent streets and arroyo is considered insignificant and is currently being coordinated with The Howard Hughes Corporation for an update to the Master Plan if deemed necessary. Note that the upstream flows in the arroyo will be cut-off and captured by the upstream regional facilities in Desert Foothills Drive, therefore, the flows within the portion of the arroyo adjacent to the site will be insignificant. Refer to Exhibit E provided in Appendix A for the Developed Condition Drainage Map depicting the prorated onsite sub-basins and a summary table of the street flow calculations.

5 Hydraulic Computations

5.1 Summary of Developed Condition Street Flows

The 100-year street flow summary table has been included on Exhibit E, and the supporting FlowMaster street flow computations have been included in Appendix B for reference. The surface flows in the adjacent perimeter streets have been referenced from the Master Study and utilized for the supporting street hydraulic computations. Note that the Master Study has planned stubs for all parcel to discharge directly into mainline storm drain facilities. Therefore, the surface flows in the perimeter streets only comprise of the runoff generated by the respective rights-of-way except Kindle Corner Avenue which now includes a portion of the site prorated as subbasin K(i).

Review of the street flow summary table shows that the criteria set forth in Section 2.3 of this report are satisfied. Note that only the 100-year street flow computations have been performed since the 100-year flows are shown to also satisfy the 10-year criteria.

5.2 Summary of Recommended Facilities

The entire site was master planned to discharge into a storm drain stub located at the northeast corner of site. A sump inlet has been proposed to capture the onsite flows and discharge thru the existing stub. The inlet has been sized by limiting the depth of ponding required to capture the flows at the top-of-curb for a total depth of 8.0-inches. Note that inclusive of the local depression typical with construction of Type CM2 inlets, the depth at top-of-curb is an average of 8.0-inches (0.67-ft) above the grate and 10-inches above the flow line. The drop inlet sizing computation is provided in Appendix C for reference.

A Standard Form 6 (SF-6) lateral loss computation is also utilized to evaluate the existing stub to ensure that it has adequate capacity to convey the flows generated by the site. Since the mainline storm drain and laterals are currently being revised by VTN Nevada to match the proposed location and site design, the starting HGL for the SF-6 computation is conservatively assumed to be just 1.0-ft below the rim elevation of the connecting manhole in Kindle Corner Avenue. The SF-6 calculation shows that the lateral stub will maintain the HGLs at more than 1-ft below the finished grade elevations. Please refer to Appendix C for the SF-6 output. Refer to Exhibit E for an illustration of the existing storm drain system and proposed drop inlet connection. The proposed inlet and existing storm drain stub system meets applicable criteria as described in Section 2.3 of this report.

Note also that the site entrance off of Foothills Drive has been designed to include a driveway hump elevated at a minimum of 6-inches above the water surface elevation in the street.

5.3 Summary of Proposed Finished Floors

All proposed finished floors have been adequately flood protected above twice the depth of flow in the adjacent streets, up to 18-inches, measured at the high side of the lot. Additionally, the 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. In addition, all finished floors are adequately flood protected and/or elevated above twice the depth of flow in the adjacent perimeter streets. The hydraulic evaluation of proposed finished floors, utilizing the applicable flow depths established by this study, has been included in Appendix D.

6 CONCLUSIONS & RECOMMENDATIONS

1. The proposed improvements are not located within a FEMA designated SFHA.
2. The project site is bordered by the proposed CCRFCD Angel Park- Desert Foothills Branch (APDF) facility. Therefore, CCRFCD concurrence is anticipated for this study.
3. The project site design is in compliance with Master Study which has established the ultimate built-out condition drainage patterns and allowable flow rates.
4. The proposed street flow and drainage facilities satisfy CLV and CCRFCD criteria.
5. Proposed finished floors will be adequately protected from flows due to a 100-year storm event meeting criteria against design flows and potential overflow conditions. All the proposed finished floor elevations have been designed to meet the local City of Las Vegas as well as the CCRFCD flood protection criteria.
6. The project's grading plan and detail sheets included in the last appendices of this study support the drainage patterns, conclusions and/or recommendations detailed in this study.

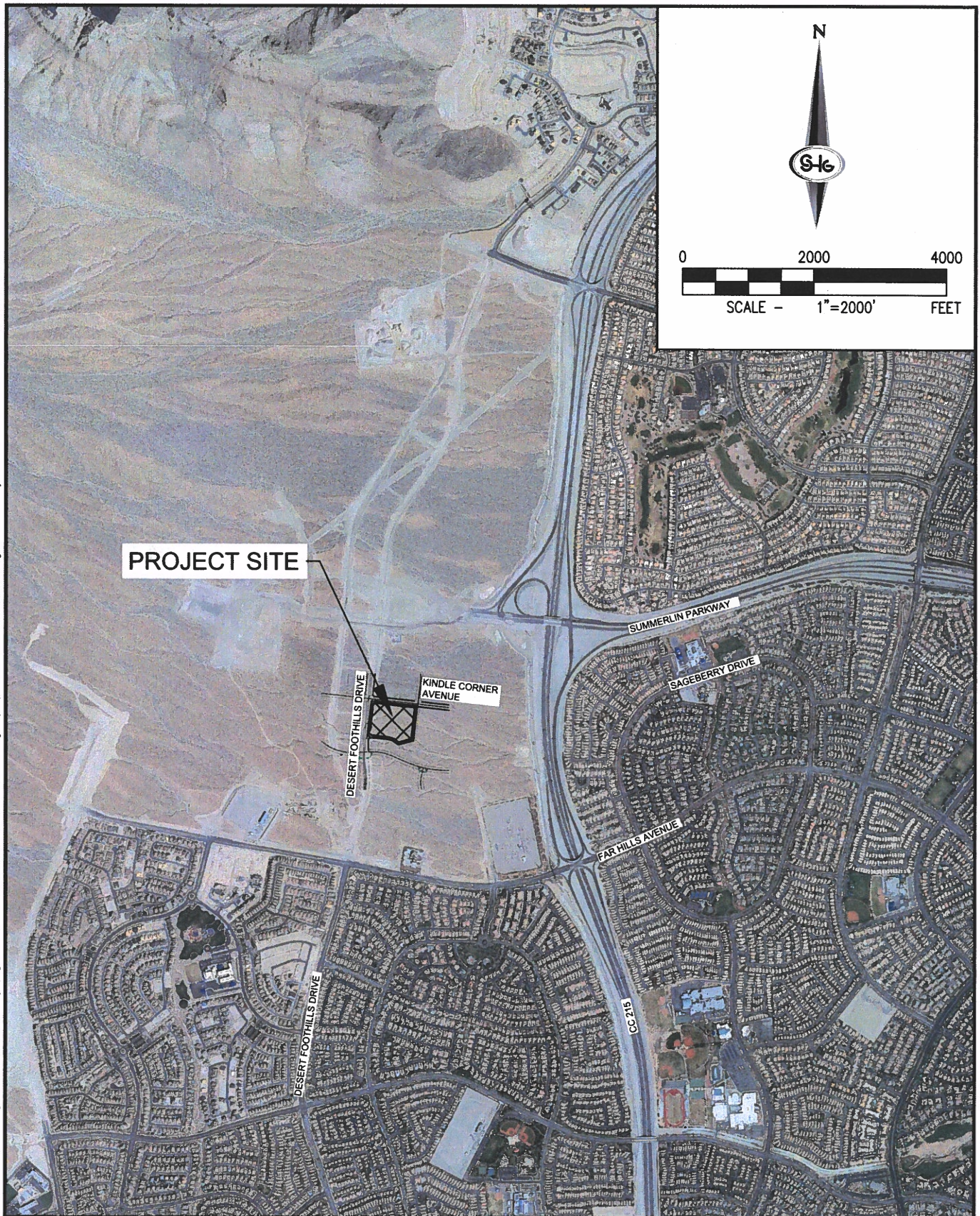
7 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. Atkins, October 2018.
2. *Hydrologic Criteria and Drainage Design Manual*. Clark County Regional Flood Control District, 1999.
3. *Soil Survey of Las Vegas Valley Area, Nevada*. U.S. Department of Agriculture, Natural Resources Conservation Services, 2019.
4. *Technical Drainage Study Update #1 for the Flood Control Master Plan Update – Summerlin West Planning Area*, by VTN Nevada, October 2018.

APPENDIX A

Drainage Exhibits

j:\rah1908 summerlin 21-k\drainage\technical study\figures\rah1908 tds exhibits a-d.dwg 7/9/2019 4:38 PM Georgio Dunkerly

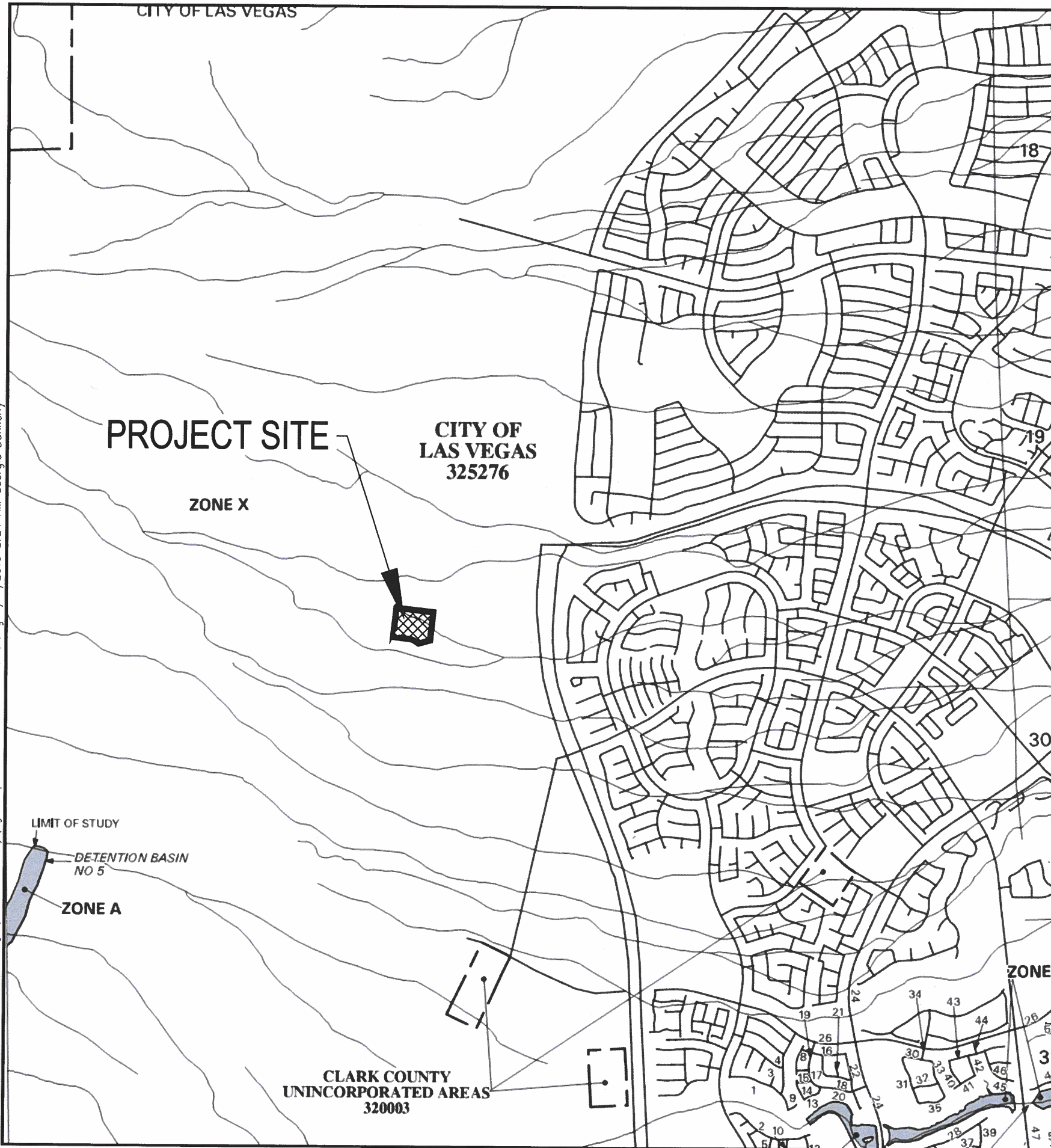


S-I-G
SLATER
HANIFAN
GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

RICHMOND AMERICAN HOMES
SUMMERLIN VILLAGE 21 PARCEL K
VICINITY MAP

DATE: JULY 2019	PROJECT NO. RAH1908.000
DRAFTER: GND	
DESIGNER: GND	EXHIBIT A SHEET 1 OF 1
CHECKED: ARP	

j:\rah1908 summerlin 21-k\drainage\technical study\figures\rah1908 tds exhibits o-d.dwg 7/11/2019 8:24 AM Georgia Dunkerly



PANEL 2150 E

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

PANEL 2150 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY: LAS VEGAS CITY OF CLARK COUNTY UNINCORPORATED AREAS

MAP NUMBER
32003C2150 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

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 sheet flow on sloping terrain) - 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.

513 (EL 987)

EL 987

A Section Line

23 Transverse Line

4276 Geographic coordinate reference to the North American Datum of 1983 (NAD 83)

600000 FT 1000-meter Universal Transverse Mercator (UTM) zone 11

DX551Q 5000-foot grid tick

M1.5 Benchmark (see explanation in North arrow section of this FIRM panel).

M1.5 River mile

MAP REPOSITORY
Refer to Property Listing in XMP

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

EFFECTIVE DATES OF REVISIONS TO THIS PANEL
September 27, 2002: to update corporate limits, to change base flood elevation, 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.

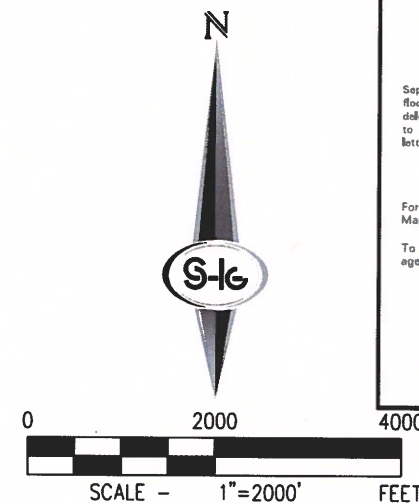
For community map revision history prior to countywide mapping this map history table located in the Flood Insurance Study report.

To determine if flood insurance is available in this community, contact the National Flood Insurance Program at (800) 620-6220.

MAP SCALE 1" = 2000'

0 1000 2000 4000 FEET

0 600 1200 1800 METERS



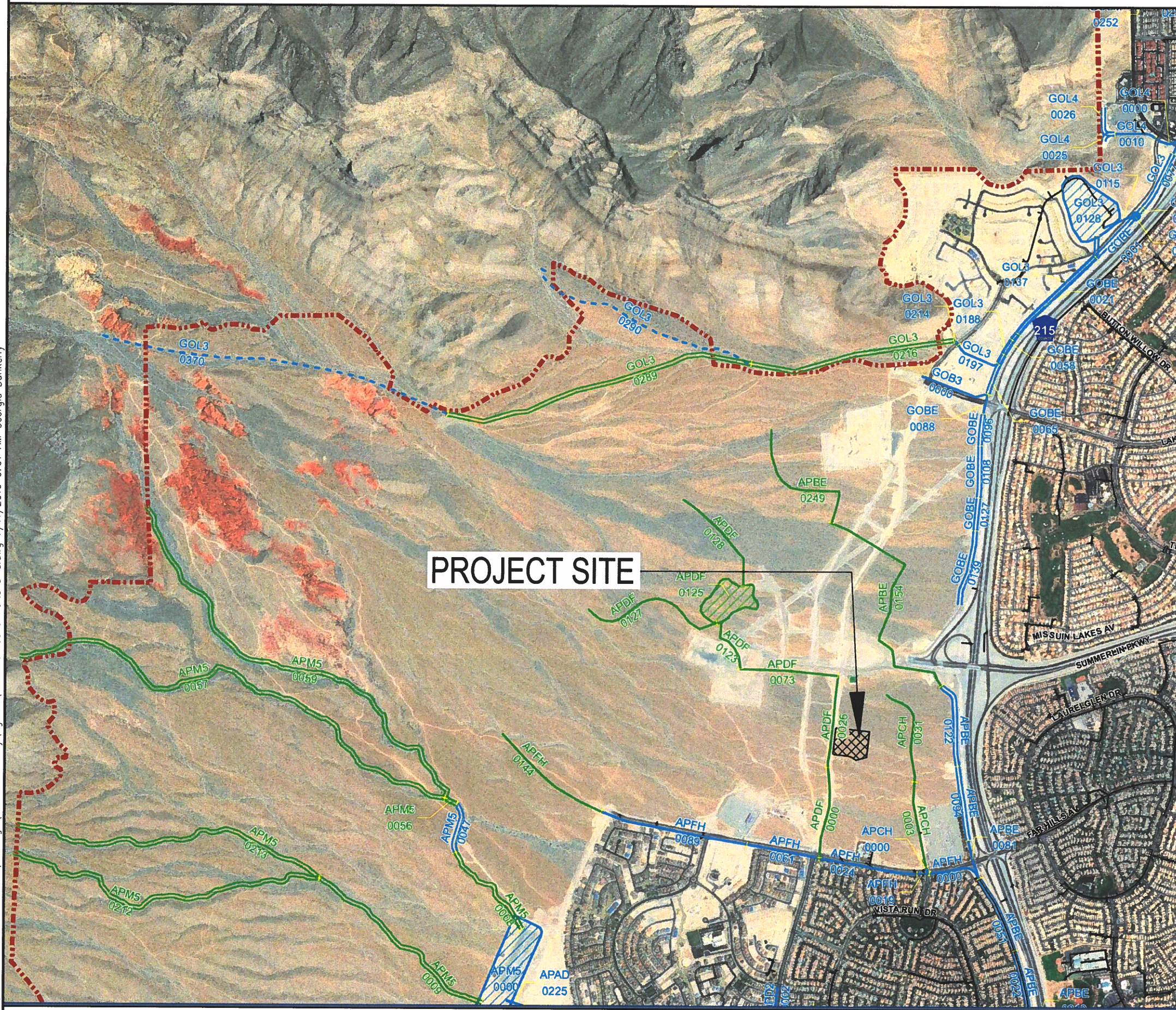
SLATER HANIFAN GROUP
a Westwood team

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89119
PHONE (702) 284-5300 FAX (702) 284-5399

RICHMOND AMERICAN HOMES
SUMMERLIN VILLAGE 21 PARCEL K
FEMA FIRM PANEL MAP

DATE: JULY 2019
DRAFTER: GND
DESIGNER: GND
CHECKED: ARP
PROJECT NO.
RAH1908.000
EXHIBIT B
SHEET 1 OF 1

j:\rah1908 summerlin 21-k\drainage\technical study\figures\ah1908 tds exhibits a-d.dwg 7/11/2019 9:01 AM Georgia Dunkerly



2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

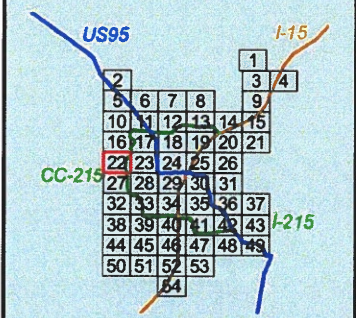
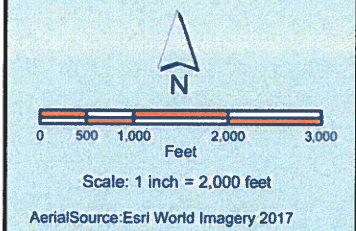
FIGURE F-22
FLOOD CONTROL FACILITIES

LEGEND

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

Remove & Replace/Parallel Facilities

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



NO.	DESCRIPTION	DATE	BY	APP

RICHMOND AMERICAN HOMES
SUMMERLIN VILLAGE 21 PARCEL K
MPU FACILITIES MAP

DATE:	JULY 2019
DRAFTER:	GND
DESIGNER:	GND
CHECKED:	ARP
PROJECT NO.	RAH1908.000
EXHIBIT C1	SHEET 1 OF 1

J:\rah1908 summerlin 21-k\drainage\technical study\figures\rah1908 tds exhibits o-d.dwg 7/11/2019 8:59 AM Georgia Dunkerly

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq. mi.)	Channel Slope (%) **
APAD 0203	E	ANGEL PARK - ALTA DRIVE BRANCH	1104	2200	CSWAA-1	GOW3A	6.95	5.28
0225	E	2' 7" X 5.5' RCB OUTLET	360	2137	SUM50B	GOW3A	6.73	3.40
APBE 0022	E	ANGEL PARK - BELTWAY BRANCH	1556	3366	CCSWFH15	GOW3A	3.39	1.81
0051	E	CONC CHNL 20W 7D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
0081	E	8' X 8' RCB @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.55	2.52
0094	E	CONC CHNL 10W 5D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.55	1.88
0122	E	CONC CHNL 10W 4D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.53	0.80
0154	P0	6' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
0249	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH 0000	E	ANGEL PARK - CARRIAGE HILL BRANCH	152	399	CSWFH-14	GOW3A	0.21	0.87
0003	P0	72" RCP	1655	399	CSWFH-14	GOW3A	0.21	2.00
0031	P0	60" RCP	2008	206	SWFH-13	GOW3A	0.10	1.58
APDZ 0002	E	ANGEL PARK - DESERT FOOTHILLS 2 BRANCH	883	674	SWAA-2	GOW3A	0.66	1.08
APDF 0000	P0	ANGEL PARK - DESERT FOOTHILLS BRANCH	1788	1428	CSWFH-9	GOW3B	0.80	3.55
0026	P0	6' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
0073	P0	6' X 4' RCB	1022	486	CSWFH-4	GOW3A	1.52	4.40
0123	P0	42" RCP	1076	141	GP0B	GOW3A	1.29	6.00
0125	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
0127	P0	6' X 6' RCB	2677	853	SWFH-1	GOW3A	0.65	3.60
0128	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH 0000	E	ANGEL PARK - FAR HILLS BRANCH	1070	2494	CCSWFH14	GOW3B	1.51	3.50
0019	E	2' 8" X 8' RCB	250	2149	CCSWFH-9	GOW3B	1.33	4.19
0024	E	18" X 8' RCP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
0061	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
0089	E	8' X 6' RCB	2546	839	CSWFH-7	GOW3A	0.50	2.00
0144	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APMS 0000	E	DETENTION BASIN #5		8856	SUM50B	GOW3A	6.73	
0008	P0	CONC CHNL 50W 4 5D 2:1 SS	2102	3854	CCDB54-7	GOW3A	4.13	5.20
0009	P0	CONC CHNL 50W 4D 2:1 SS	4180	3456	CCDB55-7	GOW3A	2.60	5.80
0047	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CCDB54-7	GOW3A	4.13	1.30
0056	P0	CONC CHNL 80W 4D 2:1 SS	264	3634	CCDB54-7	GOW3A	4.13	1.30
0057	P0	CONC CHNL 50W 3D 2:1 SS	9522	1684	CCDB54-4	GOW3A	0.81	6.80
0059	P0	CONC CHNL 100W 3D 2:1 SS	9075	2606	CCDB54-7	GOW3A	3.31	7.00
0112	P0	CONC CHNL 30W 3D 2:1 SS	8695	1082	DB55-1	GOW3A	0.64	7.50
0113	P0	CONC CHNL 50W 3D 2:1 SS	6522	1729	CCDB55-5	GOW3A	1.30	7.30
APSP 0183	E	ANGEL PARK - SUMMERLIN PARKWAY	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3 0000	E	GOWAN LONE MOUNTAIN SYST. 3 BELTWAY	1270	341	SV22-1	GOW3A	0.18	4.50
GOBE 0000	E	GOWAN LONE MOUNTAIN SYST. BELTWAY	30	1044	CSV22	GOW3A	0.67	5.67
0001	E	20' X 10' RCB @ ACCESS RD	1100	1044	CSV22	GOW3A	0.67	6.50
0021	E	CONC CHNL 11W 6 8D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
0058	E	CONC CHNL 15W 7 5D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
0065	E	CONC CHNL 17W 7 5D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
0088	E	2' 10" X 9' RCB @ LAKE MEAD	400	782	SV22-2	GOW3A	0.46	0.50
0096	E	CONC CHNL 20W 9D 2:1 SS	627	782	SV22-2	GOW3A	0.46	0.50
0108	E	CONC CHNL 20W 6D 2:1 SS	1021	782	SV22-2	GOW3A	0.46	0.50
0127	E	CONC CHNL 20W 6D 2:1 SS	638	782	SV22-2	GOW3A	0.46	0.50
0139	E	CONC CHNL 10W 5 5D 2:1 SS	1500	782	SV22-2	GOW3A	0.46	1.02
GOL3 0016	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3	3037	3277	CRCLMT1R	GOW3A	7.31	2.78
0066	E	TRANSITION STRUCTURE	100	3277	CRCLMT1R	GOW3A	7.31	3.50
0070	E	20' X 6' RCB @ CLIFF SHADOWS	350	1271	CRCSV22	GOW3A	4.95	2.44
0077	E	CONC CHNL 20W 6D 0:1 SS	1229	1271	CRCSV22	GOW3A	4.95	6.11

Highlighted facilities indicate near project site.

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq. mi.)	Channel Slope (%) **
GOL3 0100	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3	200	1271	CRCSV22	GOW3A	4.99	5.67
0115	E	CONC CHNL 20W 10D 0:1 SS	670	666	DET26	GOW3A	4.31	0.29
0128	E	96" RCP OUTLET		3515	VL28N	GOW3A	4.31	
0137	E	305 AC-FT VILLAGE 26 DETENTION BASIN	2720	3515	VL28N	GOW3A	4.31	6.50
0188	E	CONC CHNL 20W 7 5D 0:1 SS	563	3515	VL28N	GOW3A	4.31	3.51
0197	E	CONC CHNL 20W 8D 0:1 SS	890	3515	VL28N	GOW3A	4.31	0.88
0214	E	14' X 14' RCB	124	3515	VL28N	GOW3A	4.31	0.57
0216	P0	Dual 10' X 14' RCB	4060	3524	CSV26-1	GOW3A	4.02	6.68
0289	P0	CONC CHNL 50W 3 5D 2:1 SS	6215	2281	30	GOW3A	2.44	7.55
0290	E	NATURAL WASH 363W	4850	1410	SV26-1	GOW3A	1.59	22.50
0370	E	NATURAL WASH 450W	7000	2281	30	GOW3A	2.44	8.50
GOL4 0000	E	GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4	554	2243	CLMT1R	GOW3A	2.33	2.50
0010	E	14' X 8' RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
0025	E	2' 9' X 8' RCB	320	2243	CLMT1R	GOW3A	2.33	2.00
0026	E	SOIL CEMENT C-CHL 60W 8D 3 4:1 SS	700	2243	CLMT1R	GOW3A	2.33	1.00
	E	SOIL CEMENT C-CHL 42W 6D 3 4:1 SS						



2018 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE
FACILITY INVENTORY
FIGURE F-22

L ID (Facility Identifier)
E Parent Stream Name
G Stream Name
E Mile
N Distance Above Confluence
D with Parent Stream (Miles)
Miles in Hundredths

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

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

Construction Features
Cast in Place Concrete Pipe..... CIPCP
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..... RCPCL
Storm Sewer Pipe..... SSP



RICHMOND AMERICAN HOMES
SUMMERLIN VILLAGE 21 PARCEL K
FACILITIES TABLE

DATE: JULY 2019

DRAFTER: GND

DESIGNER: GND

CHECKED: ARP

PROJECT NO.

RAH1908.000

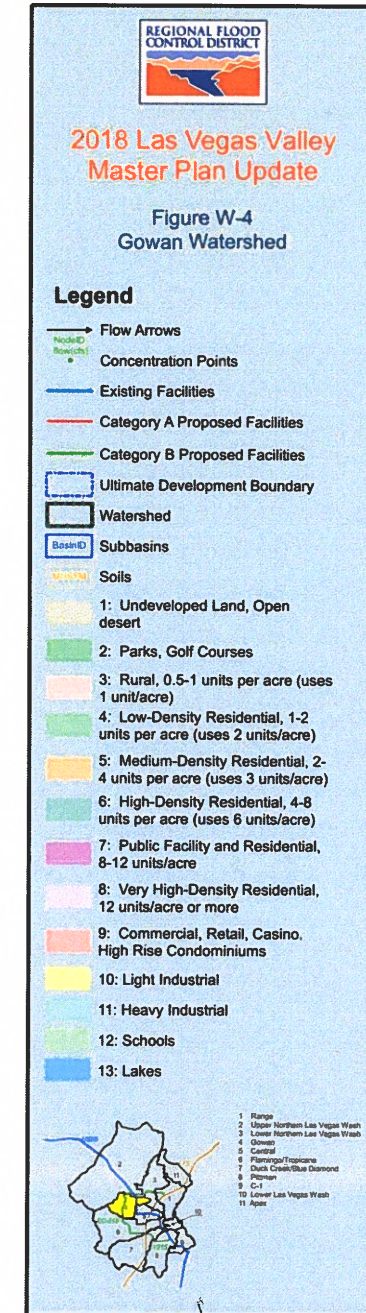
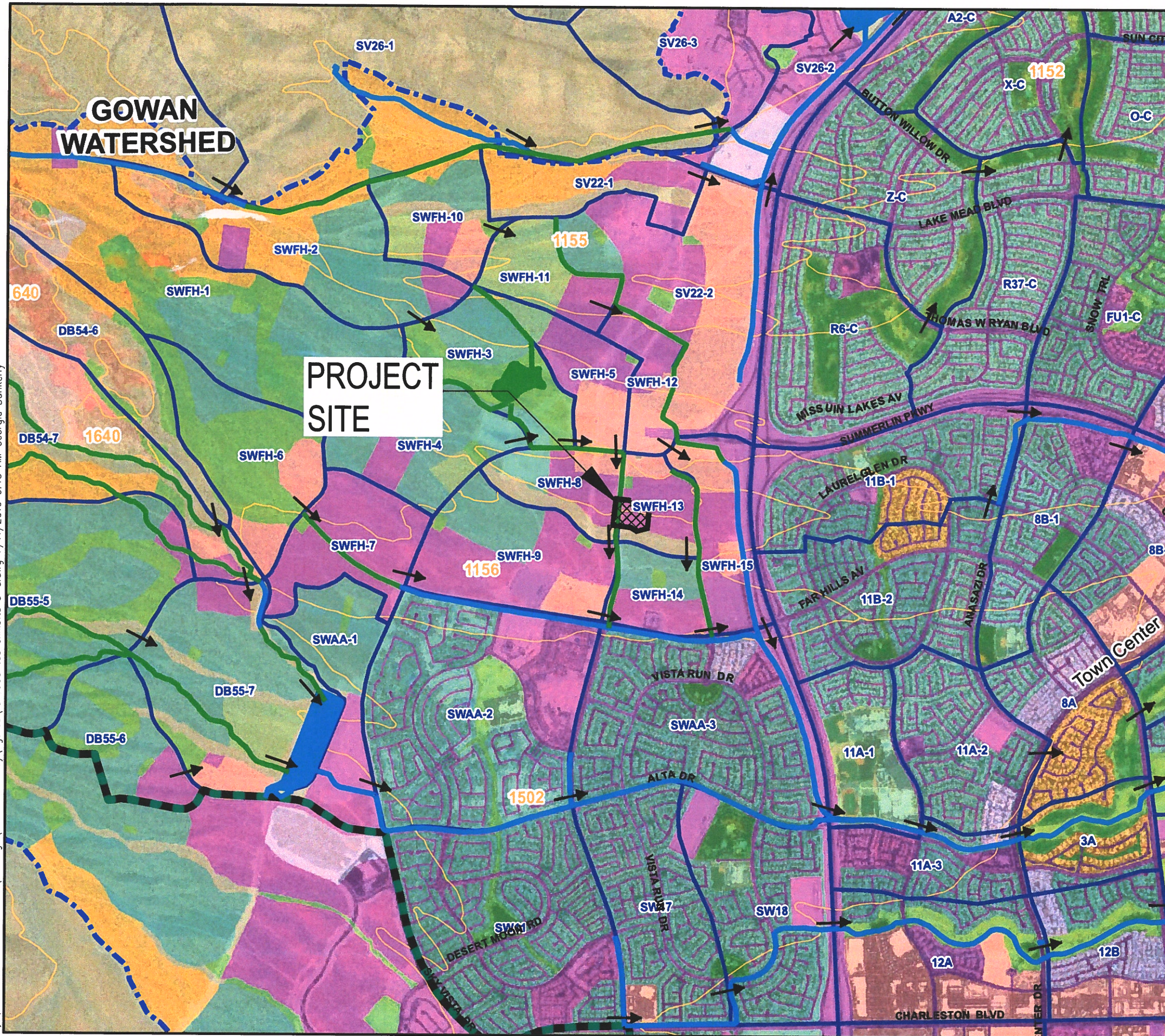
EXHIBIT C2

SHEET 1 OF 1

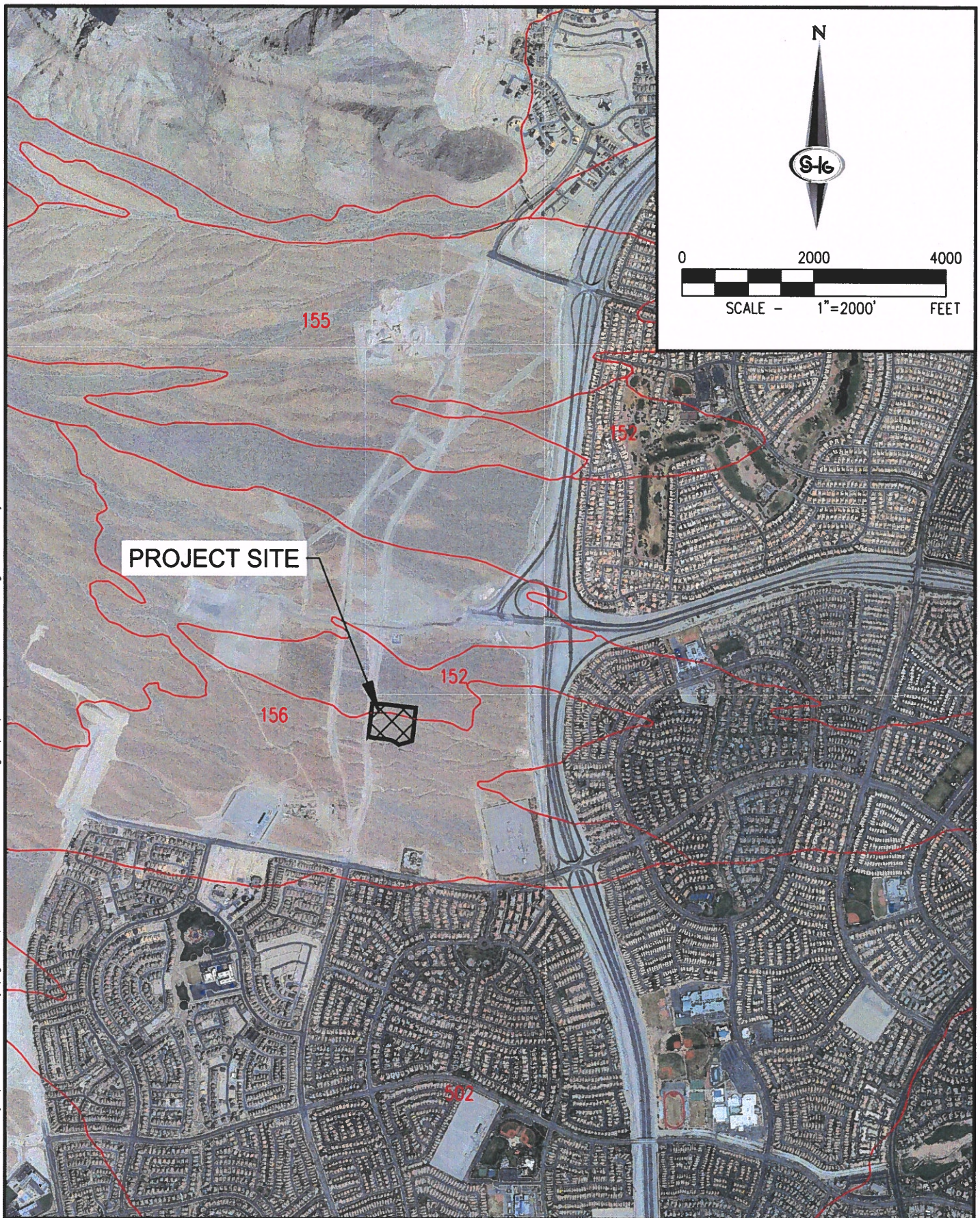


5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

j:\rah1908 summerlin 21-k\drainage\technical study\figures\rah1908 tds exhibits a-d.dwg 7/11/2019 9:15 AM Georgia Dunkerly



j:\rah1908 summerlin 21-k\drainage\technical study\figures\rah1908 tds exhibit d.dwg 7/11/2019 8:41 AM Georgia Dunkerly



S-I-G **SLATER HANIFAN GROUP**
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

RICHMOND AMERICAN HOMES
SUMMERLIN VILLAGE 21 PARCEL K
SOIL MAP

DATE: JULY 2019	PROJECT NO. RAH1908.000
DRAFTER: GND	
DESIGNER: GND	
CHECKED: ARP	EXHIBIT D SHEET 1 OF 1

APPENDIX B

FlowMaster Hydraulic Computations

Interior Street Sections

Worksheet for A1 (Min Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.60 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+15.00	0.42
0+27.50	0.17
0+27.50	0.13
0+28.67	0.00
0+28.67	0.06
0+29.65	0.38
0+30.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Options

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

Worksheet for A1 (Min Slope)

Results

Normal Depth		0.36	ft
Elevation Range	0.00 to 0.42	ft	
Flow Area		2.79	ft ²
Wetted Perimeter		23.57	ft
Hydraulic Radius		0.12	ft
Top Width		23.25	ft
Normal Depth		0.36	ft
Critical Depth		0.35	ft
Critical Slope		0.00729	ft/ft
Velocity		1.79	ft/s
Velocity Head		0.05	ft
Specific Energy		0.41	ft
Froude Number		0.91	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.35	ft
Channel Slope	0.60	%
Critical Slope	0.00729	ft/ft

Project Description

Manning Formula

Normal Depth

5.00 ft³/s

Worksheet for A1 (Max Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.85 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+15.00	0.42
0+27.50	0.17
0+27.50	0.13
0+28.67	0.00
0+28.67	0.06
0+29.65	0.38
0+30.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Options

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

Worksheet for A1 (Max Slope)

Results

Normal Depth		0.35	ft
Elevation Range	0.00 to 0.42		ft
Flow Area		2.44	ft ²
Wetted Perimeter		21.90	ft
Hydraulic Radius		0.11	ft
Top Width		21.60	ft
Normal Depth		0.35	ft
Critical Depth		0.35	ft
Critical Slope		0.00727	ft/ft
Velocity		2.05	ft/s
Velocity Head		0.07	ft
Specific Energy		0.41	ft
Froude Number		1.08	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.35	ft
Channel Slope	0.85	%
Critical Slope	0.00727	ft/ft

Project Description

Manning Formula

Normal Depth

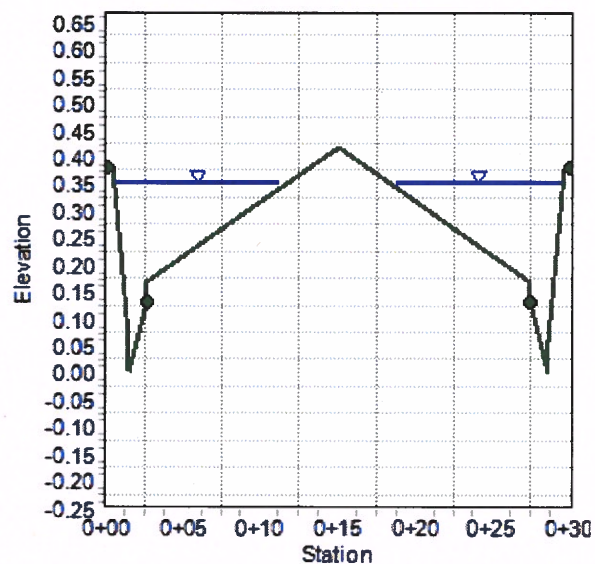
Input Data

0.85 %

0.35 ft

5.00 ft³/s

Cross Section Image



Worksheet for A2 (Min Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.87 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+18.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+18.00, 0.48)	0.016

Options

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

Results

Normal Depth 0.35 ft
Elevation Range 0.00 to 0.48 ft
Flow Area 1.30 ft²
Wetted Perimeter 11.35 ft
Hydraulic Radius 0.11 ft

Worksheet for A2 (Min Slope)

Results

Top Width	11.19	ft
Normal Depth	0.35	ft
Critical Depth	0.43	ft
Critical Slope	0.00669	ft/ft
Velocity	3.85	ft/s
Velocity Head	0.23	ft
Specific Energy	0.58	ft
Froude Number	1.99	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.43	ft
Channel Slope	2.87	%
Critical Slope	0.00669	ft/ft

Cross Section for A2 (Min Slope)

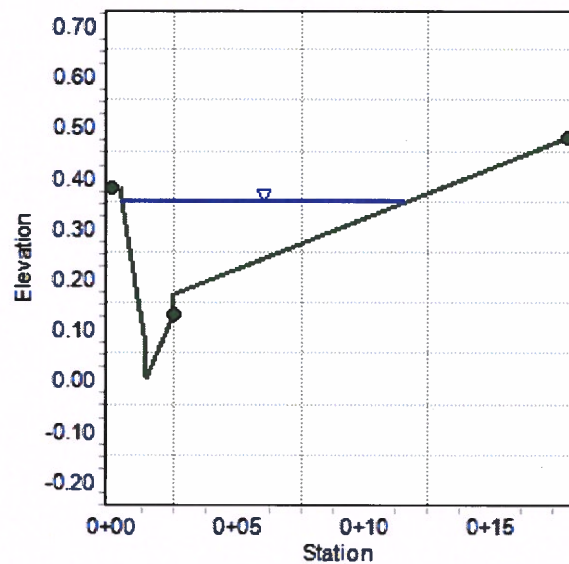
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.87 %
Normal Depth 0.35 ft
Discharge 5.00 ft³/s

Cross Section Image



Worksheet for A2 (Max Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 6.15 %
Discharge 5.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+18.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+18.00, 0.48)	0.016

Options

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

Results

Normal Depth 0.32 ft
Elevation Range 0.00 to 0.48 ft
Flow Area 0.97 ft²
Wetted Perimeter 9.62 ft
Hydraulic Radius 0.10 ft

Worksheet for A2 (Max Slope)

Results

Top Width	9.47	ft
Normal Depth	0.32	ft
Critical Depth	0.43	ft
Critical Slope	0.00664	ft/ft
Velocity	5.18	ft/s
Velocity Head	0.42	ft
Specific Energy	0.74	ft
Froude Number	2.86	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.43	ft
Channel Slope	6.15	%
Critical Slope	0.00664	ft/ft

Cross Section for A2 (Max Slope)

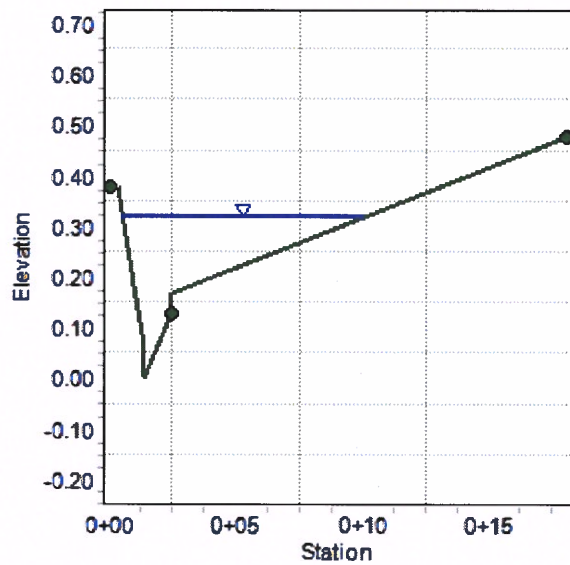
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.15	%
Normal Depth	0.32	ft
Discharge	5.00	ft ³ /s

Cross Section Image



Worksheet for B

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.87 %
Discharge 2.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+18.00	0.48

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+18.00, 0.48)	0.016

Options

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

Results

Normal Depth 0.28 ft
Elevation Range 0.00 to 0.48 ft
Flow Area 0.63 ft²
Wetted Perimeter 7.51 ft
Hydraulic Radius 0.08 ft

Worksheet for B

Results

Top Width	7.36	ft
Normal Depth	0.28	ft
Critical Depth	0.33	ft
Critical Slope	0.00731	ft/ft
Velocity	3.17	ft/s
Velocity Head	0.16	ft
Specific Energy	0.44	ft
Froude Number	1.91	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.28	ft
Critical Depth	0.33	ft
Channel Slope	2.87	%
Critical Slope	0.00731	ft/ft

Cross Section for B

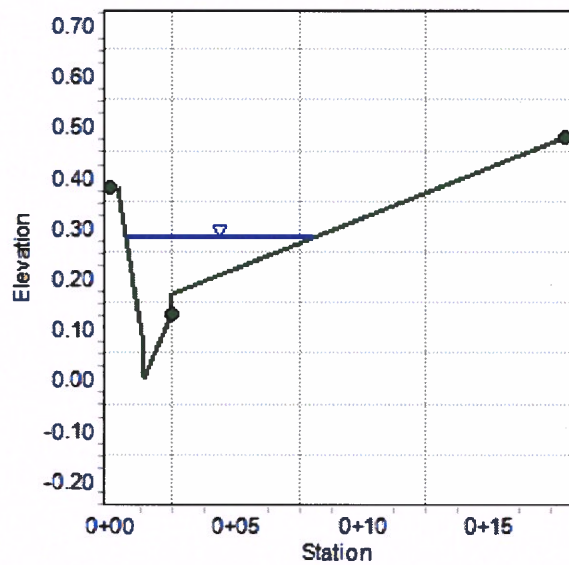
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.87 %
Normal Depth	0.28 ft
Discharge	2.00 ft ³ /s

Cross Section Image



Project Description

Manning Formula

Normal Depth

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.00
0+01.33	0.00
0+02.50	0.13
0+02.50	0.13
0+15.00	0.42
0+27.50	0.13
0+27.50	0.13
0+28.67	0.00
0+28.67	0.00
0+29.65	0.38
0+30.00	0.38

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Pavlovskii's Method

Worksheet for D

Results

Normal Depth		0.49	ft
Elevation Range	0.00 to 0.42 ft		
Flow Area		6.45	ft ²
Wetted Perimeter		30.54	ft
Hydraulic Radius		0.21	ft
Top Width		30.00	ft
Normal Depth		0.49	ft
Critical Depth		0.49	ft
Critical Slope		0.00600	ft/ft
Velocity		2.63	ft/s
Velocity Head		0.11	ft
Specific Energy		0.60	ft
Froude Number		1.00	
Flow Type	Critical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.49	ft
Channel Slope	0.60	%
Critical Slope	0.00600	ft/ft

Cross Section for D

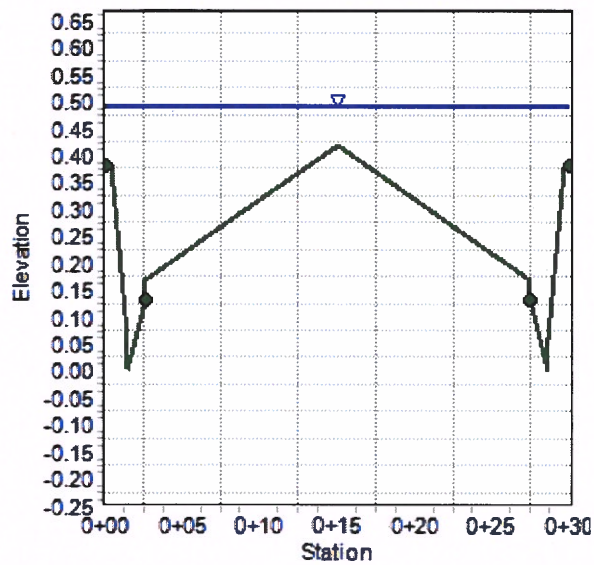
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Normal Depth	0.49	ft
Discharge	17.00	ft ³ /s

Cross Section Image



Worksheet for E

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 6.15 %
Discharge 2.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+15.00	0.42
0+27.50	0.17
0+27.50	0.13
0+28.67	0.00
0+28.67	0.06
0+29.65	0.38
0+30.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Options

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

Worksheet for E

Results

Normal Depth		0.21	ft
Elevation Range	0.00 to 0.42 ft		
Flow Area		0.49	ft²
Wetted Perimeter		7.60	ft
Hydraulic Radius		0.06	ft
Top Width		7.33	ft
Normal Depth		0.21	ft
Critical Depth		0.28	ft
Critical Slope		0.00739	ft/ft
Velocity		4.05	ft/s
Velocity Head		0.26	ft
Specific Energy		0.47	ft
Froude Number		2.76	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.28	ft
Channel Slope	6.15	%
Critical Slope	0.00739	ft/ft

Cross Section for E

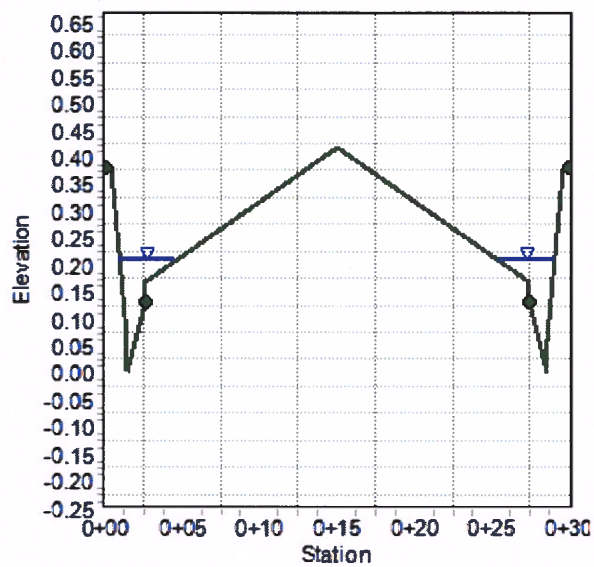
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.15 %
Normal Depth	0.21 ft
Discharge	2.00 ft ³ /s

Cross Section Image



Worksheet for F (Min Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.60 %
Discharge 21.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+15.00	0.42
0+27.50	0.17
0+27.50	0.13
0+28.67	0.00
0+28.67	0.06
0+29.65	0.38
0+30.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Options

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

Worksheet for F (Min Slope)

Results

Normal Depth	0.52	ft
Elevation Range	0.00 to 0.42 ft	
Flow Area	7.33	ft²
Wetted Perimeter	30.60	ft
Hydraulic Radius	0.24	ft
Top Width	30.00	ft
Normal Depth	0.52	ft
Critical Depth	0.52	ft
Critical Slope	0.00573	ft/ft
Velocity	2.87	ft/s
Velocity Head	0.13	ft
Specific Energy	0.65	ft
Froude Number	1.02	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	ft
Critical Depth	0.52	ft
Channel Slope	0.60	%
Critical Slope	0.00573	ft/ft

Cross Section for F (Min Slope)

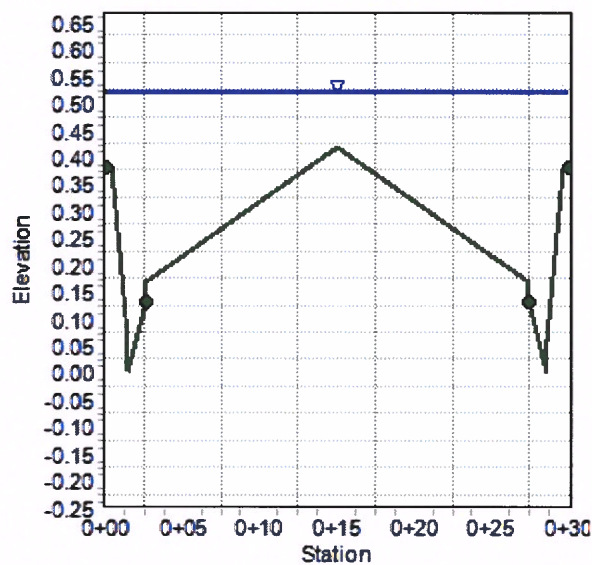
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.60	%
Normal Depth	0.52	ft
Discharge	21.00	ft ³ /s

Cross Section Image



Worksheet for F (Max Slope)

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.55 %
Discharge 21.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.38
0+00.35	0.38
0+01.33	0.06
0+01.33	0.00
0+02.50	0.13
0+02.50	0.17
0+15.00	0.42
0+27.50	0.17
0+27.50	0.13
0+28.67	0.00
0+28.67	0.06
0+29.65	0.38
0+30.00	0.38

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.38)	(0+02.50, 0.13)	0.013
(0+02.50, 0.13)	(0+27.50, 0.13)	0.016
(0+27.50, 0.13)	(0+30.00, 0.38)	0.013

Options

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

Worksheet for F (Max Slope)

Results

Normal Depth	0.46	ft
Elevation Range	0.00 to 0.42	ft
Flow Area	5.51	ft ²
Wetted Perimeter	30.48	ft
Hydraulic Radius	0.18	ft
Top Width	30.00	ft
Normal Depth	0.46	ft
Critical Depth	0.52	ft
Critical Slope	0.00573	ft/ft
Velocity	3.81	ft/s
Velocity Head	0.23	ft
Specific Energy	0.68	ft
Froude Number	1.57	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.52	ft
Channel Slope	1.55	%
Critical Slope	0.00573	ft/ft

Cross Section for F (Max Slope)

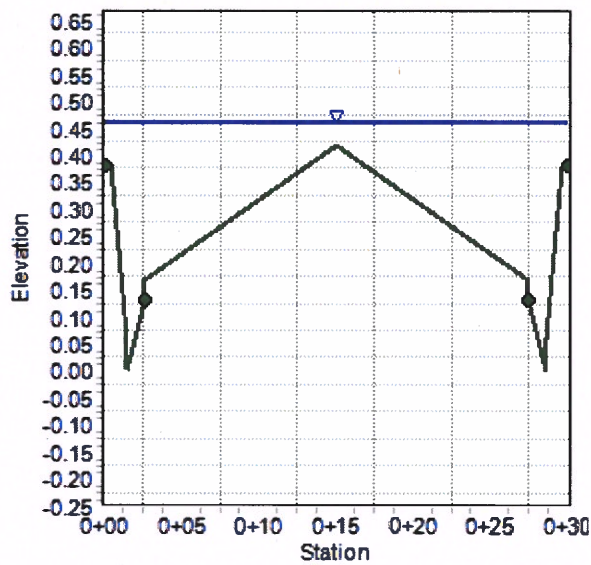
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.55	%
Normal Depth	0.46	ft
Discharge	21.00	ft ³ /s

Cross Section Image



Perimeter Street Sections

Worksheet for SECTION 1: KINDLE CORNER

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 6.56 %
Discharge 9.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+16.00	0.45
0+30.00	0.17
0+30.00	0.13
0+31.50	0.00
0+31.50	0.48
0+32.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+30.00, 0.13)	0.016
(0+30.00, 0.13)	(0+32.00, 0.50)	0.013

Options

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

Worksheet for SECTION 1: KINDLE CORNER

Results

Normal Depth		0.31	ft
Elevation Range	0.00 to 0.50 ft		
Flow Area		1.73	ft²
Wetted Perimeter		17.78	ft
Hydraulic Radius		0.10	ft
Top Width		17.07	ft
Normal Depth		0.31	ft
Critical Depth		0.42	ft
Critical Slope		0.00685	ft/ft
Velocity		5.21	ft/s
Velocity Head		0.42	ft
Specific Energy		0.73	ft
Froude Number		2.89	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.42	ft
Channel Slope	6.56	%
Critical Slope	0.00685	ft/ft

Cross Section for SECTION 1: KINDLE CORNER

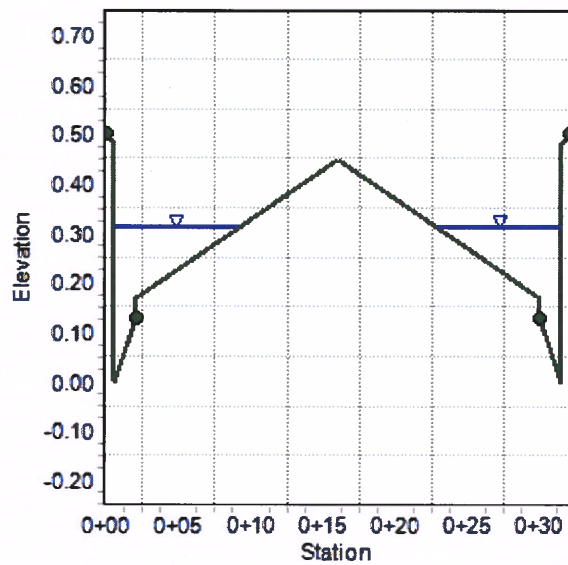
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	6.56	%
Normal Depth	0.31	ft
Discharge	9.00	ft ³ /s

Cross Section Image



Worksheet for SECTION 2: DESERT FOOTHILLS

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 1.50 %
Discharge 6.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.00	1.19
0+29.50	1.21

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.13)	0.013
(0+02.00, 0.13)	(0+29.00, 0.71)	0.016
(0+29.00, 0.71)	(0+29.50, 1.21)	0.013

Options

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

Results

Normal Depth 0.41 ft
Elevation Range 0.00 to 1.21 ft
Flow Area 1.92 ft²

Worksheet for SECTION 2: DESERT FOOTHILLS

Results

Wetted Perimeter	13.81	ft
Hydraulic Radius	0.14	ft
Top Width	13.36	ft
Normal Depth	0.41	ft
Critical Depth	0.45	ft
Critical Slope	0.00675	ft/ft
Velocity	3.13	ft/s
Velocity Head	0.15	ft
Specific Energy	0.56	ft
Froude Number	1.45	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.45	ft
Channel Slope	1.50	%
Critical Slope	0.00675	ft/ft

Cross Section for SECTION 2: DESERT FOOTHILLS

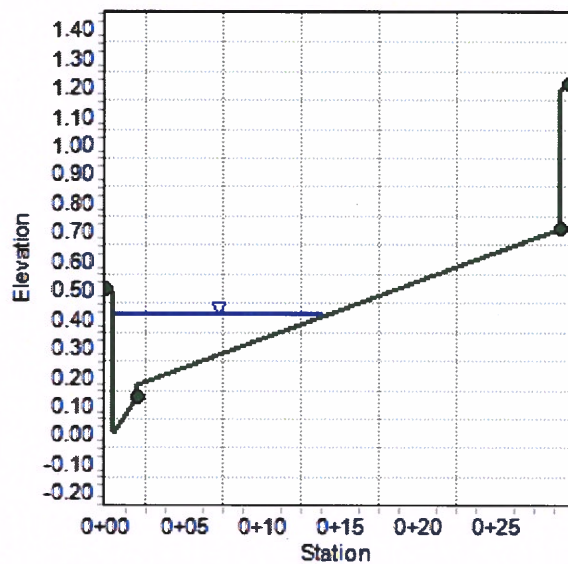
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.50	%
Normal Depth	0.41	ft
Discharge	6.00	ft ³ /s

Cross Section Image



Other Sections

Worksheet for C

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 2.90 %
Discharge 6.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	14.67
0+01.00	14.67
0+45.00	1.00
0+50.00	0.00
0+55.00	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 14.67)	(0+55.00, 1.00)	0.020

Options

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

Results

Normal Depth 0.49 ft
Elevation Range 0.00 to 14.67 ft
Flow Area 1.22 ft²
Wetted Perimeter 5.04 ft
Hydraulic Radius 0.24 ft
Top Width 4.94 ft
Normal Depth 0.49 ft
Critical Depth 0.62 ft

Worksheet for C

Results

Critical Slope	0.00885	ft/ft
Velocity	4.92	ft/s
Velocity Head	0.38	ft
Specific Energy	0.87	ft
Froude Number	1.74	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.49	ft
Critical Depth	0.62	ft
Channel Slope	2.90	%
Critical Slope	0.00885	ft/ft

Cross Section for C

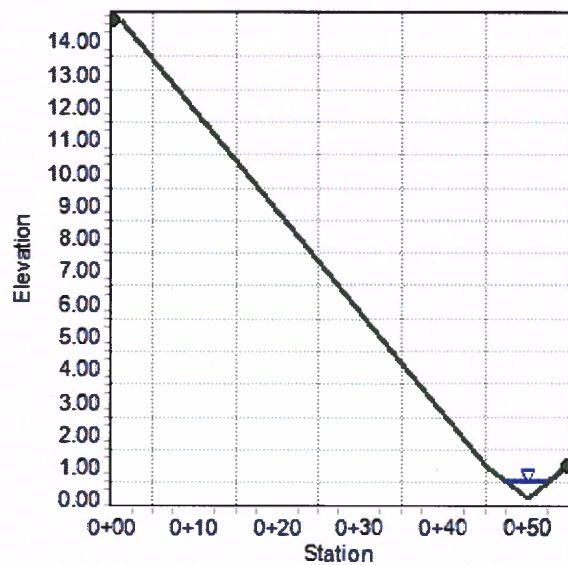
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	2.90	%
Normal Depth	0.49	ft
Discharge	6.00	ft ³ /s

Cross Section Image



Worksheet for EO: Emergency Overflow (Weir)

Project Description

Solve For Headwater Elevation

Input Data

Discharge		21.00	ft³/s
Crest Elevation		0.00	ft
Tailwater Elevation		0.17	ft
Crest Surface Type	Paved		
Crest Breadth		0.50	ft
Crest Length		50.00	ft

Results

Headwater Elevation	0.26	ft
Headwater Height Above Crest	0.26	ft
Tailwater Height Above Crest	0.17	ft
Weir Coefficient	3.09	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	3.09	US
Flow Area	13.23	ft²
Velocity	1.59	ft/s
Wetted Perimeter	50.53	ft
Top Width	50.00	ft

Cross Section for EO: Emergency Overflow (Weir)

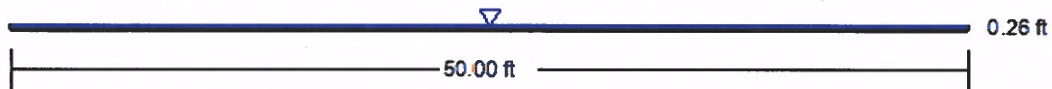
Project Description

Solve For Headwater Elevation

Input Data

Discharge		21.00	ft ³ /s
Headwater Elevation		0.26	ft
Crest Elevation		0.00	ft
Tailwater Elevation		0.17	ft
Crest Surface Type	Paved		
Crest Breadth		0.50	ft
Crest Length		50.00	ft

Cross Section Image



V: 1
H: 1

Worksheet for EO: Emergency Overflow (Normal Depth)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.025	
Channel Slope	2.00	%
Bottom Width	50.00	ft
Discharge	21.00	ft³/s

Results

Normal Depth	0.17	ft
Flow Area	8.31	ft²
Wetted Perimeter	50.33	ft
Hydraulic Radius	0.17	ft
Top Width	50.00	ft
Critical Depth	0.18	ft
Critical Slope	0.01639	ft/ft
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.27	ft
Froude Number	1.09	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.17	ft
Critical Depth	0.18	ft
Channel Slope	2.00	%
Critical Slope	0.01639	ft/ft

Cross Section for EO: Emergency Overflow (Normal Depth)

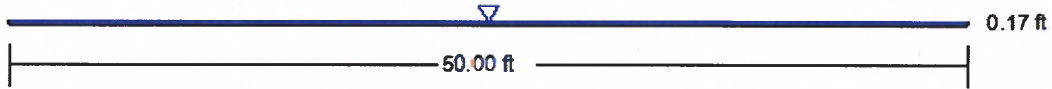
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.025
Channel Slope	2.00 %
Normal Depth	0.17 ft
Bottom Width	50.00 ft
Discharge	21.00 ft ³ /s

Cross Section Image



V: 1 
H: 1

APPENDIX C

Drop Inlet & Storm Drain Computations

Curb Inlet Sizing Computation



Project Name & Number: RAH1908: MORO ROCK (SUMM V21 PARCEL K)
 Date: 8/26/2019
 By: CAA

Notes:

Facility ID: SDDI#1
 Drainage Condition: Proposed
 Source of Flow: Q100 = Basin K(a+b+c+d+e+f)
 Design Flow (cfs): 21.0
 Inlet Type: Type CM2 (Sump)
 Inlet Length: 12.5-ft
 Number of Grates: 4

Input:

Variable:

Input:

Depth at Inlet (ft)	D	0.67
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	9.8
Length of Curb Opening (ft)	L_c	12.00
Height of Curb Opening (ft)	H	0.50
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50

Output (Grate):

Equation:

Output (Grate):

Effective Weir Length (ft)	$2*W + L_g$	12.75
Adjusted Effective Weir Length (ft)	$2*(1 - CF_g/100)*W + (1 - CF_g/100)*L_g$	6.38
Grate Open Area (sf)	$W*L_g$	14.63
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1 - CF_g/100)$	4.39
Controlling Flow Type (weir/orifice)	If $D < 1.792*(Adj. Grate Open Area/Adj. Eff. Length)$ use weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_g*(Adj. Eff. Weir Length)*D^{1.5}$ orifice: $O_c*(Adj. Grate Open Area)*(64.4*D)^{0.5}$	10.4

Output (Curb):

Equation:

Output (Curb):

Effective Weir Length (ft)	$L + 1.8*W$	14.70
Adjusted Effective Weir Length (ft)	$L + 1.8(1 - CF_c/100)*W$	13.41
Curb Open Area (sf)	$L*H$	6.00
Adjusted Curb Open Area (sf)	Curb Open Area * $(1 - CF_c/100)$	3.00
Controlling Flow Type (weir/orifice)	If $D < H$, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(Adj. Eff. Weir Length)*D^{1.5}$ orifice: $O_c*(Adj. Curb Open Area)*(64.4*(D - H/2))^{0.5}$	13.13

Output (Total):

Equation:

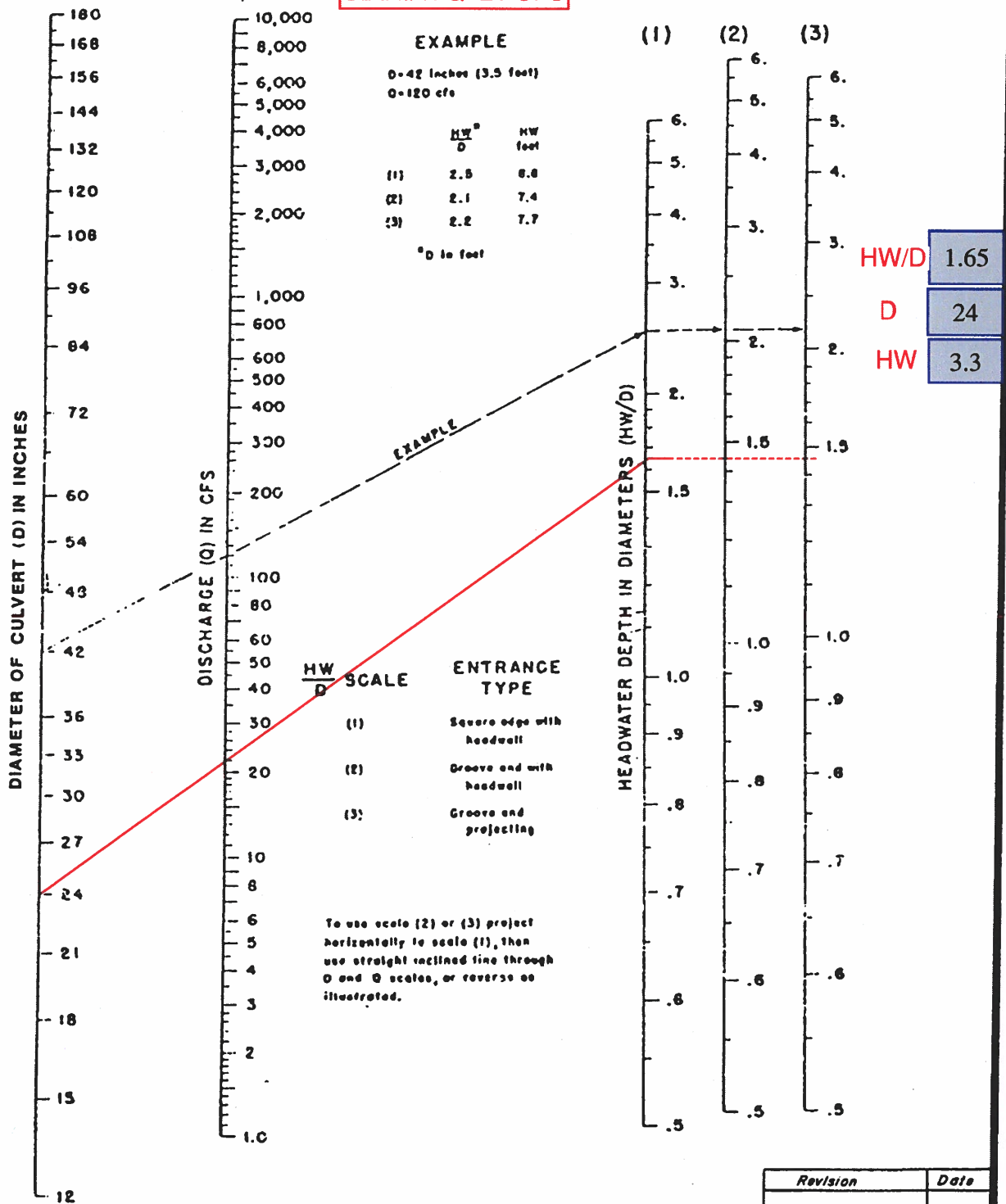
Output (Total):

Capacity Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	23.5
---------------------------------	--	------

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

SDDI#1: Q=21 CFS



Revision	Date

WRC
ENGINEERING

REFERENCE:

USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

Project Name: Moro Rock (Summerlin Village 21 Parcel K)
 Project Number: RAH1908
 Date: 8/26/2019
 By: CAA



STORM SEWER HYDRAULIC CALCULATIONS

STATION			CONDUIT DATA				FLOW DATA							LOSS		HGL		COMMENTS	
FROM	TO	SIZE / TYPE	n Manning's Roughness	INVERTS		LENGTH	A (FT ²)	R (FT)	Φ	Q (CFS)	V (FPS)	H _v = V ² /2g (FT)	S _f (FT/FT)	PIPE	H _f (FT)	D/S HGL ELEV.*	U/S HGL ELEV.	PRESS. FLOW?	OTHER
				D / S ELEV.	U / S ELEV.														
1000.00	1040.42	Round 24" RCP	0.013	3322.73	3323.44	40.42	3.1416	0.50	0.004925	21	6.6845	0.6938	0.00859	0.347		3334.27	3334.62	Yes	SDDI #1 LATERAL
Sf = Φ Hv / R ^{1.33} Φ = 2g (n ²) / 2.21 1 - Where pipes are not under pressure, assume U/S HGL is at top of pipe																			

*STARTING HGL IS ASSUMED AS 1-FT BELOW THE RIM ELEVATION OF THE CONNECTING MANHOLE (EX SDMH 6) IN KINDLE CORNER AVENUE

APPENDIX D

Finished Floor Analyses

RAH1908: MORO ROCK (SUMMERLIN VILLAGE 21 PARCEL K) - TDS FINISH FLOOR - CITY OF LAS VEGAS JURISDICTION										
INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C ¹ (ft)	F/L ² (ft)	D ₁₀₀ (ft)	Flowline F.F. _{min} ³ (ft)	T/C + 6" F.F. _{min} ⁴ (ft)	F.F. _{Design} (ft)	Flowline Check	T/C + 6" Check	See References on Last Sheet
1	A1	3359.22	3358.84	0.36	3359.56	3359.72	3361.0	OK	OK	
2	A1	3359.35	3358.97	0.36	3359.69	3359.85	3361.0	OK	OK	
3	A1	3359.56	3359.18	0.36	3359.90	3360.06	3361.4	OK	OK	
4	A1	3359.78	3359.40	0.36	3360.12	3360.28	3361.4	OK	OK	
5	A1	3360.17	3359.79	0.36	3360.51	3360.67	3362.0	OK	OK	
6	A1	3360.39	3360.01	0.36	3360.73	3360.89	3362.0	OK	OK	
7	A1	3360.54	3360.16	0.36	3360.88	3361.04	3362.3	OK	OK	
8	A1	3360.70	3360.32	0.36	3361.04	3361.20	3362.3	OK	OK	
9	A1	3360.85	3360.47	0.36	3361.19	3361.35	3362.6	OK	OK	
10	A1	3361.01	3360.63	0.36	3361.35	3361.51	3362.6	OK	OK	
11	E	3359.48	3359.10	0.21	3359.52	3359.98	3360.5	OK	OK	
12	E	3358.48	3358.10	0.21	3358.52	3358.98	3360.5	OK	OK	
13	E	3357.20	3356.82	0.21	3357.24	3357.70	3358.2	OK	OK	
14	E	3355.66	3355.28	0.21	3355.70	3356.16	3358.2	OK	OK	
15	E	3354.07	3353.69	0.21	3354.11	3354.57	3355.0	OK	OK	
16	E	3352.48	3352.10	0.21	3352.52	3352.98	3355.0	OK	OK	
17	E	3350.89	3350.51	0.21	3350.93	3351.39	3351.9	OK	OK	
18	E	3349.30	3348.92	0.21	3349.34	3349.80	3351.9	OK	OK	
19	E	3347.71	3347.33	0.21	3347.75	3348.21	3348.7	OK	OK	
20	E	3346.13	3345.75	0.21	3346.17	3346.63	3348.7	OK	OK	
21	E	3344.54	3344.16	0.21	3344.58	3345.04	3345.5	OK	OK	
22	E	3343.04	3342.66	0.21	3343.08	3343.54	3345.5	OK	OK	
23	E	3341.69	3341.31	0.21	3341.73	3342.19	3342.7	OK	OK	
24	E	3340.49	3340.11	0.21	3340.53	3340.99	3342.7	OK	OK	
25	F	3338.23	3337.85	0.52	3338.89	3338.73	3340.1	OK	OK	
26	F	3338.49	3338.11	0.52	3339.15	3338.99	3340.1	OK	OK	
27	F	3338.68	3338.30	0.52	3339.34	3339.18	3340.4	OK	OK	
28	F	3338.83	3338.45	0.52	3339.49	3339.33	3340.4	OK	OK	
29	F	3338.98	3338.60	0.52	3339.64	3339.48	3340.7	OK	OK	
30	D	3339.13	3338.75	0.49	3339.73	3339.63	3340.7	OK	OK	
31	D	3339.29	3338.91	0.49	3339.89	3339.79	3341.1	OK	OK	
32	D	3339.45	3339.07	0.49	3340.05	3339.95	3341.1	OK	OK	
33	D	3339.61	3339.23	0.49	3340.21	3340.11	3341.4	OK	OK	
34	D	3339.77	3339.39	0.49	3340.37	3340.27	3341.4	OK	OK	
35	D	3340.02	3339.64	0.49	3340.62	3340.52	3341.8	OK	OK	
36	D	3340.18	3339.80	0.49	3340.78	3340.68	3341.8	OK	OK	
37	D	3340.35	3339.97	0.49	3340.95	3340.85	3342.1	OK	OK	
38	D	3340.50	3340.12	0.49	3341.10	3341.00	3342.1	OK	OK	
39	D	3340.65	3340.27	0.49	3341.25	3341.15	3342.4	OK	OK	
40	D	3340.80	3340.42	0.49	3341.40	3341.30	3342.4	OK	OK	
41	B	3341.48	3341.10	0.28	3341.66	3341.98	3343.1	OK	OK	
42	B	3342.22	3341.84	0.28	3342.40	3342.72	3343.1	OK	OK	
43	B	3342.97	3342.59	0.28	3343.15	3343.47	3344.6	OK	OK	
44	B	3343.71	3343.33	0.28	3343.89	3344.21	3344.6	OK	OK	
45	B	3344.45	3344.07	0.28	3344.63	3344.95	3346.1	OK	OK	
46	B	3345.19	3344.81	0.28	3345.37	3345.69	3346.1	OK	OK	
47	B	3346.04	3345.66	0.28	3346.22	3346.54	3347.9	OK	OK	
48	B	3347.03	3346.65	0.28	3347.21	3347.53	3347.9	OK	OK	
49	B	3348.16	3347.78	0.28	3348.34	3348.66	3350.3	OK	OK	
50	B	3349.44	3349.06	0.28	3349.62	3349.94	3350.3	OK	OK	
51	B	3350.87	3350.49	0.28	3351.05	3351.37	3353.3	OK	OK	
52	B	3352.41	3352.03	0.28	3352.59	3352.91	3353.3	OK	OK	
53	B	3353.94	3353.56	0.28	3354.12	3354.44	3356.4	OK	OK	
54	B	3355.47	3355.09	0.28	3355.65	3355.97	3356.4	OK	OK	
55	B	3357.02	3356.64	0.28	3357.20	3357.52	3359.4	OK	OK	
56	B	3358.45	3358.07	0.28	3358.63	3358.95	3359.4	OK	OK	
57	B	3359.62	3359.24	0.28	3359.80	3360.12	3361.2	OK	OK	
58	B	3360.25	3359.87	0.28	3360.43	3360.75	3361.2	OK	OK	
59	A2	3356.12	3355.74	0.36	3356.46	3356.62	3357.1	OK	OK	
60	A2	3354.55	3354.17	0.36	3354.89	3355.05	3357.1	OK	OK	
61	A2	3352.73	3352.35	0.36	3353.07	3353.23	3353.7	OK	OK	
62	A2	3351.05	3350.67	0.36	3351.39	3351.55	3353.7	OK	OK	

[illegible]

1: Top of Curb at High Side of Lot

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

3: Minimum Allowable Finished Floor Elevation at

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.

The finished floor shall be set a vertical distance of at least 8-inches above the highest adjacent top of curb.

**RAH1908: MORO ROCK (SUMMERLIN VILLAGE 21 PARCEL K) - TDS
FINISH FLOOR ANALYSIS - 2X Depth of Flow**

INPUT INFORMATION				FINISHED FLOORS			NOTES
Building Number	Hydraulic Section Utilized	F/L ¹ (ft)	D ₁₀₀ (ft)	Flowline F.F. _{-min} ² (ft)	F.F. _{-Design} (ft)	Flowline Check	See References on Last Sheet
59	C	3356.00	0.49	3356.98	3357.10	OK	
60	C	3356.00	0.49	3356.98	3357.10	OK	
61	C	3352.50	0.49	3353.48	3353.70	OK	
62	C	3351.50	0.49	3352.48	3353.70	OK	
63	C	3349.40	0.49	3350.38	3350.60	OK	
64	C	3348.20	0.49	3349.18	3350.60	OK	
65	C	3347.00	0.49	3347.98	3348.20	OK	
66	C	3346.05	0.49	3347.03	3348.20	OK	
67	C	3345.10	0.49	3346.08	3346.30	OK	
68	C	3343.85	0.49	3344.83	3346.30	OK	
69	C	3342.60	0.49	3343.58	3344.80	OK	
70	C	3342.35	0.49	3343.33	3344.80	OK	
71	C	3342.10	0.49	3343.08	3343.30	OK	
72	C	3341.00	0.49	3341.98	3343.30	OK	
73	C	3341.00	0.49	3341.98	3342.80	OK	
74	C	3342.10	0.49	3343.08	3343.10	OK	
75	C	3342.35	0.49	3343.33	3345.70	OK	
76	C	3342.60	0.49	3343.58	3345.70	OK	
77	C	3343.85	0.49	3344.83	3348.90	OK	
78	C	3345.10	0.49	3346.08	3348.90	OK	
79	C	3346.05	0.49	3347.03	3352.10	OK	
80	C	3347.00	0.49	3347.98	3352.10	OK	
81	C	3348.20	0.49	3349.18	3355.30	OK	
82	C	3349.40	0.49	3350.38	3355.30	OK	
83	C	3351.50	0.49	3352.48	3358.40	OK	
84	C	3352.90	0.49	3353.88	3358.40	OK	
85	C	3356.00	0.49	3356.98	3360.50	OK	
86	C	3356.00	0.49	3356.49	3360.50	OK	

Where:

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

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

City of Henderson 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.

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	DESERT FOOTHILLS	3361.48	3360.98	2	0.41	3361.80	3361.0	CHECK	Yes
2	DESERT FOOTHILLS	3361.74	3361.24	2	0.41	3362.06	3361.0	CHECK	Yes
3	DESERT FOOTHILLS	3362.12	3361.62	2	0.41	3362.44	3361.4	CHECK	Yes
4	DESERT FOOTHILLS	3362.51	3362.01	2	0.41	3362.83	3361.4	CHECK	Yes
5	DESERT FOOTHILLS	3363.20	3362.70	2	0.41	3363.52	3362.0	CHECK	Yes
6	DESERT FOOTHILLS	3363.58	3363.08	2	0.41	3363.90	3362.0	CHECK	Yes
7	DESERT FOOTHILLS	3363.97	3363.47	2	0.41	3364.29	3362.3	CHECK	Yes
8	DESERT FOOTHILLS	3364.36	3363.86	2	0.41	3364.68	3362.3	CHECK	Yes
9	DESERT FOOTHILLS	3364.75	3364.25	2	0.41	3365.07	3362.6	CHECK	Yes
10	DESERT FOOTHILLS	3365.13	3364.63	2	0.41	3365.45	3362.6	CHECK	Yes
11	KINDLE CORNER	3361.11	3360.61	1	0.31	3361.23	3360.5	CHECK	Yes
12	KINDLE CORNER	3359.71	3359.21	1	0.31	3359.83	3360.5	OK	No
13	KINDLE CORNER	3358.06	3357.56	1	0.31	3358.18	3358.2	OK	No
14	KINDLE CORNER	3356.24	3355.74	1	0.31	3356.36	3358.2	OK	No
15	KINDLE CORNER	3354.49	3353.99	1	0.31	3354.61	3355.0	OK	No
16	KINDLE CORNER	3352.68	3352.18	1	0.31	3352.80	3355.0	OK	No
17	KINDLE CORNER	3350.73	3350.23	1	0.31	3350.85	3351.9	OK	No
18	KINDLE CORNER	3348.87	3348.37	1	0.31	3348.99	3351.9	OK	No
19	KINDLE CORNER	3347.00	3346.50	1	0.31	3347.12	3348.7	OK	No
20	KINDLE CORNER	3345.14	3344.64	1	0.31	3345.26	3348.7	OK	No
21	KINDLE CORNER	3343.28	3342.78	1	0.31	3343.40	3345.5	OK	No
22	KINDLE CORNER	3341.41	3340.91	1	0.31	3341.53	3345.5	OK	No
23	KINDLE CORNER	3340.07	3339.57	1	0.31	3340.19	3342.7	OK	No
24	KINDLE CORNER	3337.61	3337.11	1	0.31	3337.73	3342.7	OK	No
24	PEAR LAKE	3338.57	3338.19	F	0.52	3339.23	3342.7	OK	No
59	TOKOPAH	3359.36	3358.98	A1	0.36	3359.70	3357.1	CHECK	Yes
72	PEAR LAKE	3340.27	3339.89	D	0.49	3340.87	3343.3	OK	No
73	PEAR LAKE	3339.51	3339.13	D	0.49	3340.11	3342.8	OK	No
86	TOKOPAH	3360.39	3360.01	A1	0.36	3360.73	3360.5	CHECK	Yes

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

2: 0.36-ft is subtracted from the High TC to obtain 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.

Specific Energy Check							
Lot Number	High TC ¹	High FL ²	Section	Specific Energy ³	Min FF ⁴	Design FF	Check
27	3338.68	3338.30	E	0.65	3338.95	3340.40	OK
28	3338.83	3338.45	E	0.65	3339.10	3340.40	OK
29	3338.83	3338.45	E	0.65	3339.10	3340.70	OK
38	3340.50	3340.12	A2	0.87	3340.99	3342.10	OK
39	3340.65	3340.27	B	0.58	3340.85	3342.40	OK
40	3340.65	3340.27	B	0.58	3340.85	3342.40	OK
55	3357.02	3356.64	A1	0.47	3357.11	3359.40	OK
56	3358.45	3358.07	A1	0.47	3358.54	3359.40	OK
57	3358.45	3358.07	A1	0.47	3358.54	3361.20	OK

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

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

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

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

Emergency Overflow Finish Floor Checks

Hydraulic Section / Drainage Easements Check - Emergency Overflow							
Lot Number	High TC/FL ¹	Section	Flow Depth ²	Min FF ³	Design FF	Check	Solid Grout
24	3337.43	EO	0.26	3337.69	3342.70	OK	No
25	3337.43	EO	0.26	3337.69	3340.10	OK	No

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

2: Flow depth is either normal depth or weir depth (whichever is higher) of the emergency overflow.

3: Min FF is the High TC/FL plus the emergency overflow depth.

APPENDIX E

Reference Material

*Technical Drainage Study Update for the Flood Control Master Plan
Update – Summerlin West Area
by VTN Nevada (DS 4926)*

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		April 17, 2019
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: Summerlin West Planning Area Master Plan Update		COPIES TO: VTN Nevada
Cross Streets:	West of I-215 between Lake Mead Boulevard and Charleston Boulevard	The Howard Hughes Corporation
File Number:	F:\Depot\DSMemos\DS4926H.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-22-000-017	CCRFC
Zoning Action:		CCPW
FEMA Flood Zone	YES ☒ NO	
Proposed Storm Drain	YES ☒ NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	10/9/2017 & 10/25/2017	11/8/2017	Not Approved	\$400.00	490518: \$400
2 nd Submittal	12/6/2017	12/20/2017 & 1/10/2018	Not Approved	\$400.00	492005: \$400
3 rd Submittal	2/27/2018	3/24/2018	Not Approved	\$400.00	493739: \$400
4 th Submittal & Supplement	4/23/2018 & 5/22/2018	5/22/2018	See Comments Below	\$400.00	495223: \$400
CCPW & CCRFC	7/30/2018	7/30/2018	Concurrence Recv'd	N/C	N/C
5 th Submittal	1/3/2019 (Paid on 1/7/2019)	1/30/2019	Not Approved	\$100.00	502286: \$100
6 th Submittal	2/19/2019	3/13/2019	Conditional Approval	\$400.00	503267: \$400
CCPW & CCRFC	4/15/2019	4/17/2019	Concurrence Recv'd	N/C	N/C
TOTAL FEES (LDDRS):				\$2,100.00	----

REMARKS:

5th & 6th Submittals: Update #1 & Addendum #1 to address Land Use Changes in the Summerlin West Planning Area

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. The proposed revision of the overall *Summerlin West Planning Area* (SWPA) will have impact to the various existing downstream regional facilities. All impacted downstream facilities must be modified and substantially completed prior to the onsite development of upstream Villages.

With the exception of ***Summerlin West Villages 21 and 22***, no occupancy permits will be issued to the remaining villages prior to the pertinent downstream facility modifications being completed.

2. The *Study* states that ***Detention Basin 5 (DB5)*** needs additional capacity to accommodate the increased flows from the proposed SWPA revision. An update to the **DB5** technical drainage study must be submitted and approved prior to any upstream Villages development with the exception of Villages 21 and 22.
3. The *Study* states that a portion of the existing *Beltway Channel* between *Far Hills Avenue* and *Summerlin Parkway* requires modification with heightened stem walls. An update to the Western Beltway Channel modification must be submitted and approved prior to any upstream Villages development with the exception of Villages 21 and 22.

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
WSP/AYS

T/R/S: T21S/R69E/22
AREA K-22



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 Concurrence Letter

Date: April 10, 2019
Firm: VTN Nevada
Engineer: Joanna Ayson / Brian Ruiz
Address: 2727 South Rainbow Boulevard, Las Vegas, NV 89146
Phone: (702) 873-7550
Fax: (702) 362-2597
E-mail: jayson@vtnnv.com; bruiz@vtnnv.com

Subject: Update for Summerlin West Planning Area Master Plan Update
Location: West of I-215 between Lake Mead Blvd and Charleston Blvd
APN: 137-21-000-002, 137-26-101-001 and others
Sec, Township, Range: S33 and others T20S, R59E
Flood Zone & Panel: Zone A and Zone X, 2125E and 2150E, Dated September 27, 2002
Application Number: PW19-12378

Submittals	Date Received	Date Returned	Reviewer	Miscellaneous
Update	03/21/2019	04/10/2019	CR	
Addendum 1	03/21/2019	04/10/2019	CR	

The above-referenced project is located within the **City of Las Vegas** adjacent to Clark County unincorporated areas. The drainage study was submitted to the County for concurrence on March 21, 2019. In addition, the County has received the City of Las Vegas acceptance letter dated March 13, 2019 for the Technical Drainage Study (DS4926G).

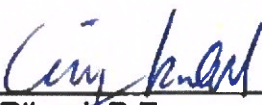
The County concurs with the acceptance of this Drainage Study by the City of Las Vegas. Please note that the County's review of this development is limited to drainage issues significant to Clark County unincorporated areas.

This update addresses; changes to land densities and parcel configurations; addition of drainage channels to Village 27; interim flood control berm to Village 21; revisions to existing washes to be designated as MPU facilities; upsizing Detention Basins DB5 and Grand Central Park to account for increased flow routing. The previously approved Technical Drainage Studies are: PW18-14248.

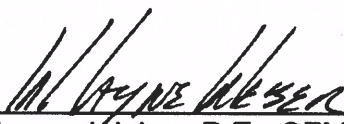
Additional Conditions:

1. The individual Technical Drainage Studies for the areas adjacent to the County to the west of the project site will need to be submitted for County review to verify acceptance of drainage flows.
2. Exhibits in future submittals need to show parcel lines and numbers; entity boundaries; ultimate development boundary; street names; etc.

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.



Crissy Rilander, P.E.
Senior Civil Engineer
Development Review
crissy@ClarkCountyNV.gov



W. Layne Weber, P.E., CFM
Principal Engineer
Development Review
wlweber@ClarkCountyNV.gov



Steven C. Parrish, P.E.
General Manager/Chief
Engineer

BOARD OF DIRECTORS

Lawrence L. Brown, III
Chair
Clark County

Mayor Debra March
Vice-Chair
City of Henderson

George Gault
City of Mesquite

James B. Gibson
Clark County

Mayor Carolyn Goodman
City of Las Vegas

Isaac Barron
City of North Las Vegas

Mayor Pro Tem
Dr. Lois Tarkanian
City of Las Vegas

Mayor Rodney Woodbury
City of Boulder City

April 4, 2019

Mr. Oh Sang Kwon, P.E.
City of Las Vegas Department of Public Works
333 North Rancho Drive
Las Vegas, NV 89106

**DISTRICT CONCURRENCE: SUMMERLIN WEST PLANNING AREA MASTER
PLAN UPDATE
(DS4926G) (RFCD No. 19-11232)**

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated January 3, 2019, and Addendum No. 1 dated February 19, 2019 for above-mentioned project as submitted by VTN NEVADA. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated March 13, 2019.

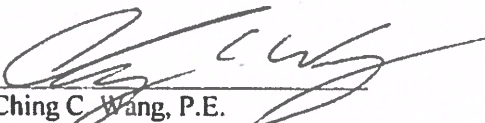
District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage*.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by VTN NEVADA may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

STEVEN C. PARRISH, P.E.
General Manager/Chief Engineer

BY:


Ching C. Wang, P.E.
Senior Civil Engineer

CCW:dd

c: Brian Troy Ruiz, P.E., VTN Nevada
P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\19-11232 doc

Addendum #1 to Update #1 to the FLOOD CONTROL MASTER PLAN UPDATE

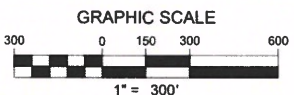
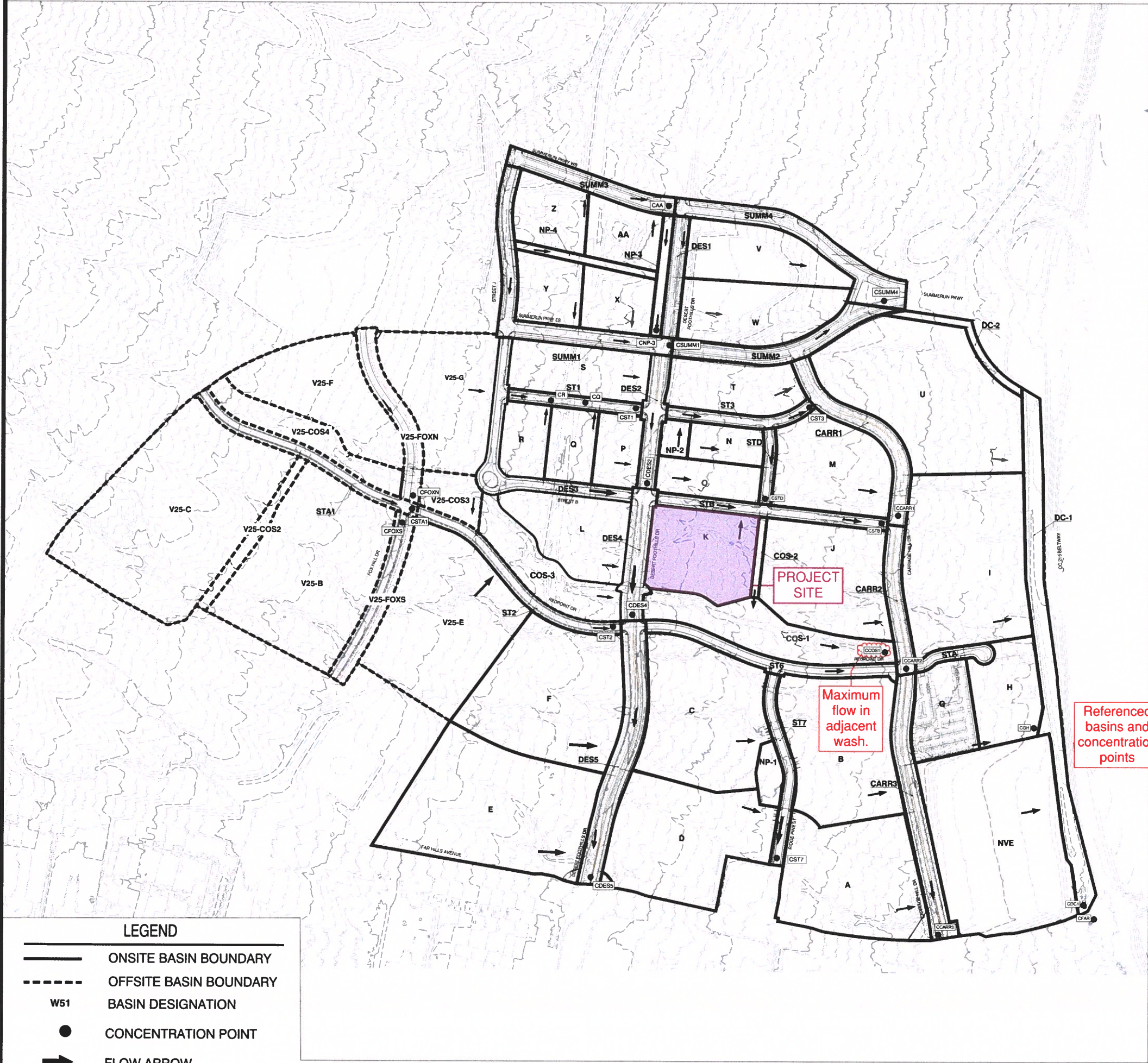
SUMMERLIN WEST PLANNING AREA *Las Vegas, Nevada*

W.O. # 7809

Prepared for:
Howard Hughes Corp.

Submitted to:
Public Works Department
City of Las Vegas





HEC-1 SUMMARY TABLE								
VILLAGE 21								
ULTIMATE CONDITION								
Basin / Concentration Point	Area (Acre)			Q ₁₀₀ (cfs)			SDN	
	Update	Previous	Difference	Update	Previous	Difference		
SUMM3	7.73	5.00	2.73	13	30	-17	SDN3	
Z	4.50	4.50	0.00	18	17	1	SDN3	
AA	4.02	3.71	0.31	17	14	3	SDN3	
CAA	-	-	-	48	-	N/A	SDN3	
NP-4	1.05	N/A	N/A	3	0	n/a	SDN3	
NP-3	1.14	1.49	-0.35	3	4	-1	SDN3	
CNP-3	-	-	-	7	-	N/A	SDN3	
SUMM1	5.05	5.00	0.05	20	19	1	SDN3	
Y	3.98	3.98	0.00	16	15	1	SDN3	
X	3.94	3.63	0.31	16	14	2	SDN3	
DES1	1.80	1.83	-0.03	8	7	1	SDN3	
CSUMM1	-	-	-	113	-	N/A	SDN3	
S	6.33	6.56	-0.23	24	25	-1	SDN3	
V25-G	11.44	N/A	N/A	45	-	N/A	SDN3	
R	3.07	3.10	-0.03	12	11	1	SDN3	
CR	-	-	-	56	-	N/A	SDN3	
Q	3.16	3.16	0.00	12	11	1	SDN3	
CQ	-	-	-	68	-	N/A	SDN3	
ST1	1.50	1.62	-0.12	7	6	1	SDN3	
CST1	-	-	-	74	54	20	SDN3	
P	3.00	3.17	-0.17	11	11	0	SDN3	
DES2	2.39	2.27	0.12	10	9	1	SDN3	
CDES2	-	-	-	119	-	N/A	SDN3	
DES3	3.73	3.78	-0.05	17	15	2	SDN3	
L	7.44	7.36	0.08	30	26	4	SDN3	
COS-3	5.90	6.10	-0.20	17	18	-1	SDN3	
DES4	2.79	2.88	-0.09	12	11	1	SDN3	
V25-F	10.45	N/A	N/A	43	-	N/A	SDN3	
V25-COS4	4.84	N/A	N/A	15	-	N/A	SDN3	
V25-FOXN	3.23	N/A	N/A	14	-	N/A	SDN3	
CFOXN	-	-	-	72	-	N/A	SDN3	
V25-B	19.93	N/A	N/A	76	-	N/A	SDN3	
V25-FOX5	3.19	N/A	N/A	11	-	N/A	SDN3	
CFOX5	-	-	-	85	-	N/A	SDN3	
V25-C	26.54	N/A	N/A	99	-	N/A	SDN3	
V25-COS2	1.79	N/A	N/A	5	-	N/A	SDN3	
STA1	2.98	N/A	N/A	13	-	N/A	SDN3	
CSTA1	-	-	-	274	-	N/A	SDN3	
V25-E	17.13	N/A	N/A	65	-	N/A	SDN3	
V25-COS3	2.37	N/A	N/A	8	-	N/A	SDN3	
ST2	2.88	2.93	-0.05	12	12	0	SDN3	
CST2	-	-	-	360	-	N/A	SDN3	
F	16.58	16.88	-0.30	65	59	6	SDN3	
E	20.15	20.20	-0.05	78	77	1	SDN3	
DES5	5.83	5.46	0.37	22	20	2	SDN3	
CDES5	-	-	-	624	-	N/A	SDN3	
C	14.83	14.05	0.78	54	44	10	SDN3	
NP-1	1.27	1.35	-0.08	4	5	-1	SDN3	
ST7	2.30	2.30	0.00	9	9	0	SDN3	
D	14.73	15.42	-0.69	56	53	3	SDN3	
CST7	-	-	-	124	108	16	SDN3	
W	8.31	7.11	1.20	31	27	4	SDN3	
SUMM2	3.63	3.28	0.35	16	13	3	SDN3	
T	5.98	5.99	-0.01	23	23	0	SDN3	
NP-2	0.93	0.87	0.06	3	3	0	SDN3	
ST3	1.70	2.09	-0.39	8	8	0	SDN3	
CST3	-	-	-	11	43	-32	SDN3	
CARR1	3.52	3.52	0.00	15	14	1	SDN3	
M	9.11	9.11	0.00	32	32	0	SDN3	
CCARR1	-	-	-	129	-	N/A	SDN3	
N	2.54	2.54	0.00	10	9	1	SDN3	
O	3.47	3.43	0.04	13	13	0	SDN3	
STD	0.88	N/A	N/A	4	-	N/A	SDN3	
CSTD	-	-	-	26	-	N/A	SDN3	
K	8.20	8.01	0.19	30	29	1	SDN3	
STB	2.65	N/A	N/A	12	-	N/A	SDN3	
CSTB	-	-	-	68	-	N/A	SDN3	
J	11.83	11.83	0.00	42	42	0	SDN3	
COS-2	0.58	N/A	N/A	2	-	N/A	SDN3	
COS-1	7.80	7.78	0.02	22	22	0	SDN3	
CCOS-1	-	-	-	24	-	N/A	SDN3	
CARR2	2.45	2.49	-0.04	10	10	0	SDN3	
ST6	3.08	3.01	0.07	13	12	1	SDN3	
CCARR2	-	-	-	286	-	N/A	SDN3	
B	13.90	13.71	0.19	54	46	8	SDN3	
A	14.15	14.36	-0.21	51	47	4	SDN3	
CARR3	4.87	4.85	0.02	19	19	0	SDN3	
CCARR3	-	-	-	410	-	N/A	SDN3	
V	7.25	7.19	0.06	29	27	2	SDN3	
SUMM4	4.87	N/A	N/A	21	-	N/A	SDN3	
CSUMM4	-	-	-	50	-	N/A	SDN3	
DC-2	1.19	1.40	-0.21	5	5	0	SDN3	
U	20.17	20.42	-0.25	73	74	-1	SDN3	
I	18.69	18.50	0.19	61	60	1	SDN3	
STA	1.01	0.00	n/a	5	0	n/a	SDN3	
G	5.01	5.71	-0.70	19	21	-2	SDN3	
H	5.79	6.26	-0.47	21	22	-1	SDN3	
CGH	-	-	-	39	-	N/A	SDN3	
DC-1	8.19	8.19	0.00	23	25	-2	SDN3	
NVE	21.74	21.74	0.00	75	79	-4	SDN3	
CDC1	-	-	-	326	-	N/A	SDN3	
CFAR	-	-	-	1598	-	N/A	SDN3	

V21 MDS UP#1 ADD#1

2018 UPDATE TO
SUMMERLIN WEST
PLANNING AREA
A.6.6
VILLAGE 21
DRAINAGE BASIN MAP

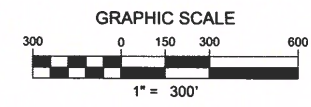
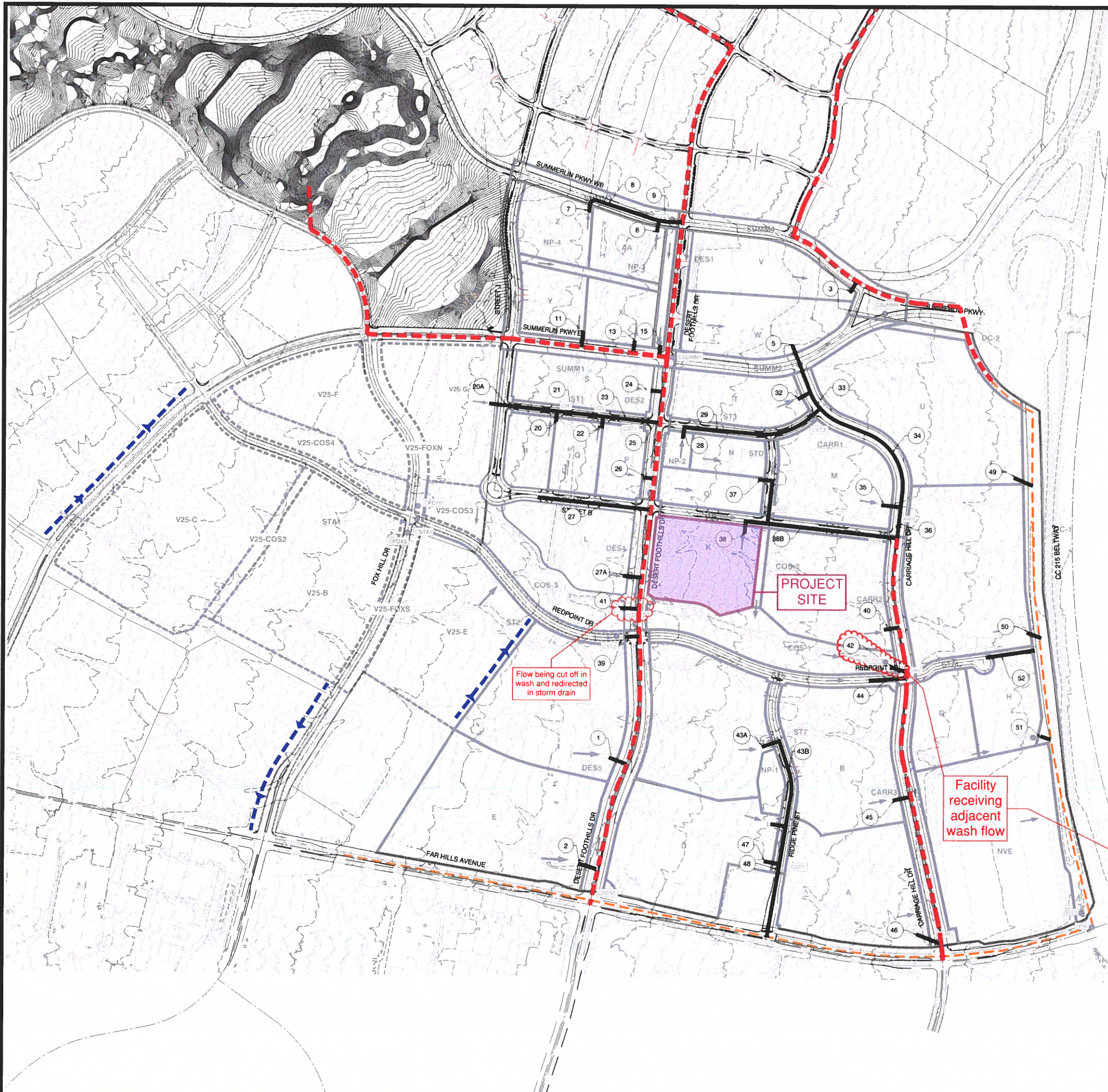
DRAWN BY: JYAGSB
DESIGNED BY: JYAGSB
CHECKED BY: JYAGSB
PROJECT NO: 7869
SCALE: N/A
DATE: NOV 2018
DATE: NOV 2018
DATE: FEB 2018
DATE: N/A
DATE: N/A

SHEET
A.6.6
OF SHEETS
DRAWING NO

THE HOWARD HUGHES CORPORATION
10801 WEST CHARLESTON BLVD, 3RD FLOOR
LAS VEGAS, NEVADA 89135
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89145-5148
PH: (702) 872-7500 FAX: (702) 382-2897 WEB: WWW.VTNV.COM
CONSULTING ENGINEERS PLANNERS LAND SURVEYORS



7/20/2018 Drainage7_UPT ADD1A Figures A.6 & Village 21 Drainage Basin Map A.6.6 Area 1 Drainage Basin Map.dwg



LEGEND

- REGIONAL STORM DRAIN ALIGNMENT
- EXISTING STORM DRAIN ALIGNMENT
- INTERIM BERM/CHANNEL ALIGNMENT
- VILLAGE 21 LOCAL STORM DRAIN ALIGNMENT
- W51 BASIN DESIGNATION
- CONCENTRATION POINT
- LOCAL FACILITY DESIGNATION
- DEVELOPED CONDITION FLOW ARROW

VILLAGE 21 LOCAL FLOOD PROTECTION FACILITIES									
Facility Label	Design Slope (%)	Q100 ULT (cfs)		Tributary Basin/CP		Facility		Technical Drainage Study	
		Previous	Updated	Previous	Updated	Previous	Updated		
1	9.0%	59	65	F	F	30" RCP	36" RCP	Reference 1	
2	8.8%	77	78	E	E	30" RCP	36" RCP	Reference 1	
3	4.2%	27	29	V	V	24" RCP	24" RCP		
5	4.8%	27	31	W	W	24" RCP	24" RCP		
6	1.3%	14	17	AA	AA	24" RCP	24" RCP		
7	1.0%	18	18	Z	Z	24" RCP	24" RCP		
8	4.2%	31	18	CZAA	Z	24" RCP	24" RCP		
9	4.2%	35	18	CNP-4A	CAA	24" RCP	24" RCP		
11	1.0%	15	16	Y	Y	24" RCP	24" RCP		
13	3.3%	14	16	X	X	24" RCP	24" RCP		
15	0.5%	4	7	NP-3	CNP-3	24" RCP	24" RCP		
20A	5.4%	n/a	45	n/a	V25-G	N/A	30" RCP		
20	2.1%	11	12	R	R	24" RCP	24" RCP		
21	5.4%	11	56	R	CR	24" RCP	30" RCP		
22	1.0%	11	12	Q	Q	24" RCP	24" RCP		
23	5.4%	23	68	CQR	CQ	24" RCP	36" RCP		
24	10.0%	25	24	S	S	24" RCP	30" RCP	Reference 6	
25	8.0%	54	74	CST1	CST1	30" RCP	36" RCP	Reference 6	
26	10.0%	11	11	P	P	24" RCP	30" RCP	Reference 6	
27	10.0%	n/a	17	N/A	DES3	N/A	30" RCP	Reference 6	
27A	10.0%	26	30	L	L	30" RCP	30" RCP	Reference 6	
28	1.5%	3	3	NP-2	NP-2	24" RCP	24" RCP		
29	5.0%	3	11	NP-2	CST3	24" RCP	24" RCP	Reference 7	
32	3.0%	23	23	T	T	24" RCP	24" RCP	Reference 7	
33	3.0%	N/A	55	N/A	N/A	N/A	24" RCP	Reference 7	
34	3.2%	N/A	66	N/A	N/A	N/A	36" RCP	Reference 7	
35	5.0%	32	32	M	M	30" RCP	36" RCP	Reference 7	
36	1.5%	N/A	104	N/A	N/A	N/A	48"	Reference 7	
37	6.0%	N/A	22	CNO	CNO	N/A	24" RCP		
38	0.5%	29	30	K	K	30" RCP	36" RCP		
38B	4.0%	108	68	CST4	CSTB	36" RCP	36" RCP	Reference 7	
39	6.1%	n/a	360	n/a	CST2	N/A	54" RCP	Reference 1	
40	4.0%	42	42	J	J	24" RCP	42" RCP	Reference 7	
41	6.3%	18	17	COS-3	COS-3	24" RCP	10X10' RCB	Reference 1	
42	10.0%	22	24	COS-1	CCOS1	24" RCP	24" RCP	Reference 7	
43A	1.5%	44	58	C	C	NP-1	36" RCP	Reference 3	
43B	1.3%	58	58	C	C	NP-1, ST7	36" RCP	Reference 3	
44	5.8%	12	13	ST6	ST6	24" RCP	24" RCP	Reference 4	
45	6.0%	46	54	B	B	30" RCP	36" RCP	Reference 2	
46	6.0%	47	51	A	A	30" RCP	36" RCP	Reference 2	
47A	N/A	N/A	N/A	N/A	For Flexibility	N/A	24" RCP	Reference 3	
47	4.0%	53	56	D	D	30" RCP	36" RCP	Reference 3	
48	1.3%	108	124	CST7	CST7	42" RCP	54" RCP	Reference 3	
49	6.0%	74	73	U	U	30" RCP	36" RCP		
50	2.0%	60	61	I	I	36" RCP	42" RCP		
51	0.9%	43	39	G, H	CGH	24" RCP	Riprap Chnl	Reference 5	
52	N/A	N/A	5	N/A	STA	N/A	24" RCP		

- 1: Desert Foothills (Far Hills to Redpoint)
- 2: Carriage Hill (Far Hills to Street A)
- 3: Ridge Pine Street
- 4: Street A (Carriage Hill to Desert Foothills)
- 5: Street A (Carriage Hill to Parcel H)
- 6: Desert Foothills (Redpoint to Summerlin Parkway)
- 7: Carriage Hill (Redpoint to Summerlin Parkway)

V21 MDS UP#1 ADD#1

THE HOWARD HUGHES CORPORATION
10801 WEST CHARLESTON BLVD. 3RD FLOOR
LAS VEGAS, NEVADA 89135

2018 UPDATE TO SUMMERLIN
WEST PLANNING AREA

DRAWN BY:
JVA/SSB
NOV 2018

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89145-1148
PH: (702) 873-7250 FAX: (702) 362-2887
WWW.VTNN.COM
CONSULTING ENGINEERS & PLANNERS @ LAND SURVEYORS

A.6.7
VILLAGE 21 LOCAL FLOOD
CONTROL FACILITIES MAP

DESIGNED BY:
JVA/SSB
NOV 2018

SCALE: 1"=300'
HORIZ. VERT.
NA

CHECKED BY:

PROJECT NO:
7608

SHEET
A.6.7
OF SHEETS

DRAWING NO

Update #1 to the FLOOD CONTROL MASTER PLAN UPDATE

SUMMERLIN WEST PLANNING AREA *Las Vegas, Nevada*

W.O. # 7809

Prepared for:
Howard Hughes Corp.

Submitted to:
Public Works Department
City of Las Vegas



B.2.4 VILLAGE 21

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Village 21

W.O. # 7809

CALCULATED BY: GB

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance			
C2 applies to the remaining travel distance			
Existing:		Developed	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

Project Site Basin

					First 500 feet		Remaining Travel Distance	
Basin	Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (ft/ft)	C1	V1 (fps)	C2	V2 (fps)
DEVELOPED CONDITION ONSITE								
A	1614	3295	3236	0.037	20.2	3.9	30.6	5.9
B	1039	3308	3265	0.041	20.2	4.1	30.6	6.2
C	1596	3357	3304	0.033	20.2	3.7	30.6	5.6
D	1240	3347	3292	0.044	20.2	4.3	30.6	6.4
E	1545	3402	3301	0.065	20.2	5.2	30.6	7.8
F	1350	3401	3323	0.058	20.2	4.9	30.6	7.4
G	780	3260	3248	0.015	20.2	2.5	30.6	3.8
H	1078	3237	3221	0.015	20.2	2.5	30.6	3.7
I	1599	3274	3223	0.032	20.2	3.6	30.6	5.5
J	1010	3323	3275	0.048	20.2	4.4	30.6	6.7
K	867	3366	3322	0.051	20.2	4.6	30.6	6.9
L	1027	3422	3366	0.055	20.2	4.7	30.6	7.1
M	1026	3326	3280	0.045	20.2	4.3	30.6	6.5
N	558	3358	3335	0.041	20.2	4.1	30.6	6.2
O	779	3371	3330	0.053	20.2	4.6	30.6	7.0
P	644	3389	3371	0.028	20.2	3.4	30.6	5.1
Q	587	3408	3389	0.021	20.2	2.9	30.6	4.4
R	555	3433	3411	0.040	20.2	4.0	30.6	6.1
S	1240	3436	3376	0.048	20.2	4.4	30.6	6.7
T	1100	3369	3322	0.043	20.2	4.2	30.6	6.3
U	1700	3314	3237	0.045	20.2	4.3	30.6	6.5
V	1020	3395	3315	0.078	20.2	5.7	30.6	8.6
W	1290	3383	3319	0.050	20.2	4.5	30.6	6.8
X	636	3408	3382	0.041	20.2	4.1	30.6	6.2
Y	721	3453	3409	0.061	20.2	5.0	30.6	7.6
Z	785	3470	3410	0.076	20.2	5.6	30.6	8.5
AA	462	3416	3387	0.063	20.2	5.1	30.6	7.7
COS-3	1556	3450	3360	0.058	14.8	3.6	29.4	7.1
COS-2	506	3325	3323	0.004	14.8	0.9	29.4	1.8
COS-1	1604	3357	3268	0.055	14.8	3.5	29.4	6.9
NP-4	896	3443	3385	0.065	20.2	5.1	30.6	7.8
NP-3	750	3402	3389	0.017	20.2	2.7	30.6	4.0
NP-2	389	3375	3360	0.039	20.2	4.0	30.6	6.0
NP-1	218	3310	3301	0.041	20.2	4.1	30.6	6.2
SUMM1	2080	3445	3385	0.029	20.2	3.4	30.6	5.2
SUMM2	1370	3385	3300	0.062	20.2	5.0	30.6	7.6
SUMM3	1070	3452	3396	0.052	20.2	4.6	30.6	7.0
SUMM4	1545	3396	3288	0.070	20.2	5.3	30.6	8.1
DES1	775	3395	3385	0.013	20.2	2.3	30.6	3.5

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Village 21

W.O. # 7809

CALCULATED BY: GB

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance			
C2 applies to the remaining travel distance			
Existing:		Developed	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

					First 500 feet		Remaining Travel Distance	
Basin	Length (ft)	High Elev (ft)	Low Elev (ft)	Slope (ft/ft)	C1	V1 (fps)	C2	V2 (fps)
DEVELOPED CONDITION ONSITE								
DES2	855	3385	3370	0.018	20.2	2.7	30.6	4.1
DES3	995	3445	3375	0.070	20.2	5.4	30.6	8.1
DES4	900	3370	3360	0.011	20.2	2.1	30.6	3.2
DES5	1620	3360	3340	0.012	20.2	2.2	30.6	3.4
CARR1	1315	3320	3275	0.034	20.2	3.7	30.6	5.7
CARR2	980	3280	3265	0.015	20.2	2.5	30.6	3.8
CARR3	1685	3265	3230	0.021	20.2	2.9	30.6	4.4
ST1	910	3435	3380	0.060	20.2	5.0	30.6	7.5
ST2	1555	3450	3360	0.058	20.2	4.9	30.6	7.4
ST3	985	3375	3315	0.061	20.2	5.0	30.6	7.6
ST6	1615	3355	3270	0.053	20.2	4.6	30.6	7.0
ST7	1230	3306	3290	0.013	20.2	2.3	30.6	3.5
DC-1	3243	3233	3194	0.012	20.2	2.2	30.6	3.4
DC-2	1220	3302	3233	0.057	20.2	4.8	30.6	7.3
NVE	1480	3253	3197	0.038	20.2	3.9	30.6	6.0
STD	466	3335	3326	0.019	20.2	2.8	30.6	4.3
STB	1439	3366	3279	0.060	20.2	5.0	30.6	7.5
STA	454	3263	3237	0.057	20.2	4.8	30.6	7.3
V25-E	1250	3447	3406	0.033	20.2	3.7	30.6	5.5
V25-FOXS	2150	3457	3442	0.007	20.2	1.7	30.6	2.6
V25-FOXN	1230	3502	3452	0.041	20.2	4.1	30.6	6.2
V25-G	720	3482	3438	0.061	20.2	5.0	30.6	7.6
V25-F	1030	3538	3455	0.081	20.2	5.7	30.6	8.7
V25-COS3	390	3453	3422	0.079	20.2	5.7	30.6	8.6
V25-COS4	1205	3538	3451	0.072	20.2	5.4	30.6	8.2
V25-COS2	1036	3507	3496	0.010	20.2	2.1	30.6	3.1
STA1	1455	3537	3456	0.056	20.2	4.8	30.6	7.2
V25-C	1465	3537	3497	0.027	20.2	3.3	30.6	5.1
V25-B	1311	3499	3452	0.036	20.2	3.8	30.6	5.8

Curve Number calculations for basins

Subbasin	Area	Type	Soil Percentage	1	2	4	5	6	7	8	9	11	12	Soil Weighted CN	CN Value
DEVELOPED CONDITION ONSITE															
V21-COS3 - COS W	5.90	156	100%								100%			88.0	88.0
V21-L - SF3	7.44	152	35%									100%		33.4	95.0
		156	65%									100%		61.6	
V21-P - VC/SFA	3.02	152	100%				95%					5%		92.1	92.1
V21-Q - VC/SFA	3.18	152	100%				95%					5%		92.2	92.2
V21-R - VC/SFA	3.05	152	100%				95%					5%		92.2	92.2
V21-S - VC/MF3	6.33	152	99%			40%						60%		93.7	94.2
		156	1%			40%						60%		0.5	
V25-COS3 - COS W	2.32	152	9%								100%			8.1	88.1
		156	91%								100%			80.0	
V25-COS4 - COS W	4.71	156	100%								100%			88.0	88.0
V25-F - SF3	10.40	152	79%									100%		75.3	95.0
		156	21%									100%		19.7	
V25-G - MF3 (R)	11.44	152	84%			100%								77.7	93.0
		156	16%			100%								15.3	
V21-B - SF3	0.16	156	100%									100%		95.0	95.0
V21-COS1 - COS	7.79	156	100%								100%			88.0	88.0
V21-COS2 - COS	0.58	152	35%								100%			30.7	88.3
		156	65%								100%			57.6	
V21J - SFA	11.75	152	28%				100%							25.4	92.0
		156	72%				100%							66.6	
V21-K - SFA	8.20	152	26%				100%							24.0	92.0
		156	74%				100%							68.0	
V21-M - SFA	8.94	152	99%				100%							90.8	92.0
		156	1%				100%							1.2	
V21-N - VC/SFA	2.50	152	100%				95%					5%		92.2	92.2
V21-NP2 - COS	0.94	152	100%								100%			89.0	89.0
V21-O - VC/SFA	3.45	152	100%				95%					5%		92.1	92.1
V21-T - EC/MF3	5.93	152	26%			40%						60%		24.7	94.2
		156	74%			40%						60%		69.5	

Project Site Basin

Curve Number calculations for basins

Subbasin	Area	Type	Soil Percentage	1	2	4	5	6	7	8	9	11	12	Soil Weighted CN	CN Value
DEVELOPED CONDITION ONSITE															
V21-DC1 - DC	8.07	152	36%										100%	33.1	93.0
		156	64%										100%	59.9	
V21-DC2 - DC	1.19	152	21%										100%	19.7	93.0
		156	79%										100%	73.3	
V21-G - EC	4.93	152	32%									100%		30.8	95.0
		156	68%									100%		64.2	
V21-H - EC	5.86	152	74%									100%		70.3	95.0
		156	26%									100%		24.7	
V21-I - SFA	18.62	152	0%				100%							0.4	92.0
		156	100%				100%							91.6	
V21-NVE - DC	21.78	152	6%										100%	5.5	93.0
		156	94%										100%	87.5	
V21-U - EC/MF3	20.09	152	56%			40%						60%		52.7	94.2
		156	44%			40%						60%		41.5	
V21-E - SF3	19.83	156	100%									100%		95.0	95.0
V21-F - SF3	16.64	156	100%									100%		95.0	95.0
V25-A - SF3	21.16	156	100%									100%		95.0	95.0
V25-B - SF1	19.86	156	100%									100%		95.0	95.0
V25-C - SF1	26.55	156	74%									100%		70.6	95.0
		731	26%									100%		24.4	
V25-COS1 - COS	3.46	156	100%								100%			88.0	88.0
V25-COS2 - COS	1.79	156	100%								100%			88.0	88.0
V25-D - SF3	27.17	156	100%									100%		95.0	95.0
V25-E - SF2	17.13	156	100%									100%		95.0	95.0
V25-LVWVD - COS	13.89	156	100%											88.0	88.0
V25-NV - COS	2.41	156	100%								100%			88.0	88.0

Curve Number calculations for basins															
Subbasin	Area	Type	Soil Percentage	1	2	4	5	6	7	8	9	11	12	Soil Weighted CN	CN Value
DEVELOPED CONDITION ONSITE															
V21-A - SF3	13.75	156	97%									100%		92.1	94.9
		502	3%									100%		2.8	
V21-B - SF3	13.65	156	100%									100%		95.0	95.0
V21-C - SF3	15.15	156	100%									100%		95.0	95.0
V21-D - SF3	14.75	156	100%									100%		95.0	95.0
V21-FIRE - DC	1.90	156	100%										100%	93.0	93.0
V21-NP1 - COS	1.27	156	100%								100%			88.0	88.0

STANDARD FORM 4										V1 applies to the first 500 feet of travel distance V2 applies to the remaining travel distance Existing: V1=148*S^{1/2} V2=234*S^{1/2} Developed V1=20*S^{1/2} V2=306*S^{1/2} $T_1 = \frac{1.8(1.1 - k)L^{1/2}}{S^{1/3}}$ $T_c = 0.0132C_n - 0.39$ $T_c = T_1 + T_r$									
DEVELOPMENT: Village 21		W.O. # 7809		CALCULATED BY: GB															

STANDARD FORM 4

DEVELOPMENT: Village 21

W.O. # 7809

CALCULATED BY: GB

V1 applies to the first 500 feet of travel distance
V2 applies to the remaining travel distance

Existing:

V1 = 1.48 * S^{1/2} V2 = 2.94 * S^{1/2} V2 = 306 * S^{1/2}

$$T_i = \frac{1.8(1.1 - k)L^{1/2}}{S^{1/3}} \quad T_i = \frac{L}{60V}$$

$$k = 0.0132C_n - 0.39 \quad T_c = T_i + T_r$$

SUB-BASIN DATA				INITIAL/OVERLAND TIME (Ti)		TRAVEL TIME (Tt)						Tc CHECK (URBANIZED BASINS)		FINAL	LAG TIME	REMARKS	
DESIG. (1)	Cn	K (2)	AREA Ac. (3)	AREA MI^2	LENGTH Ft (4)	SLOPE % (5)	Ti Min. (6)	LENGTH Ft (7)	SLOPE % (8)	V1 fps (9a)	V2 fps (9b)	Tt Min. (10)	TOTAL LENGTH (11)	Tc Min. (12)	Tc		TLAG Hr.
DEVELOPED CONDITION ONSITE																	
SUMM4	98.0	0.904	4.87	0.0076	40	2.0	1.77	1545	7.0	5.3	8.1	3.71	1585	18.81	5.49	0.055	
DES1	98.0	0.904	1.80	0.0028	35	2.0	1.66	775	1.3	2.3	3.5	4.95	810	14.50	6.61	0.066	
DES2	98.0	0.904	2.39	0.0037	35	2.0	1.66	855	1.8	2.7	4.1	4.57	890	14.94	6.23	0.062	
DES3	98.0	0.904	3.73	0.0058	35	2.0	1.66	995	7.0	5.4	8.1	2.57	1030	15.72	4.23	0.042	TLAG=0.050
DES4	98.0	0.904	2.79	0.0044	35	2.0	1.66	900	1.1	2.1	3.2	5.98	935	15.19	7.64	0.076	
DES5	98.0	0.904	5.83	0.0091	32	2.0	1.59	1620	1.2	2.2	3.4	9.20	1652	19.18	10.79	0.108	
CARR1	98.0	0.904	3.52	0.0055	24	2.0	1.37	1315	3.4	3.7	5.7	4.63	1339	17.44	6.00	0.060	
CARR2	98.0	0.904	2.45	0.0038	24	2.0	1.37	980	1.5	2.5	3.8	5.45	1004	15.58	6.82	0.068	
CARR3	98.0	0.904	4.87	0.0076	30	2.0	1.54	1685	2.1	2.9	4.4	7.34	1715	19.53	8.88	0.089	
ST1	98.0	0.904	1.50	0.0023	20	2.0	1.25	910	6.0	5.0	7.5	2.59	930	15.17	3.84	0.038	TLAG=0.050
ST2	98.0	0.904	2.88	0.0045	41	2.0	1.80	1555	5.8	4.9	7.4	4.10	1596	18.87	5.90	0.059	
ST3	98.0	0.904	1.70	0.0027	20	2.0	1.25	985	6.1	5.0	7.6	2.74	1005	15.58	4.00	0.040	TLAG=0.050
ST6	98.0	0.904	3.08	0.0048	24	2.0	1.37	1615	5.3	4.6	7.0	4.45	1639	19.11	5.82	0.058	
ST7	98.0	0.904	2.30	0.0036	40	2.0	1.77	1230	1.3	2.3	3.5	7.10	1270	17.06	8.88	0.089	
DC-1	93.0	0.838	8.19	0.0128	50	1.0	3.34	3243	1.2	2.2	3.4	17.39	3293	28.29	20.73	0.207	
DC-2	93.0	0.838	1.19	0.0019	25	1.0	2.36	1220	5.7	4.8	7.3	3.38	1245	16.92	5.75	0.057	
NVE	93.0	0.838	21.74	0.0340	100	1.0	4.72	1480	3.8	3.9	6.0	4.86	1580	18.78	9.59	0.096	
STD	98.0	0.904	0.88	0.0014	20	2.0	1.25	466	1.9	2.8	4.3	2.77	486	12.70	4.02	0.040	TLAG=0.050
STB	98.0	0.904	2.65	0.0041	20	2.0	1.25	1439	6.0	5.0	7.5	3.76	1459	18.11	5.01	0.050	
STA	98.0	0.904	1.01	0.0016	30	2.0	1.54	454	5.7	4.8	7.3	1.57	484	12.69	3.10	0.031	TLAG=0.050
V25-E	95.0	0.864	17.13	0.0268	100	1.0	4.25	1250	3.3	3.7	5.5	4.53	1350	17.50	8.78	0.088	
V25-FOXS	98.0	0.904	3.19	0.0050	60	2.0	2.17	2150	0.7	1.7	2.6	15.70	2210	22.28	17.87	0.179	
V25-FOXN	98.0	0.904	3.23	0.0050	60	2.0	2.17	1230	4.1	4.1	6.2	4.02	1290	17.17	6.19	0.062	
V25-G	93.0	0.838	11.44	0.0179	100	1.0	4.72	720	6.1	5.0	7.6	2.15	820	14.56	6.88	0.069	
V25-F	95.0	0.864	10.45	0.0163	100	1.0	4.25	1030	8.1	5.7	8.7	2.47	1130	16.28	6.72	0.067	
V25-COS3	88.1	0.773	2.37	0.0037	100	1.0	5.89	390	7.9	5.7	8.6	1.14	490	12.72	7.03	0.070	
V25-COS4	88.0	0.772	4.64	0.0073	100	1.0	5.91	1205	7.2	5.4	8.2	2.96	1305	17.25	8.88	0.089	
V25-COS2	88.0	0.772	1.79	0.0028	100	1.0	5.91	1036	1.0	2.1	3.1	6.94	1136	16.31	12.85	0.128	
STA1	98.0	0.904	2.98	0.0046	18	2.0	1.19	1455	5.6	4.8	7.2	3.95	1473	18.18	5.14	0.051	
V25-C	95.0	0.864	26.54	0.0415	100	1.0	4.25	1465	2.7	3.3	5.1	5.68	1565	18.69	9.93	0.099	
V25-B	95.0	0.864	19.93	0.0311	100	1.0	4.25	1311	3.6	3.8	5.8	4.51	1411	17.84	8.76	0.088	
															Tc Min (DEV)= 5 min		
															Tc Min (UNDEV)= 10 min		

B.3.7 VILLAGE 21 – V21-SDN3.OUT


```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 27DEC18 TIME 16:51:33 *
*****

```

```

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

```

```

X X XXXXXXX XXXX X
X X X X X XX
X X X X X
XXXXXXXX XXXX X XXXXX 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 -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

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

*DIAGRAM

*** FREE ***

```

1 ID INPUT FILE DATE = SEPTEMBER 12,2017
2 ID DESIGN STORM = 100-YEAR 6-HR STORM
3 ID STORM DISTRIBUTION = SDN #3
4 ID MODELED BY VTN (JYA)
5 ID
6 ID *****
7 ID * VILLAGE 21 (PREVIOUSLY AREA 1) HEC-1 MODE *
8 ID * REFER TO LAND USE EXHIBIT BY VTN FOR LOCATION OF AREAS 1 *
9 ID *
10 ID *****
11 ID
12 ID
13 ID
14 ID 100-YEAR, 6-HOUR STORM, SDN3
15 ID
16 IT 5 0 0 100
17 IO 5 0 0
18 IN 5 0 0
19 JR PREC 1.00
*

20 KK SUMM3
21 BA 0.0045
22 PB 3.40
23 PC 0 0.02 0.057 0.07 0.087 0.108 0.124 0.13 0.13 0.130
24 PC 0.13 0.13 0.13 0.133 0.14 0.142 0.148 0.158 0.172 0.181
25 PC 0.19 0.197 0.199 0.2 0.201 0.204 0.214 0.229 0.241 0.249
26 PC 0.251 0.256 0.27 0.278 0.281 0.283 0.295 0.322 0.352 0.409
27 PC 0.499 0.59 0.71 0.744 0.781 0.812 0.819 0.835 0.851 0.856
28 PC 0.86 0.868 0.876 0.888 0.91 0.926 0.937 0.95 0.97 0.976
29 PC 0.982 0.985 0.987 0.989 0.99 0.993 0.993 0.994 0.995 0.998
30 PC 0.998 0.999 1
31 LS 0 98
32 UD 0.050
*

33 KK Z
34 BA 0.0070
35 PB 3.41
36 LS 0 94.2
37 UD 0.065
*

38 KK AA
39 BA 0.0063
40 PB 3.40
41 LS 0 94.2
42 UD 0.060
*

```

LINE	ID	1	2	3	4	5	6	7	8	9	10
43	KK	CAA									
44	KM	COMBINES SUMM3, Z, AND AA									
45	HC	3									
	*										
46	KK	NP-4									
47	BA	0.0016									
48	PB	3.40									
49	LS	0	88.0								
50	UD	0.084									
	*										
51	KK	NP-3									
52	BA	0.0018									
53	PB	3.38									
54	LS	0	88.0								
55	UD	0.101									
	*										
56	KK	CNP-3									
57	KM	COMBINES NP-3 AND NP-4									
58	HC	2									
	*										
59	KK	SUMM1									
60	PB	3.40									
61	BA	0.0079									
62	LS	0	98								
63	UD	0.093									
	*										
64	KK	Y									
65	PB	3.40									
66	BA	0.0062									
67	LS	0	94.2								
68	UD	0.066									
	*										
69	KK	X									
70	PB	3.40									
71	BA	0.0061									
72	LS	0	94.2								
73	UD	0.068									
	*										
74	KK	DES1									
75	BA	0.0028									
76	PB	3.38									
77	LS	0	98								
78	UD	0.066									
	*										

LINE	ID	1	2	3	4	5	6	7	8	9	10
79	KK	CSUMM1									
80	KM	RFCF FACILITY IN DESERT FOOTHILLS DRIVE									
81	HC	6									
	*										
82	KK	S									
83	BA	0.0099									
84	PB	3.40									
85	LS	0	94.2								
86	UD	0.081									
	*										
87	KK	V25-G									
88	KM	OLD PARCEL NAME IS W48									
89	BA	0.0179									
90	PB	3.41									
91	LS	0	93.0								
92	UD	0.069									
	*										
93	KK	R									
94	BA	0.0048									
95	PB	3.40									
96	LS	0	92.2								
97	UD	0.071									
	*										
98	KK	CR									

99 KM COMBINE Q AND R
100 HC 2
*

101 KK Q
102 BA 0.0049
103 PB 3.40
104 LS 0 92.2
105 UD 0.075
*

106 KK CQ
107 KM COMBINE Q AND CR
108 HC 2
*

109 KK RCQ
110 KM ROUTE CQR TO CST1
111 RD 330 0.055 0.013 0 CIRC 3
*

1

HEC-1 INPUT

PAGE 4

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

112 KK ST1
113 BA 0.0023
114 PB 3.40
115 LS 0 98
116 UD 0.050
*

117 KK CST1
118 KM COMBINES CQ AND ST1
119 HC 2
*

120 KK DUMMY2
121 KM RFCF FACILITY IN DESERT FOOTHILLS DR
122 HC 2
*

123 KK P
124 BA 0.0047
125 PB 3.40
126 LS 0 92.1
127 UD 0.079
*

128 KK DES2
129 PB 3.40
130 BA 0.0037
131 LS 0 98
132 UD 0.062
*

133 KK CDES2
134 KM RFCF FACILITY IN DESERT FOOTHILLS DR
135 HC 3
*

136 KK DES3
137 BA 0.0058
138 PB 3.40
139 LS 0 98
140 UD 0.050
*

141 KK L
142 BA 0.0116
143 PB 3.40
144 LS 0 95.0
145 UD 0.072
*

1

HEC-1 INPUT

PAGE 5

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

146 KK COS-3
147 BA 0.0092
148 PB 3.39
149 LS 0 88.0
150 UD 0.107
*

151 KK DES4
152 BA 0.0044
153 PB 3.40

V21-SDN3.OUT

154	LS	0	98.0
155	UD	0.076	
	*		
156	KK	CDES4	
157	KM	RFCF FACILITY IN DESERT FOOTHILLS DR	
158	HC	5	
	*		
159	KK	V25-F	
160	BA	0.0163	
161	PB	3.44	
162	LS	0	95.0
163	UD	0.067	
	*		
164	KKV25-COS4		
165	BA	0.0073	
166	PB	3.43	
167	LS	0	88.0
168	UD	0.089	
	*		
169	KKV25-FOXN		
170	BA	0.0050	
171	PB	3.41	
172	LS	0	98.0
173	UD	0.062	
	*		
174	KK	CFOXN	
175	KM	COMBINE V25-F, V25-COS4, V25-FOXN	
176	HC	3	
	*		
177	KK	V25-B	
178	KM	OLD BASIN NAME GP20	
179	BA	0.0311	
180	PB	3.42	
181	LS	0	91.0
182	UD	0.097	
	*		

1

HEC-1 INPUT

PAGE 6

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
183	KKV25-FOXS
184	BA 0.0050
185	PB 3.40
186	LS 0 98.0
187	UD 0.179
	*
188	KK CFOXN
189	KM COMBINE V25-B, AND V25-FOXS
190	HC 2
	*
191	KK V25-C
192	BA 0.0415
193	PB 3.45
194	LS 0 90.7
195	UD 0.109
	*
196	KK RV25-C
197	KM ROUTE V25-C TO CSTA1
198	RD 2047 0.013 0.023 0 CIRC 3.5
	*
199	KKV25-COS2
200	BA 0.0028
201	PB 3.43
202	LS 0 88.0
203	UD 0.128
	*
204	KKRV25-COS2
205	KM ROUTE V25-COS2
206	RD 1947 0.013 0.023 0 CIRC 3.5
	*
207	KK STA1
208	KM OLD PARCEL NAME IS SAME
209	BA 0.0046
210	PB 3.43
211	LS 0 98.0
212	UD 0.051

*

213 KK CSTA1
 214 KM COMBINE V25-FOX5, V25-C, CFOX5, V25-COS2, STA1, AND CFOX5
 215 HC 5
 *

1

HEC-1 INPUT

PAGE 7

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

216 KK RCSTA1
 217 KM ROUTE STA1 TO CST2
 218 RD 1530 0.013 0.060 0 CIRC 3.5
 *

219 KK V25-E
 220 KM OLD PARCEL NAME IS W63
 221 BA 0.0268
 222 PB 3.40
 223 LS 0 95.0
 224 UD 0.088
 *

225 KK RV25-E
 226 KM ROUTE V25-E TO CST2
 227 RD 702 0.013 0.060 0 CIRC 3.5
 *

228 KKV25-COS3
 229 KM OLD PARCEL NAME IS GPPW3
 230 BA 0.0037
 231 PB 3.41
 232 LS 0 88.1
 233 UD 0.070
 *

234 KK ST2
 235 BA 0.0045
 236 PB 3.39
 237 LS 0 98
 238 UD 0.059

239 KK CST2
 240 KM RFCF FACILITY IN DESERT FOOTHILLS DR
 241 HC 4
 *

242 KK DUMMY5
 243 KM RFCF FACILITY IN DESERT FOOTHILLS DR
 244 HC 2
 *

245 KK F
 246 BA 0.0259
 247 PB 3.39
 248 LS 0 95.0
 249 UD 0.079
 *

1

HEC-1 INPUT

PAGE 8

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

250 KK E
 251 BA 0.0315
 252 PB 3.38
 253 LS 0 95.0
 254 UD 0.081
 *

255 KK DESS
 256 BA 0.0091
 257 PB 3.38
 258 LS 0 98.0
 259 UD 0.108
 *

260 KK CDESS
 261 KM RFCF FACILITY IN DESERT FOOTHILLS DR
 262 HC 4
 *

263 KK C
 264 BA 0.0232
 265 PB 3.36
 266 LS 0 95.0
 267 UD 0.098
 *

V21-SDN3.OUT

268 KK NP-1
 269 BA 0.0020
 270 PB 3.36
 271 LS 0 88.0
 272 UD 0.068
 *

273 KK ST7
 274 BA 0.0036
 275 PB 3.36
 276 LS 0 98
 277 UD 0.089
 *

278 KK D
 279 BA 0.0230
 280 PB 3.36
 281 LS 0 95.0
 282 UD 0.081
 *

283 KK CST7
 284 KM COMBINES IN RIDGE PINE ST
 285 HC 4
 *

1

HEC-1 INPUT

PAGE 9

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

286 KK DUMMY7
 287 KM RFGD FACILITY IN FAR HILLS
 288 HC 2
 *

289 KK W
 290 BA 0.0130
 291 PB 3.38
 292 LS 0 94.2
 293 UD 0.082
 *

294 KK SUMM2
 295 BA 0.0057
 296 PB 3.38
 297 LS 0 98
 298 UD 0.053
 *

299 KK T
 300 PB 3.38
 301 BA 0.0093
 302 LS 0 94.2
 303 UD 0.080
 *

304 KK NP-2
 305 BA 0.0015
 306 PB 3.38
 307 LS 0 89.0
 308 UD 0.073
 *

309 KK ST3
 310 BA 0.0027
 311 PB 3.38
 312 LS 0 98.0
 313 UD 0.050
 *

314 KK CST3
 315 KM COMBINE NP-2 AND ST3
 316 HC 2
 *

317 KK DUMMY8
 318 KM COMBINE CT AND CST3
 319 HC 4
 *

1

HEC-1 INPUT

PAGE 10

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

320 KK CARR1
 321 BA 0.0055
 322 PB 3.36
 323 LS 0 98.0

324 UD 0.060
 *
 325 KK M
 326 BA 0.0142
 327 PB 3.36
 328 LS 0 92.0
 329 UD 0.083
 *
 330 KK CCARR1
 331 KM RFCF FACILITY IN CARRIAGE HILL DR
 332 HC 3
 *
 333 KK N
 334 BA 0.0040
 335 PB 3.38
 336 LS 0 92.2
 337 UD 0.071
 *
 338 KK 0
 339 BA 0.0054
 340 PB 3.38
 341 LS 0 92.1
 342 UD 0.074
 *
 343 KK STD
 344 BA 0.0014
 345 PB 3.38
 346 LS 0 98
 347 UD 0.050
 *
 348 KK CSTD
 349 KM COMBINE N, O, AND STD
 350 HC 3
 *
 351 KK K
 352 BA 0.0128
 353 PB 3.37
 354 LS 0 92.0
 355 UD 0.077
 *

Project Site Basin

1

HEC-1 INPUT

PAGE 11

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

356 KK STB
 357 BA 0.0041
 358 PB 3.38
 359 LS 0 98
 360 UD 0.050
 *
 361 KK CSTB
 362 HC 3
 *
 363 KK DUMMY10
 364 KM RFCF FACILITY IN CARRIAGE HILL DR
 365 HC 2
 *
 366 KK J
 367 BA 0.0185
 368 PB 3.35
 369 LS 0 92.0
 370 UD 0.081
 *
 371 KK DUMMY11
 372 KM RFCF FACILITY IN CARRIAGE HILL DR
 373 HC 2
 *
 374 KK COS-2
 375 BA 0.0009
 376 PB 3.37
 377 LS 0 88.3
 378 UD 0.131
 *
 379 KK COS-1
 380 BA 0.0122

381 PB 3.37
 382 LS 0 88.0
 383 UD 0.110
 *

384 KK CCOS-1
 385 HC 2
 *

386 KK CARR2
 387 BA 0.0038
 388 PB 3.35
 389 LS 0 98.0
 390 UD 0.068
 *

1

HEC-1 INPUT

PAGE 12

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

391 KK ST6
 392 BA 0.0048
 393 PB 3.37
 394 LS 0 98
 395 UD 0.058
 *

396 KK CCARR2
 397 KM RFCD FACILITY IN CARRIAGE HILL DR
 398 HC 4
 *

399 KK B
 400 BA 0.0217
 401 PB 3.34
 402 LS 0 95.0
 403 UD 0.077
 *

404 KK A
 405 BA 0.0221
 406 PB 3.33
 407 LS 0 94.9
 408 UD 0.096
 *

409 KK CARR3
 410 BA 0.0076
 411 PB 3.34
 412 LS 0 98
 413 UD 0.089
 *

414 KK CCARR3
 415 KM RFCD FACILITY IN CARRIAGE HILL DR
 416 HC 4
 *

417 KK DUMMY13
 418 KM RFCD FACILITY IN FAR HILLS
 419 HC 3
 *

420 KK V
 421 BA 0.0113
 422 PB 3.38
 423 LS 0 94.2
 424 UD 0.069
 *

1

HEC-1 INPUT

PAGE 13

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

425 KK SUMM4
 426 BA 0.0076
 427 PB 3.38
 428 LS 0 98
 429 UD 0.055
 *

430 KK CSUMM4
 431 KM COMBINES IN EX BELTWAY CHANNEL
 432 HC 2
 *

433 KK DC-2
 434 BA 0.0019
 435 PB 3.36

436	LS	0	93.0
437	UD	0.057	
	*		
438	KK	U	
439	BA	0.0315	
440	PB	3.36	
441	LS	0	94.2
442	UD	0.094	
	*		
443	KK	I	
444	BA	0.0292	
445	PB	3.35	
446	LS	0	92.0
447	UD	0.106	
	*		
448	KK	STA	
449	BA	0.0016	
450	PB	3.35	
451	LS	0	98.0
452	UD	0.050	
	*		
453	KK	G	
454	BA	0.0078	
455	PB	3.35	
456	LS	0	95.0
457	UD	0.088	
	*		
458	KK	H	
459	BA	0.0091	
460	PB	3.33	
461	LS	0	95.0
462	UD	0.102	
	*		

1

HEC-1 INPUT

PAGE 14

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

463	KK	CGH	
464	KM	COMBINES G AND H	
465	HC	2	
	*		
466	KK	DC-1	
467	BA	0.0128	
468	PB	3.33	
469	LS	0	93.0
470	UD	0.207	
	*		
471	KK	NVE	
472	BA	0.0340	
473	PB	3.32	
474	LS	0	93.0
475	UD	0.096	
	*		
476	KK	CDC1	
477	KM	COMBINES IN EX BELTWAY CHANNEL	
478	HC	8	
	*		
479	KK	CFAR	
480	KM	EX FAR HILLS AVE SD	
481	HC	2	
	*		
482	ZZ		

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
LINE	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
NO.		
20	SUMM3	
	.	
33	.	Z
	.	
38	.	AA
	.	
43	CAA.....	

46	.	NP-4	.	.	.	.
51	.	.	NP-3	.	.	.
56	.	CNP-3		.	.	.
59	.	.	SUMM1	.	.	.
64	.	.	.	Y	.	.
69	.	.	.	.	X	.
74	.	.	.	.	.	DES1
79	CSUMM1		.	.	.	.
82	.	S	.	.	.	.
87	.	.	V25-G	.	.	.
93	.	.	.	R	.	.
98	.	.	CR		.	.
101	.	.	.	Q	.	.
106	.	.	CQ		.	.
109	.	.	V	.	.	.
112	.	.	V	.	.	.
117	.	.	RCQ	.	.	.
120	.	.	.	ST1	.	.
123	.	.	.	.	.	.
128	.	.	.	DES2	.	.
133	.	.	.	.	.	.
136	.	.	DES3	.	.	.
141	.	.	.	L	.	.
146	.	.	.	.	COS-3	.
151	.	.	.	.	.	DES4
156	.	.	.	.	.	.
159	.	.	.	.	.	.
164	.	.	.	.	.	.
169	.	.	.	.	.	.

174	.	.	CFOXN.....	V21-SDN3.OUT
177	.	.	.	
183	.	.	V25-B	
188	.	.	.	
191	.	.	V25-FOX5	
196	.	.	CFOX5.....	
199	.	.	.	
204	.	.	V25-C	
207	.	.	V	
213	.	.	RV25-C	
216	.	.	.	
219	.	.	V25-COS2	
225	.	.	V	
228	.	.	RV25-COS	
234	.	.	.	
239	.	.	.	STA1
242	.	.	CSTA1.....	
245	.	.	V	
250	.	.	RCSTA1	
255	.	.	.	
260	.	.	V25-E	
263	.	.	V	
268	.	.	RV25-E	
273	.	.	.	
278	.	.	V25-COS3	
283	.	.	.	
286	.	.	.	ST2
289	.	.	CST2.....	
294	.	.	.	
299	.	.	DUMMY5.....	
302	.	.	.	
307	.	.	F	
312	.	.	.	
317	.	.	E	
322	.	.	.	
327	.	.	DESS	
332	.	.	.	
337	.	.	CDESS.....	
342	.	.	.	
347	.	.	C	
352	.	.	.	
357	.	.	NP-1	
362	.	.	.	
367	.	.	ST7	
372	.	.	.	
377	.	.	.	D
382	.	.	.	
387	.	.	CST7.....	
392	.	.	.	
397	.	.	DUMMY7.....	
402	.	.	.	
407	.	.	W	
412	.	.	.	
417	.	.	SUMM2	
422	.	.	.	
427	.	.	.	
432	.	.	.	T
437	.	.	.	

				V21-SDN3.OUT
304	.	.	.	NP-2
309	.	.	.	ST3
314	.	.	.	CST3.....
317	.	.	.	DUMMY8.....
320	.	.	CARR1	
325	.	.	.	M
330	.	.	.	CCARR1.....
333	.	.	N	
338	.	.	.	O
343	.	.	.	STD
348	.	.	.	CSTD.....
351	.	.	.	K
356	.	.	.	STB
361	.	.	.	CSTB.....
363	.	.	.	DUMMY10.....
366	.	.	J	
371	.	.	.	DUMMY11.....
374	.	.	COS-2	
379	.	.	.	COS-1
384	.	.	.	CCOS-1.....
386	.	.	.	CARR2
391	.	.	.	ST6
396	.	.	.	CCARR2.....
399	.	.	B	
404	.	.	.	A
409	.	.	.	CARR3
414	.	.	.	CCARR3.....
417	DUMMY13.....	.	.	
420	.	V	.	
425	.	.	SUMM4	


```

430      .      .      .
      .      .      .
      .      .      .
433      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
438      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
443      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
448      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
453      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
458      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
463      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
466      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
471      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
476      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
      .      .      .      .      .      .      .      .      .
479      .      .      .      .      .      .      .      .      .

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   JUN 1998                     *
*   VERSION 4.1                   *
* RUN DATE 27DEC18 TIME 16:51:33 *
*                               *
*****

```

```

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

```

INPUT FILE DATE = SEPTEMBER 12,2017
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY VTN (JYA)

```

*****
* VILLAGE 21 (PREVIOUSLY AREA 1) HEC-1 MODE *
* REFER TO LAND USE EXHIBIT BY VTN FOR LOCATION OF AREAS 1 *
*                                           *
*****

```

100-YEAR, 6-HOUR STORM, SDN3

```

17 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         100 NUMBER OF HYDROGRAPH ORDINATES
      NDDATE      1 0 ENDING DATE
      NDTIME      0815 ENDING TIME
      ICENT      19 CENTURY MARK

      COMPUTATION INTERVAL .08 HOURS
      TOTAL TIME BASE      8.25 HOURS

ENGLISH UNITS
DRAINAGE AREA      SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION  FEET

```

FLOW
STORAGE VOLUME
SURFACE AREA
TEMPERATURE

CUBIC FEET PER SECOND
ACRE-FEET
ACRES
DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	
				1.00	
HYDROGRAPH AT					
+	SUMM3	.00	1	FLOW	13.
				TIME	3.50
HYDROGRAPH AT					
+	Z	.01	1	FLOW	18.
				TIME	3.50
HYDROGRAPH AT					
+	AA	.01	1	FLOW	17.
				TIME	3.50
3 COMBINED AT					
+	CAA	.02	1	FLOW	48.
				TIME	3.50
HYDROGRAPH AT					
+	NP-4	.00	1	FLOW	3.
				TIME	3.50
HYDROGRAPH AT					
+	NP-3	.00	1	FLOW	3.
				TIME	3.50
2 COMBINED AT					
+	CNP-3	.00	1	FLOW	7.
				TIME	3.50
HYDROGRAPH AT					
+	SUMM1	.01	1	FLOW	20.
				TIME	3.50
HYDROGRAPH AT					
+	Y	.01	1	FLOW	16.
				TIME	3.50
HYDROGRAPH AT					
+	X	.01	1	FLOW	16.
				TIME	3.50
HYDROGRAPH AT					
+	DES1	.00	1	FLOW	8.
				TIME	3.50
6 COMBINED AT					
+	CSUMM1	.04	1	FLOW	113.
				TIME	3.50
HYDROGRAPH AT					
+	S	.01	1	FLOW	24.
				TIME	3.50
HYDROGRAPH AT					
+	V25-G	.02	1	FLOW	45.
				TIME	3.50
HYDROGRAPH AT					
+	R	.00	1	FLOW	12.
				TIME	3.50
2 COMBINED AT					
+	CR	.02	1	FLOW	56.
				TIME	3.50
HYDROGRAPH AT					
+	Q	.00	1	FLOW	12.
				TIME	3.50

2 COMBINED AT					
+	CQ	.03	1	FLOW TIME	68. 3.50
ROUTED TO					
+	RCQ	.03	1	FLOW TIME	67. 3.50
HYDROGRAPH AT					
+	ST1	.00	1	FLOW TIME	7. 3.50
2 COMBINED AT					
+	CST1	.03	1	FLOW TIME	74. 3.50
2 COMBINED AT					
+	DUMMY2	.04	1	FLOW TIME	98. 3.50
HYDROGRAPH AT					
+	P	.00	1	FLOW TIME	11. 3.50
HYDROGRAPH AT					
+	DES2	.00	1	FLOW TIME	10. 3.50
3 COMBINED AT					
+	CDES2	.05	1	FLOW TIME	119. 3.50
HYDROGRAPH AT					
+	DES3	.01	1	FLOW TIME	17. 3.50
HYDROGRAPH AT					
+	L	.01	1	FLOW TIME	30. 3.50
HYDROGRAPH AT					
+	COS-3	.01	1	FLOW TIME	17. 3.50
HYDROGRAPH AT					
+	DES4	.00	1	FLOW TIME	12. 3.50
5 COMBINED AT					
+	CDES4	.08	1	FLOW TIME	195. 3.50
HYDROGRAPH AT					
+	V25-F	.02	1	FLOW TIME	43. 3.50
HYDROGRAPH AT					
+	V25-COS4	.01	1	FLOW TIME	15. 3.50
HYDROGRAPH AT					
+	V25-FOXN	.00	1	FLOW TIME	14. 3.50
3 COMBINED AT					
+	CFOXN	.03	1	FLOW TIME	72. 3.50
HYDROGRAPH AT					
+	V25-B	.03	1	FLOW TIME	67. 3.50
HYDROGRAPH AT					
+	V25-FOXS	.00	1	FLOW TIME	11. 3.58
2 COMBINED AT					
+	CFOXS	.04	1	FLOW TIME	77. 3.50
HYDROGRAPH AT					
+	V25-C	.04	1	FLOW TIME	86. 3.50
ROUTED TO					
+	RV25-C	.04	1	FLOW TIME	84. 3.58

HYDROGRAPH AT					
+	V25-COS2	.00	1	FLOW TIME	5. 3.58
ROUTED TO					
+	RV25-COS	.00	1	FLOW TIME	5. 3.67
HYDROGRAPH AT					
+	STA1	.00	1	FLOW TIME	13. 3.50
5 COMBINED AT					
+	CSTA1	.11	1	FLOW TIME	238. 3.50
ROUTED TO					
+	RCSTA1	.11	1	FLOW TIME	217. 3.58
HYDROGRAPH AT					
+	V25-E	.03	1	FLOW TIME	65. 3.50
ROUTED TO					
+	RV25-E	.03	1	FLOW TIME	59. 3.58
HYDROGRAPH AT					
+	V25-COS3	.00	1	FLOW TIME	8. 3.50
HYDROGRAPH AT					
+	ST2	.00	1	FLOW TIME	12. 3.50
4 COMBINED AT					
+	CST2	.15	1	FLOW TIME	291. 3.58
2 COMBINED AT					
+	DUMMY5	.23	1	FLOW TIME	461. 3.50
HYDROGRAPH AT					
+	F	.03	1	FLOW TIME	65. 3.50
HYDROGRAPH AT					
+	E	.03	1	FLOW TIME	78. 3.50
HYDROGRAPH AT					
+	DESS	.01	1	FLOW TIME	22. 3.50
4 COMBINED AT					
+	CDESS	.29	1	FLOW TIME	624. 3.50
HYDROGRAPH AT					
+	C	.02	1	FLOW TIME	54. 3.50
HYDROGRAPH AT					
+	NP-1	.00	1	FLOW TIME	4. 3.50
HYDROGRAPH AT					
+	ST7	.00	1	FLOW TIME	9. 3.50
HYDROGRAPH AT					
+	D	.02	1	FLOW TIME	56. 3.50
4 COMBINED AT					
+	CST7	.05	1	FLOW TIME	124. 3.50
2 COMBINED AT					
+	DUMMY7	.35	1	FLOW TIME	748. 3.50
HYDROGRAPH AT					
+	W	.01	1	FLOW TIME	31. 3.50
HYDROGRAPH AT					

+	SUMM2	.01	1	FLOW TIME	16. 3.50
HYDROGRAPH AT					
+	T	.01	1	FLOW TIME	23. 3.50
HYDROGRAPH AT					
+	NP-2	.00	1	FLOW TIME	3. 3.50
HYDROGRAPH AT					
+	ST3	.00	1	FLOW TIME	8. 3.50
2 COMBINED AT					
+	CST3	.00	1	FLOW TIME	11. 3.50
4 COMBINED AT					
+	DUMMY8	.03	1	FLOW TIME	81. 3.50
HYDROGRAPH AT					
+	CARR1	.01	1	FLOW TIME	15. 3.50
HYDROGRAPH AT					
+	M	.01	1	FLOW TIME	32. 3.50
3 COMBINED AT					
+	CCARR1	.05	1	FLOW TIME	129. 3.50
HYDROGRAPH AT					
+	N	.00	1	FLOW TIME	10. 3.50
HYDROGRAPH AT					
+	O	.01	1	FLOW TIME	13. 3.50
HYDROGRAPH AT					
+	STD	.00	1	FLOW TIME	4. 3.50
3 COMBINED AT					
+	CSTD	.01	1	FLOW TIME	26. 3.50
HYDROGRAPH AT					
+	K	.01	1	FLOW TIME	30. 3.50
HYDROGRAPH AT					
+	STB	.00	1	FLOW TIME	12. 3.50
3 COMBINED AT					
+	CSTB	.03	1	FLOW TIME	68. 3.50
2 COMBINED AT					
+	DUMMY10	.08	1	FLOW TIME	197. 3.50
HYDROGRAPH AT					
+	J	.02	1	FLOW TIME	42. 3.50
2 COMBINED AT					
+	DUMMY11	.10	1	FLOW TIME	239. 3.50
HYDROGRAPH AT					
+	COS-2	.00	1	FLOW TIME	2. 3.58
HYDROGRAPH AT					
+	COS-1	.01	1	FLOW TIME	22. 3.50
2 COMBINED AT					
+	CCOS-1	.01	1	FLOW TIME	24. 3.50
HYDROGRAPH AT					
+	CARR2	.00	1	FLOW	10.

Referenced Basin
Flow

				TIME	3.50
HYDROGRAPH AT					
+	ST6	.00	1	FLOW TIME	13. 3.50
4 COMBINED AT					
+	CCARR2	.12	1	FLOW TIME	286. 3.50
HYDROGRAPH AT					
+	B	.02	1	FLOW TIME	54. 3.50
HYDROGRAPH AT					
+	A	.02	1	FLOW TIME	51. 3.50
HYDROGRAPH AT					
+	CARR3	.01	1	FLOW TIME	19. 3.50
4 COMBINED AT					
+	CCARR3	.17	1	FLOW TIME	410. 3.50
3 COMBINED AT					
+	DUMMY13	.56	1	FLOW TIME	1271. 3.50
HYDROGRAPH AT					
+	V	.01	1	FLOW TIME	29. 3.50
HYDROGRAPH AT					
+	SUMM4	.01	1	FLOW TIME	21. 3.50
2 COMBINED AT					
+	CSUMM4	.02	1	FLOW TIME	50. 3.50
HYDROGRAPH AT					
+	DC-2	.00	1	FLOW TIME	5. 3.50
HYDROGRAPH AT					
+	U	.03	1	FLOW TIME	73. 3.50
HYDROGRAPH AT					
+	I	.03	1	FLOW TIME	61. 3.50
HYDROGRAPH AT					
+	STA	.00	1	FLOW TIME	5. 3.50
HYDROGRAPH AT					
+	G	.01	1	FLOW TIME	19. 3.50
HYDROGRAPH AT					
+	H	.01	1	FLOW TIME	21. 3.50
2 COMBINED AT					
+	CGH	.02	1	FLOW TIME	39. 3.50
HYDROGRAPH AT					
+	DC-1	.01	1	FLOW TIME	23. 3.50
HYDROGRAPH AT					
+	NVE	.03	1	FLOW TIME	75. 3.50
8 COMBINED AT					
+	CDC1	.15	1	FLOW TIME	326. 3.50
2 COMBINED AT					
+	CFAR	.71	1	FLOW TIME	1598. 3.50

1

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

V21-SDN3.OUT

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	COMPUTATION PEAK	INTERVAL TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
	RCQ MANE	.22	67.72	210.18	2.62	5.00	67.37	210.00	2.62
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3853E+01 EXCESS= .0000E+00 OUTFLOW= .3853E+01 BASIN STORAGE= .1974E-04 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
	RV25-C MANE	3.60	84.77	216.10	2.46	5.00	83.86	215.00	2.47
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5451E+01 EXCESS= .0000E+00 OUTFLOW= .5449E+01 BASIN STORAGE= .5287E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
	RV25-COS MANE	4.00	5.08	220.00	2.20	5.00	5.08	220.00	2.21
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3289E+00 EXCESS= .0000E+00 OUTFLOW= .3289E+00 BASIN STORAGE= .4677E-03 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
	RCSTA1 MANE	4.00	220.97	216.00	2.58	5.00	217.33	215.00	2.58
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1570E+02 EXCESS= .0000E+00 OUTFLOW= .1562E+02 BASIN STORAGE= .7824E-03 PERCENT ERROR= .5									
FOR PLAN = 1 RATIO= .00									
	RV25-E MANE	2.81	61.69	213.68	2.84	5.00	59.42	215.00	2.83
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4061E+01 EXCESS= .0000E+00 OUTFLOW= .4053E+01 BASIN STORAGE= .2477E-03 PERCENT ERROR= .2									

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

APPENDIX F

City of Las Vegas NOFA



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

LOIS TARKANIAN
Mayor Pro Tem

STAVROS S. ANTHONY

BOB COFFIN

STEVEN G. SEROKA

MICHELE FIORE

CEDRIC CREAR

SCOTT D. ADAMS
City Manager

DEPARTMENT OF PLANNING
ROBERT SUMMERFIELD
DIRECTOR

**DEVELOPMENT
SERVICES CENTER**

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



cityoflasvegas
lasvegasnevada.gov

3✓

S.✓

May 17, 2018

Mr. Kevin Orrock
Howard Hughes Company, LLC
10000 West Charleston Boulevard
Las Vegas, Nevada 89135

**RE: MDR-72778 [PRJ-72462] - MASTER DEVELOPMENT PLAN
REVIEW
CITY COUNCIL MEETING OF MAY 16, 2018**

Dear Mr. Orrock:

The City Council at a regular meeting held on May 16, 2018 voted to **APPROVE** a request for a Summerlin Development Plan Review for Village 21 on 321.00 acres at the northwest corner of Far Hills Drive and Clark County 215 (portion of APN 137-22-000-017), P-C (Planned Community) Zone, Ward 2 (Seroka) [PRJ-72462].

This approval is subject to the following conditions:

Planning

1. Approval of a General Development Plan Review (MDR-72841) for the undeveloped portions of Summerlin West.
2. Conformance with the Summerlin Village 21 development plan, date stamped 03/28/18, except as amended by conditions herein.
3. The maximum number of dwelling units shall be 5,717.
4. Prior to development of Parcels N through AA, a Major Modification of the Village 21 Development Plan shall be submitted that details the specific land use categories and development standards that apply to these parcels.
5. Recordation of a Parcel Map, such as PMP-72289, defining the boundaries of Summerlin Village 21 prior to submittal of a Tentative Map over this area.
6. All development shall be in conformance with the Summerlin Development Standards, unless amended through a separate action.

Mr. Kevin Orrock
Howard Hughes Company, LLC
MDR-72778 [PRJ-72462] - Page Two
May 17, 2018

7. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

8. Prior to or concurrent with development of each parcel/village, appropriate right of way dedications, street improvements, drainage plan/study submittals, drainage improvements, sanitary sewer collection system extensions and traffic impact analyses including traffic mitigation plans along with signal participation schedules and pedestrian circulation plans may be required by the Department of Public Works. Provide appropriate easements for all public facilities (sewer, drainage, sidewalk, traffic signal, streetlighting, etc.) as required by the Department of Public Works. Comply with such requirements when imposed and/or when compliance is indicated.
9. Provide a minimum of two lanes of paved legal access from an existing paved public street to each individual development area prior to occupancy of any buildings within each development area.
10. Development of this site shall substantially conform to Summerlin Improvement Standards. Approval of deviations to the Summerlin Improvement Standards may be approved through the approval of a Master Tentative Map. Street lighting shall be per Standard Drawing #300.S3. Public parking shall meet the approval of the City Traffic Engineer.
11. An update to the "Summerlin West" Master Sewer Plan for the overall site must be submitted to and approved by the Department of Public Works prior to the recordation of a Parent Final Map. Additional specific village and/or site sewer plan/studies may be required with each individual pod or phase of development activity based upon sewer capacities at the time of development. Comply with all recommendations of the "Summerlin West" Master Sewer Plan.
12. An update to the previously approved Traffic Impact Analysis must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits or the submittal of any construction drawings, whichever may occur first. Comply with the recommendations of the approved update to the Traffic Impact Analysis prior to occupancy of the site. Phased compliance will be allowed if recommended by the approved Traffic Impact Analysis. No recommendation of the approved Traffic Impact Analysis, nor compliance therewith, shall be deemed to modify or eliminate any condition of approval imposed by the Planning Commission or the City Council on the development of this site.

Mr. Kevin Orrock
Howard Hughes Company, LLC
MDR-72778 [PRJ-72462] - Page Three
May 17, 2018

13. An update to the "Summerlin West" Master Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to submittal of any construction drawings or the issuance of any building or grading permits, or the recordation of Final Maps, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage study update.
14. The approval of all Public Works related improvements shown on this Master Development Review is in concept only. Cross Sections provided may be used in construction provided that their uses in roadway designs are acceptable to the Department of Public Works. 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 Summerlin and/or 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. We reserve the right to impose additional conditions of approval for each individual development site when such plans are known. We anticipate the need for additional conditions concurrent with approval of the Master Tentative Map(s) and/or Village Map(s) for this site.

The Notice of Final Action was filed with the Las Vegas City Clerk on May 17, 2018.

Sincerely,



Robert Summerfield, AICP[®]
Director
Department of Planning

RTS:PL:clb

cc: Ms. Jolene Granberg-Thompson
VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89146



**LAS VEGAS
CITY COUNCIL**

CAROLYN G. GOODMAN
Mayor

LOIS TARKANIAN
Mayor Pro Tem

STAVROS S. ANTHONY

BOB COFFIN

STEVEN G. SEROKA

MICHELE FIORE

CEDRIC CREAR

SCOTT D. ADAMS
City Manager

DEPARTMENT OF PLANNING
ROBERT SUMMERFIELD
DIRECTOR

**DEVELOPMENT
SERVICES CENTER**
DEPARTMENT OF PLANNING
333 N. RANCHO DRIVE
3RD FLOOR
LAS VEGAS, NV 89106
702.229.6301 | VOICE
702.474.7463 | FAX
711 | TTY



cityoflasvegas
lasvegasnevada.gov

3✓

S.✓

May 17, 2018

Mr. Kevin Orrock
Howard Hughes Company, LLC
10000 West Charleston Boulevard
Las Vegas, Nevada 89135

**RE: MDR-72841 [PRJ-72832] - GENERAL DEVELOPMENT PLAN
REVIEW
CITY COUNCIL MEETING OF MAY 16, 2018**

Dear Mr. Orrock:

The City Council at a regular meeting held on May 16, 2018 voted to **APPROVE** a request for a Summerlin General Development Plan Review for the undeveloped portions of Summerlin West on 5,054.53 acres at the northwest corner of Far Hills Drive and Clark County 215 (APNs 137-14-401-002, 137-21-000-002, 137-22-000-017, 137-28-000-001 and 137-32-000-003), P-C (Planned Community) Zone, Ward 2 (Séroka) [PRJ-72832].

This approval is subject to the following conditions:

Planning

1. Conformance to the Summerlin West Development Agreement as amended.
2. Conformance with the Summerlin West general development plan, date stamped 03/29/18, except as amended by conditions herein.
3. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

4. Prior to or concurrent with development of each parcel/village, appropriate right of way dedications, street improvements, drainage plan/study submittals, drainage improvements, sanitary sewer collection system extensions and traffic impact analyses including traffic mitigation plans along with signal participation schedules and pedestrian circulation plans may be required by the Department of Public Works. Provide appropriate easements for all public facilities (sewer, drainage, sidewalk, traffic signal, streetlighting, etc.) as required by the Department of Public Works. Comply with such requirements when imposed and/or when compliance is indicated.

Mr. Kevin Orrock
Howard Hughes Company, LLC
MDR-72841 [PRJ-72832] - Page Two
May 17, 2018

5. Provide a minimum of two lanes of paved legal access from an existing paved public street to each individual development area prior to occupancy of any buildings within each development area.
6. Development of this site shall substantially conform to Summerlin Improvement Standards. Approval of deviations to the Summerlin Improvement Standards may be approved through the approval of a Master Tentative Map. Street lighting shall be per Standard Drawing #300.S3. Public parking shall meet the approval of the City Traffic Engineer.
7. An update to the "Summerlin West" Master Sewer Plan for the overall site must be submitted to and approved by the Department of Public Works prior to the recordation of a Parent Final Map. Additional specific village and/or site sewer plan/studies may be required with each individual pod or phase of development activity based upon sewer capacities at the time of development. Comply with all recommendations of the "Summerlin West" Master Sewer Plan.
8. An update to the "Summerlin West" Master Traffic Impact Analysis for the overall site must be submitted to and approved by the Department of Public Works prior to the recordation of a Parent Final Map within this site. Approval of additional village-specific traffic studies will be required with each individual village prior to recordation of the respective village final maps. Comply with all recommendations of the "Summerlin West" Master Traffic Impact Analysis.
9. An update to the "Summerlin West" Master Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to submittal of any construction drawings or the issuance of any building or grading permits, or the recordation of Final Maps, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage study update.
10. The approval of all Public Works related improvements shown on this Master Development Review is in concept only. Cross Sections provided may be used in construction provided that their uses in roadway designs are acceptable to the Department of Public Works. 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 Summerlin and/or 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. We reserve the right to impose additional conditions of approval for each individual development site when such plans are known. We anticipate the need for additional conditions concurrent with approval of the Master Tentative Map(s) and/or Village Map(s) for this site.

Mr. Kevin Orrock
Howard Hughes Company, LLC
MDR-72841 [PRJ-72832] - Page Three
May 17, 2018

The Notice of Final Action was filed with the Las Vegas City Clerk on May 17, 2018.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert Summerfield". The signature is fluid and cursive, with the first name "Robert" and last name "Summerfield" clearly distinguishable.

Robert Summerfield, AICP[®]
Director
Department of Planning

RTS:PL:clb

cc: Ms. Jolene Granberg-Thompson
VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89146

APPENDIX G

E-mail Correspondence w/ Howard Hughes Corporation

Stanley Amadi

From: Stanley Amadi
Sent: Wednesday, August 7, 2019 10:58 AM
To: Amy Poechmann; Caitlyn Alcantara
Subject: RE: Summerlin Village 21 Parcel K Open Space

Thanks,

PLEASE NOTE MY NEW EMAIL ADDRESS BELOW

Stanley Okey Amadi, PE., CFM

PROJECT MANAGER II

stanley.amadi@westwoodps.com – New Email Address

Direct (702) 284-5327

Main (702) 284-5300

Westwood Multi-Disciplined Surveying & Engineering

5740 S. Arville Street, Suite 216 | Las Vegas, NV 89118

westwoodps.com

(888) 937-5150

From: Amy Poechmann <Amy.Poechmann@westwoodps.com>
Sent: Wednesday, August 7, 2019 10:45 AM
To: Stanley Amadi <Stanley.Amadi@westwoodps.com>; Caitlyn Alcantara <Caitlyn.Alcantara@westwoodps.com>
Subject: FW: Summerlin Village 21 Parcel K Open Space

Stanley and Caitlyn,

Below is the e-mail from Summerlin about allowing the flows about curb height based on our meeting.

Amy Poechmann

PROJECT MANAGER I

apoechmann@westwoodps.com

Direct (702) 284-5342

Main (702) 284-5300

Westwood Multi-Disciplined Surveying & Engineering

5740 S. Arville Street, Suite 216 | Las Vegas, NV 89118

westwoodps.com

(888) 937-5150

From: Betty Shevorski <Betty.Shevorski@howardhughes.com>
Sent: Thursday, July 11, 2019 4:10 PM
To: Isaac Guzman <Isaac.Guzman@westwoodps.com>; Vincent Esposito <Vincent.Esposito@howardhughes.com>
Cc: Amy Poechmann <Amy.Poechmann@westwoodps.com>; Kevin Bross <Kevin.Bross@westwoodps.com>; Todd Steadham <Todd.Steadham@westwoodps.com>
Subject: RE: Summerlin Village 21 Parcel K Open Space

Hello Isaac and Amy,

The SDRC approved the site plans and proposed drainage as is. Please don't move any sidewalks or streets, the water above the curb will be ok.

If you haven't already, please send the proposed utility tie in locations to the THHC engineering team.

Thanks,

Betty

Betty Shevorsi, AIA

Senior Architect | Summerlin

The Howard Hughes Corporation | 10801 W. Charleston Blvd | 3rd Floor | Las Vegas, NV 89135

702.791.4362 phone | 702.791.4385 fax | 702.279.0416 mobile

From: Isaac Guzman <Isaac.Guzman@westwoodps.com>

Sent: Monday, July 8, 2019 2:55 PM

To: Betty Shevorsi <Betty.Shevorsi@howardhughes.com>; Vincent Esposito <Vincent.Esposito@howardhughes.com>

Cc: Amy Poechmann <Amy.Poechmann@westwoodps.com>; Kevin Bross <Kevin.Bross@westwoodps.com>; Todd Steadham <Todd.Steadham@westwoodps.com>

Subject: RE: Summerlin Village 21 Parcel K Open Space

This email originated from an external server. Use caution.

Good afternoon Betty/Vincent,

We ran preliminary calculations for the Summerlin Village 21 Parcel K onsite storm drain and are finding some conflicts with the narrow roadway and street flow depth criteria. We are taking a look at different scenarios and would like to set up a meeting to discuss them.

Let us know what day works best for you this week.

Thanks-

Isaac Guzman

PROJECT MANAGER

isaac.guzman@westwoodps.com

Direct (702) 284-5320

Main (702) 284-5300

Westwood Multi-Disciplined Surveying & Engineering

5740 S. Arville Street, Suite 216 | Las Vegas, NV 89118

westwoodps.com

(888) 937-5150

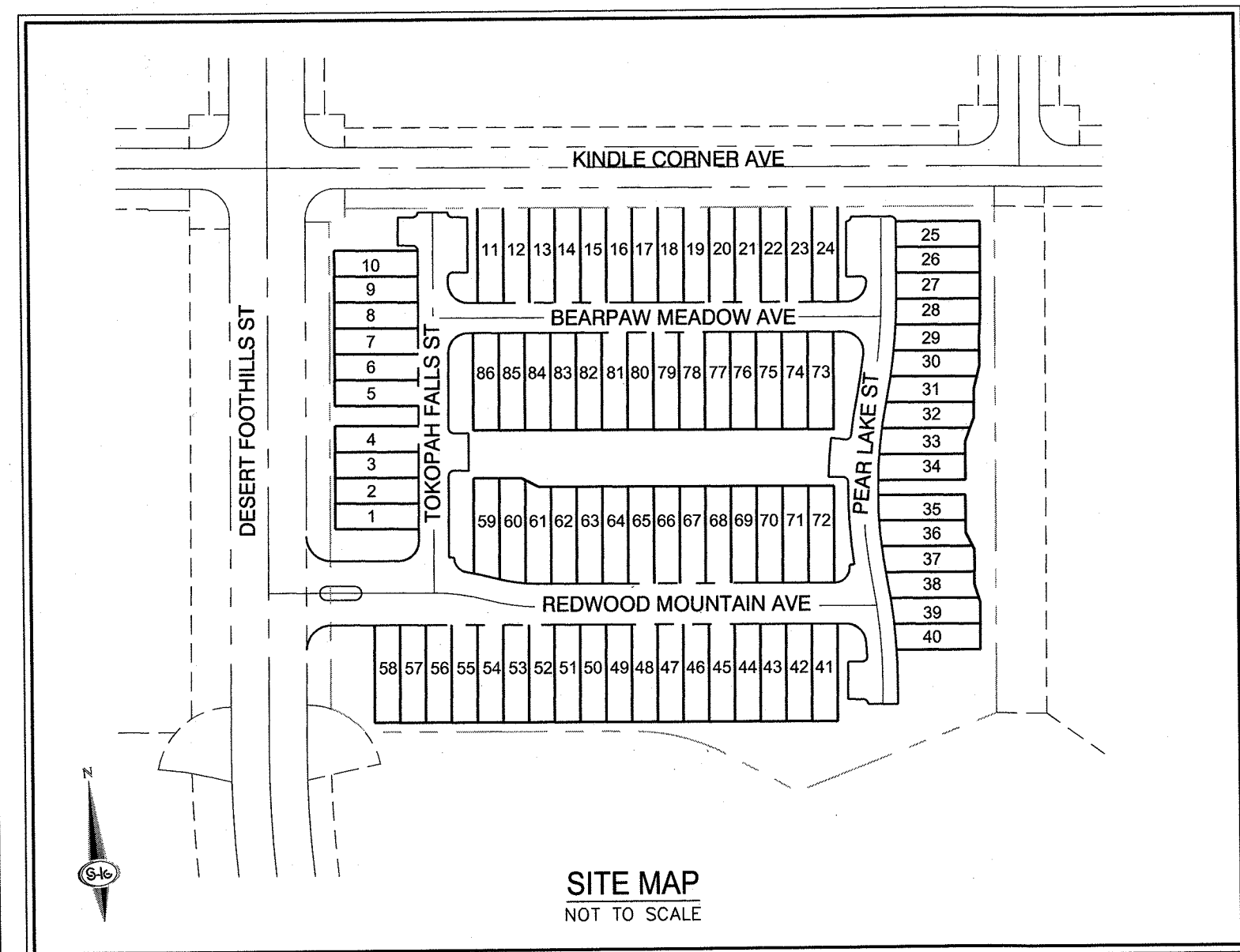
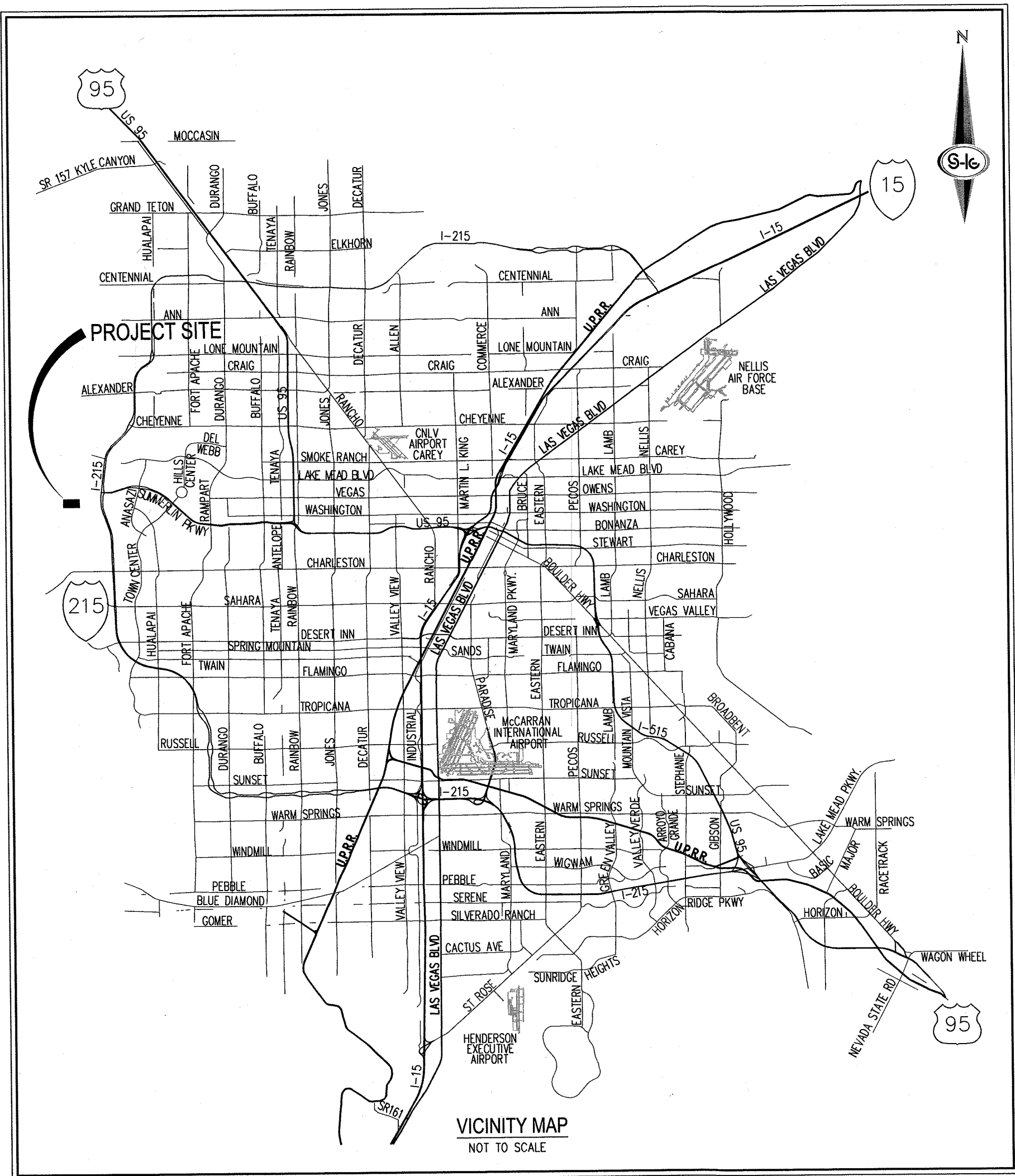
Disclaimer

The information contained in this communication from the sender is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, distribution or taking action in relation of the contents of this information is strictly prohibited and may be unlawful.

This email has been scanned for viruses and malware, and may have been automatically archived by **Mimecast Ltd**, an innovator in Software as a Service (SaaS) for business. Providing a **safer** and **more useful** place for your human generated data. Specializing in; Security, archiving and compliance. To find out more [Click Here](#).

APPENDIX H

CD of Electronic Files & Revised Improvement Plans



RICHMOND AMERICAN HOMES

IMPROVEMENT PLANS FOR SUMMERLIN V21 PARCEL K AKA MORO ROCK

CITY OF LAS VEGAS, NEVADA
RESIDENTIAL SUBDIVISION
APN: 137-26-112-003



Sheet List Table		
NO.	SHEET	TITLE
1	C-1	COVER SHEET
2	C-2	STANDARD NOTES
3	C-3	QUANTITIES & LEGEND
4	G-1	GRADING PLAN I
5	G-2	GRADING PLAN II
6	D-1	STREET SECTIONS
7	D-2	GRADING DETAILS
8	PP-1	PLAN AND PROFILE - PEAR LAKE ST

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 STATUTES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.	
APPROVED FOR CONSTRUCTION	
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES PROJECT NO. ##### FIRST APPROVED DATE: _____ LVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 20 GPM SHEETS: ADD FIELD	
NV ENERGY	DATE
NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.	
SOUTHWEST GAS CORPORATION	DATE
COX COMMUNICATIONS LAS VEGAS, INC.	DATE

OWNER	DEVELOPER	ENGINEER
HOWARD HUGHES COMPANY LLC 10801 W. CHARLESTON BLVD. LAS VEGAS, NV 89135	RICHMOND AMERICAN HOMES 7770 S. DEAN MARTIN DR. #308 LAS VEGAS, NV 89139 PH: 702-817-8400 FX: 702-348-5964 CONTACT: NICOLE BLOOM	SLATER HANIFAN GROUP, INC. 5740 S. ARVILLE STREET, SUITE 216 LAS VEGAS, NV 89118 PH: (702) 284-5300 FX: (702) 284-5399 CONTACT: ISAAC GUZMAN

LEGAL DESCRIPTION
BEING LOT "X" OF THAT CERTAIN FINAL MAP TITLED "SUMMERLIN VILLAGE 21 - UNIT 3", IN BOOK 159 OF PLATS, PAGE 50, IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA.

BENCHMARK
BENCHMARK NUMBER: SLV0926W6 RIVET AND PLATE IN TOP OF CURB AT SOUTHEAST CORNER OF CARRIAGE HILL DRIVE AND FAR HILLS AVENUE. ELEVATION = 3229.29 FEET, 984.288 METERS N.A.V.D. 88 DATUM PER THE CITY OF LAS VEGAS VERTICAL CONTROL

BASIS OF BEARINGS
SOUTH 89°51'25" EAST, BEING THE BEARING OF THE NORTH LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 58 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 159, PAGE 13 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

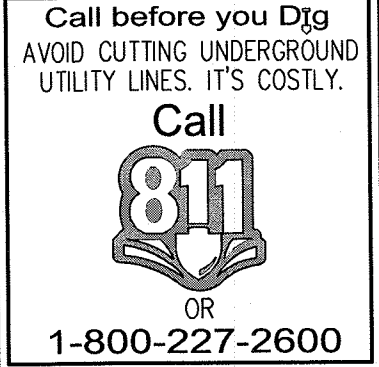
FEMA FLOOD ZONE INFORMATION
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (AREA OUTSIDE THE 500 YEAR FLOODPLAIN), PER THE FEMA FIRM PANELS 32003C2150E DATED SEPTEMBER 27, 2002

DEVIATIONS FROM STANDARDS
NONE

SWPPP NOTE
NOTE: ALL LAND SURFACE AREA DISTURBANCES OVER 1 ACRE REQUIRE A STORMWATER DISCHARGE PERMIT ISSUED BY THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDPE). A PHASED CONSTRUCTION UNIT IN A CONTIGUOUS SUBDIVISION IS CONSIDERED UNDER CONSTRUCTION UNTIL ALL STRIPPED SURFACE AREAS HAVE BEEN COVERED BY PAVING, BUILDING CONSTRUCTION OR PLANTING. A STORMWATER DISCHARGE PERMIT APPLICATION AND ASSOCIATED INFORMATION MAY BE DOWNLOADED FROM THE WEB SITE: HTTP://WWW.STATE.NV.US/BWPC/STORM01.HTM PROJECTS THAT DISTURB MORE THAN ONE ACRE OF LAND MUST SUBMIT TO NDPE A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

PROJECT INFORMATION
ACREAGE (GROSS): = 8.20 AC ACREAGE (NET): = 7.03 AC DENSITY (LOTS/NET ACRE): = 12.23 DU/NET AC ZONING: = P-C TOTAL NO. OF RESIDENTIAL LOTS = 86 TOTAL NO. OF COMMON ELEMENTS = 3 MINIMUM LOT SIZE = 2,173 SF± MAXIMUM LOT SIZE = 2,685 SF± PROVIDED OPEN SPACE = 81,178 SF± EARTHWORK SUMMARY (UNADJUSTED) CUT 4,905 CY. FILL 64,115 CY. NET 59,210 CY.

GEOTECHNICAL ENGINEER
PREPARED BY: ANGLE ENGINEERING ADDRESS: 5985 SOUTH EDMOND STREET, LAS VEGAS, NV 89118 PHONE: 702-382-8453 PROJECT NO. 26223-1 DATED: 6/22/19



SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

CITY OF LAS VEGAS, NV
NO. DESCRIPTION DATE BY APP. DATE

RICHMOND AMERICAN HOMES
SUMMERLIN V21 PARCEL K
COVER SHEET

DATE: 8/21/19
DRAFTER: HA
DESIGNER: IG
CHECKED: IG
PROJECT NO.
RAH1908.00

ISAAC M. GUZMAN
exp. 06/30/2021
CIVIL
No. 23513 YUMI
8-26-19
C-1
SHEET 1 OF 7

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 AND 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 NWR100000, 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 NWR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

LEGAL DESCRIPTION

BEING LOT "C" OF THAT CERTAIN FINAL MAP TITLED "SUMMERLIN VILLAGE 21 - UNIT 3", IN BOOK 159 OF PLATS, PAGE 50, IN THE OFFICE OF THE COUNTY RECORDER OF CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: SLV09266

RIVET AND PLATE IN TOP OF CURB AT SOUTHEAST CORNER OF CARRIAGE HILL DRIVE AND FAR HILLS AVENUE.

ELEVATION = 3229.29 FEET, 984.28 METERS
N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL.

BASIS OF BEARINGS

SOUTH 89°51'25" EAST, BEING THE BEARING OF THE NORTH LINE OF SECTION 27, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 159, PAGE 13 OF PLATS IN THE CLARK COUNTY RECORDERS OFFICE, NEVADA.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
 2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRICAL SHALL BE AT LEAST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS.
A) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
 3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION.
 4. IN THE EVENT OF NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-365-2099
CAUTION: HIGH PRESSURE GAS
- CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION

DATE

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. POLYVNYL (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 08/01/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION, FOR FUTURE INSPECTIONS. NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT 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 AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCTS LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

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 ADJUTING 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.

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

GRADING NOTES

1. INDICATED GRADES OTHER THAN T.C., F.G. & GUTTER F.L. ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLANS WILL RESULT IN QUANTITY CHANGES.
3. CARE SHALL BE EXERCISED IN GRADING CORNER LOTS.
4. ROUGH PAD ELEVATIONS SHALL BE GRADED TO WITHIN 0.1' OF THE PAD ELEVATIONS SHOWN ON THE PLANS. WHEN GRADING IS COMPLETE PER THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE LOTS CAN BE INSPECTED. AT THAT TIME THE ENGINEER SHALL ALSO DECIDE IF ANY ADDITIONAL DITCHES OR BERMS ARE REQUIRED. THE CONTRACTOR IS REQUESTED NOT TO REMOVE ANY OF HIS ROUGH GRADING EQUIPMENT UNTIL HE RECEIVES GRADING APPROVAL FROM THE ENGINEER.
5. SOILS REPORT PREPARED BY ANGLE ENGINEERING, PROJECT NO. 26223-1, DATED 6/12/19.
6. EARTHWORK QUANTITIES (RAW):
- CUT = 4.905 CUBIC YARDS
- FILL = 6.415 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, & FEEST FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICTS - APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE 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 § 106.6.15.
4. ON ANY 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 VERIFICATION 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 PAINTED 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; 800 FT SPRINKLERED.
• COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE 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 1000 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 FT OF THE PERMETER OF THE RADIUS OF THE CUL-DE-SAC
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC § C102.10
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 IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM, FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION, FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. 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 FT 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 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. IFC § 503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC § 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB, NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB, NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. 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. IFC § 503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS OR A SINGLE POINT OF ACCESS OF 600 FT, CLV REGULATION AND MOU
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LINES, 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, CLV REGULATION
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 FT 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. IFC § 503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

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 CALL 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 INTERFERENCES WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
 3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
 4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
 5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
 6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
 7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
 8. AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE UP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK 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 #26223-1, 6/12/19, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
 13. EXACT LOCATION OF ALL SAWDUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATIONS 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 APPROXS, 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 UTILITIES, 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 DOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
 20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
 21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF THE PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAP(S) MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINITIES OF ± 0.09 METERS (+/- 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATION ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
 22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST ADDITION.
 23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

2.3 CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICAADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS HAVE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCLOSED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBSTRUCTION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VIF CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1100 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM TO THEIR RESPECTIVE CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC INTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE. UNDER NO CIRCUMSTANCES, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER PAVEMENT IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOPS SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED AT-SITE TRAFFIC CONTROL SPECIALIST OR A QUALIFIED SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECTS OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT EXISTING SECTIONS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

2.4 CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST REVISION (USS), AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA" (USD), LATEST REVISION.
2. DESIGN PROFESSIONAL AND CONTRACTOR SHALL VERIFY CITY'S LATEST LED FIXTURE SPECIFICATIONS AND APPROVED FIXTURES PER CLV WEBSITE, UNDER BUILDING AND SAFETY FORMS, PRIOR TO ORDERING MATERIALS.
3. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC AND CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
4. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS.
5. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN NO. #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
6. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A. WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
7. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARE.
8. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED. AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

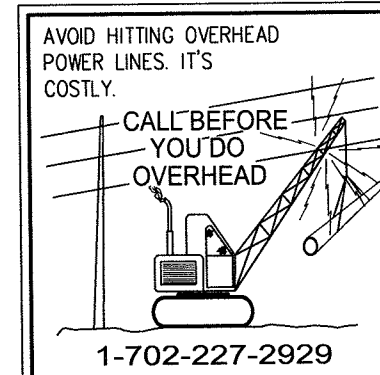
DEVIATIONS FROM STANDARDS

NONE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. _____ FIRST APPROVED DATE: _____



SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5389

</

A:\cvt\908 summerlin v21\misco\rah1908.dwg, 8/26/2019, 2:43 PM, Isaac Guzman

ABBREVIATIONS

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

NOTICE TO CONTRACTOR

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

EXISTING UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS. CALL BEFORE YOU DIG. (800) 227-2600

LEGEND

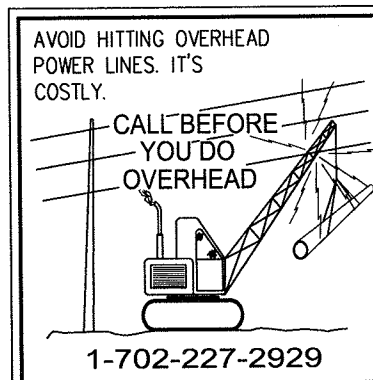
EXISTING	PROPOSED	DESCRIPTION
		5' CONTOUR
		1' CONTOUR
		STRIPING
		SEWER MANHOLE
		CURB AND GUTTER
		SANITARY SEWER PIPE AND FLOW ARROW
		WATER PIPE
		WATER GATE VALVE
		FIRE HYDRANT
		WATER BLOW-OFF
		WATER LATERAL W/ METER
		SANITARY SEWER LATERAL
		STREETLIGHT
		EDGE OF PAVEMENT
		TRAFFIC SIGN
		PAD ELEVATION
		FINISHED FLOOR ELEVATION
		ELEVATION
		RETAINING WALL
		STORM DRAIN W/ MANHOLE
		EXISTING GAS GATE VALVE PROPOSED SCARP AREA
		EXISTING UNKNOWN MANHOLE DRIVEWAY
		EXISTING GAS, SIZE PER PLAN PROPOSED RIP RAP
		EXISTING POWER POLE SIGHT VISIBILITY ZONE PER STD DWG NO. 201.2
		EXISTING TRAFFIC SIGNAL HANDICAP RAMP
		EXISTING WALL
		WATER PIPE FITTING
		WATER POINT OF CONNECTION
		SEWER POINT OF CONNECTION
		DAYLIGHT LINE
		STREET CENTERLINE
		RIGHT-OF-WAY
		MATCHLINE
		BOUNDARY LINE
		PHASE LINE
		PROPERTY LINE
		FLOWLINE
		SAWCUT
		CUT/FILL TRANSITION LINE
		SIDEWALK
		EX STRIPING TO BE OBLITERATED
		GRADE BREAK LINE
		REFLECTIVE RAISED PAVEMENT MARKERS
		BACK WATER VALVE
		WROUGHT IRON FENCE
		PONY WALL
		DECORATIVE PERIMETER WALL
		DECORATIVE PERIMETER RETAINING WALL
		PROPOSED CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		EXISTING CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB
		FUTURE CURB AND GUTTER WITH RIGHT-OF-WAY AT BACK OF CURB

QUANTITIES

	PRIVATE	PUBLIC
DRAINAGE		
1. 12.5' TYPE "CM2" DROP INLET	EA	1
2. 3' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	962
3. 8' WIDE CONCRETE VALLEY GUTTER W/10" TYPE I AGGREGATE BASE	SF	2,822
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
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)	LF	-
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 8" 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	5,640
2. STANDARD 24" TYPE "L" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	135
3. STANDARD 8" TYPE "A" ISLAND CURB W/6" TYPE I AGGREGATE BASE	LF	489
4. STANDARD 30" TYPE "ROLL" CURB & GUTTER W/6" TYPE I AGGREGATE BASE	LF	2,759
5. 5' WIDE CONCRETE SIDEWALK W/4" TYPE II AGGREGATE BASE	SF	21,167
6. ADA SIDEWALK RAMPS	EA	8
7.		
TRAFFIC SIGNALS		
1. 30" STOP SIGN WITH POST (R1-1)	EA	-
2. 9" STREET NAME SIGN (0-3, 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 (RR)	EA	-
5. 200 AMP SERVICE PEDESTAL (STL)	EA	-
6.		

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. _____ FIRST APPROVED DATE: _____



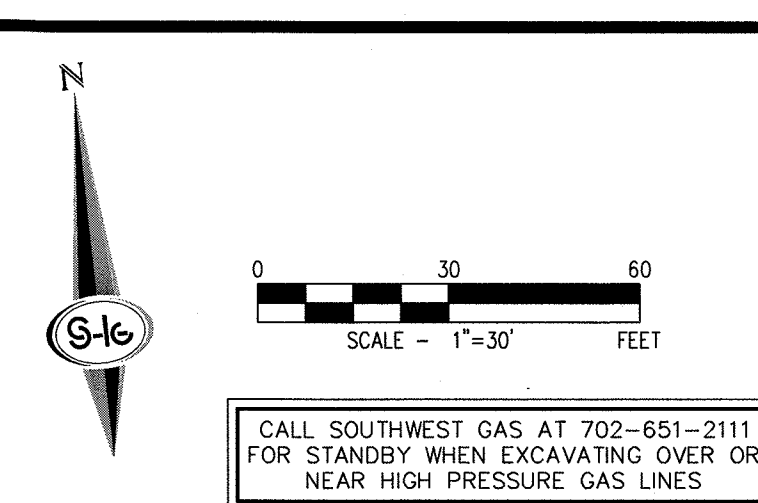
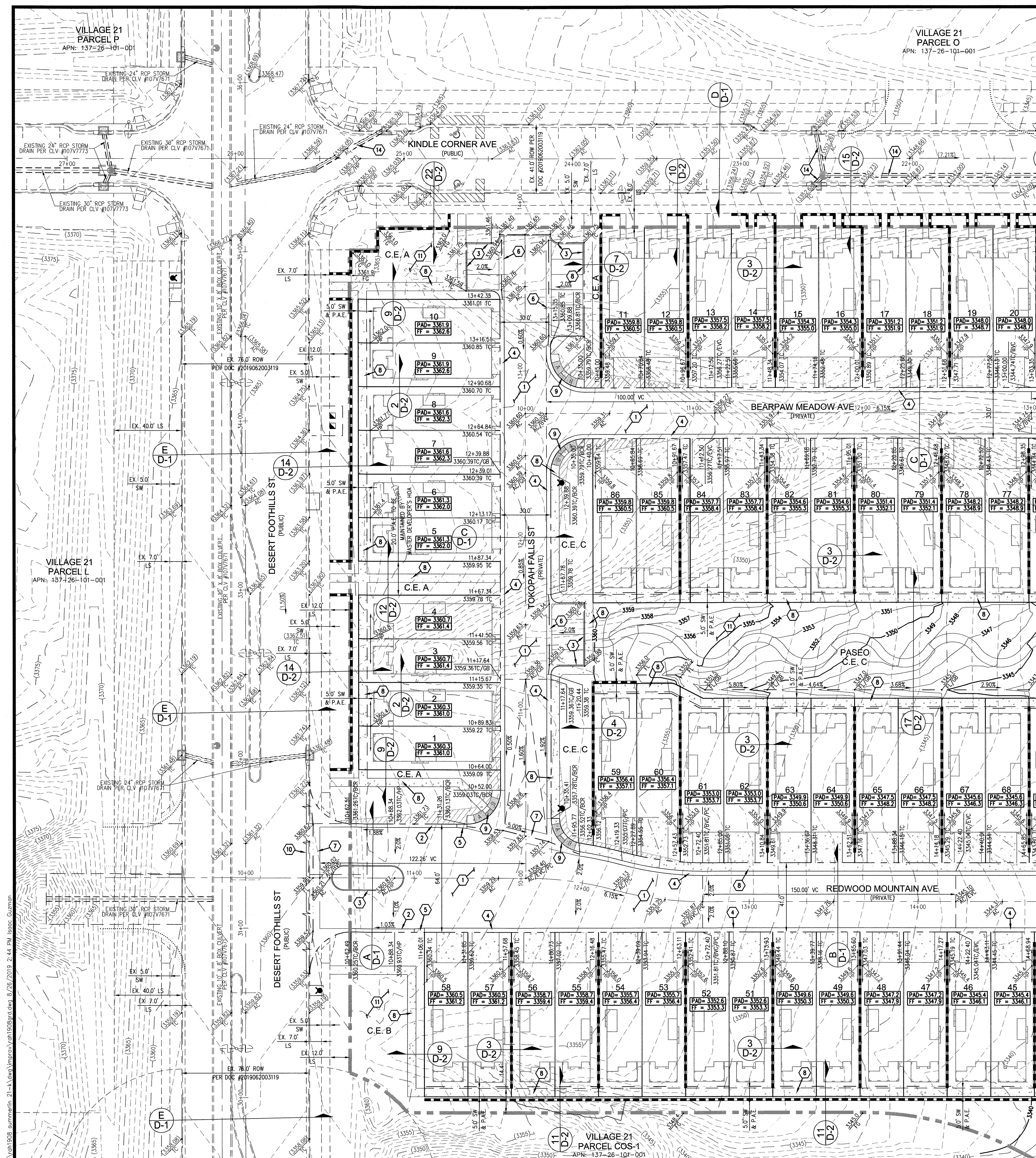
SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300

SLATER HANIFAN GROUP
CITY OF LAS VEGAS, NV
SUMMERLIN V21 PARCEL K
QUANTITIES & LEGEND

RICHMOND AMERICAN HOMES
ISAAC M. GUZMAN
Exp. 06/30/2021
CIVIL
No. 23513 YUM NV
8-26-19
C-3
SHEET 3 OF 7

DATE: 8/21/19
DRAFTER: HA
DESIGNER: IG
CHECKED: IG
PROJECT NO. RAH1908.00

626
720
R59



DRAINAGE IMPROVEMENT QUANTITIES		
1	12.5" TYPE "CM2" DROP INLET	EA 1
2	3" WIDE CONCRETE VALLEY GUTTER	EA 962
3	8" WIDE CONCRETE VALLEY GUTTER	EA 2,822

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

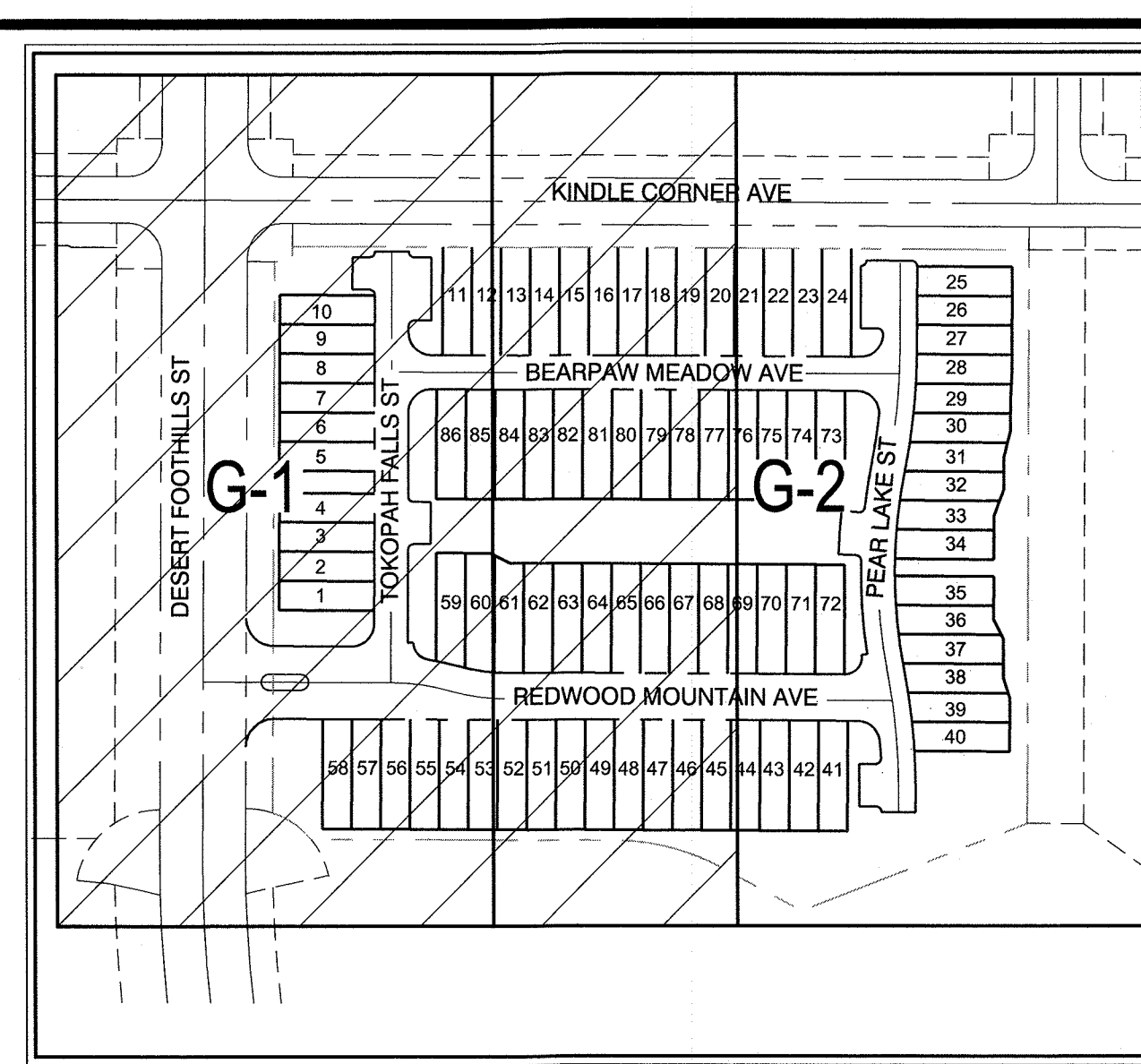
SOILS REPORT
SOILS REPORT BY ANGLE ENGINEERING
PROJECT NO. 26223-1 DATED 6/12/19
EARTHWORKS
EARTHWORK QUANTITIES (RAW):
CUT: 4,905 CU YDS
FILL: 64,115 CU YDS
EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

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

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

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 NVR00000, 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 NVR00000, 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.



- GRADING NOTES**
1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
 2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
 3. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
 4. CONSTRUCT 30" ROLL CURB AND GUTTER PER CCAUSD NO. 217.1
 5. CONSTRUCT 5" TRANSITION FROM ROLLED CURB TO "L" TYPE CURB PER DETAIL 21 SHEET D-2
 6. CONSTRUCT 3" CROSS GUTTER PER DETAIL 1 SHEET D-1
 7. CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
 8. CONSTRUCT 5" WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
 9. CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1
 10. SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 503 & 500.2
 11. LANDSCAPING TO BE DESIGNED AND MAINTAINED BY MASTER DEVELOPER HOA
 12. INSTALL CABLE RAIL QUADRORAIL PER DETAIL 19 ON SHEET D-2
 13. INSTALL 12.5" TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421
 14. EXISTING 24" RCP STORM DRAIN PER CLV #107V7671
 15. EXISTING 60" TYPE II STORM DRAIN MANHOLE PER CLV #107V7671
 16. INSTALL SIDEWALK UNDERDRAIN PER CCAUSD NO. 236

FLOOD ZONE
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2150E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PRIVATE DRAINAGE EASEMENT NOTE
ALL PRIVATE STREET AND COMMON ELEMENTS ARE PRIVATE DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE MASTER DEVELOPER'S HOA

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

ISAAC GUZMAN, P.E. 23513 DATE

FAST
Call before you UnderGround
1-702-432-5300
FREEMAN & 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

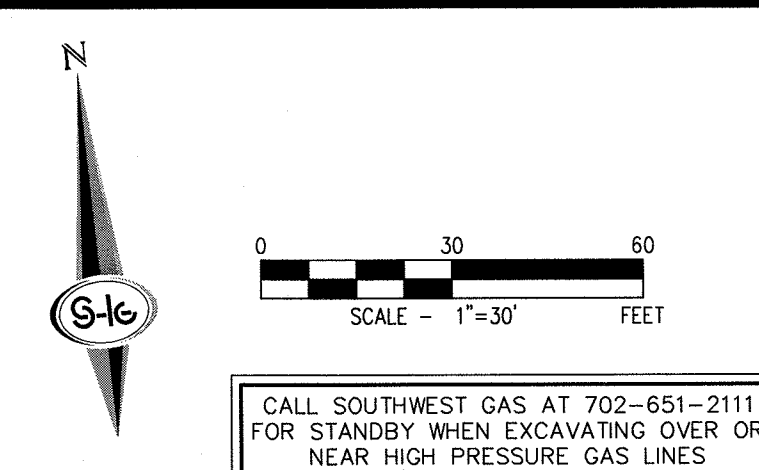
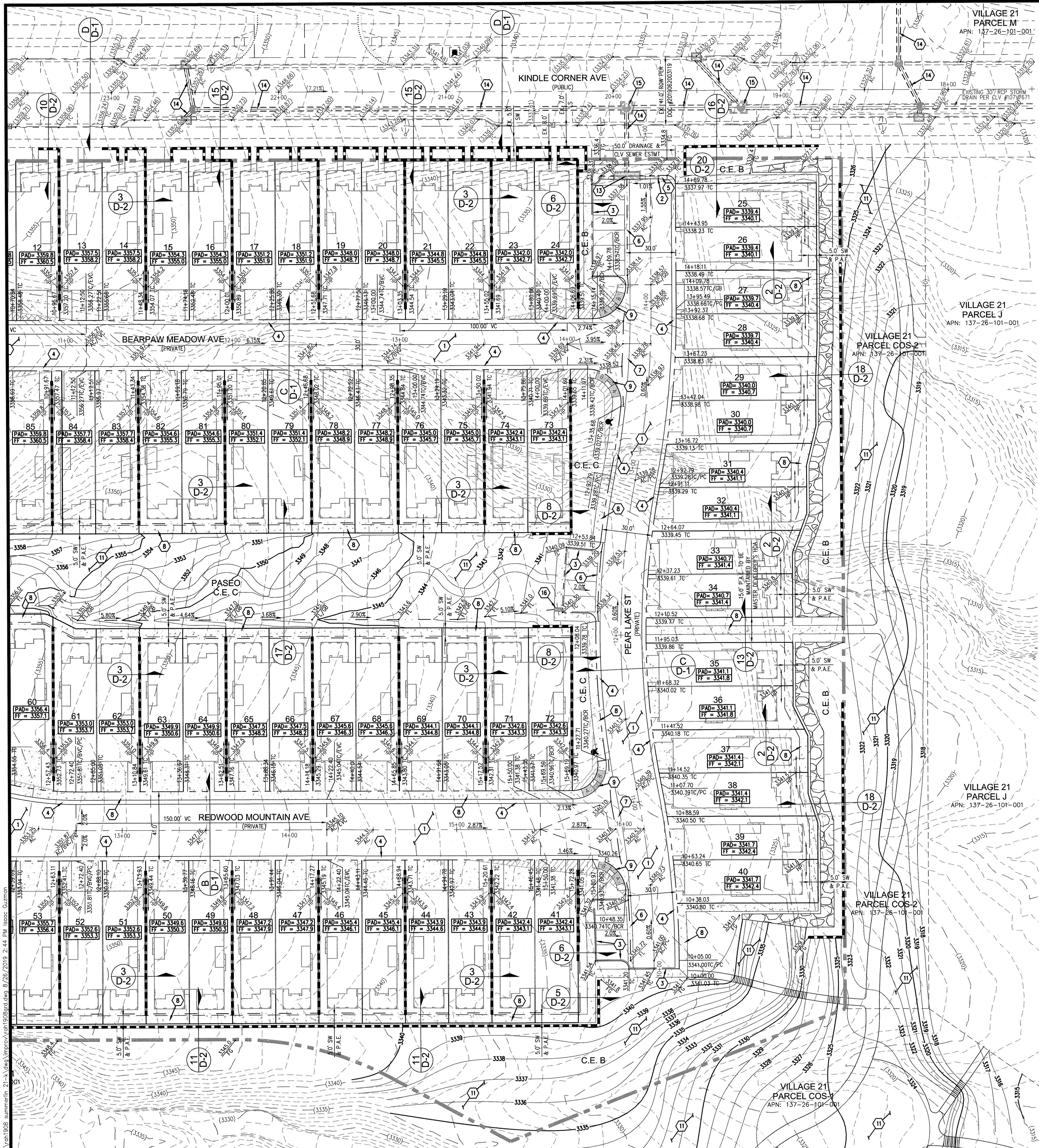
Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811 OR 1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

PROFESSIONAL ENGINEER - STATE OF NEVADA
ISAAC M. GUZMAN
Exp. 06/29/2021
CIVIL
No. 23513

G-1
SHEET 4 OF 7

CITY OF LAS VEGAS, NV
DATE: 8/21/19
DRAFTER: HA
DESIGNER: IG
CHECKED: IG
PROJECT NO. RAH1908.00



DRAINAGE IMPROVEMENT QUANTITIES			
1	12.5' TYPE "CM2" DROP INLET	EA	1
2	3' WIDE CONCRETE VALLEY GUTTER	EA	962
3	8' WIDE CONCRETE VALLEY GUTTER	EA	2,822

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

SOILS REPORT
SOILS REPORT BY ANGLE ENGINEERING
PROJECT NO. 26223-1 DATED 6/12/19
EARTHWORKS
EARTHWORK QUANTITIES (RAW):
CUT = 4,895 CU YDS
FILL = 64,115 CU YDS
EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

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

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

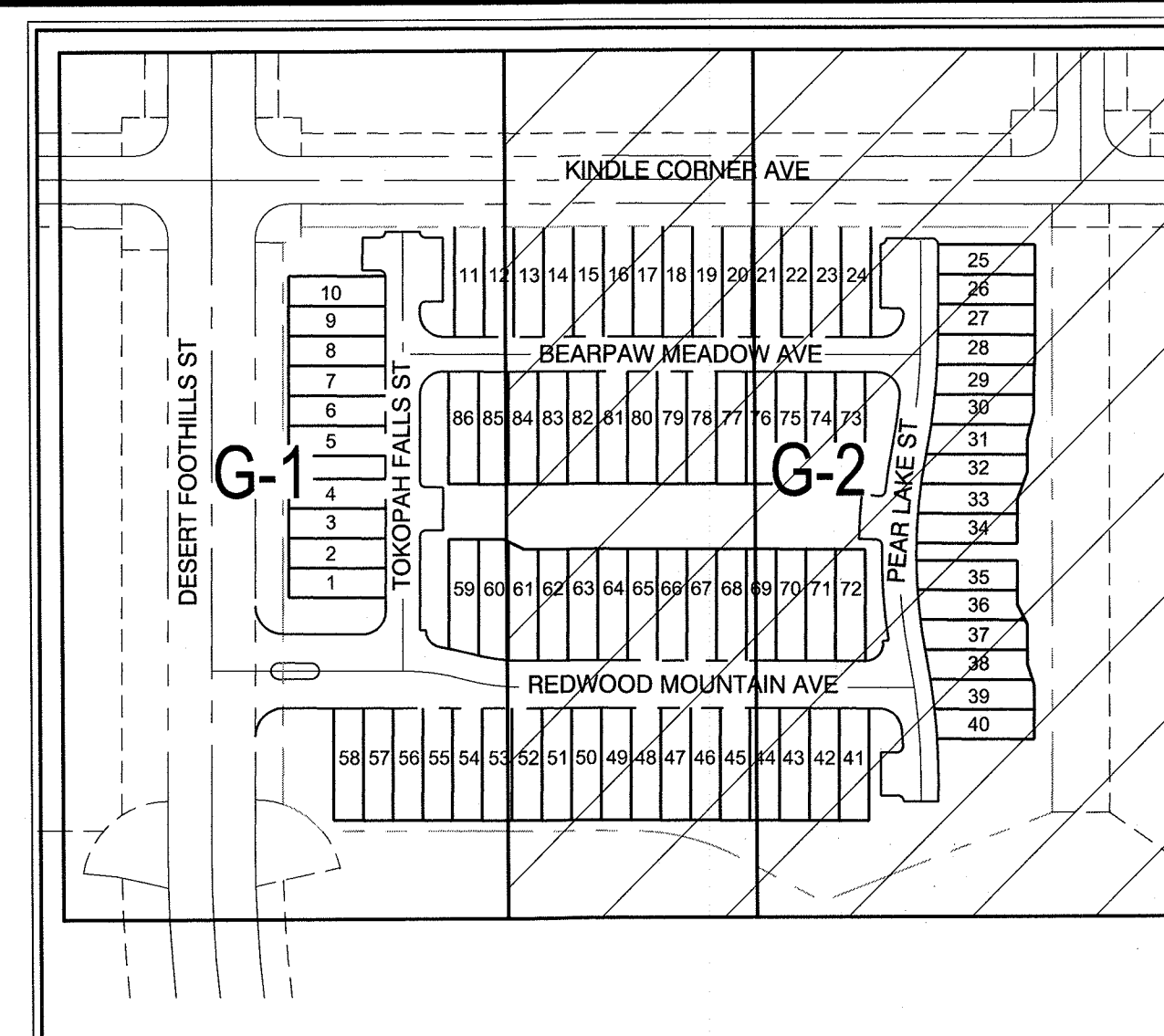
LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))
1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED 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.

GRADING NOTES
1) CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
2) CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
3) CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
4) CONSTRUCT 30" ROLL CURB AND GUTTER PER CCAUSD NO. 217.1
5) CONSTRUCT 5" TRANSITION FROM ROLLED CURB TO "L" TYPE CURB PER DETAIL 21 SHEET D-2
6) CONSTRUCT 3" CROSS GUTTER PER DETAIL 1 SHEET D-1
7) CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
8) CONSTRUCT 5" WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
9) CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE 1
10) SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 503 & 500.2
11) LANDSCAPING TO BE DESIGNED AND MAINTAINED BY MASTER DEVELOPER HOA
12) INSTALL CABLE RAIL GUARDRAIL PER DETAIL 19 ON SHEET D-2
13) INSTALL 12.5' TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421
14) EXISTING 24" RCP STORM DRAIN PER CLV #107V7671
15) EXISTING 60" TYPE III STORM DRAIN MANHOLE PER CLV #107V7671
16) INSTALL SIDEWALK UNDERDRAIN PER CCAUSD NO. 236

FLOOD ZONE
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2150E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PRIVATE DRAINAGE EASEMENT NOTE
ALL PRIVATE STREET AND COMMON ELEMENTS ARE PRIVATE DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY THE MASTER DEVELOPER'S HOA

FLOOD CERTIFICATION
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY 22222222 ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.
ISAAC GUZMAN, P.E. 23513 DATE



FAST
Call before you Underground
1-702-432-5300
FREWAY & 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

OR
1-800-227-2600

SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

S-I-G

CITY OF LAS VEGAS, NV

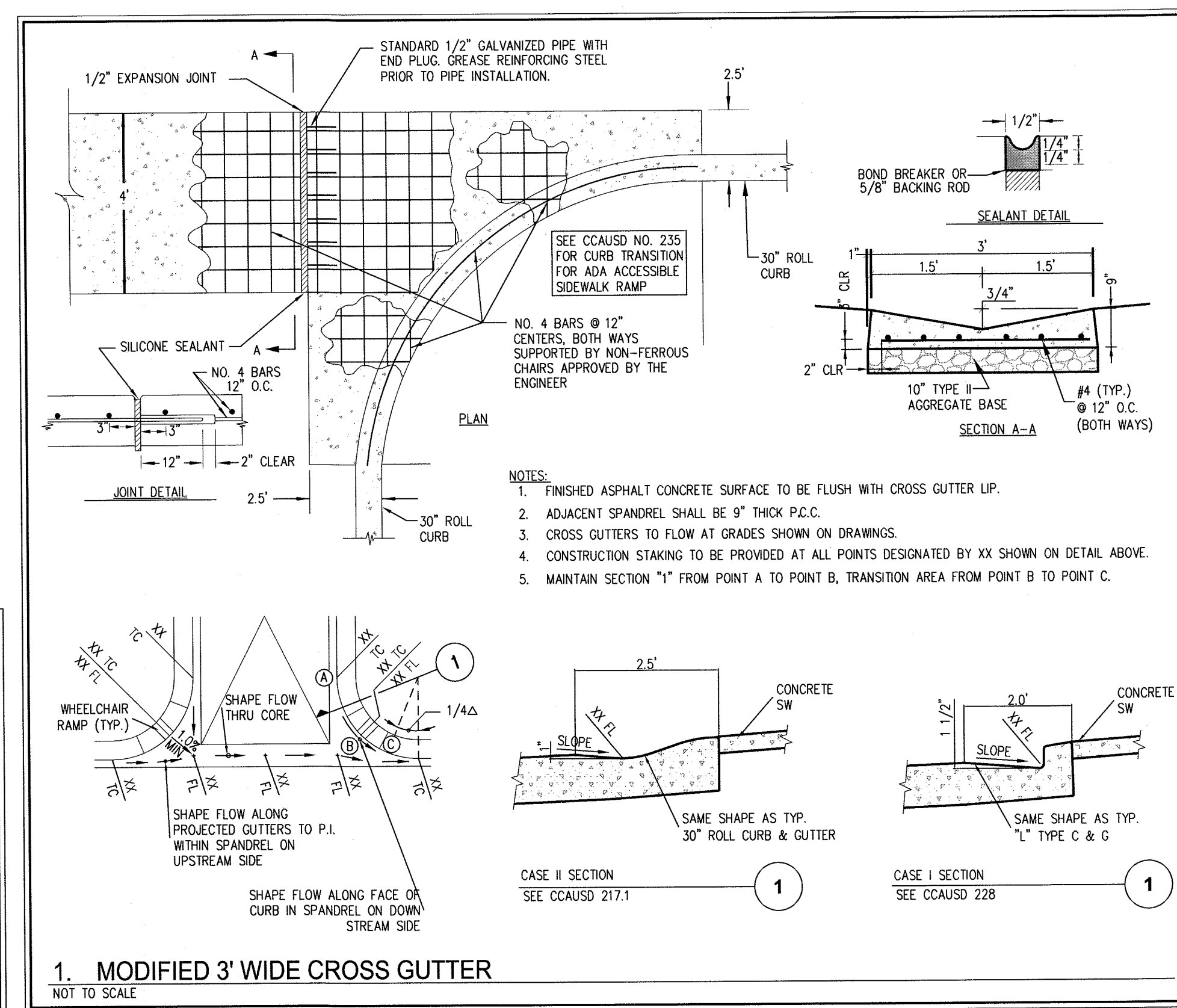
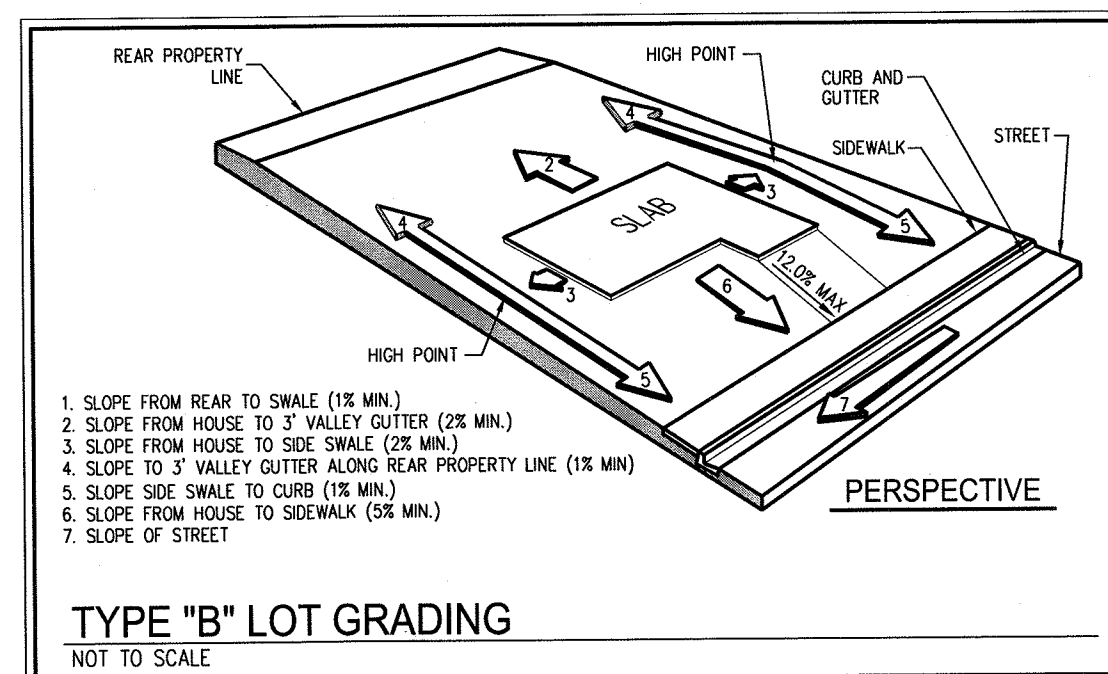
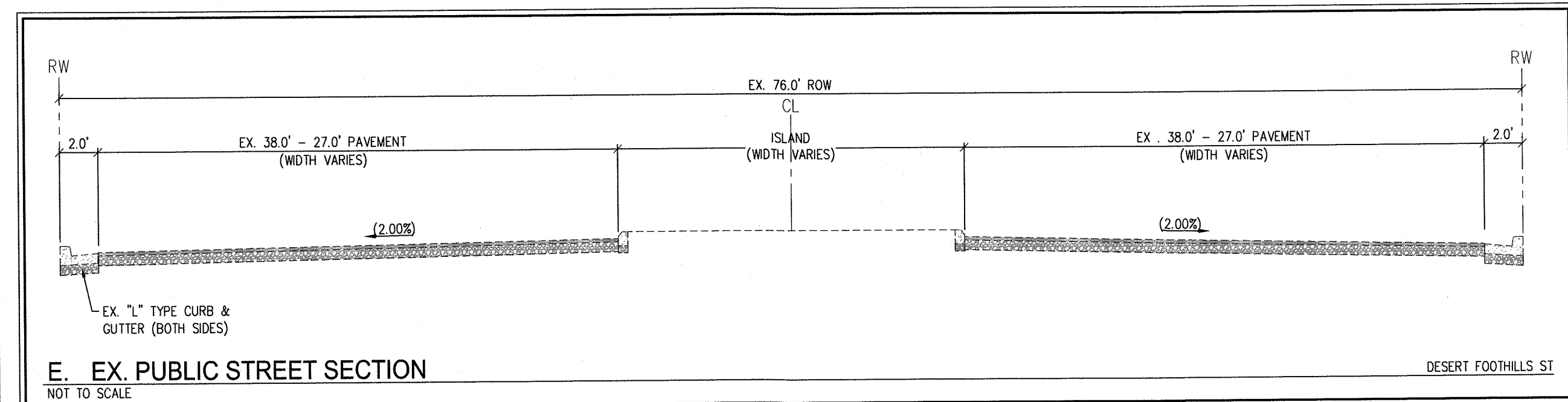
RICHMOND AMERICAN HOMES

SUMMERLIN V21 PARCEL K GRADING PLAN II

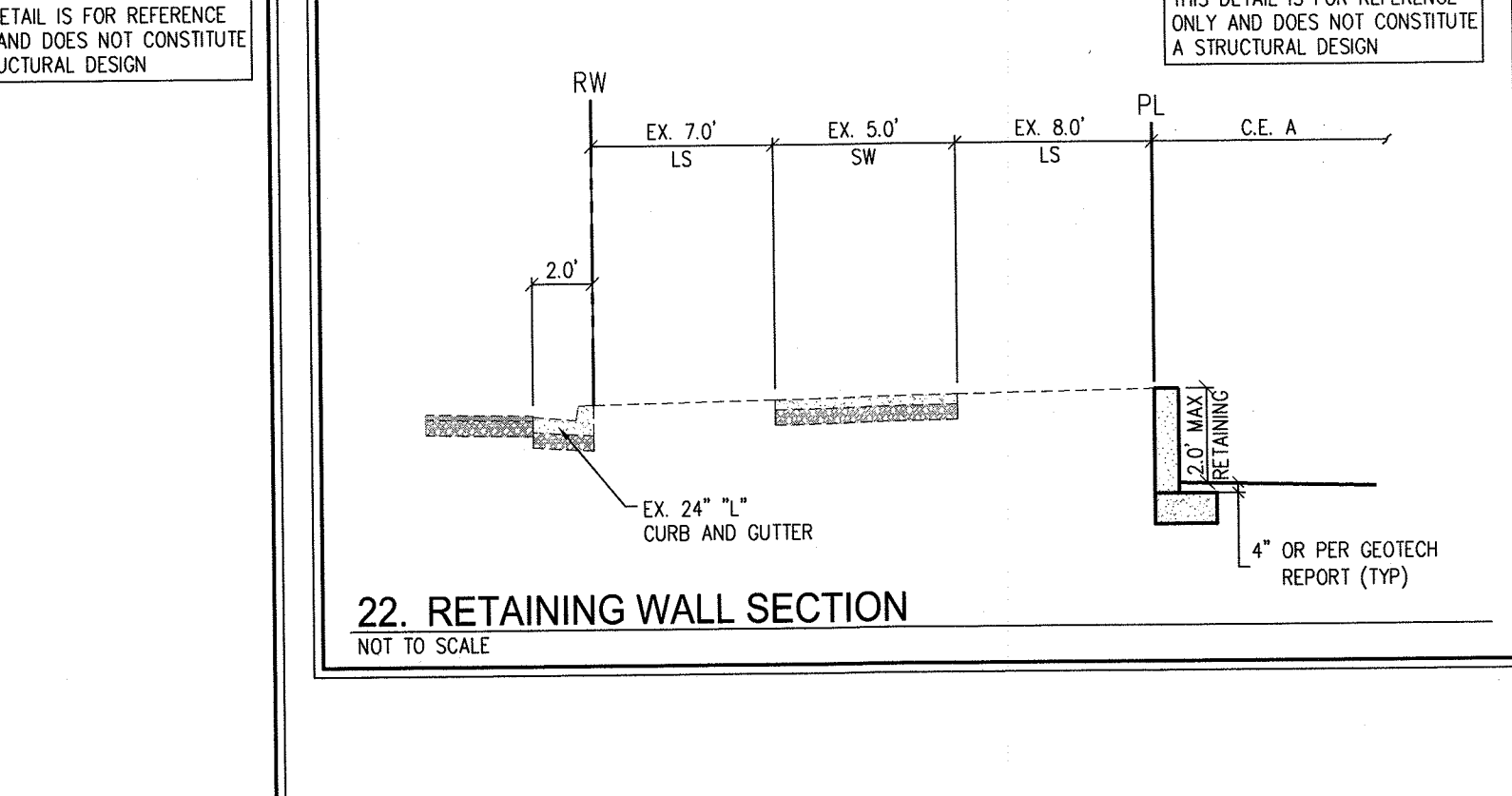
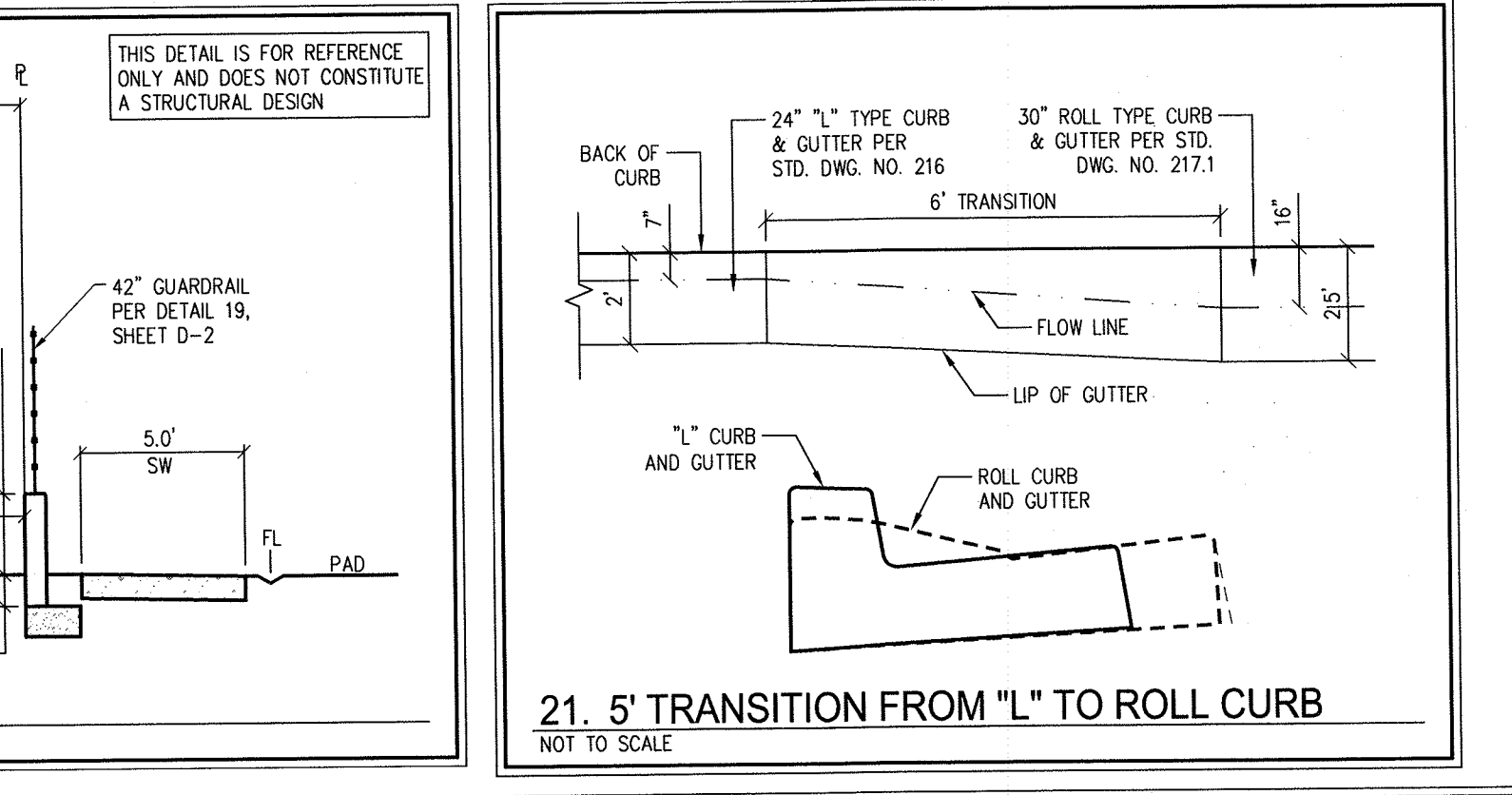
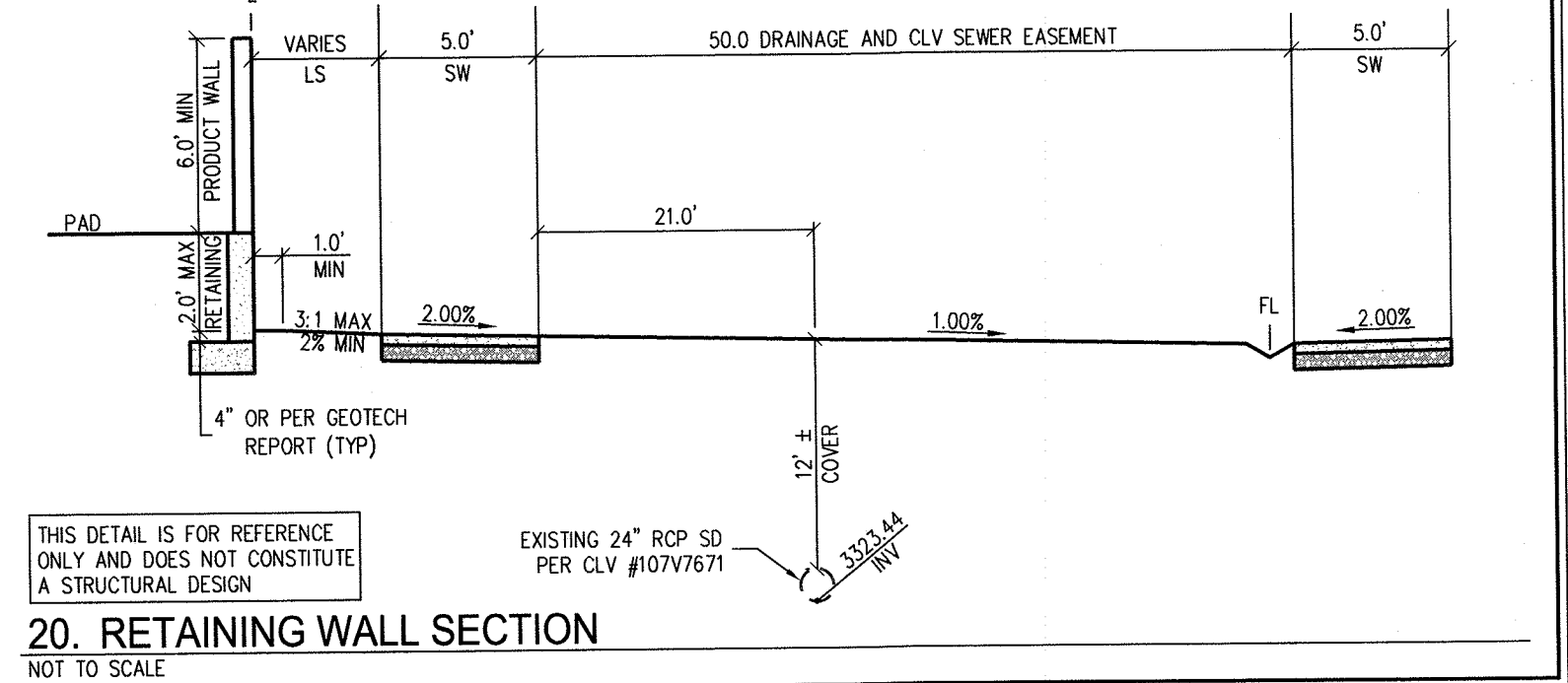
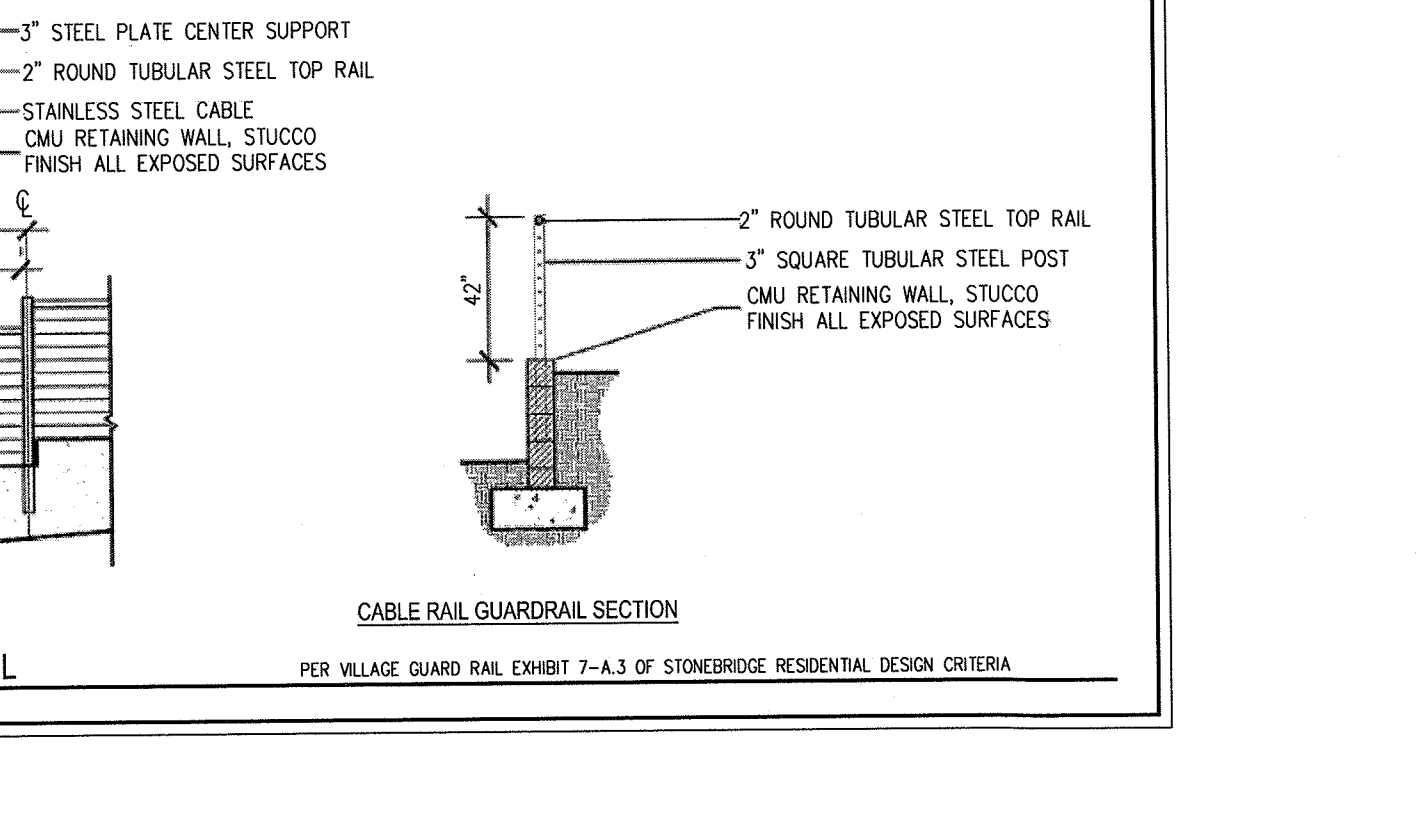
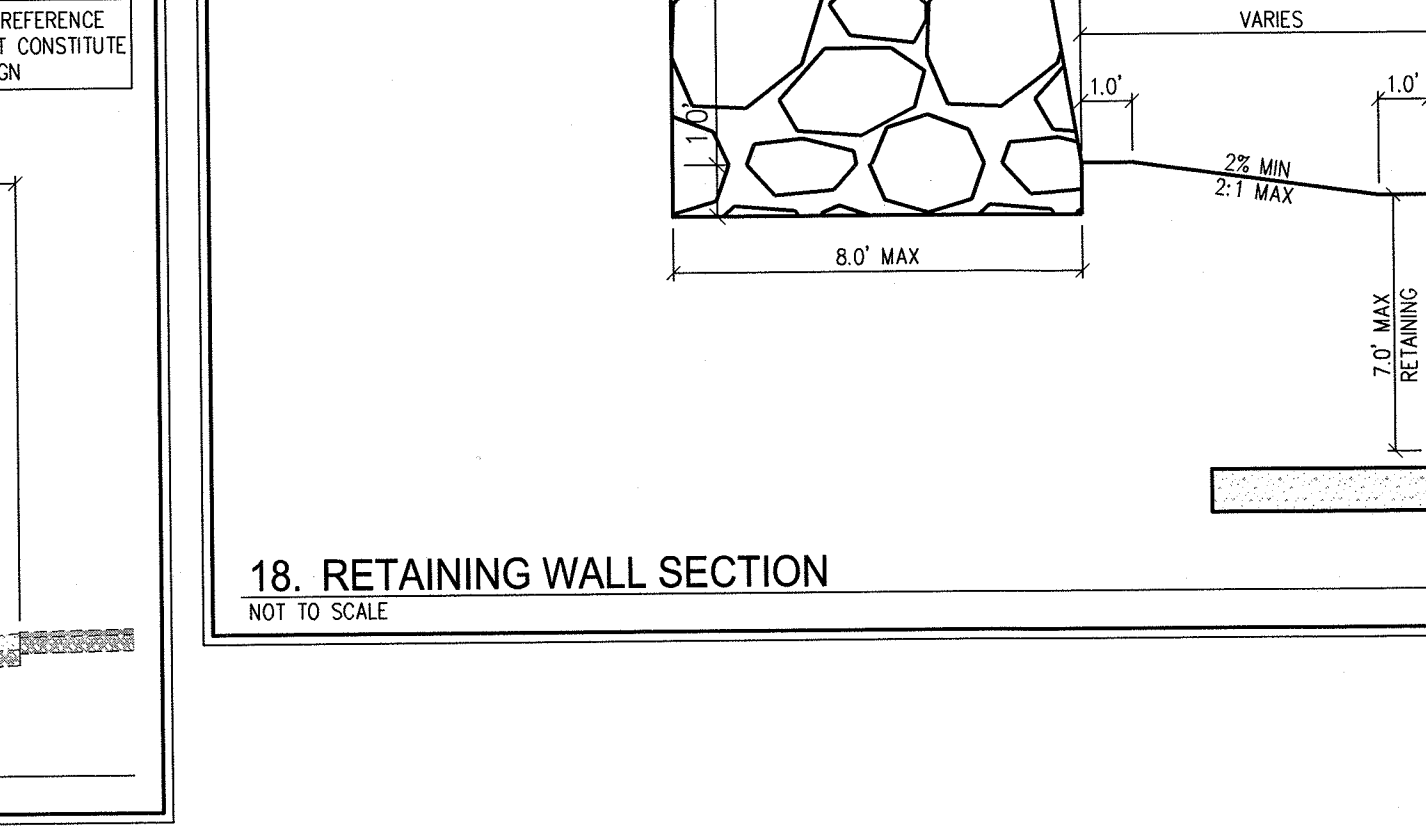
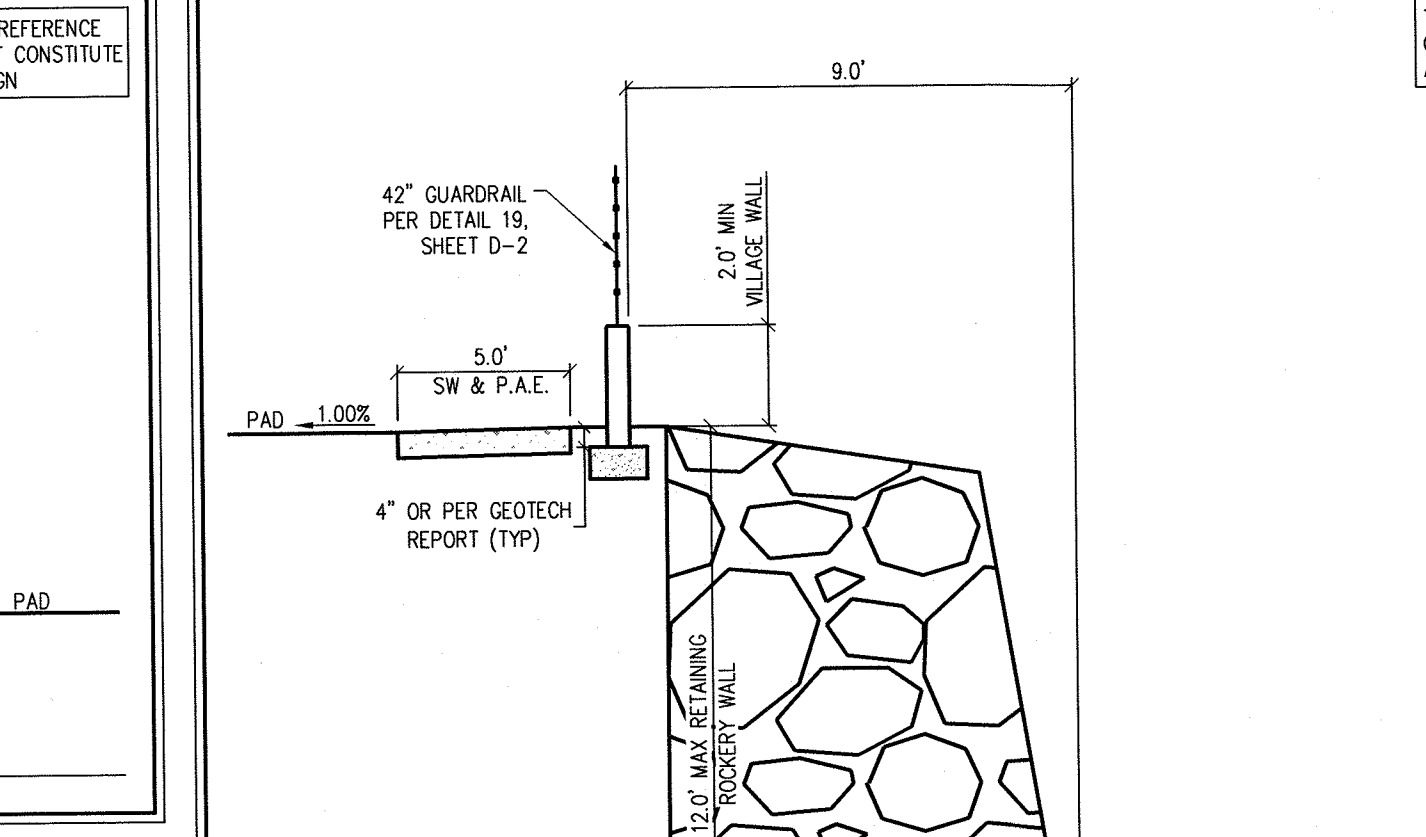
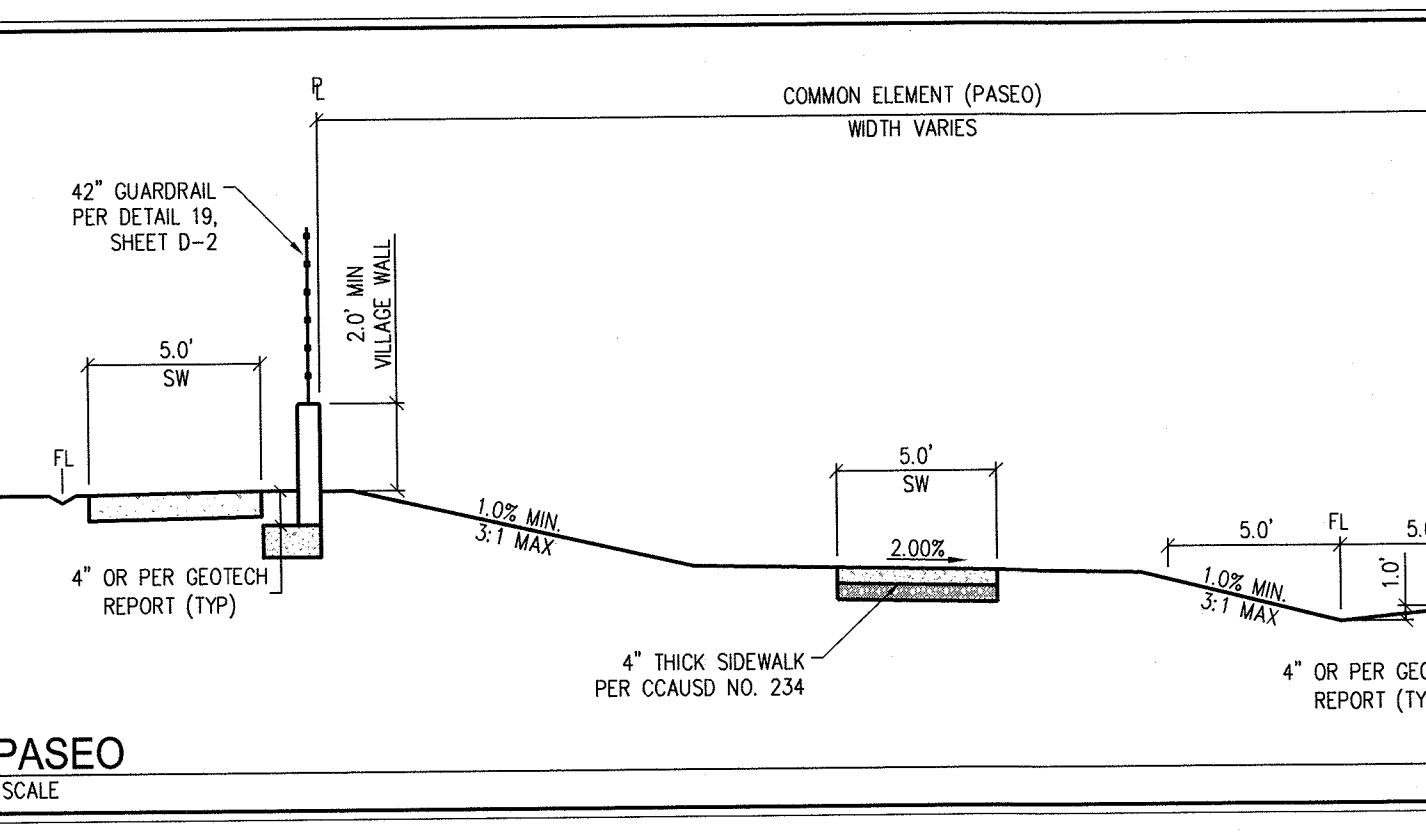
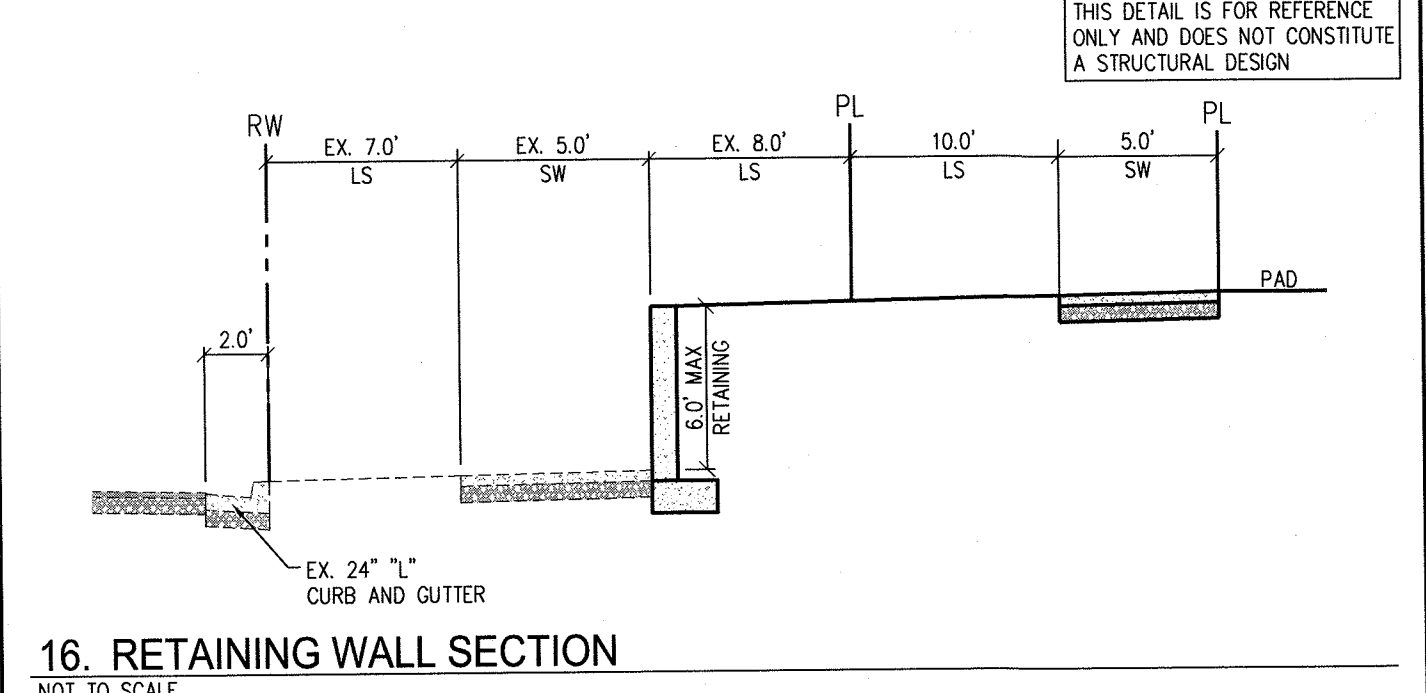
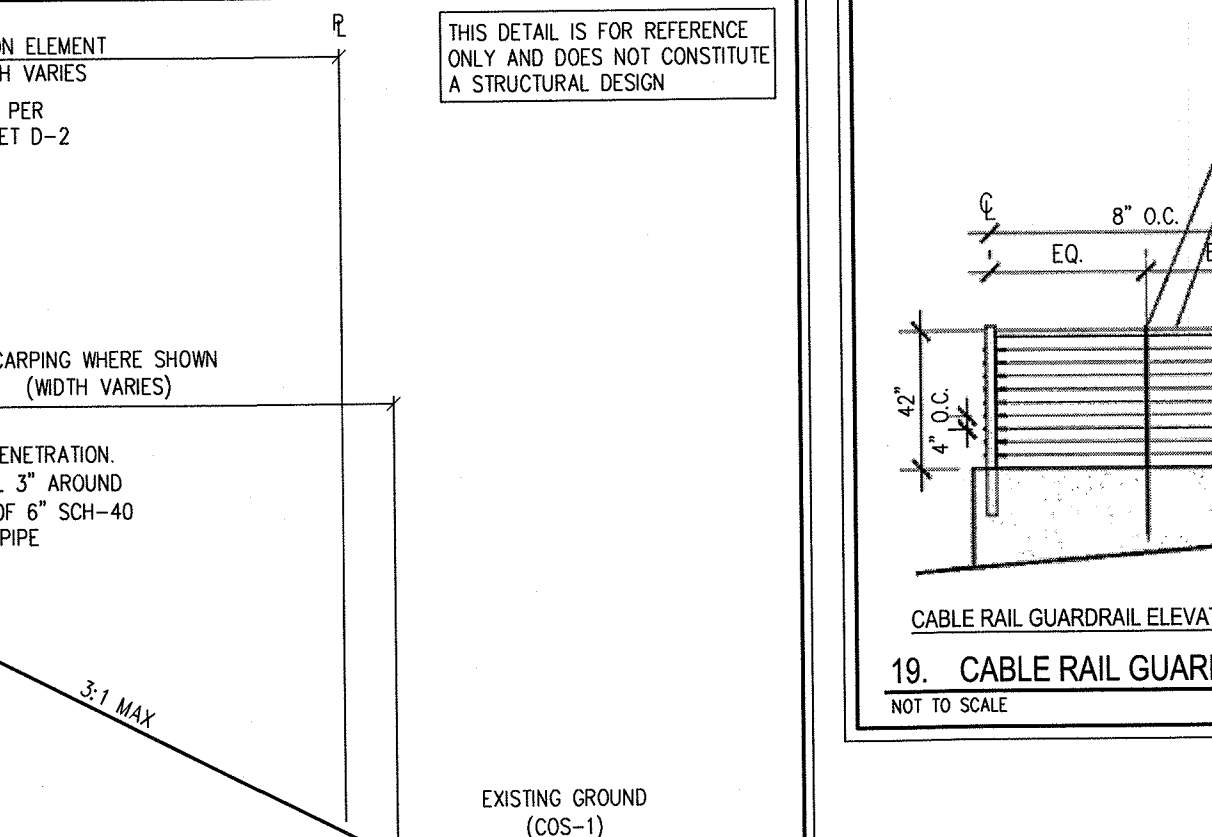
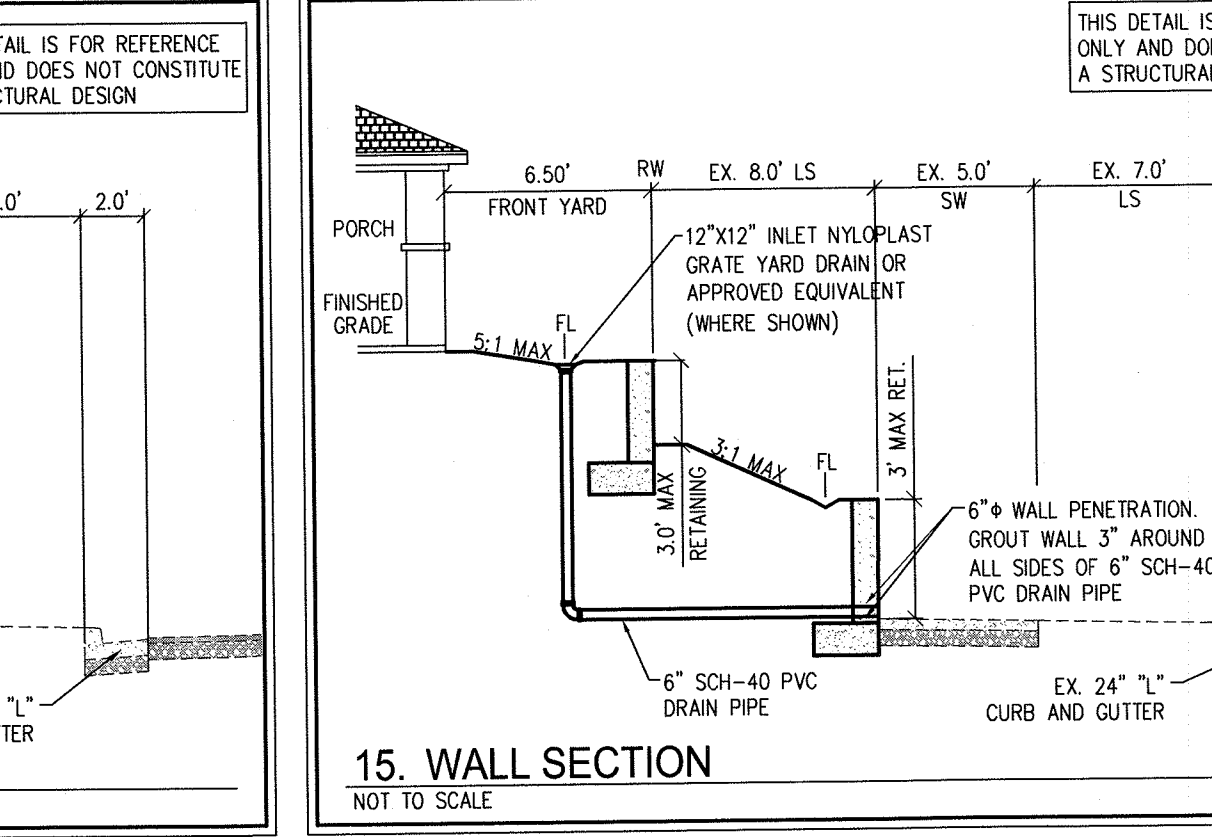
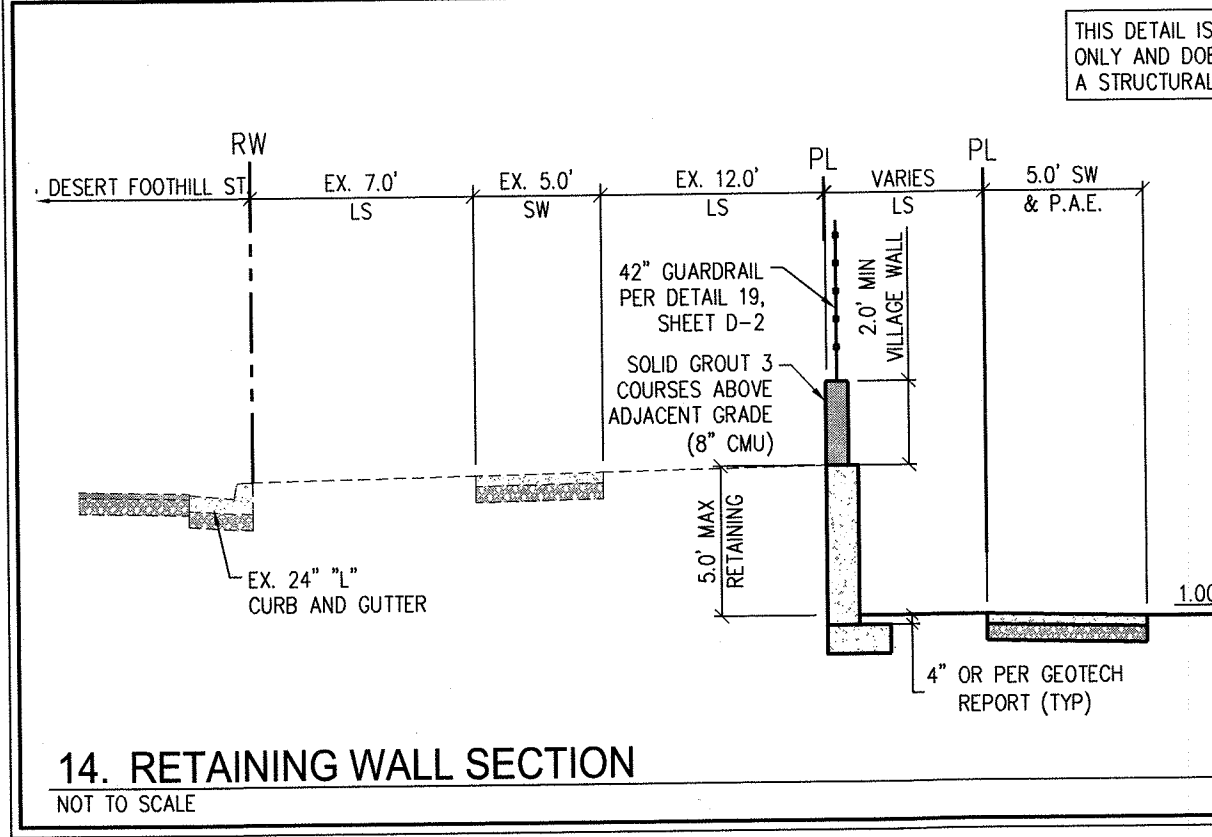
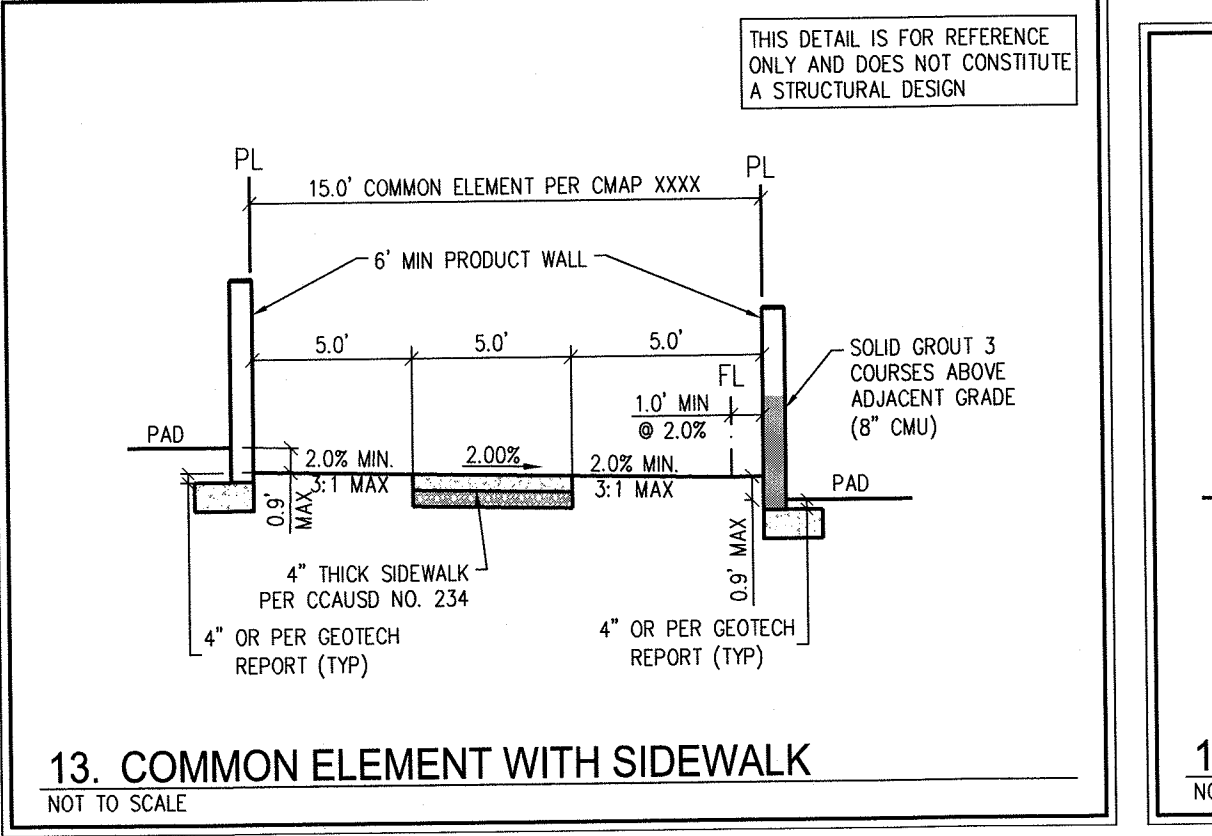
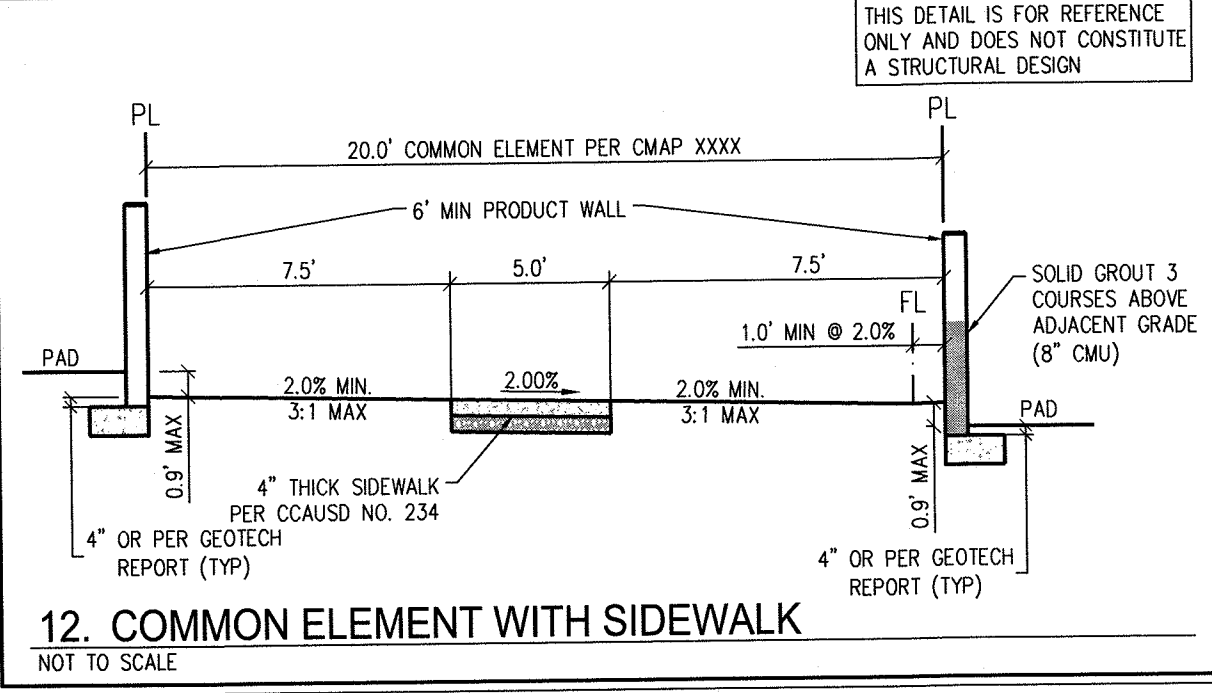
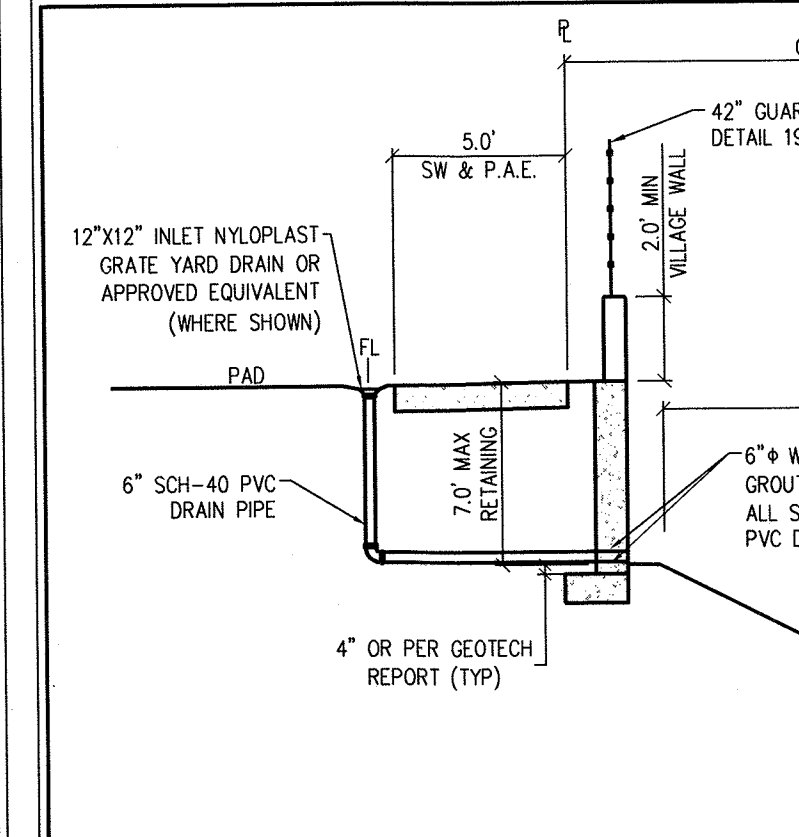
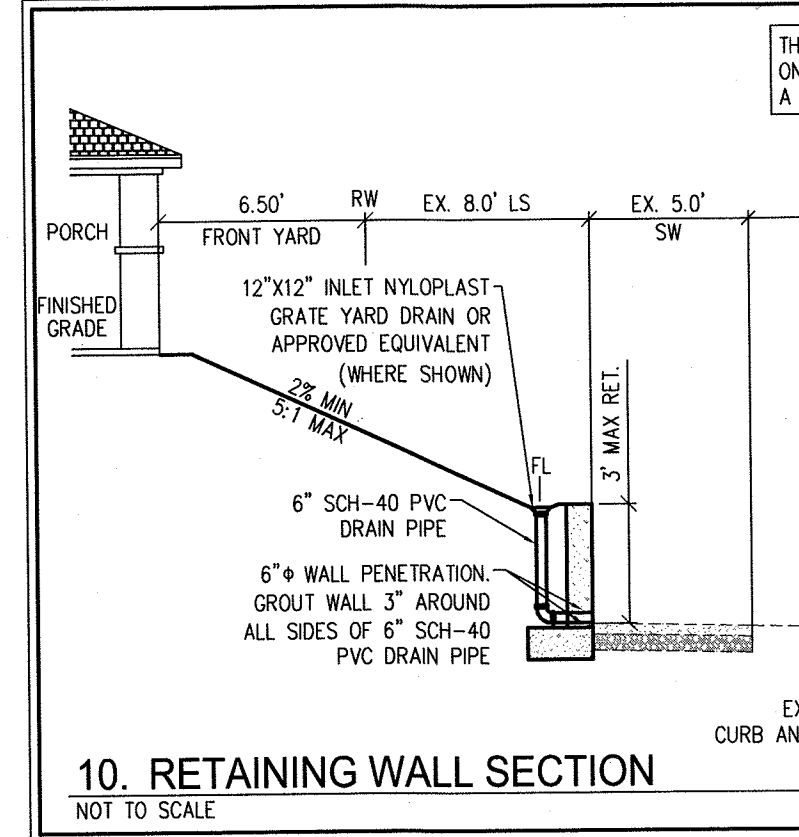
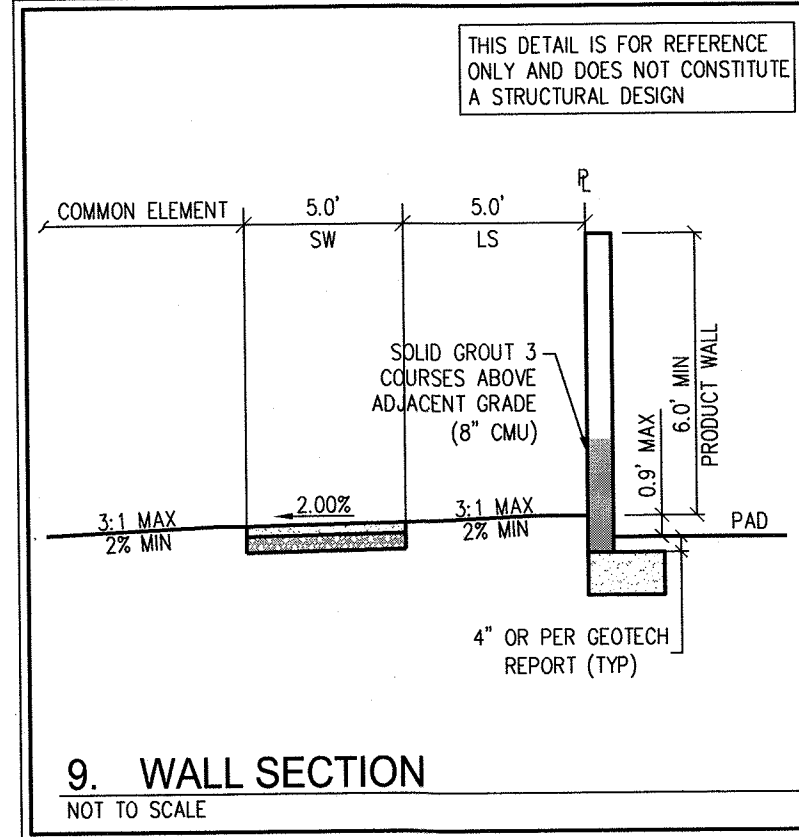
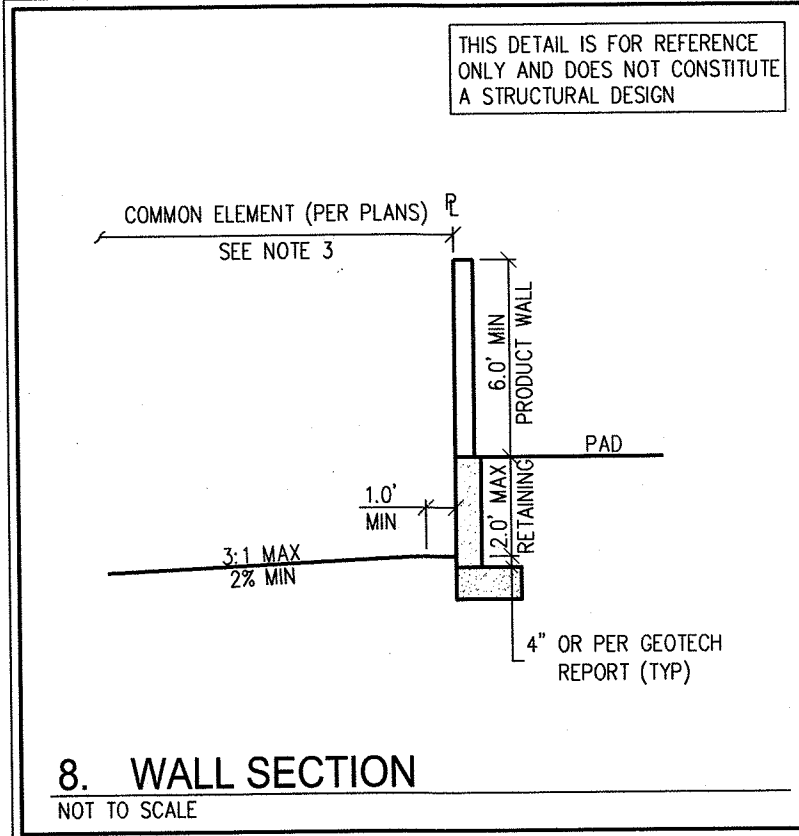
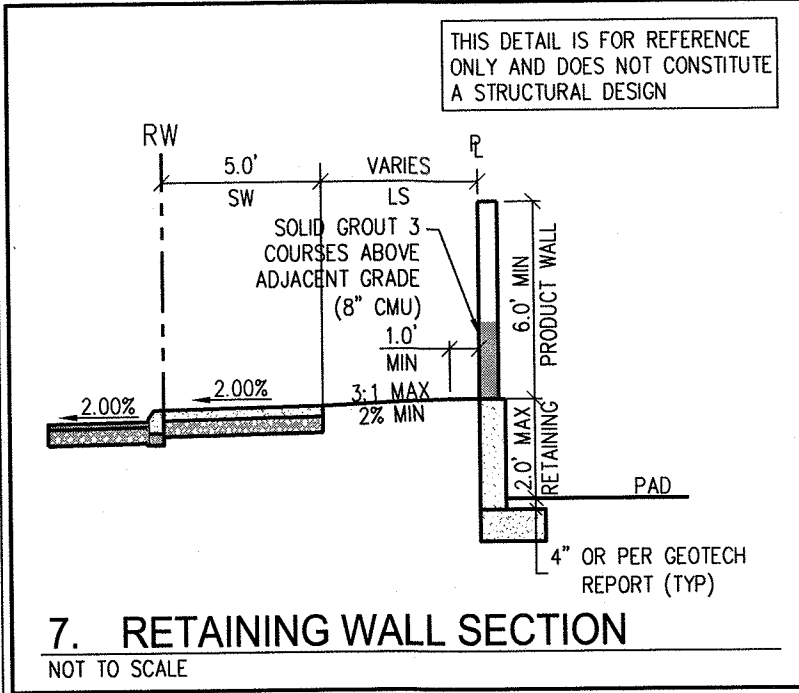
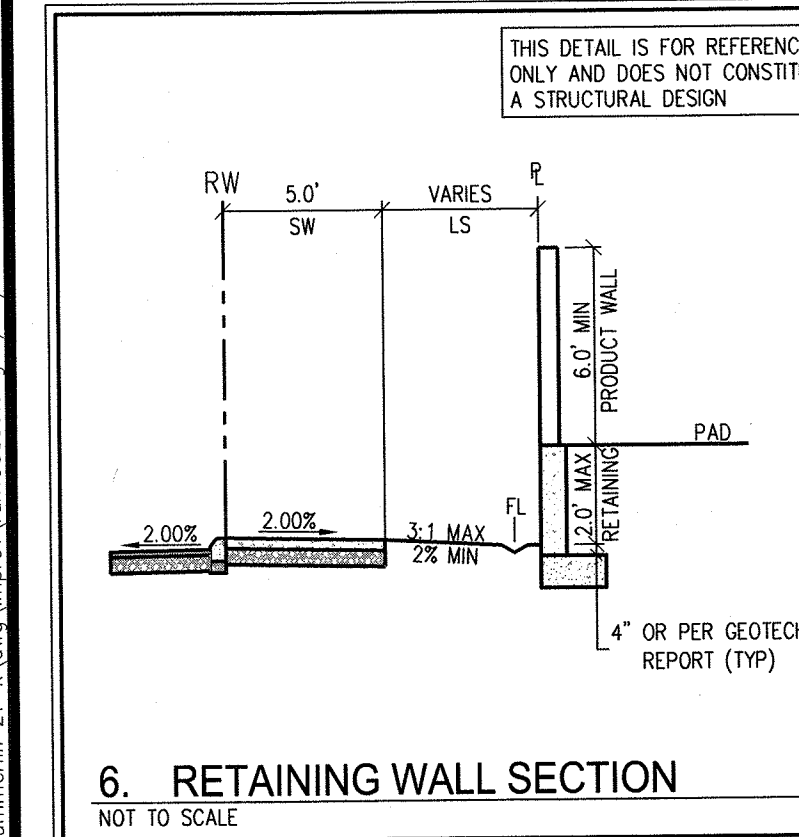
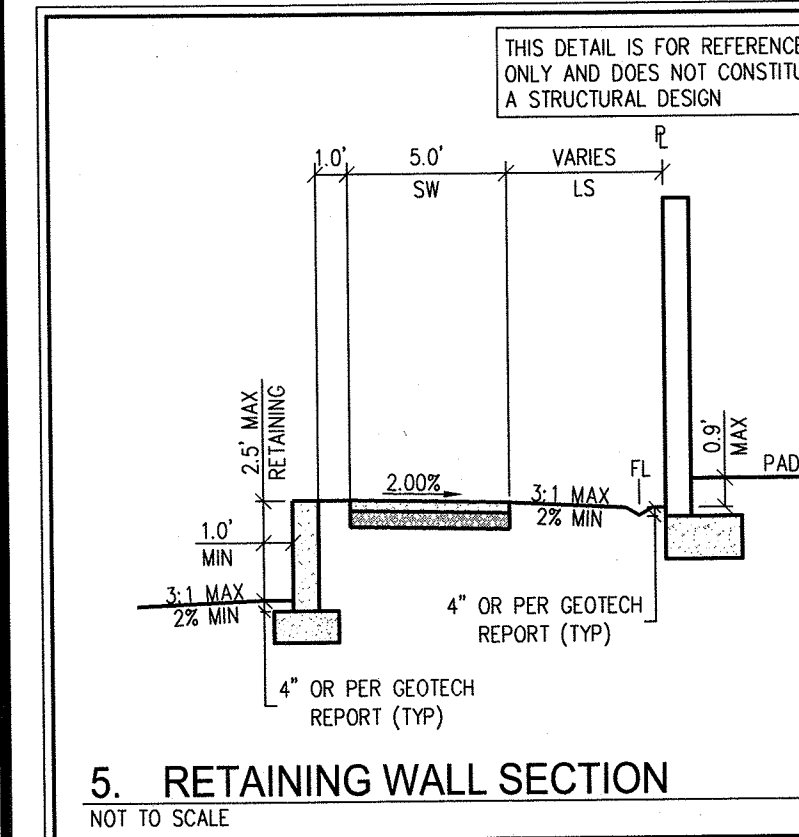
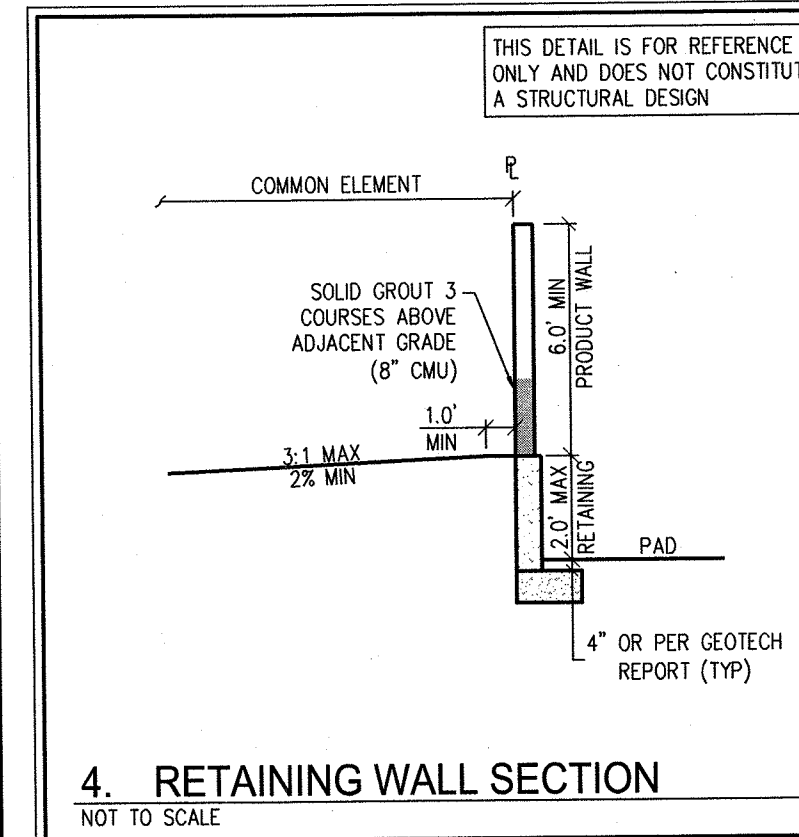
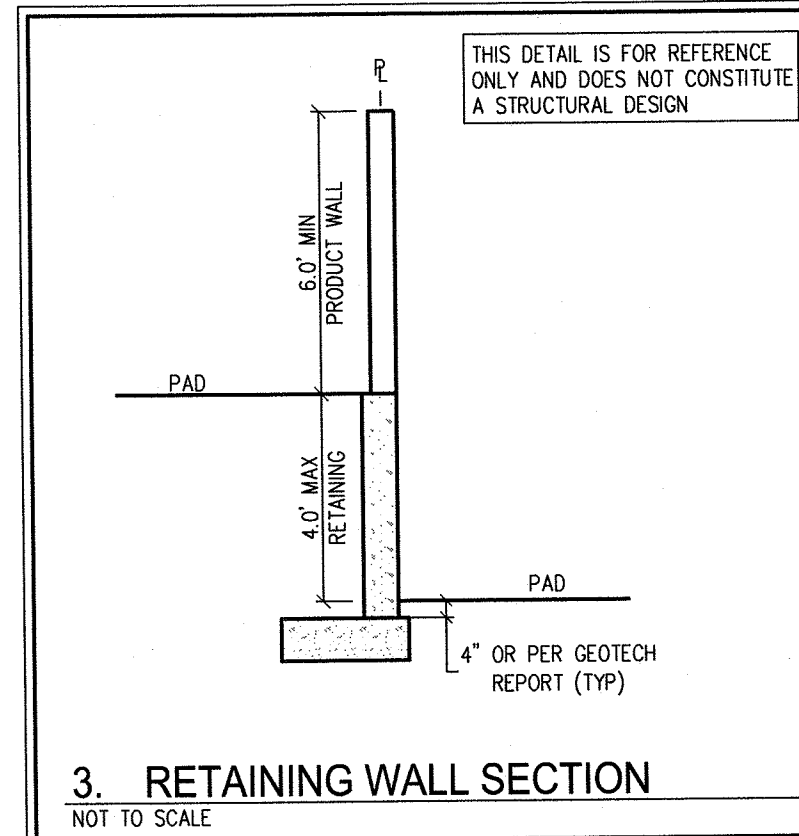
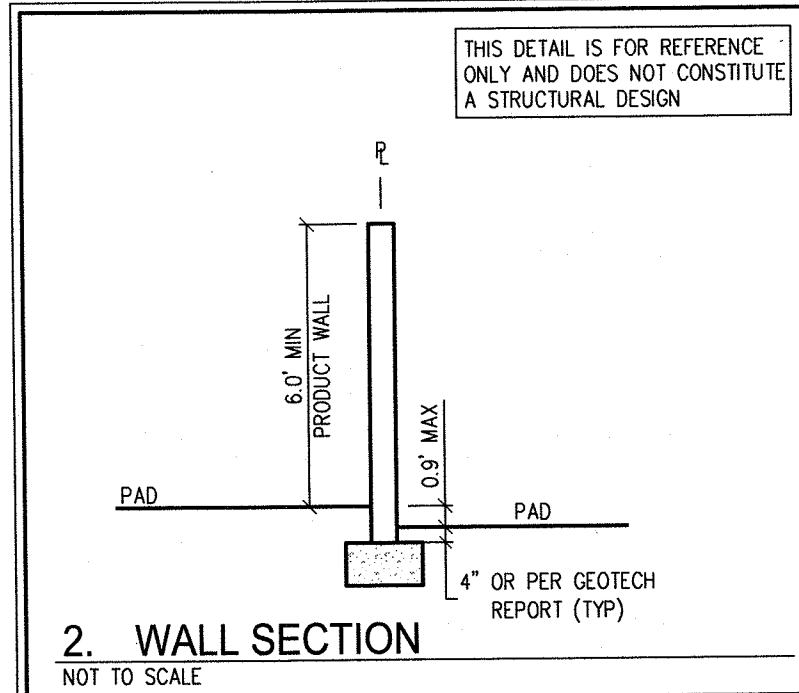
DATE: 8/21/19
DRAFTER: HA
DESIGNER: IG
CHECKED: IG
PROJECT NO. RAH1908.00

ISAAC M. GUZMAN, P.E. 23513

G-2
SHEET 5 OF 7



J:\rah1908 summerlin v21\rah1908\rah1908.dwg, 8/26/2019, 2:44 PM Isaac Guzman



SLATER
HANIFAN
GROUP

a Westwood team

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

DATE: 8/21/19

DRAFTER: HA

DESIGNER: IG

CHECKED: IG

PROJECT NO.
RAH1908.00

PROFESSIONAL ENGINEER - STATE OF NEVADA

ISAAC M. GUZMAN

Exp. 06/30/2021

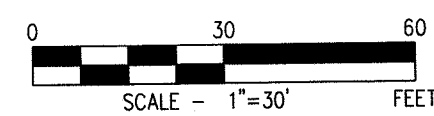
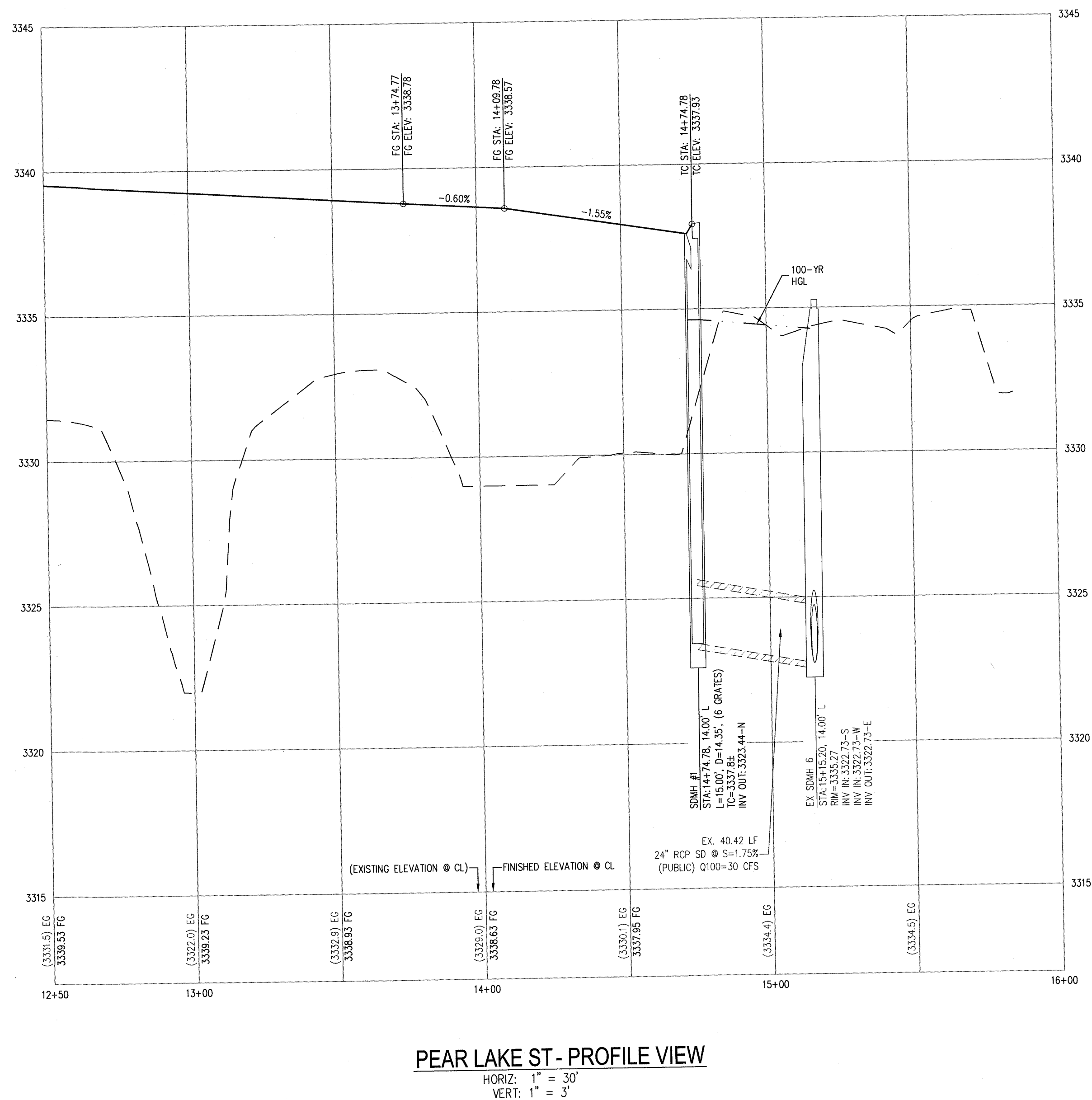
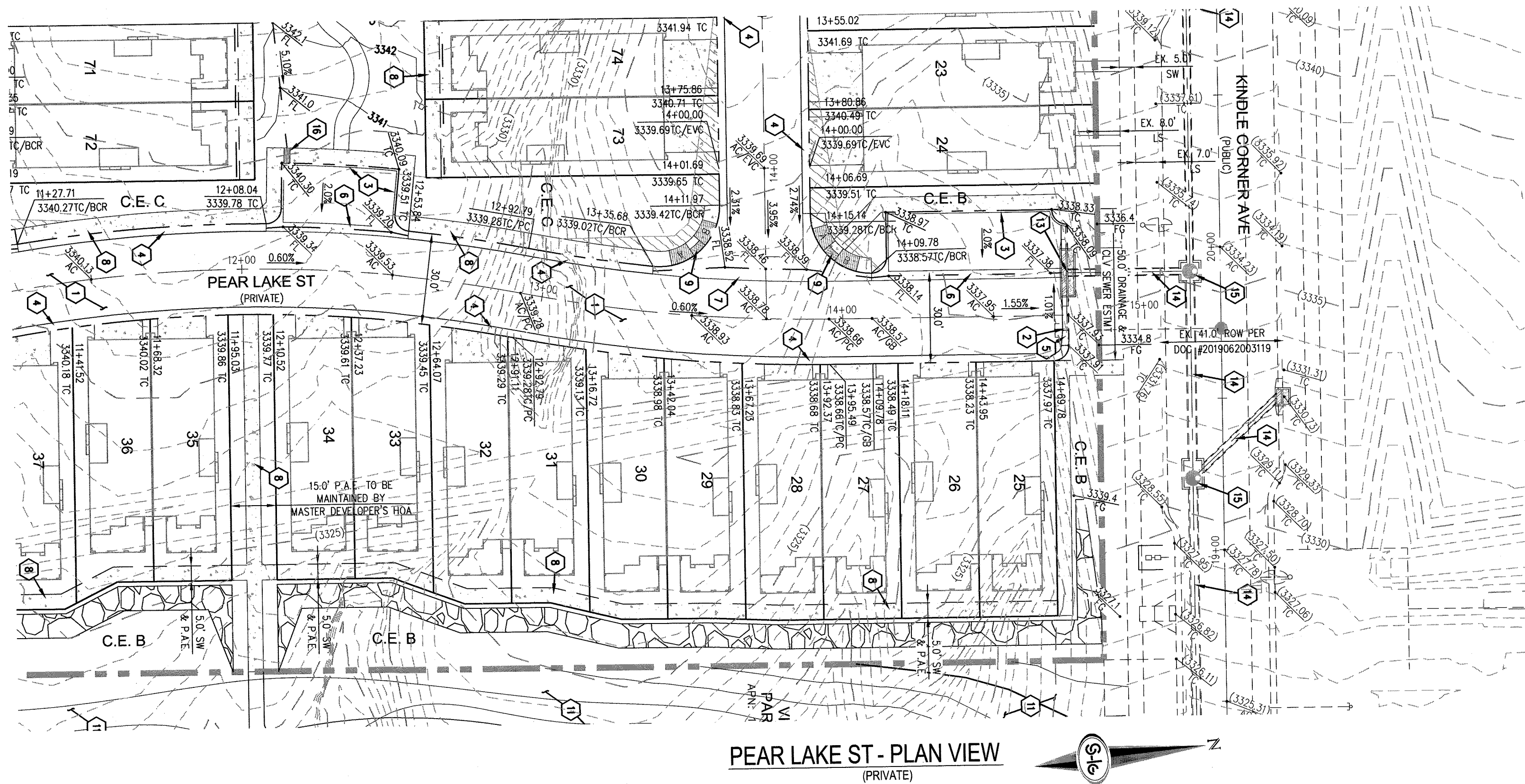
CIVIL

No. 23513

9-20-19

D-2

SHEET 7 OF 7



CALL SOUTHWEST GAS AT 702-651-2111 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

DRAINAGE IMPROVEMENT QUANTITIES		
1. 12.5" TYPE "CM2" DROP INLET	EA	1
2. 3" WIDE CONCRETE VALLEY GUTTER	EA	962
3. 8" WIDE CONCRETE VALLEY GUTTER	EA	2,822

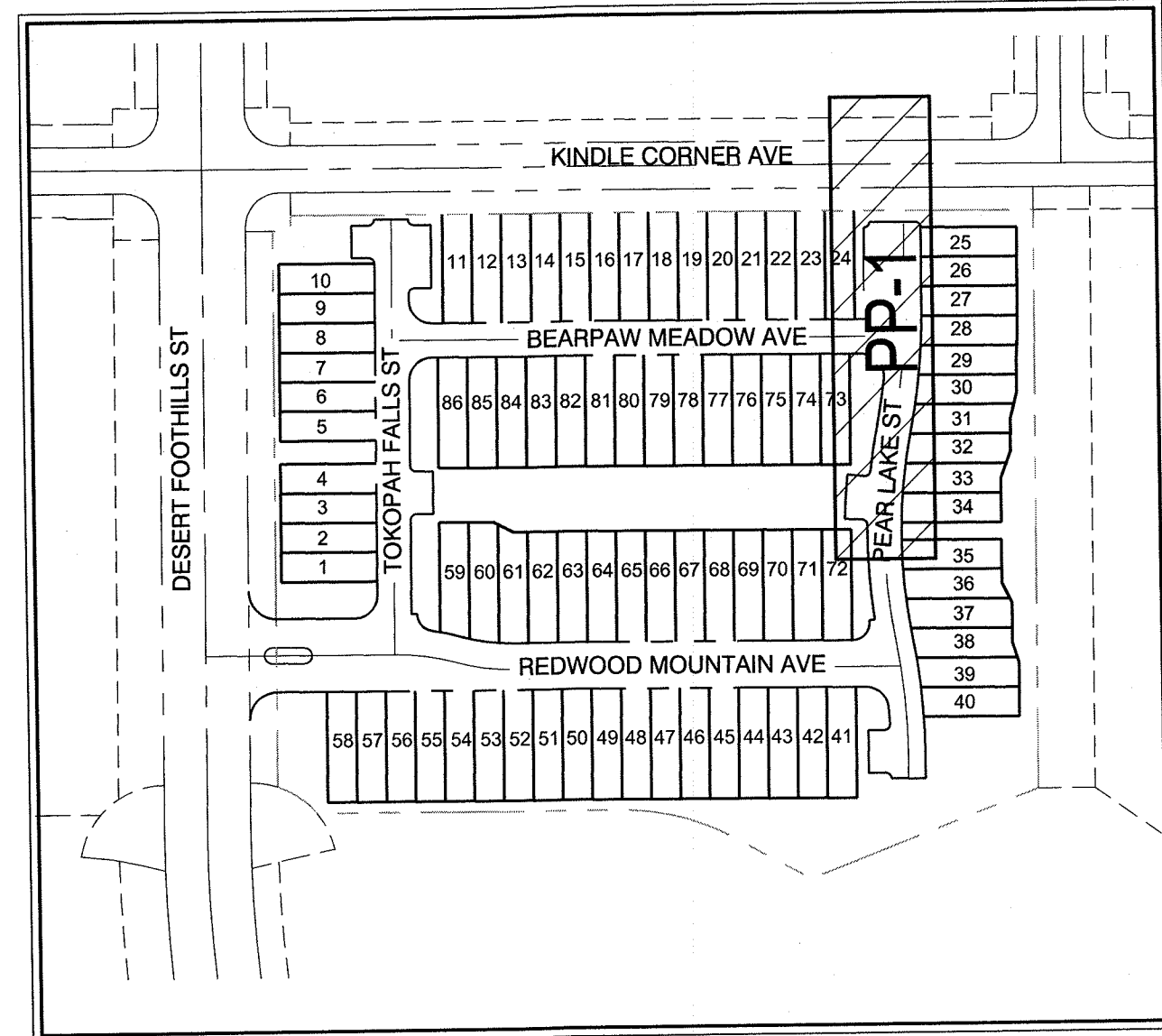
SURVEY NOTE
OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED, OR OBLISCURED DURING CONSTRUCTION.

SOILS REPORT
SOILS REPORT BY ANGLE ENGINEERING
PROJECT NO. 26223-1 DATED 6/12/19
EARTHWORKS
EARTHWORK QUANTITIES (RAW):
CUT= 4,905 CU YDS
FILL= 64,115 CU YDS
EXPORTED MATERIAL TO BE DISPOSED OF AT AN APPROVED LICENSED DISPOSAL FACILITY OR AT A SITE WITH AN APPROVED AND ACTIVE GRADING PERMIT.

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

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

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.



- GRADING NOTES**
1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II AGGREGATE BASE
 2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD NO. 216
 3. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD NO. 219
 4. CONSTRUCT 30" ROLL CURB AND GUTTER PER CCAUSD NO. 217.1
 5. CONSTRUCT 5" TRANSITION FROM ROLLED CURB TO "L" TYPE CURB PER DETAIL 21 SHEET D-2
 6. CONSTRUCT 3" CROSS GUTTER PER DETAIL 1 SHEET D-1
 7. CONSTRUCT 8" CROSS GUTTER PER CCAUSD NO. 228
 8. CONSTRUCT 5" WIDE SIDEWALK PER CCAUSD NO. 234 (4" THICK W/ 5" TYPE II AGGREGATE BASE)
 9. CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235, CASE I
 10. SAWCUT AND MATCH EXISTING IMPROVEMENTS PER CCAUSD NO. 503 & 500.2
 11. LANDSCAPING TO BE DESIGNED AND MAINTAINED BY MASTER DEVELOPER HOA
 12. INSTALL CABLE RAIL GUARDRAIL PER DETAIL 19 ON SHEET D-2
 13. INSTALL 12.5" TYPE "CM2" DROP INLET PER CCAUSD NO. 412.1 AND STORM WATER QUALITY MANAGEMENT STAMP PER CCAUSD NO. 421
 14. EXISTING 24" RCP STORM DRAIN PER CLV #107V7671
 15. EXISTING 60" TYPE III STORM DRAIN MANHOLE PER CLV #107V7671
 16. INSTALL SIDEWALK UNDERDRIN PER CCAUSD NO. 236
 - 17.

FLOOD ZONE
THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2150E, DATED SEPTEMBER 27, 2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.



SLATER HANIFAN GROUP
a Westwood team
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

RICHMOND AMERICAN HOMES
SUMMERLIN V21 PARCEL K
PLAN AND PROFILE - PEAR LAKE ST

DATE: 8/21/19
DRAFTER: HA
DESIGNER: IG
CHECKED: IG
PROJECT NO.
RAH1908.00

PP-1
SHEET 8 OF 7

