

DS #: 5335

APN: 137-27-601.002

PROJECT: Summerlin Village 25 NVE Substation Grading

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: August 27, 2020
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 25 NVE Substation Grading	
Cross Streets:	NEC of Far Hills Boulevard & Fox Hill Drive	
File Number:	F:\Depot\DSMemos\DS5335A.doc	
Parcel Number:	137-27-601-002	
Zoning Action:	EOT-74898	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X
COPIES TO:		
		GCW Engineers / Surveyors
		Howard Hughes Company, LLC
		Bart Anderson, P.E., DevCo
		CCRFCD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	8/10/2020	8/27/2020	See Comments Below	\$400.00	3949160: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

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

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

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

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

END OF REMARKS

ays

T/R/S: T20S/R59E/27
AREA K-27

LETTER OF TRANSMITTAL



Project No.: 62025-208
Date: August 10, 2020

To: **City of Las Vegas**
333 N. Rancho Boulevard
Las Vegas, NV 89106

Attention: Albert Y. Sung

Subject: **Technical Drainage Study for Summerlin Village 25 NVE Substation Grading**

Sent Via: Hand Delivery

Items being sent:

- 1 Copy of the Technical Drainage Study for the Subject Study
- 1 Copy of Improvement Plans
- 1 CD (back of the study)

These items are submitted:

- | | |
|---|---|
| ☐ At your request | ☒ For your action |
| ☒ For your approval | ☐ For your files |
| ☐ For your review and comments | ☐ For your information |

Acknowledgment of receipt:

☒ **Required**

Received by: _____
Date: _____
Time: _____

Remarks:

Cordially,

GCW, INC.

Copies to:
Steve Jones, GCW

Masih Edalat
Flood Control Division

1555 South Rainbow Boulevard
Las Vegas, Nevada 89146



O 702.804.2000
F 702.804.2299



info@gcwengineering.com
gcwengineering.com

**TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 25 NVE SUBSTATION GRADING**

62025-208

August 2020

Prepared for:

**The Howard Hughes Company, LLC
10845 Griffith Peak Drive, Suite 160
Las Vegas, NV 89135
Phone: (702) 791-4300**



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: SUMMERLIN VILLAGE 25 NVE SUBSTATION GRADING Date: August 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Fox Hill

East/West: Far Hills

b) Section: 27 Township: 20 Range: 59

c) APN : 137-27-601-002

Name of Owner: Hughes Howard Company, LLC

Telephone No.: 702-791-4300 Fax No.: 702-791-4385 E-Mail Address: April.Chapman@howardhughes.com

Address: 10845 Griffith Peak Drive, Suite 160, Las Vegas, Nevada 89135

Contact Person-Name: Mohammad Masih Edalat Telephone No.: (702) 804-2127

* E-Mail Address: Medalat@gcwengineering.com Fax No.: (702) 804-2299

Firm: GCW, Inc.

Address: 1555 South Rainbow Blvd, Las Vegas, Nevada 89146

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: 2.4 Being Developed/Disturbed: 2.4

2. Is a portion or all of the subject property located in a designated 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.): Industrial

5. Approximate upstream land area which drains to the subject site: NA

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: Technical Drainage Study for Summerlin Village 23B Far Hills Avenue Improvements

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing 24" RCP that is connected to 8'X6' RCB in Far Hills

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



Engineer's Seal 08/07/2020

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.

***New Required Field**

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

	Revision	Date
Local Entity File No. _____		

REFERENCE:

STANDARD FORM 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL		
DRAINAGE SUBMITTAL CHECKLIST		
Project Name: SUMMERLIN VILLAGE 25 NVE SUBSTATION GRADING	Map ID: 137-27-601-002	
Firm Name: GCW, Inc.	Engineer: Mohammad Masih Edalat	
Address: 1555 S. Rainbow Blvd		
City: Las Vegas	State: Nevada	Zip: 89146
Phone Number: (702) 804-2127	Fax Number: (702) 804-2299	
Property Owner: Hughes Howard Company, LLC		
Address: 10845 Griffith Peak Drive, Suite 160		
City: Las Vegas	State: Nevada	Zip: 89135
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 (CCRFCDD) 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> _____ Design Manual Standard Form 1 with the engineer's seal and signature. <u>X</u> _____ Design Manual Standard Form 4. <u>X</u> _____ 2 copies of the 24" x 36" Drainage Plan. _____ <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> _____ A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated. <u>X</u> _____ A copy of the current CCRFCDD 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

- ☒ _____ Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
- ☒ _____ 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.
- ☒ _____ Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes No

- ☒ _____ Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
- ☒ _____ Minimum scale: 1" = 60'.
- ☒ _____ Project name.
- ☒ _____ Vicinity Map with local and major cross streets.
- ☒ _____ Revision box.
- ☒ _____ North arrow and bar scale.
- ☒ _____ Engineer's/consultant's address and phone number.
- ☒ _____ Elevation datum and benchmark.
- ☒ _____ Legend for symbols and abbreviations.
- ☒ _____ Cut/fill scarps, where applicable.
- ☒ _____ Street names, grades, widths.
- ☒ _____ 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.
- ☒ _____ Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
- ☒ _____ Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
- _____ N/A _____ Proposed typical street sections.

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes No

- | | | |
|-------------------------------------|--------------------------|---|
| ☐ | <u>N/A</u> | Streets with off-set crowns. |
| ☒ | ☐ | Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes. |
| ☒ | ☐ | Property lines. |
| ☒ | ☐ | Right-of-way lines and widths, existing and proposed. |
| ☒ | ☐ | Existing improvements and their elevations. |
| ☒ | ☐ | Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points. |
| ☒ | ☐ | Concentration points and drainage flow direction with Q100 and V100 and D100 in streets. |
| ☒ | ☐ | Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows. |
| ☒ | ☐ | Location and cross-section of street capacity calculations. |
| ☒ | ☐ | Cross-sectional detail for channels, including cutoff wall locations. |
| ☒ | ☐ | 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. |
| ☐ | <u>N/A</u> | Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement. |
| ☐ | <u>N/A</u> | 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. |
| ☐ | <u>N/A</u> | Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc. |
| ☒ | ☐ | 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. |
| ☐ | <u>N/A</u> | Building and/or lot numbers. |
| ☒ | ☐ | Alignment of all existing, proposed, or future Regional Facilities adjacent to the site. |
| ☐ | <u>NA</u> | 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

- ☐ NA 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.
- ☒ ☐ 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 Q100 flows.
- ☒ ☐ Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
- ☐ NA Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes No

- ☒ ☐ Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
- ☒ ☐ Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- ☒ ☐ Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- ☒ ☐ Use of correct precipitation values in and around the McCarran Airport rainfall area.
- ☒ ☐ A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
- ☒ ☐ A summary table of stormwater flows showing basin area, Q10 and Q100 for both individual basins and combined basin flows, where applicable.
- ☒ ☐ Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
- ☒ ☐ On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
- ☐ N/A Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
☐	<u>N/A</u>	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
☒	☐	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q100 and Q10 flows representing the worst case for interior and all perimeter streets. Q100 d x v < 8. Q10 d x v < 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.
☒	☐	A summary table of interior and exterior street capacity calculations showing the street name, Q100 flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
☐	<u>N/A</u>	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
☐	<u>N/A</u>	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.
☐	<u>N/A</u>	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 Q100 weir height or flow depth, whichever is greater.
☐	<u>N/A</u>	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.
☒	☐	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
☒	☐	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.
☒	☐	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
☐	<u>N/A</u>	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2



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 (CCRFCDD) 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 CCRFCDD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCDD 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	
	NA	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.)
	NA	Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. <u> </u> by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

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

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
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.
	NA	Back of lot elevations and lot drainage pattern for all lots including common lots.
	NA	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.
	NA	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.)
	NA	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.
	NA	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	
	NA	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.
	NA	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.
	NA	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.
	NA	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.
	NA	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	
	NA	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.
	NA	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.

62025-208

August 7, 2020

Albert Y. Sung, P.E.
City of Las Vegas, Public Works
333 N. Rancho Drive, 7th Floor, Las Vegas, NV 89106

Re: Technical Drainage Study for Summerlin Village 25 NVE Substation Grading

Dear Mr. Sung,

This letter is to certify that all documents provided on electronic submittal (CD) match the hardcopy version of the study.

Respectfully submitted,



Masih Edalat, PhD, P.E.
Project Engineer



08/07/2020



**TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 25 NVE SUBSTATION GRADING**

62025-208

August 2020

Authored By:

Masih Edalat, PhD, PE

Prepared for:

**The Howard Hughes Company, LLC
10845 Griffith Peak Drive, Suite 160
Las Vegas, NV 89135
Phone: (702) 791-4300**

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I. INTRODUCTION

The Howard Hughes Company, LLC is proposing NV energy substation grading improvements on the 2.41 acres undeveloped land of Assessor's Parcel Number (APN) 137-27-601-002. The site is located on the northeast corner of the Far Hills Avenue and Fox Hill Drive intersection, in the City of Las Vegas, Nevada.

The purpose of this report is to accompany the improvement plans, to provide detailed hydrologic and hydraulic analyses for the site in accordance with the CCRFCD Manual (Reference 1, hereafter referred to as HCDDM) and local drainage criteria. The following tasks were performed in the preparation of this study:

- ◆ Determine the FEMA floodplain designation for the project site.
- ◆ Identify CCRFCD regional facilities adjacent or affected by the project.
- ◆ Review pertinent approved drainage studies in the area for evaluation of drainage impacts affecting the project.
- ◆ Estimate peak runoff impacting the proposed grading and storm drain improvements during the 10-year and 100-year return period storms for existing and ultimate conditions.
- ◆ Recommend drainage facilities to protect the project from storm runoff.

II. LOCATION AND DESCRIPTION

The project is located on the northeast corner of the Far Hills Avenue and Fox Hill Drive intersection in Section 27, Township 20 South, and Range 59 East, M.D.M. Please refer to Figure 1 for the location of the project. The site is presently undeveloped with land cover typical of sparse desert vegetation and existing topography sloping in a southeasterly direction at approximately 5%. For this study, the proposed onsite improvements include the development of a mass graded pad.

III. FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD HAZARD ANALYSIS

Based on the FEMA Flood Insurance Rate Map (FIRM) Community Panel 32003C2150E, dated September 27, 2002, the project site lies within a Zone X. Areas designated as Zone X are described as being outside the 500-year floodplain. Therefore, the project is not located within a FEMA-designated Special Flood Hazard Area (SFHA). Figure 2 shows the site depicted on a portion of the aforementioned FIRM.

IV. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD) HYDROLOGY AND FACILITIES

Figures 3 and 4, included in Appendix D, show subbasins and facilities based on the 2018 Las Vegas Valley Master Plan Update, respectively (Reference 2, hereafter referred to as the 2018 MPU). As shown on Figure 4, the site is adjacent to CCRFCD Facility APFH0089, defined as existing 8' X 6' RCB.

V. REFERENCED STUDIES

Below are reference materials that have been reviewed and accepted by GCW for use in this study.

The Technical Drainage Study for Summerlin Village 23B Far Hills Avenue Improvements (Reference 3, hereinafter referred to as the Far Hills Study) was approved by the City of Las Vegas on April 23, 2007. The Far Hills Study provides existing condition drainage map and ultimate condition street flow for the study area.

Village 23B Far Hills Avenue Improvements – Phase I Desert Foothills Drive to Fox Hill Drive (Reference 4, hereinafter referred to as the Far Hills Phase I Study) was approved by the City of Las Vegas on October 29, 2013. The Far Hills Phase I Study shows existing storm drain and designed flow through the site.

The Technical Drainage Study for Fox Hill Drive Improvements (Reference 5, hereinafter referred to as the Fox Hill Study) was approved by the City of Las Vegas on June 25, 2019. The Fox Hill Study shows Fox Hill Drive is drainage barrier for the project site. Pertinent reference material has been included in Appendix C.

VI. HYDROLOGY

The methodology presented in this study is in compliance with the HCDDM.

Model Description – The watersheds were modeled using the SCS Unit Hydrograph method within the Army Corps of Engineers HEC-1 Flood Hydrograph package.

Precipitation – The project location is outside the McCarran Airport Rainfall boundary per HCDDM Figure 513; therefore, the 100-year precipitation values have been obtained from GIS rainfall data provided in the 2018 MPU. Since the drainage area for the project is less than 8 square miles, an SDN 3 design storm was selected for use in the HEC-1 computer model.

Soils – 2018 MPU provides the latest soil layer in GIS format representing the hydrologic soil group for each soil map unit area. The GIS data delineates each soil map unit area and has a corresponding map unit number. The following table summarizes the soil types identified in the drainage watershed. Refer to Figure 5, Soil Map for the delineation of the soil boundaries summarized in the table below.

Table 1 MPU 2018 HSG Soils Summary					
Map Unit Symbol (MPU)	% HSG 'A'	% HSG 'B'	% HSG 'C'	% HSG 'D'	% Rock
1156	1	10	0	89	0

Curve Numbers (CN) – The ultimate condition hydrologic analyses have been performed for this study. The selected land use for the onsite area is newly graded. Based on the land use and the soils composites summarized above, the appropriate curve numbers have been selected from HCDDM Table 602. Hydrological calculations have been provided in Appendix A.

VII. EXISTING CONDITIONS

The existing condition is defined as the project undeveloped and the offsite watershed in its current state. The interim condition for the Far Hills Study has been used as the existing condition of this study, because the construction of Far Hills Avenue and the storm drain facility has been completed. Note that Fox Hill Drive is constructed in the existing condition and is a drainage barrier for project site. Therefore, no offsite flow entering the project site. In the existing condition, the project site land cover is desert shrub sloping in a south-

easterly direction. There is an existing storm drain inlet in a sump located on the southeast corner of the project site, designed for 19 cfs that collects the flow inside the project site and discharges into the existing RCB in Far Hills Avenue. Refer to the Appendix C for the existing conditions hydrology map (Far Hills Study, Figure 5B).

VIII. ULTIMATE CONDITIONS

The ultimate condition is defined as the project developed and the offsite watershed also developed at a state consistent with current zoning and obeying drainage patterns consistent with the proposed condition. During ultimate condition, the project site is fully graded and general flow patterns remain unchanged. Onsite subbasin DON1 has been delineated to estimate onsite flow rate. A NDOT Type 2 double grate inlet is designed to connect to the existing 24 inch RCP to collect onsite flow. Note that the ultimate condition flow is less than the designed flow rate. An onsite ultimate conditions HEC-1 Analysis is included in Appendix A. Refer to the Figure 8 for the ultimate condition drainage map.

IX. STREET/SURFACE HYDRAULICS

Surface grading has been reviewed. Grading shows positive drainage throughout the site. Two courses of solid grouted wall are proposed for south and east wall to protect against runoff. Refer to Figure 8 for illustration of the location of hydraulic sections performed for the project. Review of the calculations shows that street flow criteria is met. The resulting Far Hills street flow data is based on the highest flow rate referenced from the Far Hills Study (Section D-D Figure 5B, and Section J-J Figure 6B). The flowrate used in the street flow normal depth calculations have been presented on Figure 8. Hydraulic calculations are provided in Appendix B.

X. CONCLUSIONS

- 1- Methodology used in this report is in compliance with the Clark County Regional Flood Control District (CCRFCD) criteria.
- 2- The proposed project lies within a designated FEMA Flood Zone X. The project is not currently located in a FEMA-designated Special Flood Hazard Area.
- 3- The project site is adjacent to CCRFCD Facility APFH0089, defined as existing 8' X 6' RCB.
- 4- The ultimate condition runoff for the project site is less than the designed flow rate, therefore, the project will not adversely impact any downstream properties or facilities.

XI. REFERENCES

1. Clark County Regional Flood Control District. *Hydrologic Criteria and Drainage Design Manual*. August 1999.
2. CCRFCD 2013 Las Vegas Valley Master Plan Update. 2013.
3. G.C. Wallace. *The Technical Drainage Study for Summerlin Village 23B Far Hills Avenue Improvements*. 2006.
4. G.C. Wallace. *Village 23B Far Hills Avenue Improvements – Phase I Desert Foothills Drive to Fox Hill Drive*. 2013.
5. GCW, Inc. *The Technical Drainage Study for Fox Hill Drive Improvements*. 2019.

APPENDIX LAYOUT

<i>Appendix A</i>	Hydrology Calculations and Information 1. Table 602 from the CCRFCD Manual – Runoff Curve Number 2. Curve Number Calculations 3. Ultimate Conditions Standard Form 4 4. Ultimate Conditions HEC-1 Analysis
<i>Appendix B</i>	Hydraulic Calculations and Information 1. Drop Inlet Calculations 2. Normal depth Calculations
<i>Appendix C</i>	Referenced Materials and Supporting Documents 1. Technical Drainage Study for Summerlin Village 23B Far Hills Avenue Improvements 2. Village 23B Far Hills Avenue Improvements – Phase I Desert Foothills Drive to Fox Hill Drive 3. Far Hills Avenue Improvements – Phase I Desert Foothills Drive to Fox Hill Drive Technical Drainage Study for Fox Hill Drive Improvements
<i>Appendix D</i>	Drainage Figures and Plans 1. Figure 1; Vicinity Map 2. Figure 2; FEMA FIRM 3. Figure 3; 2018 MPU Subbasin Map 4. Figure 4; 2018 MPU Facility Map 5. Figure 5; 2018 MPU Soil Map 6. Figure 6; 100-Year Rainfall Map 7. Figure 7; 10-Year Rainfall Map 8. Figure 8; Ultimate Condition Drainage Map

APPENDIX A

Hydrology Calculations and Information

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ³ :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ⁴ ...		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas

Newly graded areas (pervious areas only, no vegetation)⁵

77	86	91	94
----	----	----	----

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

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

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

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

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

Revision	Date

BASIN ID	HYDROLOGIC SOIL GROUP				
	%A	%B	%C	%D	% ROCK
DON1	1	10	0	89	0

Basin ID	Land Cover Type Percentage (%)				Weighted CN
	Newly Graded Area				
DON1	100.0%				93

HYDROLOGIC CRITERIA AND DESIGN MANUAL

TIME OF CONCENTRATION



VILLAGE 25 NVE SUBSTATION GRADING

ULTIMATE CONDITION

Project No: 62025-208

Date: 12-May-20

Calculated by: ME

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK URBANIZED BASINS		Tc	Tlag	REMARKS
DESIG: (1)	DEV./EX. (D or E)	CN (16)	K (2)	AREA Ac (3)	AREA Sq Mi (4)	INITIAL LENGTH Feet (5)	SLOPE % (6)	Ti Min (7)	TRAVEL LENGTH Feet (8)	SLOPE % (9a)	V1 VELOCITY fps (9b)	V2 VELOCITY fps (10)	Tt Min (11)	TOTAL LENGTH Feet (12)	Tc = (L/180)+10 Min (13)	Min (14)	Tlag = 0.6Tc/60 Hours (15)	Remarks:
DON1	D	93.0	0.8376	2.4	0.0038	50	1.0	3.3	430	1.60	2.6	3.9	2.8	480	12.7	6.1	0.061	
$T_c = T_i + T_t$ $T_{lag} = 0.6 T_c$ For the travel time (Tt) calculations, $T_i = 1.8 (1.1 - K) L^{1/2} / S^{1/3}$ V1 applies to the first 500 feet of travel distance; Existing: $V1 = 14.8 * (S/100)^{1/2}$ Developed: $V1 = 20.2 * (S/100)^{1/2}$ $K = 0.0132 (CN) - 0.39$ V2 applies to the remaining travel distance. $V2 = 29.4 * (S/100)^{1/2}$ $V2 = 30.6 * (S/100)^{1/2}$																		
REFERENCE:														STANDARD FORM 4				

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 13MAY20 TIME 09:26:20
*
*****

                                ULT.OUT

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

```

```

X   X XXXXXX XXXX   X
X   X X   X   X   XX
X   X X   X   X   X
XXXXXX XXXX X   XXXX X
X   X X   X   X   X
X   X X   X   X   X
X   X XXXXXX XXXX   XXX

```

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

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

1 HEC-1 INPUT PAGE 1

```

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

*** FREE ***

*DIAGRAM
1 ID *****
2 ID *
3 ID * : VILLAGE 25 NVE SUBSTATION GRADING : *
4 ID * : ULTIMATE CONDITION : *
5 ID * : : *
6 ID * : : *
7 ID * : RETURN PERIOD_ _ _ _ 10 & 100-YEAR : *
8 ID * : DISTRIBUTION_ _ _ _ 6-HOUR SDN3 : *
9 ID * : PROJECT NO_ _ _ _ 62025-208 : *
10 ID * : FILENAME_ _ _ _ ULT.H1 : *
11 ID * : DATE_ _ _ _ 05/04/2020 : *
12 ID * : MODELED BY_ _ _ _ ME : *
13 ID * : : *
14 ID * : : *
15 ID * : : *
16 ID *****
17 ID
18 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
19 ID
20 ID AREA DARF
21 ID SQ.MI.
22 ID
23 ID 0 - 0.5 1.00
24 ID 0.5 - 1 0.98
25 ID 1 - 2 0.97
26 ID 2 - 4 0.93
27 ID
28 ID IT 5 0 0 300
29 ID IO 5 0
30 ID IN 5 0 0
31 ID JR PREC 1.00 0.55
*
*
32 KK DON1
33 BA 0.0038
34 PB 3.42
35 PC 0.000 .0200 .0570 .0700 .0870 .1080 .1240 .1300 .1300 .1300
36 PC .1300 .1300 .1300 .1330 .1400 .1420 .1480 .1580 .1720 .1810
37 PC .1900 .1970 .1990 .2000 .2010 .2040 .2140 .2290 .2410 .2490
38 PC .2510 .2560 .2700 .2780 .2810 .2830 .2950 .3220 .3520 .4090
39 PC .4990 .5900 .7100 .7440 .7810 .8120 .8190 .8350 .8510 .8560
40 PC .8600 .8680 .8760 .8880 .9100 .9260 .9370 .9500 .9700 .9760
41 PC .9820 .9850 .9870 .9890 .9900 .9930 .9930 .9940 .9950 .9980
42 PC .9980 .9990 1.000
43 LS 0 93.00
44 UD 0.061
*
45 ZZ

```


1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

32 DON1

(**) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
*
* RUN DATE 13MAY20 TIME 09:26:20 *
*

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

* *
* : VILLAGE 25 NVE SUBSTATION GRADING : *
* : ULTIMATE CONDITION : *
* : *
* : RETURN PERIOD_ _ _ 10 & 100-YEAR : *
* : DISTRIBUTION_ _ _ 6-HOUR SDN3 : *
* : PROJECT NO_ _ _ 62025-208 : *
* : FILENAME_ _ _ _ _ ULT.H1 : *
* : DATE_ _ _ _ _ 05/04/2020 : *
* : MODELED BY_ _ _ _ _ ME : *
* : *
* : *
* : *

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA	DARF
SQ.MI.	
0 - 0.5	1.00
0.5 - 1	0.98
1 - 2	0.97
2 - 4	0.93

29 IO

OUTPUT CONTROL VARIABLES

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

IT

HYDROGRAPH TIME DATA

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

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

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

JP

MULTI-PLAN OPTION

NPLAN 1 NUMBER OF PLANS

JR

MULTI-RATIO OPTION

RATIOS OF PRECIPITATION
1.00 .55

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

ULT.OUT

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				1.00	.55
HYDROGRAPH AT					
+	DON1	.00	1	10.	5.
			FLOW	3.50	3.50
			TIME		

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

APPENDIX B

Hydraulic Calculations and Information



Drop Inlet Sizing Calculation

Project Name: _____ V25 NVE Substation
 By: _____ Masih Edalat
 Date: _____ 07/09/2020

Grate Inlet Headwater Depth		
NDOT Drop Inlet Type		2
Number of Grates		Double (Two Grates)
Facility ID		
Known:		
Q=	Flow (cfs)	10
D=	RCP size (in)	24
Cf=	Clogging Factor (%)	50
	ID	2
Weir Conditions:		
$H_w = (Q / (C_w * P))^{2/3}$		
Cw=	Weir Coefficient	3.0
P=	Perimeter of open grate (ft)	8.50
Pc=	Perimeter (w/clogging) (ft)	4.3
Q=	Flow for single grate (cfs)	5.0
Hw=	Headwater depth (ft)	0.54
Orifice Conditions:		
$H_w = (Q / (C_o * A_c))^2 / 2 * g$		
Co=	Orifice Coefficient	0.65
Ag=	Grate Area (ft ²)	6.00
Gf=	Grate Opening Factor	0.67
Ac=	Grate Open Area (w/ clogging) (ft ²)	2.0
Hw=	Headwater depth (ft)	0.23
Worst Case Scenario Occurs Under Weir Conditions		
Headwater Depth (ft) =		0.54

0.6 ft headwater
is provided



Worksheet for Section A (Half Street) - 100yr

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 5.55 %
Discharge 6.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.00	1.13
0+47.00	1.13

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+47.00, 1.13)	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 0.34 ft
Elevation Range 0.00 to 1.13 ft
Flow Area 1.16 ft²

Worksheet for Section A (Half Street) - 100yr

Results

Wetted Perimeter	10.51	ft
Hydraulic Radius	0.11	ft
Top Width	10.12	ft
Normal Depth	0.34	ft
Critical Depth	0.45	ft
Critical Slope	0.00666	ft/ft
Velocity	5.18	ft/s
Velocity Head	0.42	ft
Specific Energy	0.76	ft
Froude Number	2.70	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.45	ft
Channel Slope	5.55	%
Critical Slope	0.00666	ft/ft

Cross Section for Section A (Half Street) - 100yr

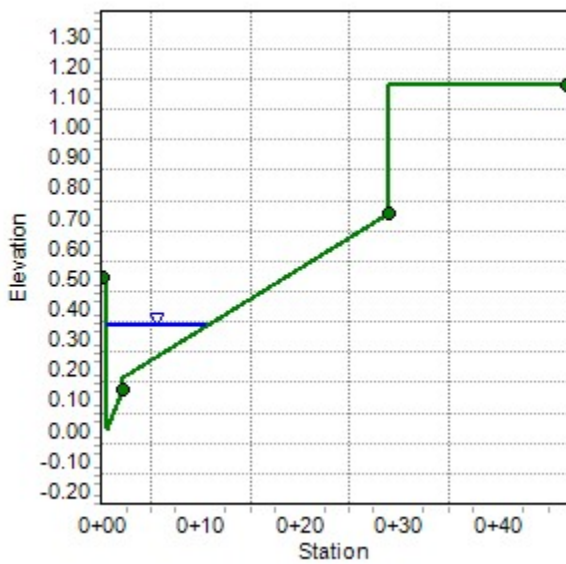
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.55	%
Normal Depth	0.34	ft
Discharge	6.00	ft ³ /s

Cross Section Image



Worksheet for Section A (Half Street) - 10yr

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 5.55 %
Discharge 2.50 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.50
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.00	1.13
0+47.00	1.13

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+47.00, 1.13)	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 0.27 ft
Elevation Range 0.00 to 1.13 ft
Flow Area 0.57 ft²

Worksheet for Section A (Half Street) - 10yr

Results

Wetted Perimeter	6.95	ft
Hydraulic Radius	0.08	ft
Top Width	6.63	ft
Normal Depth	0.27	ft
Critical Depth	0.35	ft
Critical Slope	0.00726	ft/ft
Velocity	4.35	ft/s
Velocity Head	0.29	ft
Specific Energy	0.57	ft
Froude Number	2.60	
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	0.27	ft
Critical Depth	0.35	ft
Channel Slope	5.55	%
Critical Slope	0.00726	ft/ft

Cross Section for Section A (Half Street) - 10yr

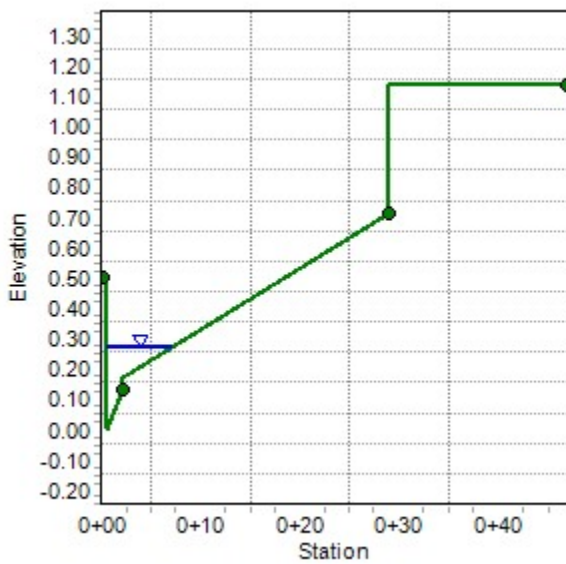
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	5.55	%
Normal Depth	0.27	ft
Discharge	2.50	ft ³ /s

Cross Section Image



Project Description

Input Data

Station (ft)	Elevation (ft)
--------------	----------------

Roughness Segment Definitions

Options

Results

Bentley Systems, Inc. Bentley FlowMaster V8i (SELECTseries 1) [08.11.01.03]

Worksheet for Section B - 100yr

Results

Velocity Head	0.04	ft
Specific Energy	0.56	ft
Froude Number	0.57	
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	0.52	ft
Critical Depth	0.41	ft
Channel Slope	0.47	%
Critical Slope	0.01585	ft/ft

Cross Section for Section B - 100yr

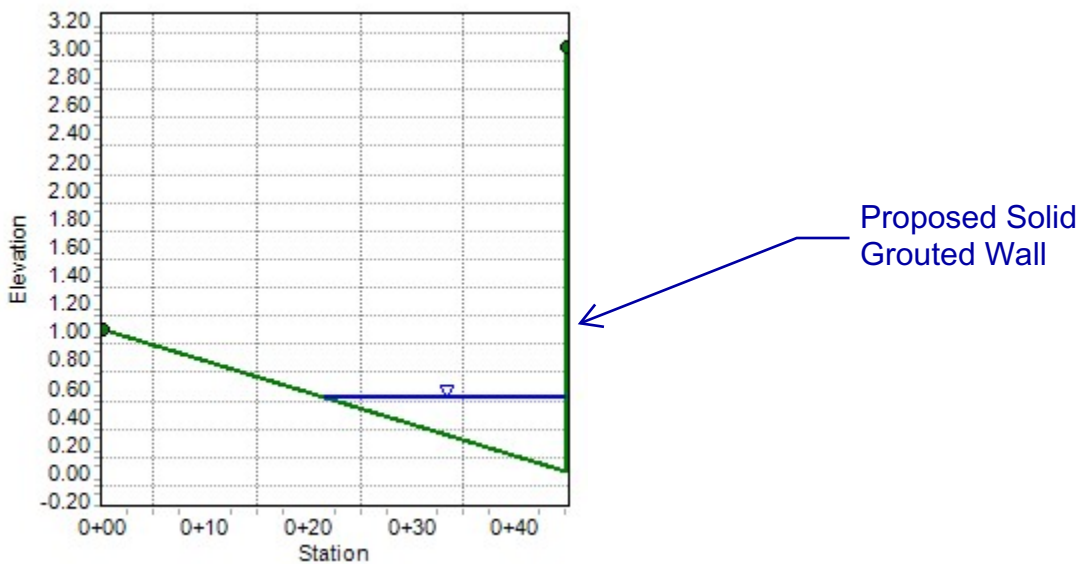
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	0.52	ft
Discharge	10.00	ft ³ /s

Cross Section Image



Worksheet for Section B - 10yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Discharge	5.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00.00	1.00
0+45.00	0.00
0+45.00	3.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 1.00)	(0+45.00, 3.00)	0.025

Options

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

Results

Normal Depth		0.40	ft
Elevation Range	0.00 to 3.00 ft		
Flow Area		3.63	ft²
Wetted Perimeter		18.48	ft
Hydraulic Radius		0.20	ft
Top Width		18.08	ft
Normal Depth		0.40	ft
Critical Depth		0.31	ft
Critical Slope		0.01738	ft/ft
Velocity		1.38	ft/s

Worksheet for Section B - 10yr

Results

Velocity Head	0.03	ft
Specific Energy	0.43	ft
Froude Number	0.54	
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	0.40	ft
Critical Depth	0.31	ft
Channel Slope	0.47	%
Critical Slope	0.01738	ft/ft

Cross Section for Section B - 10yr

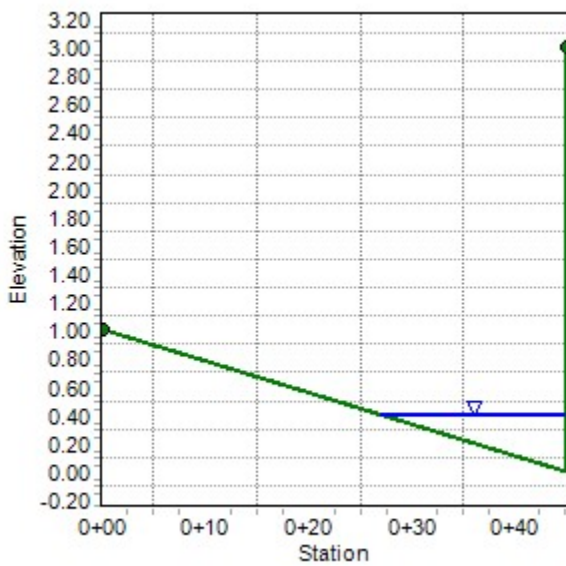
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.47	%
Normal Depth	0.40	ft
Discharge	5.00	ft ³ /s

Cross Section Image



APPENDIX C

Referenced Materials and Supporting Documents

**RESPONSE TO COMMENTS
ON THE
TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23B
FAR HILLS AVENUE IMPROVEMENTS**

62A.23.230

November 2006

Prepared For:

**Howard Hughes Corporation, Inc.
a Delaware Corporation
10000 West Charleston Boulevard, Suite 200
Las Vegas, Nevada 89135
Phone: (702) 791-4300
Fax: (702) 791-4450**



G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM

DATE:

April 23, 2007

TO:
Land Development Services
Department of Public Works

FROM:
Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works

SUBJECT: Drainage Study for:
Summerlin Village 23B – Far Hills Avenue Improvements

COPIES TO:
G.C. Wallace, Inc.

Cross Streets: Far Hills Ave from Desert Foothills to Sky Vista

Howard Hughes Corporation

File Number: F:\Depot\DSMemos\DS4084C.doc

Bart Anderson, P.E., DevCo

Parcel Number: 137-22-000-015

CCRFCD

Zoning Action: N/A

FEMA Flood Zone YES NO X

Proposed Storm Drain YES NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1 st Submittal	10/5/2006	10/25/2006	Not Approved	\$400.00	55426: \$400
2 nd Submittal	11/13/2006	12/1/2006	Conditional Approval	\$400.00	57514: \$400
CCRFCD	4/13/2007	4/23/2007	Concurrence	N/C	N/C
TOTAL FEES (LDDRS):				\$800.00	---

REMARKS:

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

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

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 Amendment and accepted by the *City of Las Vegas Flood Control Section*. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

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

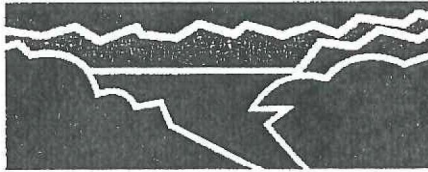
END OF REMARKS

ays

T/R/S: T20S/R59E/22

AREA K-22

REGIONAL FLOOD CONTROL DISTRICT



Gale Wm. Fraser, II, P.E.
General Manager/Chief
Engineer

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Chip Maxfield
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Andy Hafen
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Mayor Bill Nicholas
City of Mesquite

Roger Tobler
City of Boulder City

Bruce L. Woodbury
Clark County

January 2, 2007

Mr. Randy Fultz, P.E.
City of Las Vegas Public Works
731 S. 4th Street
Las Vegas, NV 89101

DISTRICT CONCURRENCE: SUMMERLIN VILLAGE 23B - FAR HILLS AVENUE IMPROVEMENTS (DS4084) (RFCD No. 06-7092)

Dear Mr. Fultz:

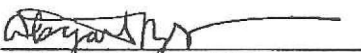
Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated December 6, 2006, and Addendum No. 1 dated December 6, 2006, for above-mentioned project as submitted by G. C. WALLACE, INC. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Public Works dated December 5, 2006.

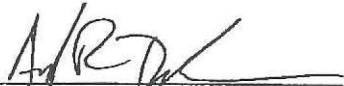
District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Public Works.

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 G. C. WALLACE, INC., may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

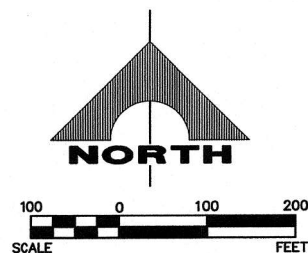
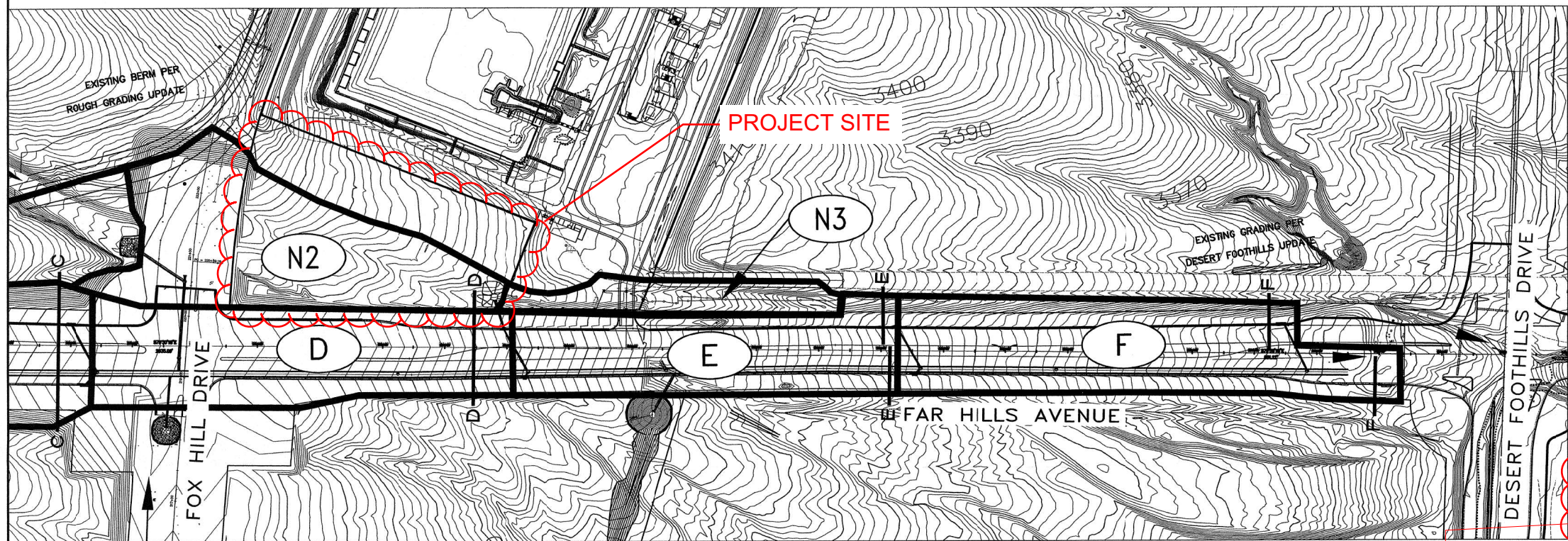
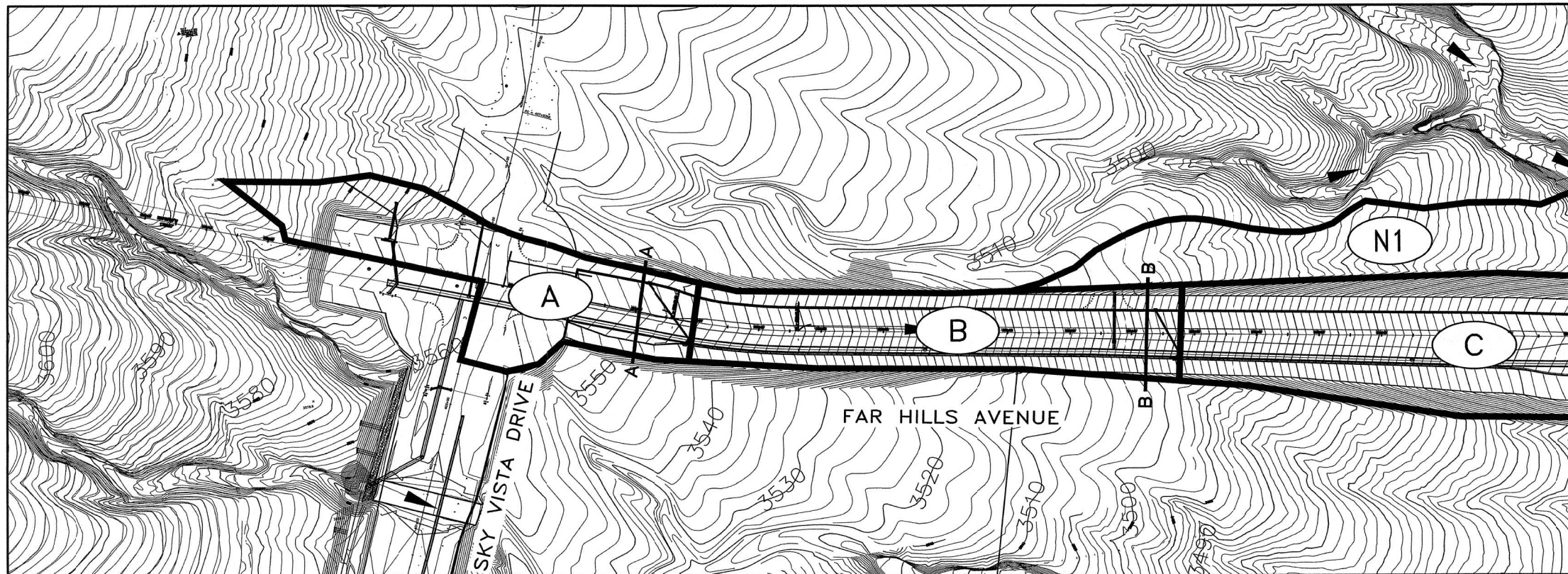
BY: 
Abigail Mayfena, P.E.
Associate Engineer


Andrew R. Trelease, P.E., CFM
Principal Civil Engineer

AM:ART:jb

c: Randall K. Gremlich, P.E., G. C. WALLACE, INC.

P:\Letters and Memos\Local Drainage\Land Development & Drainage\Concurrence Letters\2007\20-59-22.GCW.doc



- LEGEND**
- D PRORATED SUBBASIN
 - SUBBASIN BOUNDARY
 - FLOW DIRECTION
 - A — A STREET SECTION

THIS FIGURE IS USED AS THE EXISTING
CONDITION DRAINAGE MAP

100 Year Runoff			
Basin	Area (ac)	Q ₁₀₀ (cfs)	Unit Flow (cfs/ac)
FH1	8.2	28	3.43
FH2	6.8	25	3.67
I3	5.7	18	3.15

Prorated Flows			
Basin	Area (ac)	Unit Flow (cfs/ac)	Q ₁₀₀ (cfs)
A	2.28	3.43	8
B	2.31	3.43	8
C	3.56	3.43	12
D	2.36	3.67	9
E	1.92	3.67	7
F	2.56	3.67	9
N1	2.58	3.15	8
N2	2.49	3.15	8
N3	0.64	3.15	2

10 Year Runoff			
Basin	Area (ac)	Q ₁₀ (cfs)	Unit Flow (cfs/ac)
FH1	8.2	14	1.72
FH2	6.8	13	1.91
I3	5.7	8	1.40

Prorated Flows			
Basin	Area (ac)	Unit Flow (cfs/ac)	Q ₁₀ (cfs)
A	2.28	1.72	4
B	2.31	1.72	4
C	3.56	1.72	6
D	2.36	1.91	5
E	1.92	1.91	4
F	2.56	1.91	5
N1	2.58	1.40	4
N2	2.49	1.40	3
N3	0.64	1.40	1

STREET FLOW (100 Year)					
Section	Q ₁₀₀ Total (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	D*V
A-A	8	3.00	0.34	3.65	1.24
B-B	11	7.70	0.32	5.64	1.80
C-C	17	7.70	0.36	6.22	2.24
D-D	12	5.55	0.34	4.98	1.69
E-E North	8.5	5.55	0.38	5.49	2.09
E-E South	6.5	5.55	0.35	5.16	1.81
F-F North	6.5	5.55	0.35	5.16	1.81
F-F South	7	3.57	0.38	4.45	1.69

STREET FLOW (10 Year)					
Section	Q ₁₀ Total (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	D*V
A-A	4	3.00	0.28	3.14	0.88
B-B	4	7.70	0.25	4.60	1.15
C-C	6	7.70	0.28	4.96	1.39
D-D	5	5.55	0.28	4.11	1.15
E-E North	3.5	5.55	0.30	4.49	1.35
E-E South	2.5	5.55	0.28	4.19	1.17
F-F North	2.5	5.55	0.28	4.19	1.17
F-F South	2.5	3.57	0.29	3.53	1.02

DROP INLET CALCULATIONS (100 Year)						
Section	Depth (ft)	Slope (%)	Q ₁₀₀ Total (cfs)	Q ₁₀₀ Intercept (cfs)	Q ₁₀₀ Bypass (cfs)	Description of DI
A-A	0.34	3.00	8	5	3	2 - 5' Type "CM"
B-B	0.32	7.70	11	6	5	2 - 5' Type "CM"
C-C	0.36	7.70	17	14	3	2 - 15' Type "CM"
D-D	0.34	5.55	12	6	6	2 - 5' Type "CM"
E-E North	0.38	5.55	8.5	6.5	2	1 - 12.5' Type "CM"
E-E South	0.35	5.55	6.5	4	2.5	1 - 7.5' Type "CM"
F-F North	0.35	5.55	6.5	4	2.5	1 - 7.5' Type "CM"
F-F South	0.38	3.57	7	7	0	1 - 15' Type "CM"

DROP INLET CALCULATIONS (10 Year)						
Section	Depth (ft)	Slope (%)	Q ₁₀ Total (cfs)	Q ₁₀ Intercept (cfs)	Q ₁₀ Bypass (cfs)	Description of DI
A-A	0.28	3.00	4	4	0	2 - 5' Type "CM"
B-B	0.25	7.70	4	4	0	2 - 5' Type "CM"
C-C	0.28	7.70	6	6	0	2 - 15' Type "CM"
D-D	0.28	5.55	5	4	1	2 - 5' Type "CM"
E-E North	0.30	5.55	3.5	3.5	0	1 - 12.5' Type "CM"
E-E South	0.28	5.55	2.5	2.5	0	1 - 7.5' Type "CM"
F-F North	0.28	5.55	2.5	2.5	0	1 - 7.5' Type "CM"
F-F South	0.29	3.57	2.5	2.5	0	1 - 15' Type "CM"

G.C. WALLACE COMPANIES
 ENGINEERS | PLANNERS | SURVEYORS
 1555 S. RAINBOW BOULEVARD, SUITE 200, LAS VEGAS, NV 89146
 T: 702.894.2299 F: 702.894.2299 GCWALLACE.COM

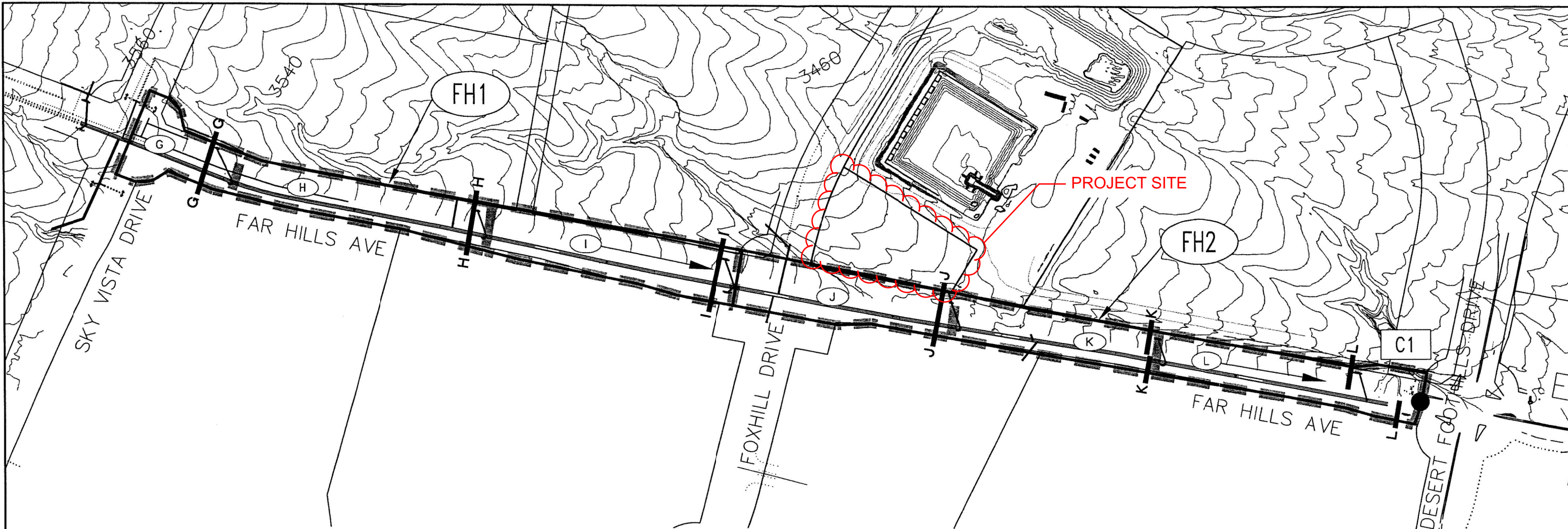
FAR HILLS AVENUE IMPROVEMENTS
 SUMMERLIN VILLAGE 23B

FIGURE 5B
 INTERIM CONDITIONS

PRORATED FLOWS DRAINAGE MAP

DRAWING
FIG 5B

1 OF 5 SHTS



SUMMARY OF ULTIMATE HEC-1 FLOWS

FH1	6.4	24	12
FH2	6.8	25	13
C1	-	47	24

PRORATED FLOW CALCULATIONS

BASIN	AREA (AC.)	Q100 (cfs)	UNIT FLOW (CFS/AC)
FH1	6.4	24	3.75
FH2	6.8	25	3.68

PRORATED SUBBASINS

BASIN	AREA (AC.)	UNIT FLOW (CFS/AC)	Q100 (cfs)
G	1.47	3.75	5
H	2.30	3.75	9
I	2.77	3.75	10
J	2.35	3.68	9
K	1.87	3.68	7
L	2.54	3.68	9

100-YEAR STREET FLOW CALCULATIONS

Section	Q100 (CFS)	SLOPE (%)	Depth (ft)	Velocity (fps)	DxV
G	5	3.0	0.30	3.3	0.99
H	10	7.7	0.32	5.5	1.76
I	14	7.7	0.34	6.0	2.04
J	10	5.6	0.33	4.9	1.62
K NORTH	5.5	5.6	0.34	5.0	1.70
K SOUTH	5.5	5.6	0.34	5.0	1.70
L NORTH	5.0	5.6	0.33	4.9	1.62
L SOUTH	6.5	3.6	0.37	4.4	1.63

100-YEAR DROP INLET CALCULATIONS

Section	Q100 TOTAL (CFS)	Q100 INTERCEPT (CFS)	Q100 BYPASS (CFS)	Description of Drop Inlets
G	5	4	1	2-5.0' TYPE CM
H	10	6	4	2-5.0' TYPE CM
I	14	13	1	2-15.0' TYPE CM
J	10	6	4	2-5.0' TYPE CM
K NORTH	5.5	5	0.5	1-12.5' TYPE CM
K SOUTH	5.5	5	0.5	1-12.5' TYPE CM
L NORTH	5.0	5	0	1-15.0' TYPE CM
L SOUTH	6.5	6.5	0	1-15.0' TYPE CM

LEGEND

- SUBBASIN BOUNDARY
- SUBBASIN DESIGNATION
- PRORATED SUBBASIN BOUNDARY
- PRORATED SUBBASIN DESIGNATION
- FLOW DIRECTION
- CROSS SECTION



GRAPHIC SCALE



(IN FEET)
1 inch = 300 ft.

SUMMERLIN VILLAGE 23B
FAR HILLS AVENUE IMPROVMENTS

FIGURE 6B
ONSITE DRAINAGE MAP
ULTIMATE CONDITIONS



G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD • LAS VEGAS, NV 89146
T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM

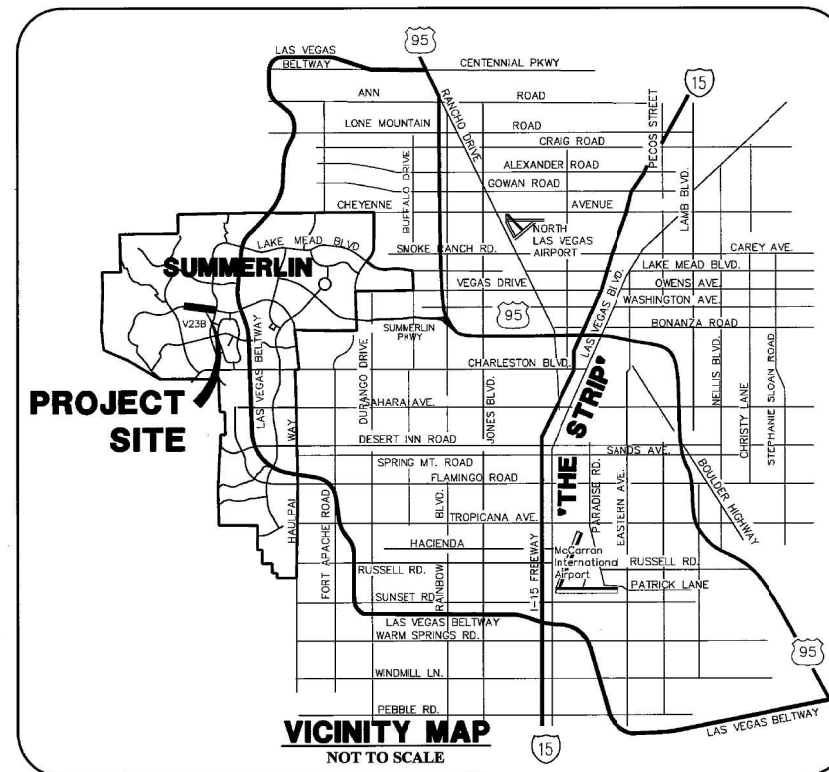
SUMMERLIN



VILLAGE 23B FAR HILLS AVENUE IMPROVEMENTS - PHASE 1 DESERT FOOTHILLS DRIVE TO FOX HILL DRIVE 2013

APN# 137-22-000-015

SID NO. 810 PROJECTS 4A, 4B, 4C, 5A, 5B, AND 5C
SID NO. 813 PROJECTS 2A, 2B, 2C, 3A, 3B AND 3C



OWNER/DEVELOPER

THE HOWARD HUGHES COMPANY, LLC
10801 W. CHARLESTON BLVD., 3RD FLOOR
LAS VEGAS, NEVADA 89146
OFFICE PHONE NO. (702) 791-4300
OFFICE FAX NO. (702) 791-4450

ENGINEER



G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD. • LAS VEGAS, NV 89146
T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DANIEL F. KELLEY P.E. 21134

7/16/13
DATE

DAVID BOWERS, PE, PTOE, PE# 16736
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

10/29/13
DATE

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

CLV PLANNING DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE CITY OF LAS VEGAS PLANNING DEPARTMENT

NA

CHRIS KNIGHT, DIRECTOR BUILDING AND SAFETY

DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 122068 DATE: 10/29/13
DRAWINGS G1-G3, M1, P1-P7, L1-L3, D1-D2

THE HOWARD HUGHES COMPANY, LLC

KEVIN ORROCK
TITLE: VICE PRESIDENT

1/7/13
DATE

UTILITY/AGENCY APPROVALS

DAVID BOWERS, PE, PTOE, PE# 16736
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

7/17/13
DATE

MADEIRA R. JAMES
CENTRAL CO. DBA CENTURYLINK

7-17-13
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.

NAVY ENERGY
NV ENERGY

7-17-2013
DATE

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

SHARON MCKEE
NV ENERGY - TRANSMISSION ENGINEERING

7-21-2013
DATE

SOUTHWEST GAS CORP.

7/18/13
DATE

H #50132
CLV # 107V6128

PROJECT NO.	DESIGN	DRAWN	CHECK	DATE	DESCRIPTION
62023B-206	DFK	HJF	JUL	10/15/13	DESIGN
				10/15/13	REVISION
				10/15/13	REVISION
				10/15/13	REVISION

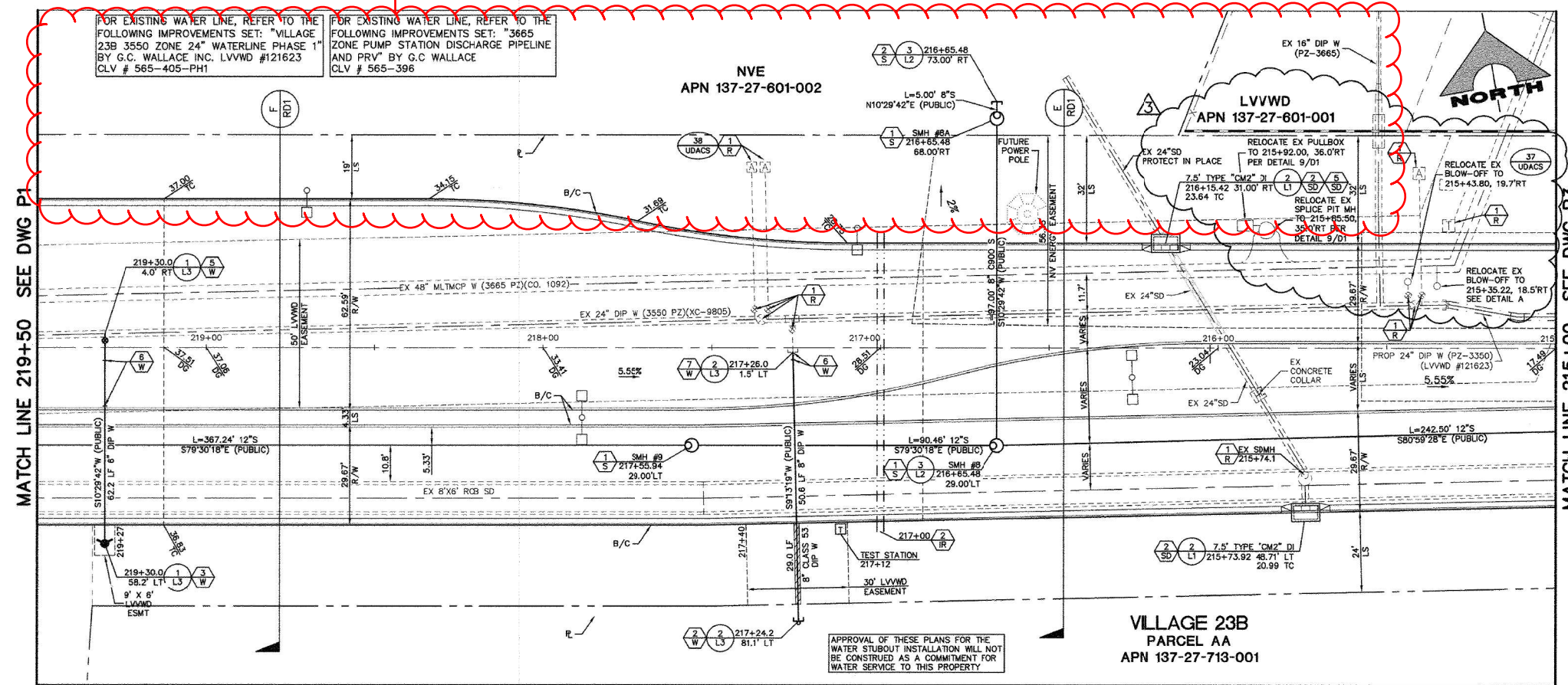
PROJECT NO. 62023B-206
DESIGN: DFK
DRAWN: HJF
CHECK: JUL
DATE: 10/15/13
PLOT TIME: 14:44:28

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD. • LAS VEGAS, NV 89146
T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM
LAS VEGAS, NEVADA

THE HOWARD HUGHES COMPANY, LLC
VILLAGE 23B
FAR HILLS AVENUE IMPROVEMENTS - PHASE 1
DESERT FOOTHILLS DRIVE TO FOX HILL DRIVE
COVER SHEET

DRAWING
G1
1 OF 29 SHTS

PROJECT SITE



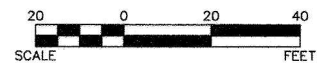
LAS VEGAS VALLEY WATER DISTRICT NOTE:
THIS PROJECT PLAN APPROVAL CONTINGENT ON SUMMERLIN VILLAGE 23B
24" 3550 ZONE WATERLINE (LWWD #121623) PLAN APPROVAL.

ALL WATERLINE CROSSING TRENCH WIDTHS GREATER THAN 6' SHALL HAVE A PIPE SUPPORT DETAIL SUBMITTED TO LVWD FOR APPROVAL PRIOR TO EXCAVATION.

FAR HILLS AVENUE (PUBLIC)

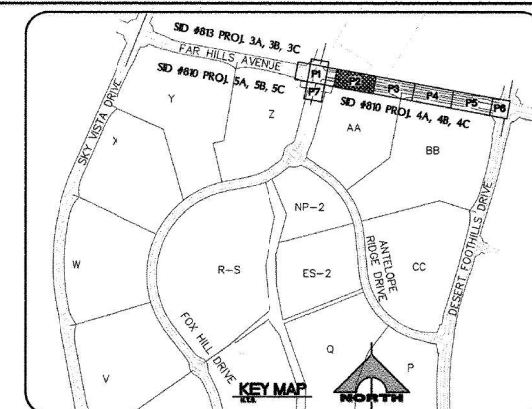
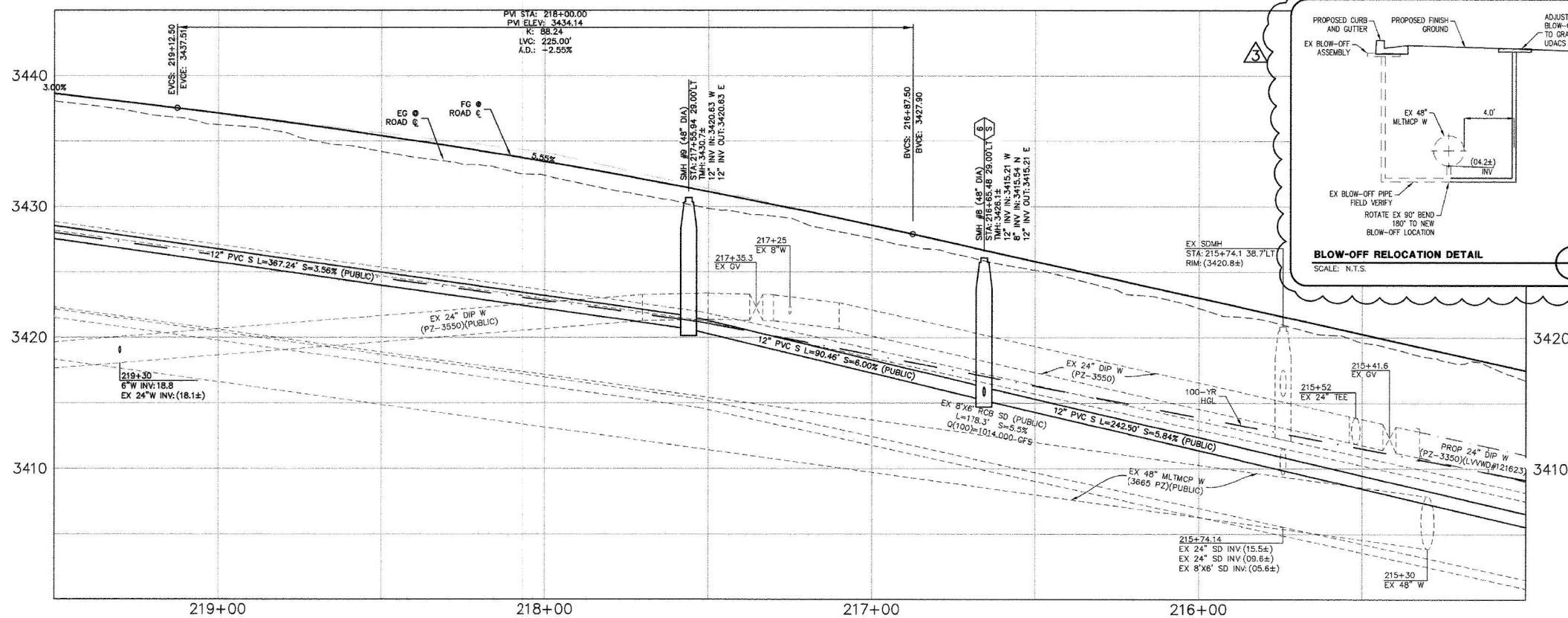
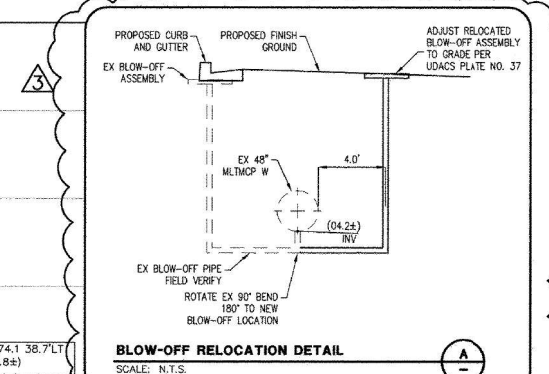
SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

SID #810 PROJECTS 4A, 4B, 4C, 5A, 5B, 5C



SEWER CONNECTION NOTE:

ONE OR MORE SEGMENTS OF THE DOWNSTREAM SEWER SYSTEM THAT WILL SERVE THIS PROJECT HAS NOT BEEN COMPLETED AND/OR ACCEPTED FOR MAINTENANCE BY THE CITY OF LAS VEGAS. ANY WORK DONE ON THIS PROJECT PRIOR TO THE COMPLETION AND/OR ACCEPTANCE OF THE DOWNSTREAM SEWER SYSTEM(S) SHALL BE DONE AT THE DEVELOPER'S OWN RISK. THE CITY OF LAS VEGAS RESERVES THE RIGHT TO PREVENT THE PHYSICAL CONNECTION OF THIS PROJECT INTO THE DOWNSTREAM SEWER SYSTEM UNTIL ALL SEGMENTS HAVE BEEN COMPLETED AND ACCEPTED FOR MAINTENANCE, OR UNTIL SUCH TIME AS THEY ARE DEEMED AVAILABLE FOR SERVICE.



EXISTING UTILITY NOTE:
EXISTING UTILITIES SHOWN HEREIN ARE APPROXIMATE ONLY AND MAY NOT SHOW ALL EXISTING FACILITIES WITHIN THE PROJECT AREA. CONTRACTOR MUST FIELD VERIFY AND POTHOLE EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO BEGINNING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE PROTECTED IN PLACE DURING CONSTRUCTION UNLESS OTHERWISE NOTED ON DRAWINGS. CONTACT UTILITY COMPANIES AT LEAST 24 HOURS PRIOR TO INTERRUPTION OF SERVICE.

STRUCTURE NOTE:
MANHOLE RIM ELEVATIONS ARE PROVIDED FOR ESTIMATING PURPOSES ONLY. ALL MANHOLE RIMS AND COVERS MUST BE ADJUSTED TO MATCH FINISH GRADE AT TIME OF CONSTRUCTION

ROADWAY CONSTRUCTION NOTES:

- 1
R VERIFY LOCATION AND ELEVATION OF EXISTING IMPROVEMENTS AND ADJUST TO GRADE. WATER VALVES TO REMAIN ACCESSIBLE AT ALL TIMES.

WATER CONSTRUCTION NOTES:

- | | |
|---|---|
| 1 | INSTALL 1-1/2" WATER METER AND 1-1/2" RPPA PER UDACS PLATES 4 AND 8 |
| 2 | INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PL. 36 |
| 3 | INSTALL FIRE HYDRANT PER UDACS PLATES 40 OR 41 (AS APPLICABLE PER PROFILE) |
| 4 | PROTECT EX FIBER OPTIC AND SPLICE PIT, AND ADJUST PER DTL 9, DWG D1 |
| 5 | INSTALL 24"x6" TAPPING SLEEVE W/ 6" TAPPING VALVE PER UDACS 2.24.01(9) |
| 6 | AND UDACS PLATES 34, 35 AND 39 |
| 7 | INSTALL 45° BEND PER UDACS PL. 31 |
| 8 | REMOVE CAP AND BLOWOFF PER UDACS PL. 36 AND CONNECT TO EX WATER LINE
(CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION OF EX WATER PRIOR TO
CONSTRUCTION) |

SEWER CONSTRUCTION NOTES:

- | | |
|---|--|
| 1 | INSTALL SEWER MANHOLE PER DCS STD. DWG. 1A AND 1B |
| 2 | STUB AND CAP SEWER PIPE PER DTL 4, DWG D1 |
| 3 | REMOVE JOINT AND CONNECT TO EX SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION OF SEWER LINE TO CONNECTION) |
| 4 | ELASTOMERIC JOINT SEALANT TO BE INSTALLED AT ALL MANHOLE JOINTS. |
| 5 | INSTALL LATERAL CONNECTION PER DCS STD. DWG. 23 |
| 6 | INSTALL CORROSION PROTECTION PER DCS SECTION 2.2.10i |

STORM DRAIN CONSTRUCTION NOTES:

- 1/ INSTALL TYPE III MANHOLE PER USD DWG. NO. 406
- 2/ INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
- 3/ REMOVE PLUG AND CONNECT TO EX STORM DRAIN LINE (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION OF EX STORM DRAIN PRIOR TO CONSTRUCTION)
- 4/ INSTALL TEMPORARY PLUG AND CAP
- 5/ USE MECHANICAL WATER STOPS, CENTERBULB, OR FLAT STRIP TO PROVIDE WATER-TIGHT JOINTS OF STRUCTURE (W/INLET, GREENSTREAK PLASTIC PRODUCTS, OR APPROVED EQUAL). SEAL BETWEEN WALLS AND ROOF TO BE KENT SEAL, OR APPROVED EQUAL. PROVIDE WATER-TIGHT PIPE TO STRUCTURE CONNECTION.
- 6/ WALL STOP DRAIN WITH TWO 1/2" DIA. JOINTS USING LYVMO APPROVED INTERNAL ELASTOMERIC JOINT SEALANT PER UDAC5 SECTION 2.2.02 D.2 LYVMO TO SUPERVISE APPLICATION OF SEALANT.
- 7/ CONTROLLED LOW STRENGTH MATERIAL (CLSM) WHEREVER A WATERLINE IS BELOW A STORM DRAIN/SEWER LINE, THE TRENCH SHALL BE BACKFILLED WITH TYPE 1 CLSM TO THE SPRING LINE OF THE STORM DRAIN/SEWER

IRRIGATION CONSTRUCTION NOTES:

- 1 BANK "A": 1-6" & 2-4" SCH 40 PVC PER SIS DWG. NO. U-18
2 BANK "B": 2-4" SCH 40 PVC PER SIS DWG. NO. U-18

BENCHMARK

BM #	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
5LV09- 34NE6	RIVET AND PLATE IN TOP OF CURB @ NORTHEAST CORNER OF DESERT FOOTHILLS AND ALTA DRIVE	3304.45 (FEET)	1007.197 (METERS)

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM, PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE 11, FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

APPROVED FOR CONSTRUCTION

1ST APP'D 10/24/13

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 122068 DATE: 9/26/14

Call before you Dig
Avoid cutting underground
utility lines. It's costly.

Call
811
OR
1-800-227-2600
AND
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-7544

FAST
Call before you 
UnderGround.
1-702-432-5300
FREEWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION

H #50132
CLV #107V6128

REPORT

DATE: 9/28/14

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP
Δ	8/2/04	REVISE EX-BLOW-OFF'S, SPLOCE PIT WH, AND PULLBOX LOCATIONS	10-2-14	PK		

PROJECT NO.	62023B-205
DESIGN:	DFK
DRAWN:	HJF
CHECK:	JLJ
PLOT DATE:	09-22-14
PLOT TIME:	16:35:22

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
15555 S. RAINBOW BOULEVARD • LAS VEGAS, NV 89146
T: 702.804.2000 • F: 702.804.2299 • GCWALLACE.COM
LAS VEGAS • MESQUITE

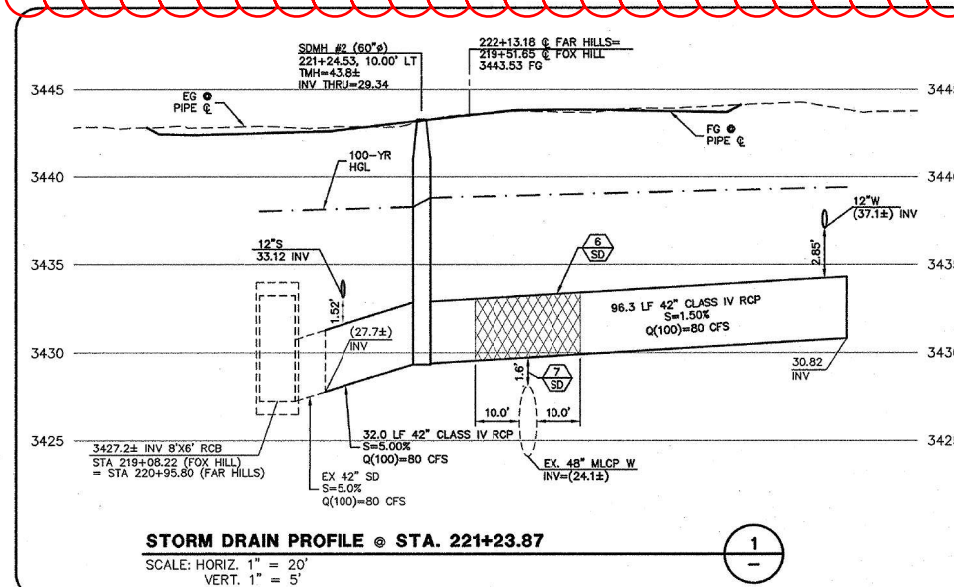
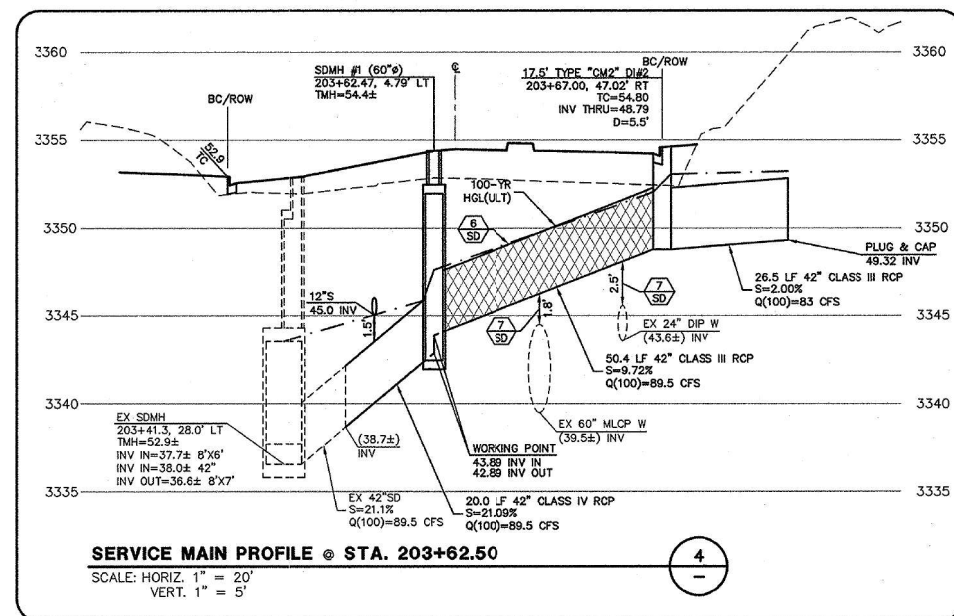
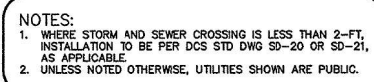
LAS VEGAS

00223b~205/DWG/production\205~UTILITY.dwg



THE HOWARD HUGHES COMPANY, LLC
VILLAGE 23B
PEAR HILL'S AVENUE IMPROVEMENTS - PHASE
DESERT FOOTHILLS DRIVE TO FOX HILL DRIVE
UTILITY PLAN AND PROFILE 2

DRAWING
P2
9 OF 29 SHTS



APPROVED FOR CONSTRUCTION

Don Meade

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 122088 DATE: 10/24/13

**TECHNICAL DRAINAGE STUDY
FOR
FOX HILL DRIVE IMPROVEMENTS**

62025-201

March 2019

Prepared for:

**Hughes Howard Company, LLC
10801 Charleston Blvd., 3Rd Floor
Las Vegas, Nevada 89146
Phone: (702) 791-4300**



CITY OF LAS VEGAS			DATE:
INTER-OFFICE MEMORANDUM			June 25, 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:		COPIES TO:
	Summerlin V25 - Fox Hill Drive Improvements (from Far Hills Avenue to Redpoint Drive)		GCW Engineers / Surveyors
Cross Streets:	Fox Hill Drive & Far Hills Avenue		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5118C.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-22-101-001		CCRFC
Zoning Action:	N/A		
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	4/1/2019	4/15/2019	Not Approved	\$400.00	3073933: \$400
2 nd Submittal	5/6/2019	5/22/2019	Conditional Approval	\$400.00	3122271: \$400
CCRFC	6/20/2019	6/25/2019	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	\$800.00	----

REMARKS:

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

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

- The project proposes to build temporary drainage facilities including drainage berms/swales along the west side of the proposed *Far Hills Drive*. Prior to final plan approval the developer must complete a **Maintenance & Liability Agreement** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facilities and an exhibit that adequately shows the location and limits of the drainage facilities to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section (229-6371)* to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

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

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

END OF REMARKS

ays

T/R/S: T20S/R59E/22

AREA K-22

REGIONAL FLOOD CONTROL DISTRICT



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

BOARD OF DIRECTORS

Lawrence L. Brown, III
Chair
Clark County

Mayor Debra March
Vice-Chair
City of Henderson

George Gault
City of Mesquite

James B. Gibson
Clark County

Mayor Carolyn Goodman
City of Las Vegas

Isaac Barron
City of North Las Vegas

**Mayor Pro Tem
Dr. Lois Tarkanian**
City of Las Vegas

Mayor Rodney Woodbury
City of Boulder City

June 20, 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 V25 B- FOX HILL DRIVE
IMPROVEMENTS (FROM FAR HILLS AVENUE TO
REDPOINT DRIVE)
(DS5118B) (RFCD No. 19-11283)**

Dear Mr. Kwon:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated April 1, 2019, Addendum No. 1 dated May 6, 2019 for above-mentioned project as submitted by GCW, INC. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Department of Public Works dated May 23, 2019.

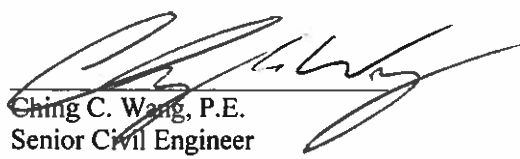
District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Department of Public Works.

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 GCW, INC. may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

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

BY:


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

CCW:cr

c: Stephen M. Jones, P.E., GCW, Inc.

P:\Letters and Memos\Local Drainage\Land Development & Drainage\2019\L-19-11283.doc

SM

DATE: 03/28/2019

[illegible]

PROJECT NO.
62025-201

DESIGN:	LG/MF
DRAWN:	AS
CHECK:	LG/MF

PLOT DATE: 03-28-19
PLOT TIME: 10:10:58

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

GCV
ENGINEERS SURVEYORS

THE HOWARD HUGHES COMPANY, LLC

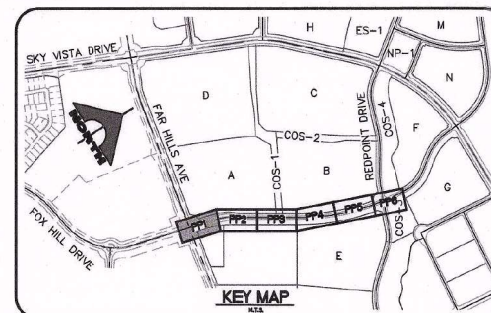
VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
(FAR HILLS AVENUE TO REDPOINT DRIVE)

COVER SHEET

DRAWING
G1

1 OF 32 SHTS

90% REVIEW - NOT FOR CONSTRUCTION



PROTECTION NOTES:

- EXISTING PAVEMENT, PROTECT IN PLACE
- EXISTING CURB/GUTTER, PROTECT IN PLACE
- EXISTING PULLBOX, ADJUST TO FINISH GRADE
- EXISTING TEST STATION, ADJUST TO FINISH GRADE PER DETAILS 1 & 3 ON DWG. DT1
- EXISTING BLOW-OFF, ADJUST TO FINISH GRADE PER UDACS PL. NO. 37
- EXISTING AVAL, ADJUST TO FINISH GRADE PER UDACS PL. NO. 38 & DETAIL 1 ON DWG. DT3
- EXISTING GATE VALVE, ADJUST TO FINISH GRADE PER UDACS PL. NO. 39
- EXISTING WATER VAULT MH, ADJUST TO FINISH GRADE PER UDACS PL. NO. C-475
- EXISTING SSMH, ADJUST TO FINISH GRADE

ROADWAY IMPROVEMENTS NOTES:

- INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE DWG. DT1
- INSTALL "L" TYPE CURB & GUTTER, SEE SUMMERLIN STD DWG. S-47
- INSTALL "A" TYPE ISLAND CURB, SEE SUMMERLIN STD DWG. S-50
- INSTALL CONCRETE SIDEWALK PER USD DWG. NO. 234.
- CONSTRUCT SIDEWALK RAMP PER USD DWG. NO. 235 (CASE II) AND DWG. DT2
- INSTALL CURB TRANSITION PER DETAIL 10 ON DWG. DT2

WATER CONSTRUCTION NOTES:

- INSTALL 1-1/2" WATER METER AND 1-1/2" RPPA PER DETAIL 11 DWG. DT2
- INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY PER UDACS PL. NO. 38
- INSTALL GATE VALVE AND BOX PER UDACS PL. NO. 30 AND 39
- INSTALL FIRE HYDRANT & ASSEMBLY PER UDACS PL. NO. 40. FOR "DEEP" FIRE HYDRANTS SEE UDACS PL. NO. 41.
- INSTALL HORIZONTAL BEND PER UDACS PL. NO. 31
- REMOVE PLUG & BLOWOFF PER UDACS PL. NO. 38 AND CONNECT TO EX WATER LINE (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION OF EX WATER LINE PRIOR TO CONSTRUCTION)
- INSTALL VERTICAL BEND PER UDACS PL. NO. 31 UNLESS OTHERWISE IDENTIFIED. (SEE PLAN FOR ANGLE)
- INSTALL TEE PER UDACS PL. NO. 31

SEWER CONSTRUCTION NOTES:

- INSTALL SEWER MANHOLE PER DCS STD. DWG. 1A AND 1B
- STUB AND CAP SEWER PIPE PER DETAIL 2, DWG. DT2
- REMOVE PLUG & CONNECT TO SEWER LINE W/ CONCRETE COLLAR PER DETAIL 1 ON DWG. DT2 (CONTRACTOR TO VERIFY SIZE, INVERT, LOCATION PRIOR TO CONSTRUCTION)

STORM DRAIN CONSTRUCTION NOTES:

- INSTALL TYPE II-SD MANHOLE PER USD DWG. NO. 405.2
- INSTALL TYPE "CM2" DROP INLET PER USD DWG. NO. 412.1 AND 421
- REMOVE PLUG & CONNECT TO STORM DRAIN W/ CONCRETE COLLAR PER DETAIL 1 ON DWG. DT2 (CONTRACTOR TO VERIFY SIZE, INVERT, LOCATION PRIOR TO CONSTRUCTION)
- INSTALL TEMPORARY PLUG AND CAP
- INSTALL TYPE "C" DROP INLET PER USD DWG. NO. 413 AND 421
- INSTALL TYPE III MANHOLE PER USD DWG. NO. 408

IRRIGATION CONSTRUCTION NOTES:

- BANK "A": 1-6" & 2-4" SCH 40 PVC. PER DETAIL 3 DWG. DT2

BASIS OF BEARING AND COORDINATES

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983, SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE/LAS VEGAS HIGH ELEVATION ZONE
PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000.00 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

- 1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA.
- 2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

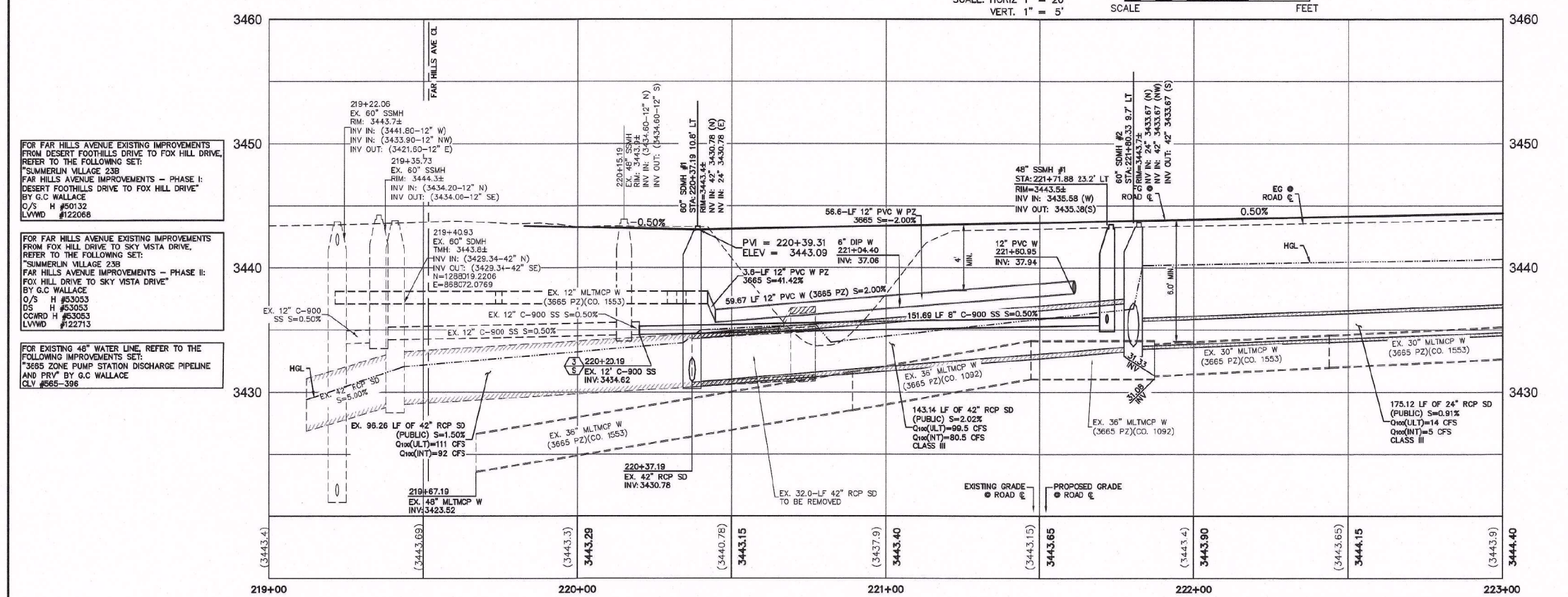
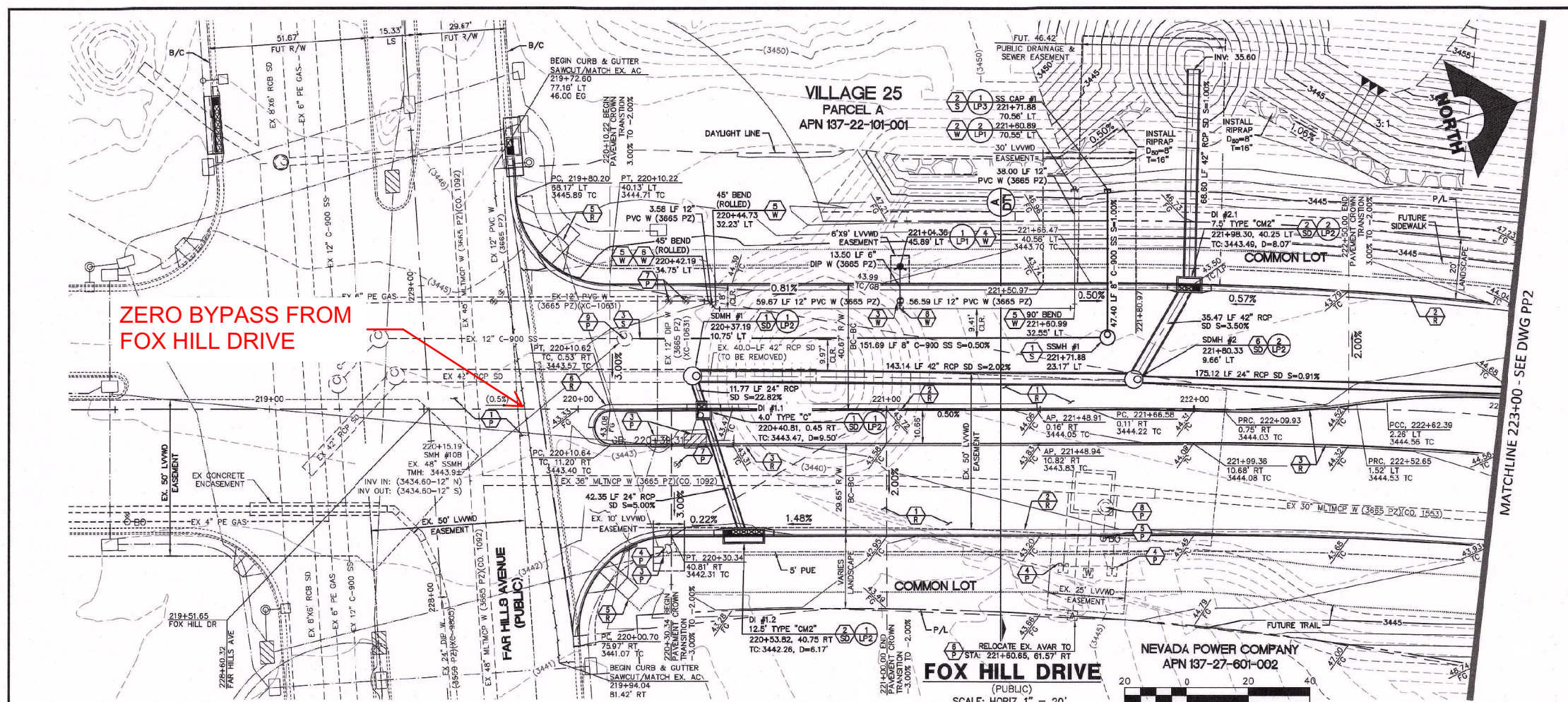
BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM NO. 7	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. TSOS,RS9E,S34	3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.

FAST
Call before you UnderGround
1-702-432-5900
FREWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you dig
Avoid hitting overhead power lines. It's costly.

CALL BEFORE YOU DIG
1-702-227-2929



FOR FAR HILLS AVENUE EXISTING IMPROVEMENTS FROM FOX HILL DRIVE TO SKY VISTA DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 238
FAR HILLS AVENUE IMPROVEMENTS - PHASE I:
DESERT FOOTHILLS DRIVE TO FOX HILL DRIVE"
BY G.C. WALLACE
O/S H #50132
LVWD #122068

FOR FAR HILLS AVENUE EXISTING IMPROVEMENTS FROM FOX HILL DRIVE TO SKY VISTA DRIVE, REFER TO THE FOLLOWING SET:
"SUMMERLIN VILLAGE 238
FAR HILLS AVENUE IMPROVEMENTS - PHASE II:
FOX HILL DRIVE TO SKY VISTA DRIVE"
BY G.C. WALLACE
O/S H #53053
DS H #53053
CCARD H #53053
LVWD #122713

FOR EXISTING 48" WATER LINE, REFER TO THE FOLLOWING IMPROVEMENTS SET:
"5655 ZONE PUMP STATION DISCHARGE PIPELINE AND PRIV" BY G.C. WALLACE
CLV #565-396

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

DROP INLET NOTE:
ALL STORM DRAIN DROP INLETS ARE TO BE CONSTRUCTED PER THE REQUIREMENTS OF USDOCA DWG. NO. 421 (STORMWATER QUALITY MANAGEMENT STAMP AND SIGN DETAIL).

OFF-SITE FLOOD CONTROL NOTE:
ALL OFF-SITE INTERIM FLOOD CONTROL FACILITIES SUCH AS, BUT NOT LIMITED TO, BERMS/DITCHES AND TEMPORARY SIPS ARE PRIVATELY OWNED AND ARE TO BE PRIVATELY MAINTAINED BY THE HOWARD HUGHES COMPANY.

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
PROJECT NO. 0000000 FIRST APPROVAL DATE:

PROJECT NO. 62025-201
DESIGN: LG/AF
DRAWN: AS
CHECK: LG/AF
PLOT DATE: 03-28-19
PLOT TIME: 10:25:00
REV: DATE

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gowingengineering.com

GCH
ENGINEERS & SURVEYORS

THE HOWARD HUGHES COMPANY, LLC
VILLAGE 25 FOX HILL DRIVE IMPROVEMENTS
(FAR HILLS AVENUE TO REDPOINT DRIVE)

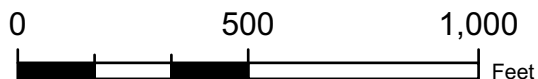
DRAWING
PP1
13 OF 32 SHTS

APPENDIX D

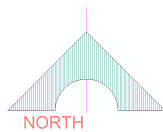
Drainage Figures and Plans



FIGURE 1
VICINITY MAP



Scale: 1:5,000



GCV
ENGINEERS \ SURVEYORS

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

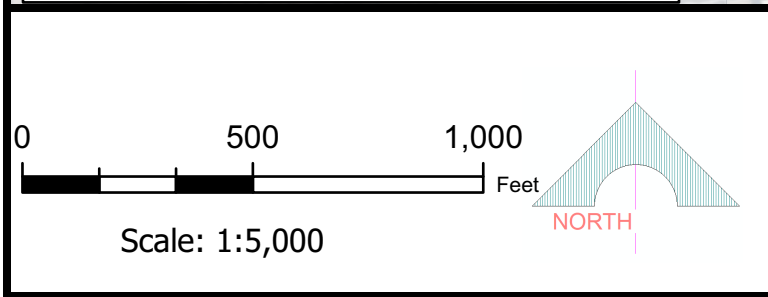
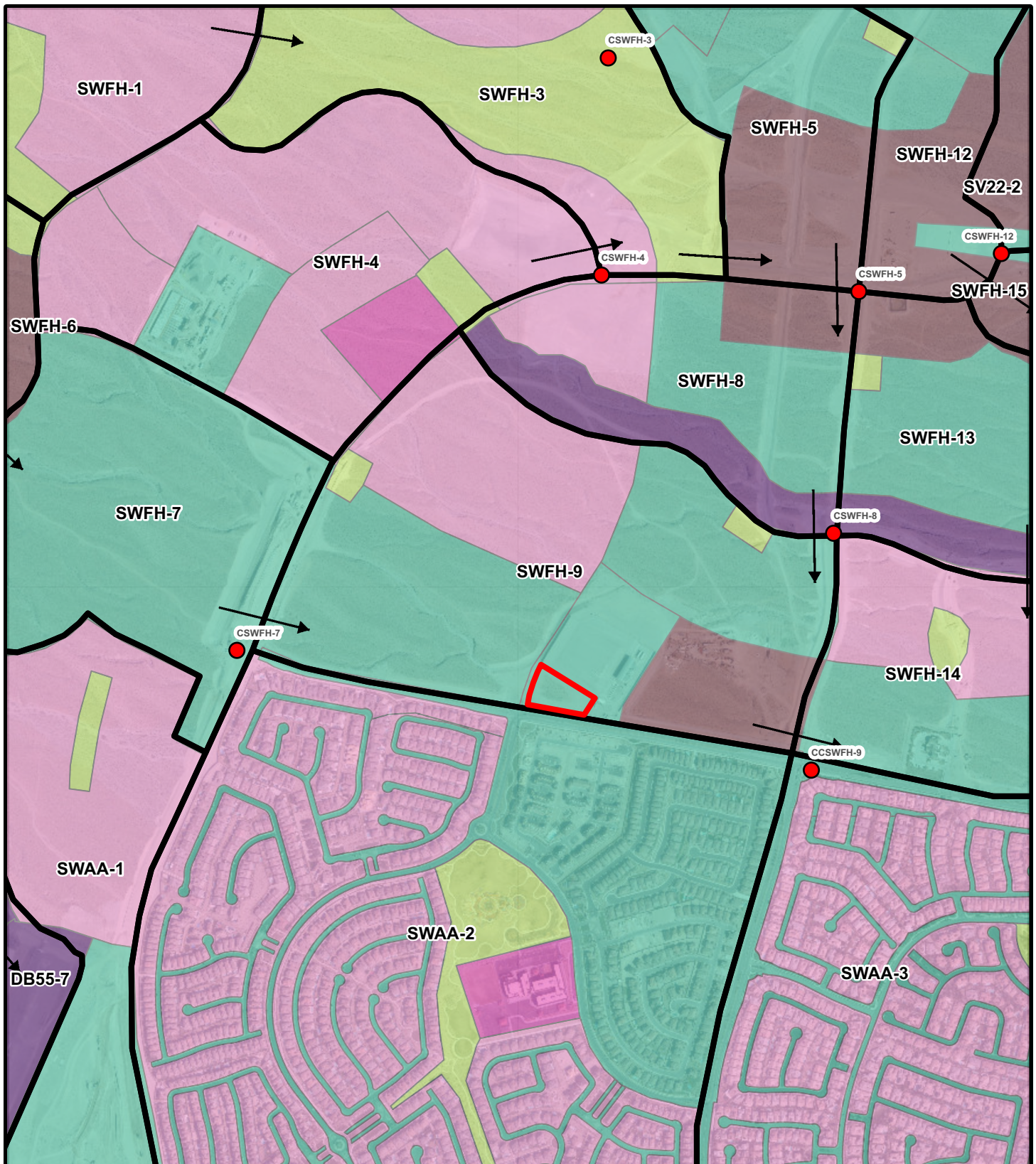


FIGURE 2
FEMA FIRM

GCV
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LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



- | | |
|---------------------------------|-------------------------------|
| Undeveloped Land, Open desert | Very High-Density Residential |
| Parks, Golf Courses | Commercial |
| Rural | Light Industrial |
| Low-Density Residential | Heavy Industrial |
| Medium-Density Residential | Schools |
| High-Density Residential | Lakes |
| Public Facility and Residential | PROJECT SITE |

FIGURE 3
2018 MPU SUBBASIN MAP

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1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



ID_MILE	FAC_DESC	WATERSHED	LENGTH_FT	W_FT	SLOPE_FTFT	HEC1_MODEL	HEC1_NODE	HEC1_FLOW	TRIB_AREA	FACNAME
APFH0061	8' X 6' RCB	GOWAN	1435	8	0.02	GOW3A	CSWFH-7	839	0.5	ANGEL PARK - FAR HILLS BRANCH
APFH0089	8' X 6' RCB	GOWAN	2946	8	0.02	GOW3A	CSWFH-7	839	0.5	ANGEL PARK - FAR HILLS BRANCH

CCRFCF Facilities	CCRFCF Basins
STATUS	STATUS
COM	COM
CON	CON
PRO	PRO
TN1	TN1
TN2	TN2
	PROJECT SITE

FIGURE 4

2018 MPU FACILITY MAP

GCV

ENGINEERS SURVEYORS

1555 S. RAINBOW BLVD.

LAS VEGAS, NV 89146

T: 702.804.2000

F: 702.804.2299

gcwengineering.com



MPU MUSYM	A%	B%	C%	D%	ROCK%
1156	1	10	0	89	0
1502	60	0	0	40	0

FIGURE 5
2018 MPU SOIL MAP

GCV
ENGINEERS \ SURVEYORS

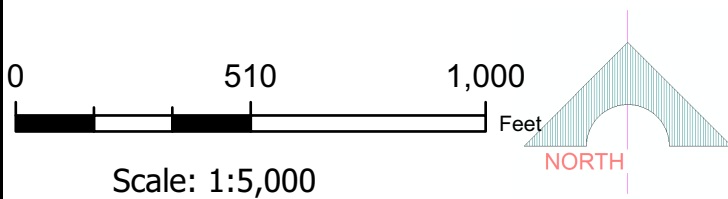
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



FIGURE 6
100-YEAR RAINFALL MAP

GCV
ENGINEERS \ SURVEYORS

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



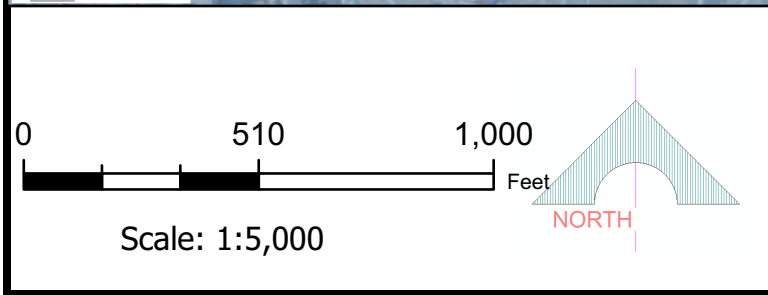
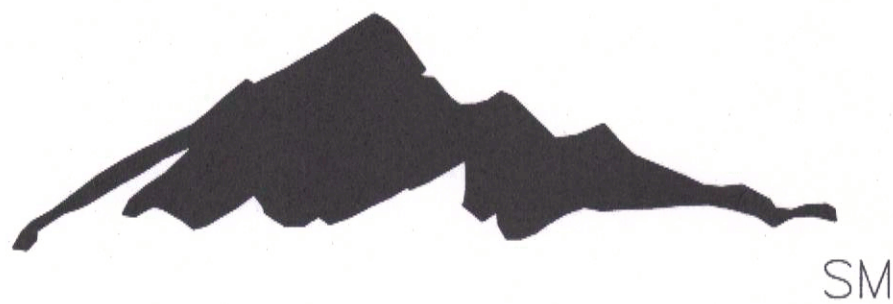


FIGURE 7
10-YEAR RAINFALL MAP

GCV
ENGINEERS SURVEYORS

1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

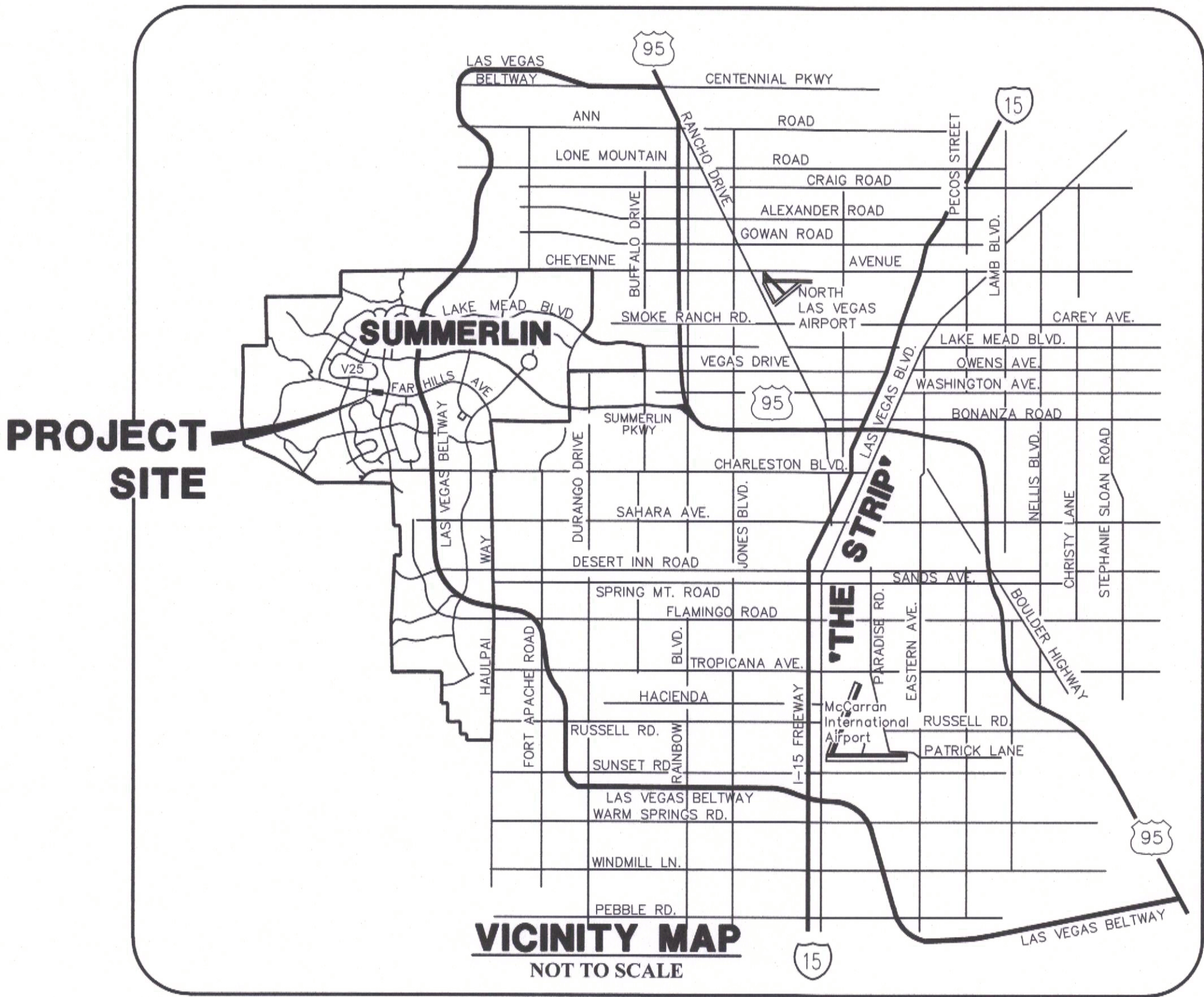
SUMMERLIN



VILLAGE 25 NVE SUBSTATION GRADING (FAR HILLS AVENUE/FOX HILL DRIVE)

2020

A.P.N. 137-27-601-002



VICINITY MAP
NOT TO SCALE

OWNER/DEVELOPER

THE HOWARD HUGHES COMPANY, LLC
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NEVADA 89135
OFFICE PHONE NO. (702) 791-4300

ENGINEER

GCV ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcvengineering.com



DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED TO DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

MICHAEL FANG, P.E. 24464 DATE

CAUTION TO CONTRACTOR

THE CONTRACTOR SHALL BE RESPONSIBLE TO INVESTIGATE AND VERIFY THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING UNDERGROUND FACILITIES AT LEAST 48 HOURS IN ADVANCE OF THE PERFORMANCE OF ANY WORK.

THE HOWARD HUGHES COMPANY, LLC

KEVIN ORROCK DATE
TITLE: VICE PRESIDENT

APPROVED FOR CONSTRUCTION

CITY OF LAS VEGAS FIRE DEPARTMENT DATE

UTILITY/AGENCY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. DATE

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.

NV ENERGY DATE

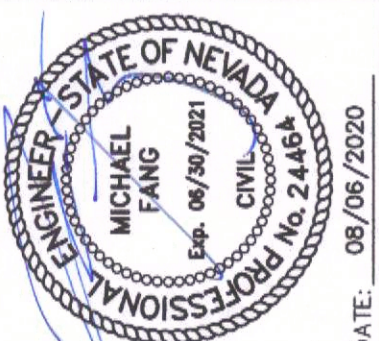
NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL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

NV ENERGY - TRANSMISSION ENGINEERING DATE

SOUTHWEST GAS CORPORATION DATE

L#: CLV#:

SHEET INDEX		
NO.	DWG	DESCRIPTION
1	G1	COVER SHEET
2	G2	LEGEND AND ABBREVIATIONS
3	G3	GENERAL NOTES
4	GP1	GRADING PLAN
5	DT1	GRADING DETAILS
6	DT2	TYPICAL DETAILS & SECTIONS
7	LP1	LATERAL PROFILE 1



PROJECT NO.	DATE	DESCRIPTION
62025-208		
DESIGN: APM		
DRAWN: APM		
CHECK: LP/MF		
PLOT DATE: 08-06-20		
PLOT TIME: 11:17:52		

GCV ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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THE HOWARD HUGHES COMPANY, LLC
VILLAGE 25 NVE SUBSTATION GRADING
(FAR HILLS DRIVE/FOX HILL DRIVE)
COVER SHEET
DRAWING
G1
1 OF 7 SHTS

60% REVIEW - NOT FOR CONSTRUCTION

LEGEND			
	TYPICAL PROPOSED LINEWORK		DETAIL BUBBLE W/ REF.
	TYPICAL EXISTING LINEWORK		BENCHMARK
	TYPICAL FUTURE LINEWORK		GATE VALVE
	SECTION LINE		PRESSURE REDUCING VALVE
	EASEMENT LINE		BACK WATER VALVE
	RIGHT-OF-WAY LINE		DROP INLET
	PROPERTY LINE		FIRE HYDRANT
	CENTERLINE		WATER METER
	TYPICAL UTILITY LINE 4" - 12" (SINGLE LINE)		WATER RPPA
	TYPICAL UTILITY LINE > THAN 12" (DOUBLE LINE)		WATER RPDA
	TYPICAL SEWER LINE W/MH		TRAFFIC SIGNAL PULL BOX
	TYPICAL WATER LINE W/GV		STREET LIGHT CLARK COUNTY
	TYPICAL STORM LINE W/MH		STREET LIGHT SUMMERLIN STD
	100 YR HYDRAULIC GRADE LINE		TRAFFIC SIGNAL/FLASHER
	CONCRETE OR STEEL ENCASEMENT		EXISTING TELE POLE
	TYPICAL STUB & BLOW-OFF		EXISTING POWER POLE
	EX. UTILITIES PROFILE VIEW		EXISTING POLE
	EX. GAS LINE		EX. ELEC MARKER
	EX. ELECTRICAL		TRANSFORMER PAD
	EX. CABLE TV		SERVICE PEDESTAL
	EX. TELEPHONE		PULLBOX
	EX. OVERHEAD POWER LINES		PROPOSED CONTOUR
	EX. ELEC & PWR POLES		EXISTING CONTOUR
	TYPICAL CURB & GUTTER, SIDEWALK AND RAMP		PROPOSED SPOT ELEVATION
	POST AND CABLE FENCE		EXISTING SPOT ELEVATION
	CHAIN LINK FENCE		PROPOSED SLOPE
	SAWCUT		SLOPE DIRECTION
	PAVEMENT RESORATION AREA		FINISH FLOOR ELEVATION
	PROPOSED ABANDONMENT		
	EXISTING ABANDONMENT		
	CUT LINE LIMITS		
	FILL LINE LIMITS		

ABBREVIATIONS			
A	AIR	DI/D.I.	DROP INLET
AC	ASPHALT CONCRETE, ACRE	DIA, Ø	DIAMETER
ACP	ASBESTOS CEMENT PIPE	DIP	DUCTILE IRON PIPE
ADD'L	ADDITIONAL	DIST	DISTANCE
AP	ANGLE POINT	DR	DRIVE
APN	ASSESSOR'S PARCEL NUMBER	DS	DOWNSPOUT
APPROX	APPROXIMATELY	DTL	DETAIL
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	DW	DRIVEWAY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	DWG	DRAWING
AVE	AVENUE	E	EAST
AVAR	AIR VALVE, AIR RELEASE	ECR	END CURB RETURN
AWWA	AMERICAN WATER WORKS ASSOCIATION	ELE,ELEC	ELECTRICAL
BC	BACK OF CURB	ELEV	ELEVATION
BCR	BEGIN CURB RETURN	EP, EOP	EDGE OF PAVEMENT
BLM	BUREAU OF LAND MANAGEMENT	ESMT	EASEMENT
BLVD	BOULEVARD	EVC	END VERTICAL CURVE
BM	BENCHMARK	EVP	END VERTICAL POINT
BO	BLOW-OFF	EXIST,EX	EXISTING
BVCE	BEGIN VERTICAL CURVE	EXP	EXPANSION JOINT
BVCS	BEGIN VERTICAL CURVE STATION	FC	FACE OF CURB
BVP	BEGIN VERTICAL POINT	FF, FFE	FINISH FLOOR ELEVATION
BW	BACK OF SIDEWALK	FG	FINISH GRADE
C	CENTERLINE	FI	FIRE HYDRANT
C&G	CURB AND GUTTER	FL	FLOW LINE
CATV	UNDERGROUND CABLE TV	FO	FIBER OPTIC
CCBM	CLARK COUNTY BENCH MARK	FRP	FIBERGLASS REINFORCED PLASTIC
CCPW	CLARK COUNTY PUBLIC WORKS	FS	FINISH SURFACE
CCTV	CLOSED-CIRCUIT TELEVISION	FT	FOOT/FEET
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	FTG	FOOTING
CE	COMMON ELEMENT	FUT	FUTURE
CFS	CUBIC FEET PER SECOND	G	GAS
CIP	CAPITAL IMPROVEMENTS PROJECT, CORRUGATED IRON PIPE	GA	GAGE, GUY ANCHOR
CIPM	CURED-IN-PLACE MANHOLE	GB	GRADE BREAK
CIPP	CURED-IN-PLACE PIPE	GND	GROUND
CIR	CIRCLE	GRD	GRADE, GROUND
CLR	CLEAR OR CLEARANCE	H, HGT	HEIGHT
CLSM	CONTROLLED LOW STRENGTH MATERIAL	HDWL	HEADWALL
CLV	CITY OF LAS VEGAS	HGL	HYDRAULIC GRADE LINE
CMU	CORRUGATED METAL PIPE	HORIZ	HORIZONTAL
CNU	CONCRETE MASONRY UNIT	HP	HIGH POINT, HIGH PRESSURE
CNLV	CITY OF NORTH LAS VEGAS	HPS	HIGH PRESSURE SODIUM
CO	CLEANOUT	IBC	INTERNATIONAL BUILDING CODE
CONC	CONCRETE	INV	INVERT
COND	CONDUIT	INT	INTERIM
CONST	CONSTRUCT OR CONSTRUCTION	JT	JOINT
COORD	COORDINATE	L	LENGTH
COR	CORNER	L, LT	LEFT
CRP	CORRUGATED POLYETHYLENE PIPE	LF	LINEAR FEET
CT	COURT	LIP	LIP OF GUTTER
CY	CUBIC YARD(S)	LN	LANE
Δ	DELTA	LP	LOW POINT, LIGHT POLE
DBL	DOUBLE	LSCP	LANDSCAPE
DCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM (LATEST EDITION)	LWWD	LAS VEGAS VALLEY WATER DISTRICT
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM (LATEST EDITION)	MAX	MAXIMUM
DEFL	DEFLECTION	MH	MANHOLE
DG	DESIGN GRADE	MIN	MINIMUM
		MLTMC	MORTAR LINED TAPE & MORTAR COATED PIPE
		MP	MESA PARK
		MOD	MODIFY/MODIFIED
		MON	MONUMENT
		MPH	MILES PER HOUR
		N	NORTH
		NAP	NOT A PART
		NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
		N.I.C.	NOT IN CONTRACT
		NO	NUMBER
		NOSHA	STATE OF NEVADA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
		NPC	NEVADA POWER COMPANY
		NTS	NOT TO SCALE
		NVE	NV ENERGY
		OB	OVERBUILD
		OC	ON CENTER
		OHC	OVERHEAD COX COMMUNICATION
		OHP	OVERHEAD POWER LINE
		P	POWER LINE
		PB	PULL BOX
		PBS	PLANTIMIX BITUMINOUS SURFACE
		PC	POINT OF CURVE, PRESSURE CLASS
		PCC	POINT OF COMPOUND CURVE
		PE	PROJECT ENGINEER OR POLYETHYLENE
		PED	PEDESTRIAN
		PGL	PROFILE GRADE LINE
		PH	POT HOLE
		PI	POINT OF INTERSECTION
		PIV	POST INDICATOR VALVE
		PLCP	POLYURETHANE LINED AND COATED STEEL PIPE
		PMF	PAVEMENT MARKING FILM
		POB	POINT OF BEGINNING
		POC	POINT ON CURVE, POINT OF CONNECTION
		POT	POINT ON TANGENT
		PP	POWER POLE
		PROP	PROPOSED
		PRC	POINT OF REVERSE CURVE
		PRVC	POINT OF REVERSE VERTICAL CURVE
		PSI	POUNDS PER SQUARE INCH
		PT	POINT OF TANGENCY
		PVC	POLYVINYL CHLORIDE
		PVI	POINT OF VERTICAL INTERSECTION
		PVMT	PAVEMENT
		PZ	PRESSURE ZONE
		R, RAD	RADIAL, RADIUS
		R, RT	RIGHT
		RCB	REINFORCED CONCRETE BOX
		RCP	REINFORCED CONCRETE PIPE
		RD	ROAD
		RDWY	ROADWAY
		REC	RECTANGULAR
		REF	REFERENCE
		REINF	REINFORCED
		REQD	REQUIRED
		RIM	TOP OF RIM ELEVATION
		RND	ROUND
		ROW,R/W	RIGHT OF WAY
		RP	RADIUS POINT
		RPM	RAISED PAVEMENT MARKERS
		RSOV	RESILIENT SEAT GATE VALVE
		S	SEWER, SOUTH
		SCH	SCHEDULE
		SD	STORM DRAIN
		SDMH	STORM DRAIN MANHOLE
		SECT	SECTION
		SF	SQUARE FOOT/FEET
		SHLDR	SHOULDER
		SHT	SHEET
		SIS	SUMMERLIN IMPROVEMENT STANDARDS
		SL	STREET LIGHT
		SP	SERVICE POINT
		SQ	SQUARE
		SR	SEWER RECLAIM MAIN
		SS	SANITARY SEWER
		SSMH	SANITARY SEWER MANHOLE STATION
		STA	STATION
		ST	STREET
		STD	STANDARD
		STL	STEEL
		STRUCT	STRUCTURE
		SV	SKY VISTA DRIVE
		SVZ	SIGHT VISIBILITY ZONE
		SW	SIDEWALK
		SWG	SOUTHWEST GAS
		T	TELEPHONE OR TOP
		TAN	TANGENT
		TB	TOP OF BERM
		TC	TOP OF CURB
		TCE	TEMPORARY CONSTRUCTION ESMT
		TELE,TELE	TELEPHONE
		TEMP	TEMPORARY
		TF	TOP OF FOOTING
		TG	TOP OF GRATE
		TMH	TOP OF MANHOLE
		TP	TOP OF PIPE
		TP	TELEPHONE POLE
		TRANS	TRANSITION
		TRW	TOP OF RETAINING WALL
		TS	TEST STATION
		TS&V	TAPPING SLEEVE & VALVE
		TW	TOP OF WALL
		TYP,(TYP)	TYPICAL
		UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (LATEST EDITION)
		UG	UNDERGROUND
		ULT	ULTIMATE
		USD,	USDCCA,
		USDCCA,	USDCCA
		CCAUSD	UNIFORM STD. DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA (LATEST EDITION)
		UT	UNDERGROUND TELEPHONE
		VAR	VARIABLE/VARIES
		VC	VERTICAL CURVE
		VCP	VITRIFIED CLAY PIPE
		VERT	VERTICAL
		VG	VALLEY GUTTER
		VOL	VOLUME
		W	WATER, WEST
		W/	WITH
		WMH	WATER MANHOLE
		WS	WATER SUPPLY
		WT	WEIGHT
		WTR	WATER
		XING	CROSSING
		YD	YARD, YARD DRAIN
		Z	PRESSURE ZONE

SOUTHWEST GAS APPROVAL

SOUTHWEST GAS CORPORATION _____ DATE _____

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.

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION

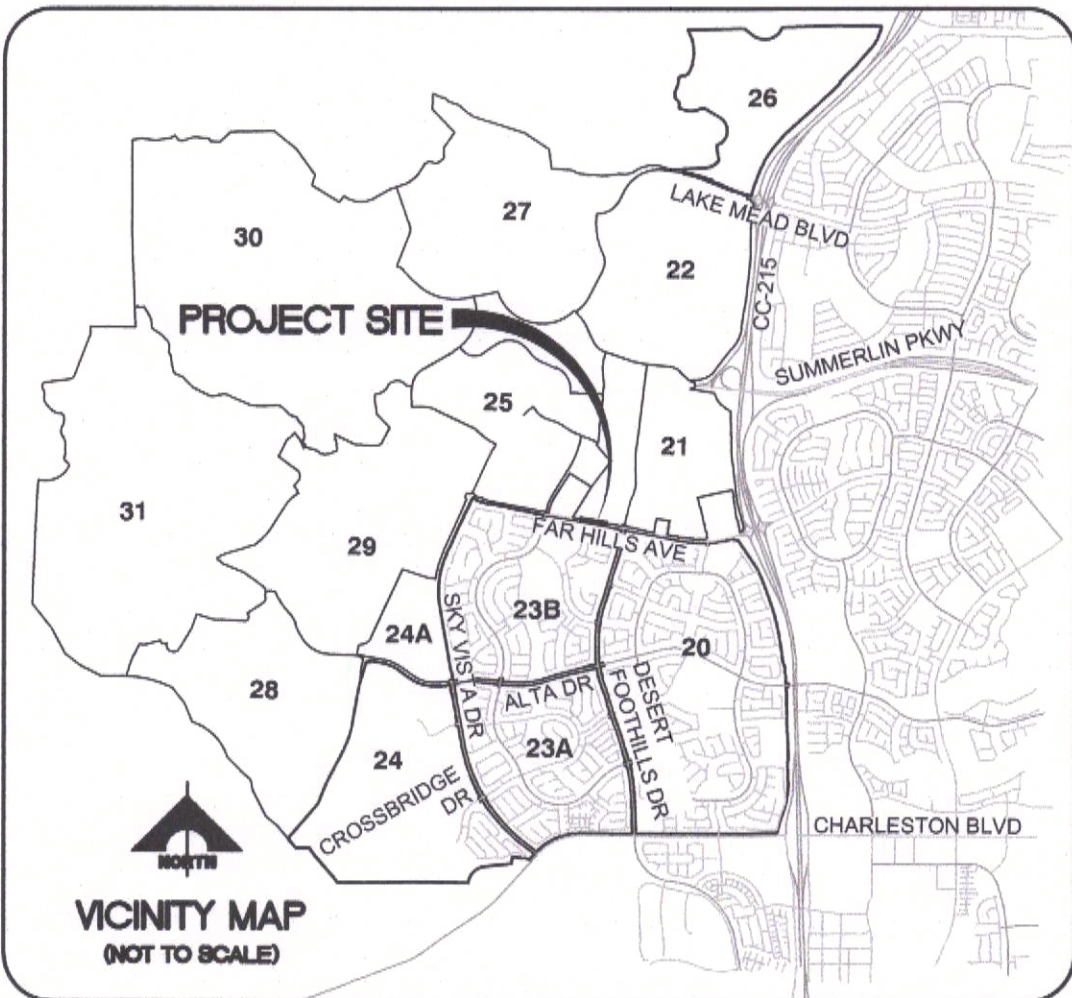
GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020

2. THERE SHALL BE A MINIMUM HORIZONTAL AND VERTICAL CLEARANCE OF 12-INCHES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS AND ELECTRIC

3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION

4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099



BASIS OF BEARING AND COORDINATES

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FT/US)

DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00

SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)

ZONE: LAS VEGAS HIGH ELEVATION ZONE

PROJECTION: TRANSVERSE MERCATOR

STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N

LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W

NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FT/US)

EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FT/US)

SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)

NOTES:

1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO 'GROUND' DISTANCES IN THE PROJECT AREA.

2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

BM#	DESCRIPTION	NAVD 88 DATUM	NAVD 88 DATUM
CLV BM No. 7LV09345W6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T20S,R59E,S34	3318.31 (FEET)	1,011.422 (METERS)

PROJECT NO. 62025-208

DESIGN: APM

DRAWN: APM

CHECK: LP/NF

PLOT DATE: 08-06-20

PLOT TIME: 11:17:58

PROJECT NO. 62025-208

1555 S. RAINBOW BLVD., LAS VEGAS, NV 89146

T: 702.804.2000

F: 702.804.2299

gowengineering.com

ENGINEERS & SURVEYORS

THE HOWARD HUGHES COMPANY, LLC

VILLAGE 25 NVE SUBSTATION GRADING (FAR HILLS DRIVE/FOX HILL DRIVE)

LEGEND AND ABBREVIATIONS

DRAWING G2

2 OF 7 SHTS

60% REVIEW - NOT FOR CONSTRUCTION

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 SHOWN ON ANY ADDITIONS, DELETIONS, OR CHANGES FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE CEMENT PORTLAND CONCRETE PAVING. 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 PERMITTED 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.

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 REPAIR OF SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADERS 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 CONSIDERED IN THE DESIGN OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFT-OVER 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:

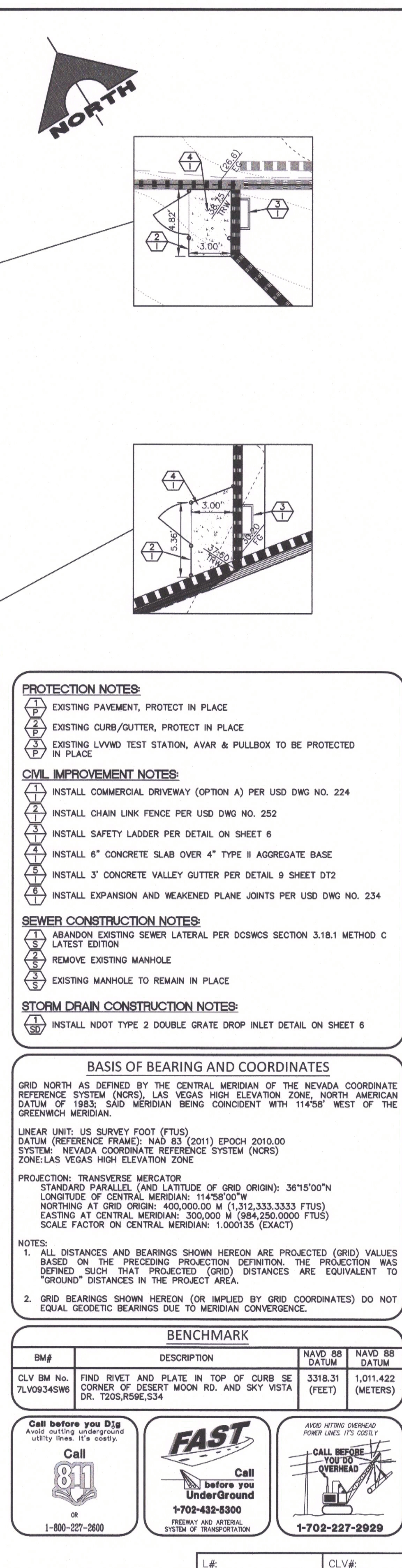
	HORIZONTAL/VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1±	+0.0' TO -0.1' SEE SOILS REPORT
B. ENGINEERED FILL	0.5±	+0.1' TO -0.1' SEE SOILS REPORT
- REPORT COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION 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 SUPPRESSION 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.

1. ALL CONSTRUCTION SIGNING, BARRICADING, 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 ADVANCED WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY FLAG SIGNS AT ALL INTERSECTIONS AND ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCLOSED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A GUARDED "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 OBLITERATION, 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 SIGNS SHALL UTILIZE TYPE XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COLOR TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE IN ACCORDANCE WITH THE CITY STANDARD. ALL SIGNS AND SHEETING 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, THE SIGN OR 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 ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE TYPE OF TYPE OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6631 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR 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. [FJC SECTION 105.6.15]
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. [FJC SECTION 3310, SECTION 3312]
5. TO IDENTIFY FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [FJC SECTION 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE LINES, CENTER LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS NOT ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [FJC SECTION 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. [FJC SECTION 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. [FJC SECTION 507]
9. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED. [FJC SECTION 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. [FJC SECTION 507]
11. FIRE HYDRANTS SPACING SHALL BE AS FOLLOWS: [FJC SECTION C102]
RESIDENTIAL - 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
COMMERCIAL - 500 FT UNSPRINKLERED; 400 FT SPRINKLERED.

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, "CLARK COUNTY AND AREA NEVADA", LATEST REVISION, "CLARK COUNTY AND AREA NEVADA", LATEST REVISION. ED. THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLAND AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE U.S. ARMY CORPS OF ENGINEERS 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 THE CONTRACTOR'S LIBRARY ARE APPROPRIATE 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 UTILITIES AND ALL REFERENCES 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 AVOID CONTACT THEREWITH. THE CONTRACTOR 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 TO ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, CONSTRUCTION, ENGINEERING 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 BE USED 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 TOP OF ALL GUTTERS AFTER

[illegible]



BENCHMARK			NAVD 88 DATUM	NAVD 88 DATUM
BM#	DESCRIPTION			
CLV BM No. 7LW09434SW6	FIND RIVET AND PLATE IN TOP OF CURB SE CORNER OF DESERT MOON RD. AND SKY VISTA DR. T205,R59E,S34		3318.31 (FEET)	1,011.422 (METERS)

Call before you Dig
Avoid cutting underground utility lines. It's costly.

Call

OR
1-800-227-2600

FAST

Call before you UnderGround

1-702-432-6300

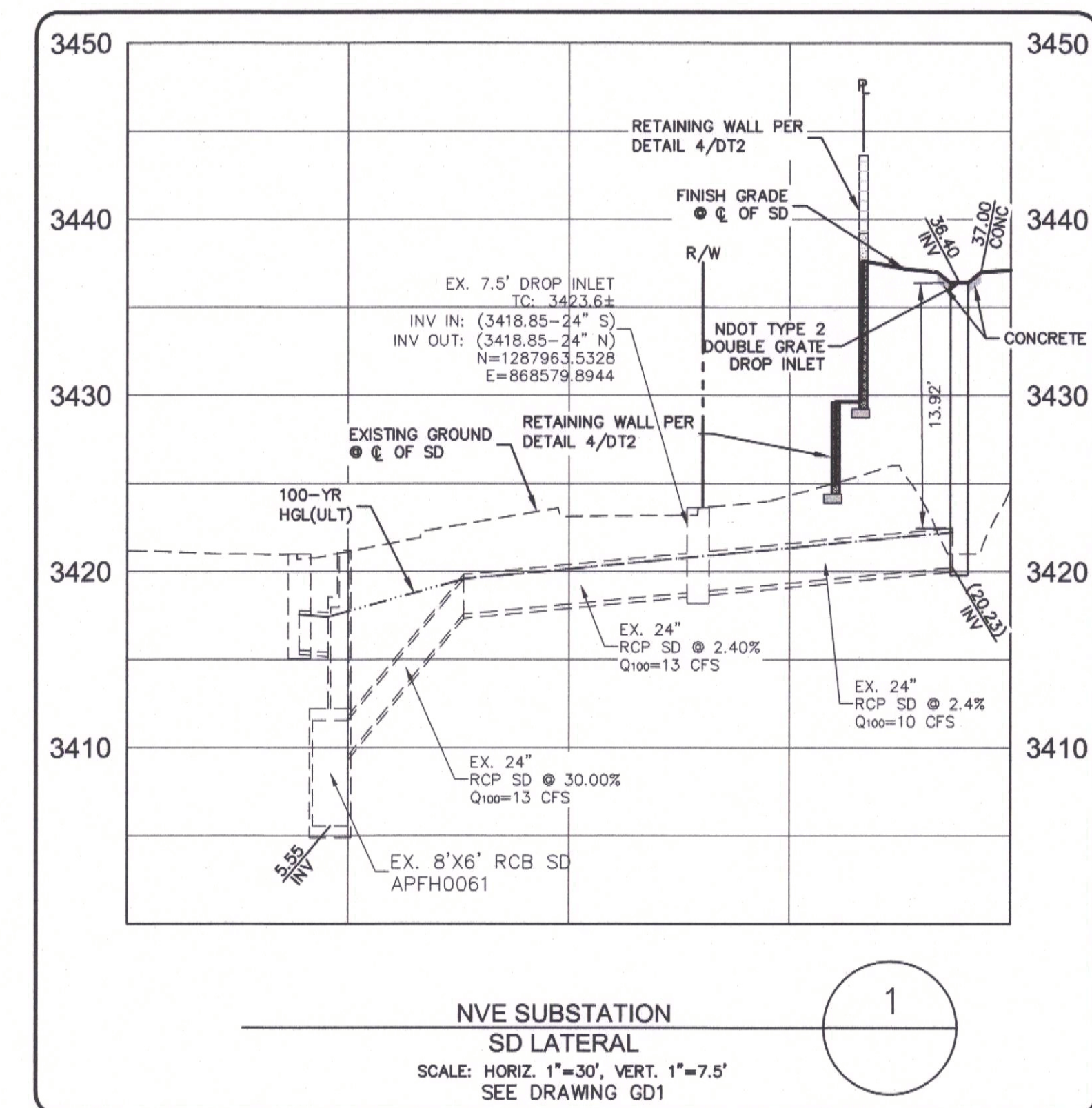
FREEDWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

CALL BEFORE YOU GO OVERHEAD



1-702-227-2929



THE HOWARD HUGHES COMPANY, LLC		VILLAGE 25 NVE SUBSTATION GRADING (FAR HILLS DRIVE/FOX HILL DRIVE)		LATERAL PROFILE 1		1555 S. RAINBOW BLVD. LAS VEGAS, NV 89146 T: 702.804.2000 F: 702.804.2299 gowingengineering.com		PROJECT NO. 62025-208		DESIGN: APM DRAWN: APM CHECK: LP/AF		PLOT DATE: 08-08-20 PLOT TIME: 11:24:24			
DRAWING		LP1		7 OF 7 SHTS											