

DS #:

5137

APN:

137-24-101-001

PROJECT:

Summerlin West V21 Parcel 1 - Stockpile Permit

SUBMITTAL:

1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		May 28, 2019
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	Summerlin West V21 Parcel I – Stockpile Permit	
Cross Streets:	NEC of Carriage Hill Drive & Redpoint Drive	COPIES TO:
File Number:	F:\Depot\DSMemos\DS5137A.doc	VTN Nevada
Parcel Number:	137-26-101-001	Howard Hughes Company, LLC
Zoning Action:	N/A	Bart Anderson, P.E., DevCo
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES	NO X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	5/8/2019	5/28/2019	See Comments Below	\$400.00	3125925: \$400
TOTAL FEES (LDDRS):				\$400.00	----

REMARKS:

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

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

1. The City will not issue a stockpile permit prior to the *Dust Mitigation Plan* approved by the Clark County.

Provide a note on the grading plan that states "Stockpile to comply with approved Clark County Dust Mitigation Plan # _____".

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/26
AREA K-26

Technical Drainage Study for

Summerlin West Village 21 Parcel I Stockpile

Las Vegas, Nevada

Prepared for:

Howard Hughes Company, LLC

Submitted to:

City of Las Vegas
Public Works



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin West Village 21 Parcel I Stockpile Date: May 6, 2019

Location of Development: a) Descriptive (Cross Streets) North/South: Carriage Hill Drive
East/West: Redpoint Drive

b) Section: 26 Township: 20S Range: 59E

c) APN : 137-26-101-001

Name of Owner: The Howard Hughes Company, LLC

Telephone No.: (702) 791-4336 Fax No.: (702) 791-4453 E-Mail Address: chris.anderson@howardhughes.com

Address: 10801 W. Charleston Blvd. LV, NV, 89135

Contact Person-Name: Joanna Ayson Telephone No.: (702)-873-7550

* E-Mail Address: jayson@vtnnv.com Fax No.: (702)-362-2597

Firm: VTN Nevada

Address: 2727 S. Rainbow Blvd, LV, NV, 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: +/-19 Acres Being Developed/Disturbed: +/-6 Acres

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

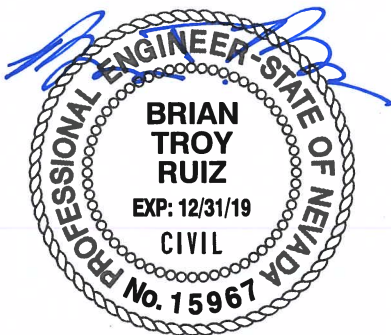
4. Proposed type of development (Residential, Commercial, Etc.): Stockpile

5. Approximate upstream land area which drains to the subject site: +/- 3.6 acres

6. Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: SWPA MPU (DS4926)
Summerlin V21 Carriage Hill (Redpoint to Summ Prky),

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing I-215 Western Beltway Channel

8. Briefly describe your proposed schedule for the subject project: As soon as possible



Engineer's Seal

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

***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



May 6, 2019

Albert Sung, P.E.
Flood Control Division
Department of Public Works
CITY OF LAS VEGAS
333 N. Rancho Blvd, 7th Floor
Las Vegas, NV 89106

Subject: Technical Drainage Study for Summerlin West Village 21 Parcel I Stockpiles

Mr. Sung:

This letter certifies that all items on the **Technical Drainage Study for Summerlin West Village 21 Parcel I Stockpiles** electronic submittal matches the paper version bound into the study.

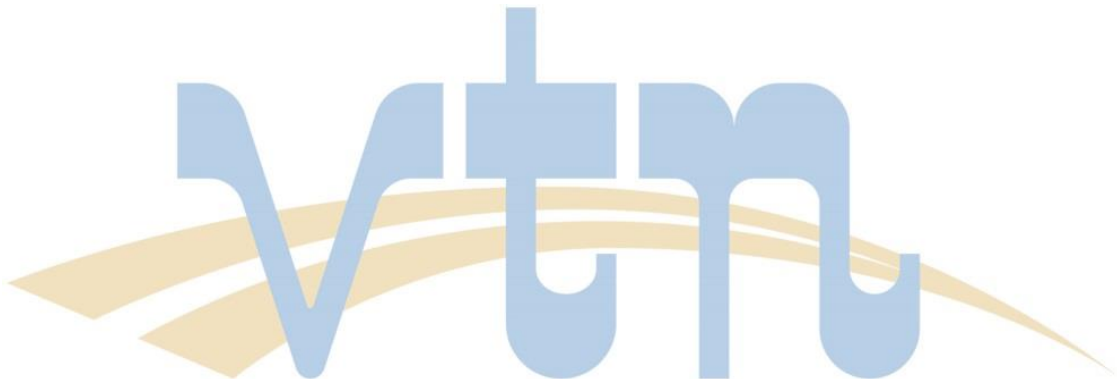
Respectfully submitted,

Brian Ruiz, P.E.

TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE
CLARK COUNTY, NEVADA
W.O. # 7809

Prepared for:
THE HOWARD HUGHES COMPANY, LLC

Submitted To:
CITY OF LAS VEGAS
DEPARTMENT OF PUBLIC WORKS





January 16, 2019
W.O. #7851-MISC-18

City of Las Vegas
Land Development Services
Department of Building Safety

Attention: Albert Sung, P.E., CFM
Flood Control Project Engineer

SUBJECT: TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 21 PARCEL I STOCKPILE

Mr. Sung,

Transmitted herewith for your review is one (1) copy of the *Technical Drainage Study for Summerlin West Village 21 Parcel I Stockpile*. The project consists of a 91,960 cubic yard stockpile over ± 7 -acres. The site is located within a portion of Section 26, Township 20 South, Range 59 East, M.D.M., Clark County, Nevada.

If you have any questions concerning this study or if additional information is needed, please do not hesitate to contact this office.

Respectfully Submitted,

VTN Nevada

Joanna Y. Ayson, E.I.

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
A. STUDY OVERVIEW AND PURPOSE	1
B. LOCATION	1
C. DESCRIPTION	1
D. FLOODPLAIN INFORMATION	1
E. MASTER PLANNING INFORMATION	1
F. REFERENCED HYDROLOGY STUDIES	1
II. HYDROLOGIC ANALYSIS.....	2
A. METHOD OF ANALYSIS	2
B. RAINFALL CRITERIA	2
C. RUNOFF COMPUTATION.....	2
D. PEAK FLOWS	3
III. ONSITE & OFFSITE BASIN ANALYSIS	3
A. EXISTING CONDITION	3
B. INTERIM CONDITION	3
C. ULTIMATE CONDITION	3
IV. HYDRAULIC ANALYSIS.....	4
V. CONCLUSIONS.....	4

I. INTRODUCTION

A. STUDY OVERVIEW AND PURPOSE

The Howard Hughes Company, LLC is proposing to construct a stockpile within Summerlin West Village 21 Parcel I. The proposed stockpile is approximately 590-feet by 530-feet in area and will consist of approximately 91,960 cubic yards of fill. *This Technical Drainage Study for Summerlin West Village 21 Parcel I Stockpile* serves to accompany the grading plans and to provide a detailed hydrologic and hydraulic analysis for the proposed stockpile site. The methodology presented in this study is in accordance with the criteria set forth in the Clark County Regional Flood Control District (CCRFC) *Hydrologic Criteria and Drainage Design Manual* (HCDDM) (Hereinafter referred to as the Manual).

B. LOCATION

The site is located within a portion of Section 26, Township 20 South, Range 59 East, M.D.M, Clark County, Nevada. The project lies within Village 21 of the Summerlin West Planning Area (SWPA). (Refer to *Figure 1: Vicinity Map*).

C. DESCRIPTION

The existing site slopes from the west to east at approximately +/-6%. Presently, the site is bound by undeveloped land. Carriage Hill Drive is expected to be constructed prior to or concurrently with the proposed project. Carriage Hill Drive is located west of the project. (Refer to *Figure 2: Site Description Map*)

D. FLOODPLAIN INFORMATION

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel Number 32003C2150E, Clark County, Nevada, and Incorporated Areas, dated September 27, 2002, the site is located within a Zone "X". A Zone "X" is described as an area determined to be outside the 0.2% annual chance floodplain. (Refer to *Figure 3: Flood Insurance Rate Map*)

E. MASTER PLANNING INFORMATION

The proposed site is delineated on the referenced Figures W-4 and F-22 from the 2018 Clark County Regional Flood Control District (CCRFC) Las Vegas Valley Flood Control Master Plan Update (MPU) (Refer to *Figures 4A and 4B, MPU Hydrologic Map and MPU Facilities Map*). According to the 2013 CCRFC MPU, no existing CCRFC facilities cross the project and no CCRFC facilities are proposed by this project.

F. REFERENCED HYDROLOGY STUDIES

The following drainage studies and their corresponding addendums and updates have been referenced for the purposes of this report:

- *Drainage Study for Summerlin West Planning Area Master Plan Update* (referred to as the Master Study), approved by the City of Las Vegas (CLV) on July 30, 2018

- *Technical Drainage Study for Summerlin West Village 21 Carriage Hill Drive (Redpoint Drive to Summerlin Parkway)* (referred to as the Carriage Hill Study), approved by CLV on April 4, 2019.

The referenced drainage studies have been reviewed by the engineer and have been determined to be acceptable for use in this drainage study.

II. HYDROLOGIC ANALYSIS

A. METHOD OF ANALYSIS

The hydrologic modeling for this study was prepared using the SCS Unit Hydrograph Methodology in conjunction with the HEC-1 computer program from the U.S. Army Corps of Engineers (USACOE) as outlined in the Clark County Regional Flood Control District *Hydrologic Criteria and Drainage Design Manual* (hereinafter referred to as the *Manual*). The computation and analyses have been included in the Appendix of this study.

B. RAINFALL CRITERIA

The project site is outside in the McCarran Airport Rainfall Area as shown by Figure 513 of the *Manual*. Rainfall depths for the project were included in both the Master Study. A precipitation coverage map referenced from the Master Study has been included in Appendix D.

C. RUNOFF COMPUTATION

The SCS Soil Survey of Las Vegas, Nevada, was used to identify soil types and their corresponding hydrologic soil groups. The land uses or land covers for the project include Desert Shrub in Poor Condition and Newly Graded Areas. For the given soil type and land use, CN values were determined from using the appropriate columns of Table 602 of the *Manual*. Soil information and CN calculations have been included in Appendix B. Pertinent reference material has been included in Appendix D.

The lag times quantify how long before basins are contributing to flow at the outlet and is a representative scale of an individual basin that were determined using Standard Form 4. Velocities used in Standard Form 4 have been calculated using the equation $V = CS^{1/2}$ from the *Manual*. The coefficient $C = 14.8$ represents wide channel flow with $D = 0.25$ and $n = 0.04$ for undeveloped (non-urban) conditions. The coefficient $C = 29.4$ represents wide channel flow with $D = 0.7$ and $n = 0.04$ for non-urban conditions. The coefficient $C = 20.2$ represents street flow with $n = 0.016$ and a depth in the gutter of 0.3 feet for urbanized conditions. The coefficient $C = 30.6$ represents curb height street flow for urbanized conditions.

Travel Time velocities have been calculated based on the equation $V = CS^{1/2}$ from section 602.1 of the *Manual*. For basins analyzed in this study, the first 500 feet of the Travel Time Length uses the V_1 set of C coefficients from the *Manual* and the remaining Travel Time Length uses the larger V_2 set of coefficients. The Standard Form 4 computes the Travel Time separately for the V_1 and V_2 portions of the basin and adds them together to give the total Travel Time for the basin. Based on the hydrologic properties and land usages of the basins within this study, we feel that the 500-foot break point provides a conservative but

representative assumption to where enough flow can be generated within the basin to warrant the use of the higher velocity coefficients. In summary,

Existing (Non-Urban) Conditions	Developed (Urban) Conditions
$V_1 = 14.8*(S/100)^{1/2}$	$V_1 = 20.2*(S/100)^{1/2}$
$V_2 = 29.4*(S/100)^{1/2}$	$V_2 = 30.6*(S/100)^{1/2}$

D. PEAK FLOWS

TABLE 1 PROPOSED CONDITION HEC-1 SUMMARY TABLE		
BASIN ID	AREA (ac)	Q100 (CFS)
OFF1	1.91	5
OFF2	1.09	3
OFF3	0.63	2
ON1	6.08	26

III. ONSITE & OFFSITE BASIN ANALYSIS

A. EXISTING CONDITION

Presently, the offsite areas immediately the surrounding the site are undeveloped. The existing ground of the site and upstream areas fall easterly at toward the I-215 Western Beltway Channel. A majority of the flow generated to the west of the project is intercepted by the Carriage Hill Drive Improvements. The drainage impacts of the development of Parcel I has been addressed in the Master Study. The Master Study has determined that the development of Parcel I will not adversely impact existing downstream facilities. Therefore, a site-specific existing condition hydrologic analysis is not necessary for this study.

B. INTERIM CONDITION

(Refer to *Figure 6: Interim Condition Basin Map* in Appendix A.)

The offsite areas are consistent with those described in existing condition. The proposed stockpile has been placed between two major washes so that no major washes impact the stockpile. Proposed condition is depicted on Figure 5.

Flow generated by the offsite basins OFF1, OFF2, AND OFF3 are diverted around the stockpile and will subsequently flow into the Beltway Channel as they do in existing condition. Flow generated on the top of the stockpile will be conveyed easterly as sheet flow. Therefore, the stockpile will not obstruct flows and flow patterns will be returned to their historic conditions.

C. ULTIMATE CONDITION

The proposed stockpile is temporary and will be removed with the development of Parcel I. An overall ultimate condition analysis assuming Parcel I and the Summerlin

West Planning Area is fully developed was provided with the Master Study. Therefore, a site-specific ultimate condition hydrologic analysis is not necessary for this study.

IV. HYDRAULIC ANALYSIS

Hydraulic cross sections have been taken along the perimeter of the stockpile to determine normal depth and velocity of the anticipated storm flows as they are conveyed around the stockpile. The results of the normal depth analysis are summarized in Table 5. Normal depth calculations have been included in Appendix C.

TABLE 2 PROPOSED CONDITION CHANNEL SUMMARY TABLE					
Channel	Q100 (cfs)	Slope	Normal Depth (ft)	Velocity (ft/s)	Description
1	5	1.60%	0.51	2.99	OFF1
2	5	6.71%	0.37	4.98	OFF1
3	3	2.22%	0.38	2.91	OFF2
4	2	6.24%	0.24	3.37	OFF3

The normal depth analysis shows that the velocities of the flow against the slope of the stockpile are non-erosive. In addition, flow depths are contained below the top of the stockpile with additional freeboard.

V. CONCLUSIONS

This *Technical Drainage Study for Summerlin West Village 21 Parcel I Stockpile* has been developed in accordance with Criteria established in the Manual. The proposed development does not adversely impact any proposed or existing Clark County Regional Flood Control District Master Plan Update facilities.

The site has been designed to control storm water runoff for the 6-hour, 100-year floods as calculated in this study and the Master Study. There are no adverse effects on upstream or downstream properties due to the proposed drainage system or infrastructure improvements.

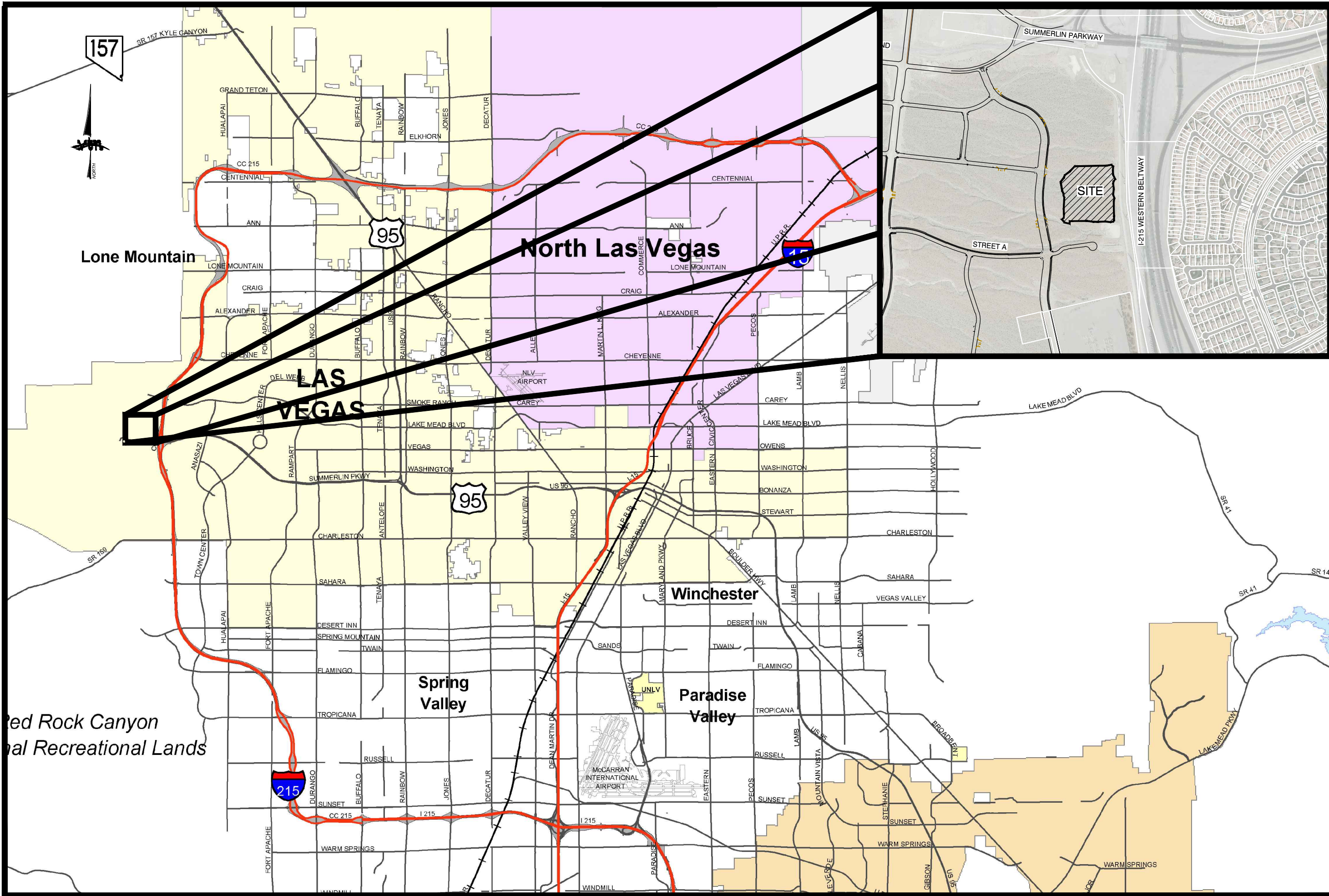
REFERENCES

1. *Hydrologic Criteria and Drainage Design Manual*, Clark County Regional Flood Control District, 1999.
2. *CCRFCD Las Vegas Valley Flood Control Master Plan Update*, 2008 and 2013.
3. *Flood Insurance Rate Map*, Community Panel Number 32003C2150E, Clark County, Nevada and Incorporated Areas, effective date September 27, 2002, and is a digital duplication of the FIRM Map derived from the Clark County GIS database.
4. *Drainage Study for Summerlin West Planning Area Master Plan Update*, VTN Nevada, May 2018.
5. *Technical Drainage Study for Summerlin West Village 21 Carriage Hill Drive (Redpoint to Summerlin Parkway)*, VTN Nevada, April 2019

APPENDIX

APPENDIX A

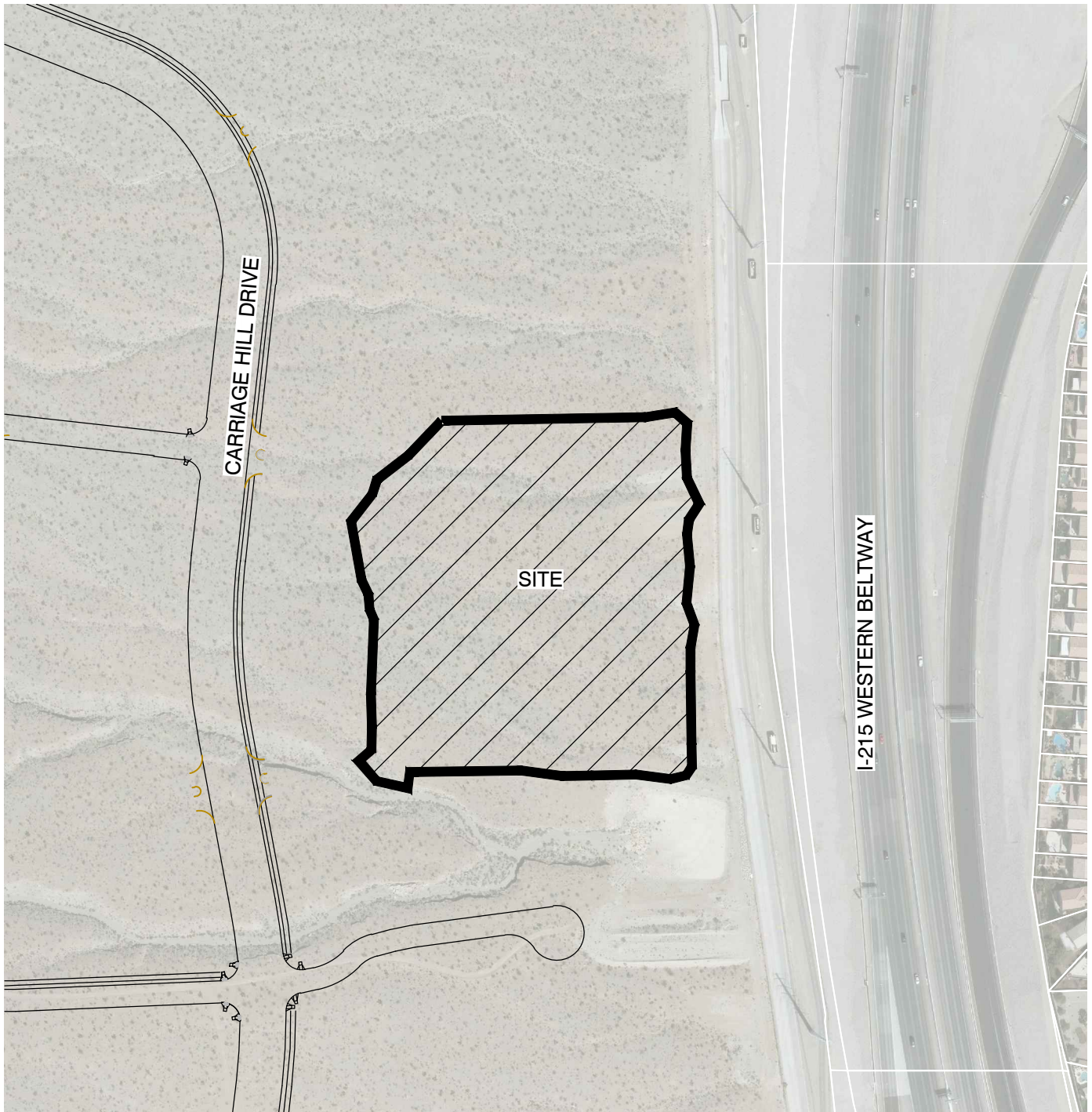
FIGURES



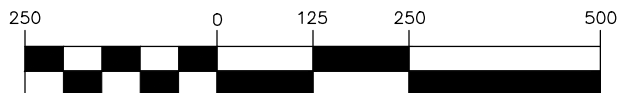
W.O.#:	7809
DATE:	5/2019
BY:	RBR
SCALE:	N.T.S
SHEET	1 OF 1

FIGURE 1: VICINITY MAP
SUMMERLIN WEST VILLAGE 21
PARCEL I STOCK PILE

H:\7851\Parcel I Stock Pile\Drainage\A Figures\Figure 1 & 2.dwg(rchaelr, May 01, 2019 - 11:27am)



GRAPHIC SCALE



1" = 250'



vtm
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

**SUMMERLIN WEST VILLAGE 21
PARCEL I STOCK PILE**

**SITE DESCRIPTION MAP
FIGURE 2**

SCALE	HORZ.	1"=250'
	VERT.	N/A
W.O. NO.		7809
DRAWN BY:		RBR
DATE:		5/2019
SHEET 1 OF 1		

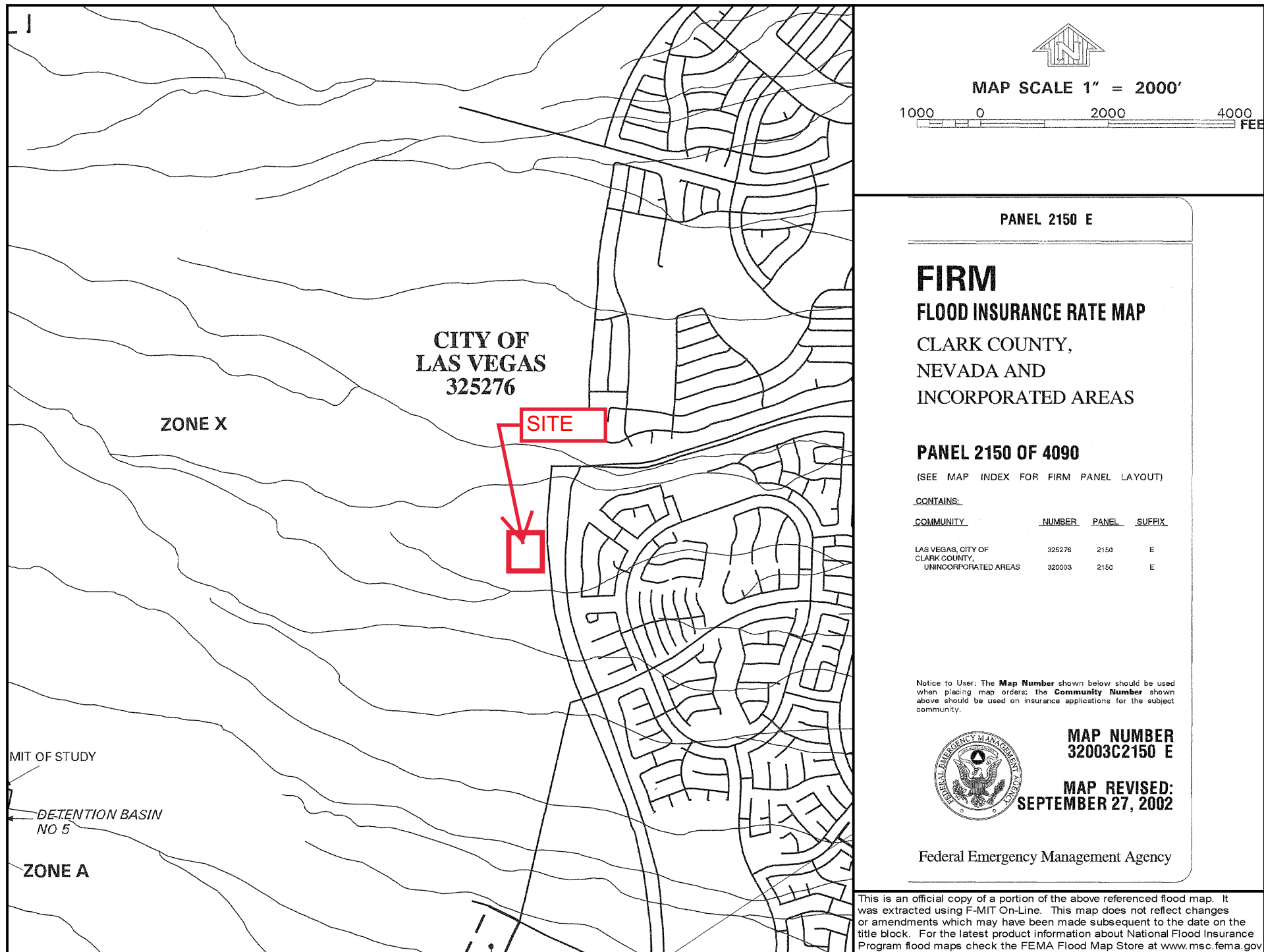
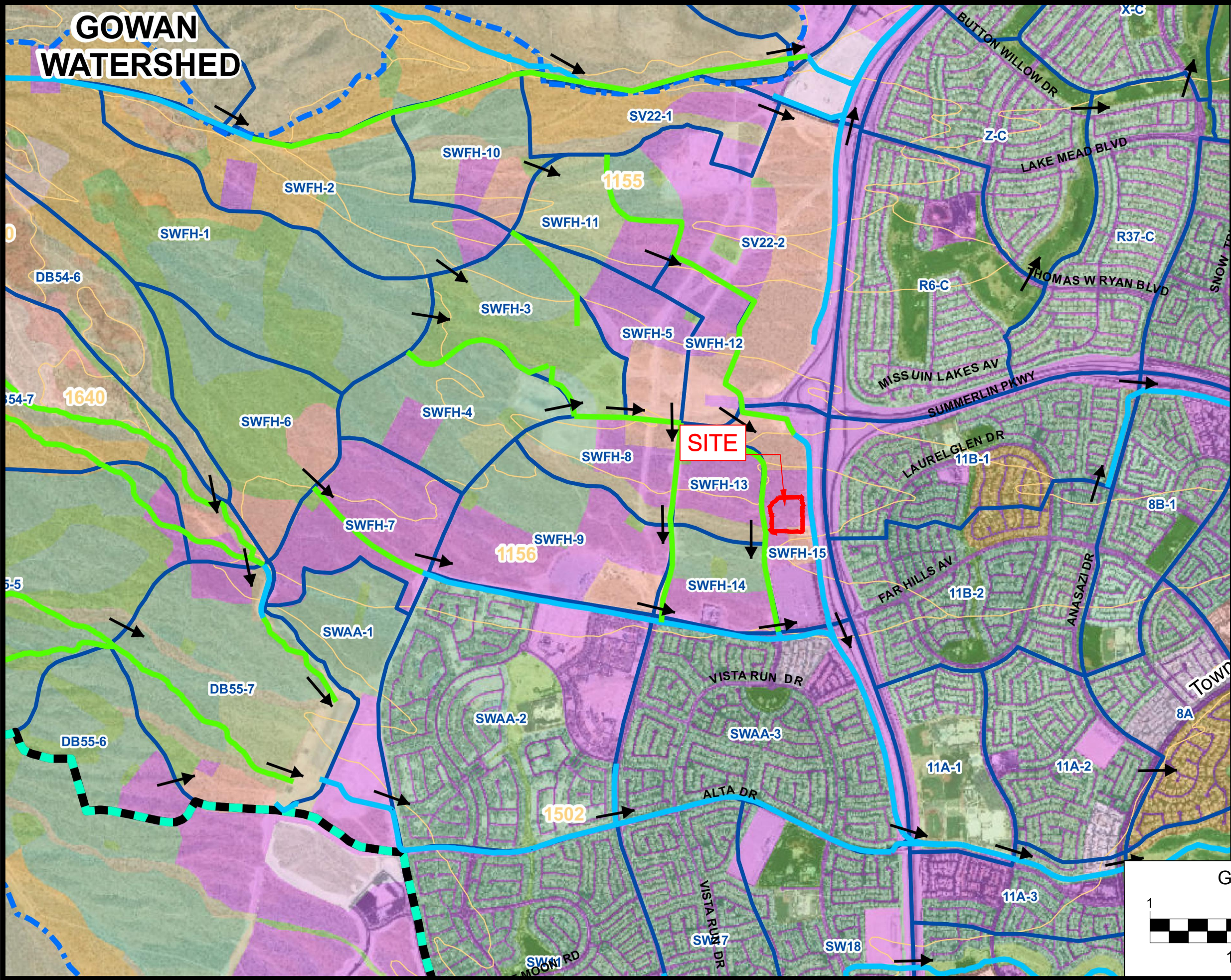


FIGURE 3 - FLOOD INSURANCE RATE MAP

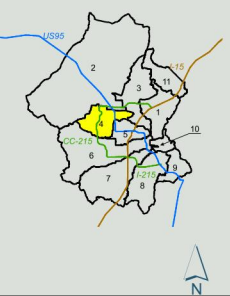


2018 Las Vegas Valley
Master Plan Update

Figure W-4
Gowan Watershed

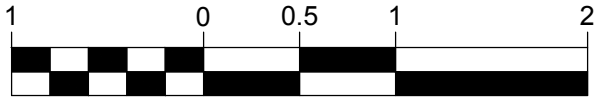
Legend

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



- 1 Range
- 2 Upper Northern Las Vegas Wash
- 3 Lower Northern Las Vegas Wash
- 4 Gowan
- 5 Central
- 6 Flamingo/Tropicana
- 7 Duck Creek/Blue Diamond
- 8 Pittman
- 9 C-1
- 10 Lower Las Vegas Wash
- 11 Apex

GRAPHIC SCALE



W.O.#:	7809
DATE:	5/1/2019
BY:	RBR
SCALE:	
SHEET	OF

SUMMERLIN WEST VILLAGE 21 PARCEL 1 STOCKPILE
W-4 GOWAN WATERSHED TRUNCATED W-MAP
CCRFC 2018 MPU

H:\7851\Parcel 1 Stock Pile\Drainage\A Figures\MPU Map\Truncated W-Map.dwg\trachair, May 01, 2019 - 11:24am

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD		ANGEL PARK - ALTA DRIVE BRANCH						
0203	E	2- 7' X 5.5' RCB	1104	2200	CSWAA-1	GOW3A	6.95	5.28
0225	E	2- 7' X 5.5' RCB OUTLET	360	2137	SUM5DB	GOW3A	6.73	3.40
APBE		ANGEL PARK - BELTWAY BRANCH						
0022	E	CONC CHNL 20"W 7'D 2:1 SS	1556	3366	CCSWFH15	GOW3A	3.39	1.81
0051	E	CONC CHNL 20"W 7'D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
0081	E	8' X 8' RCBC @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.59	2.32
0094	E	CONC CHNL 10"W 5'D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.59	1.88
0122	E	CONC CHNL 10"W 4'D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.59	0.80
0154	P0	8' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
0249	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH		ANGEL PARK - CARRIAGE HILL BRANCH						
0000	E	8' X 6' RCB	152	399	CSWFH-14	GOW3A	0.21	0.87
0003	P0	72" RCP	1685	399	CSWFH-14	GOW3A	0.21	2.00
0031	P0	60" RCP	2008	206	SWFH-13	GOW3A	0.10	1.38
APD2		ANGEL PARK - DESERT FOOTHILLS 2 BRANCH						
0002	E	7' X 6' RCB	883	674	SWAA-2	GOW3A	0.68	1.08
APDF		ANGEL PARK - DESERT FOOTHILLS BRANCH						
0000	P0	10' X 6' RCB	1788	1428	CSWFH-9	GOW3B	0.80	3.55
0026	P0	8' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
0073	P0	6' X 4' RCB	1922	486	CSWFH-4	GOW3A	1.52	4.40
0123	P0	42" RCP	1076	141	GPDB	GOW3A	1.29	6.00
0125	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
0127	P0	6' X 6' RCB	2977	853	SWFH-1	GOW3A	0.69	3.80
0128	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH		ANGEL PARK - FAR HILLS BRANCH						
0000	E	2- 8' X 8' RCB	1070	2494	CCSWFH14	GOW3B	1.51	3.50
0019	E	2- 8' X 8' RCB	250	2149	CCSWFH9	GOW3B	1.30	4.19
0024	E	16' X 8' RCAP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
0061	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
0089	E	8' X 6' RCB	2946	839	CSWFH-7	GOW3A	0.50	2.00
0144	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APM5		DETENTION BASIN #5						
0000	E	384 AC-FT DETENTION BASIN #5		6856	SUM5IN	GOW3A	6.73	
0008	P0	CONC CHNL 50"W 4.5'D 2:1 SS	2102	3634	CODB54-7	GOW3A	4.13	5.20
0009	P0	CONC CHNL 50"W 4'D 2:1 SS	4180	3485	CDB55-7	GOW3A	2.60	5.80
0047	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CODB54-7	GOW3A	4.13	1.30
0056	P0	CONC CHNL 80"W 4'D 2:1 SS	264	3634	CODB54-7	GOW3A	4.13	1.30
0057	P0	CONC CHNL 50"W 3'D 2:1 SS	9922	1664	CDB54-4	GOW3A	0.81	6.80
0059	P0	CONC CHNL 100"W 3'D 2:1 SS	9075	2606	CDB54-7	GOW3A	3.31	7.00
0212	P0	CONC CHNL 30"W 3'D 2:1 SS	6695	1092	DB55-1	GOW3A	0.64	7.50
0213	P0	CONC CHNL 50"W 3'D 2:1 SS	6522	1729	CDB55-6	GOW3A	1.30	7.30
APSP		ANGEL PARK - SUMMERLIN PARKWAY						
0183	E	CONC CHNL 10"W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3		GOWAN LONE MOUNTAIN SYST. 3 BELTWAY						
0000	E	66" RCP	1370	341	SV22-1	GOW3A	0.18	4.50
GOBE		GOWAN LONE MOUNTAIN SYST. BELTWAY						
0000	E	20' X 10' RCBC @ ACCESS RD	30	1044	CSV22	GOW3A	0.67	5.67
0001	E	CONC CHNL 20"W 5'D 2:1 SS	1100	1044	CSV22	GOW3A	0.67	6.50
0021	E	CONC CHNL 11"W 6.8'D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
0058	E	CONC CHNL 15"W 7.5'D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
0065	E	CONC CHNL 17"W 7.5'D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
0088	E	2- 10' X 9' RCBC @ LAKE MEAD	400	782	SV22-2	GOW3A	0.49	0.50
0096	E	CONC CHNL 20"W 9'D 2:1 SS	627	782	SV22-2	GOW3A	0.49	0.50
0108	E	CONC CHNL 20"W 6'D 2:1 SS	1021	782	SV22-2	GOW3A	0.49	0.50
0127	E	CONC CHNL 20"W 6'D 2:1 SS	638	782	SV22-2	GOW3A	0.49	0.50
0139	E	CONC CHNL 10"W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
GOL3		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
0010	E	CONC CHNL 20"W 10'D 0:1 SS	3037	3277	CRCLMT1R	GOW3A	7.31	2.78
0068	E	TRANSITION STRUCTURE	100	3277	CRCLMT1R	GOW3A	7.31	3.50
0070	E	20' X 6' RCBC @ CLIFF SHADOWS	350	1271	CRCSV22	GOW3A	4.99	2.44
0077	E	CONC CHNL 20"W 6'D 0:1 SS	1229	1271	CRCSV22	GOW3A	4.99	6.11

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOL3		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3						
0100	E	CONC CHNL 20"W 10'D 0:1 SS	200	1271	CRCSV22	GOW3A	4.99	5.67
0115	E	96" RCP OUTLET	670	666	DET26	GOW3A	4.31	0.29
0128	E	305 AC-FT VILLAGE 26 DETENTION BASIN		3615	VIL26IN	GOW3A	4.31	
0137	E	CONC CHNL 20"W 7.5'D 0:1 SS	2720	3615	VIL26IN	GOW3A	4.31	6.50
0188	E	CONC CHNL 20"W 8'D 0:1 SS	563	3615	VIL26IN	GOW3A	4.31	3.91
0197	E	14' X 14" RCB	880	3615	VIL26IN	GOW3A	4.31	0.88
0214	E	Dual 10' X 14" RCB	124	3615	VIL26IN	GOW3A	4.31	0.57
0216	P0	CONC CHNL 50"W 4'D 2:1 SS	4060	3524	CSV26-1	GOW3A	4.02	6.08
0289	P0	CONC CHNL 50"W 3.5'D 2:1 SS	6215	2281	30	GOW3A	2.44	7.95
0290	E	NATURAL WASH 363"W	4850	1410	SV26-1	GOW3A	1.59	22.50
0370	E	NATURAL WASH 450"W	7000	2281	30	GOW3A	2.44	8.50
GOL4		GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4						
0000	E	14' X 8" RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
0010	E	2- 9' X 8" RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
0025	E	SOIL CEMENT CHNL 60"W 8'D 3-4:1 SS	320	2243	CLMT1R	GOW3A	2.33	2.00
0026	E	SOIL CEMENT CHNL 42"W 8'D 3-4:1 SS	700	2243	CLMT1R	GOW3A	2.33	1.00

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

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

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



2018 LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F-22

LEGEND	ID (Facility Identifier)	AABB						Construction Features			
	Parent Stream Name	_____	_____	Existing Facility.....	E	Bottom Width.....	W	Cast in Place Concrete Pipe.....	CIPCP	Reinforced Concrete Arch Culvert.....	RCAC
	Stream Name	_____	_____	Proposed or Modified Facility.....	P	Depth.....	D	Corrugated Metal Arch Pipe Culvert.....	CMAP	Reinforced Concrete Box.....	RCB
	Mile	_____	0000	Contingency Level		Side Slope, H:V.....	SS	Corrugated Metal Pipe Culvert.....	CMPC	Reinforced Concrete Box Culvert.....	RCBC
	Distance Above Confluence with Parent Stream (Miles)	_____	_____	Category A.....	P			High Density Polyethylene.....	HDPE	Reinforced Concrete Pipe.....	RCP
	Miles in Hundredths	_____	_____	Category B.....	P0			Horizontal Elliptical Reinforced Concrete Pipe.....	HERCP	Reinforced Concrete Pipe Culvert.....	RCPC
								Reinforced Concrete Arch Pipe.....	RCAP	Storm Sewer Pipe.....	SSP

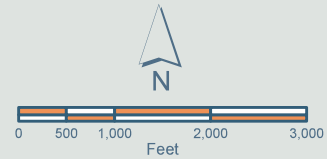




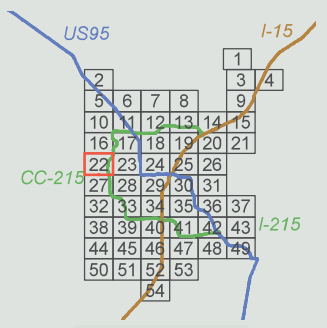
2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-22
FLOOD CONTROL FACILITIES

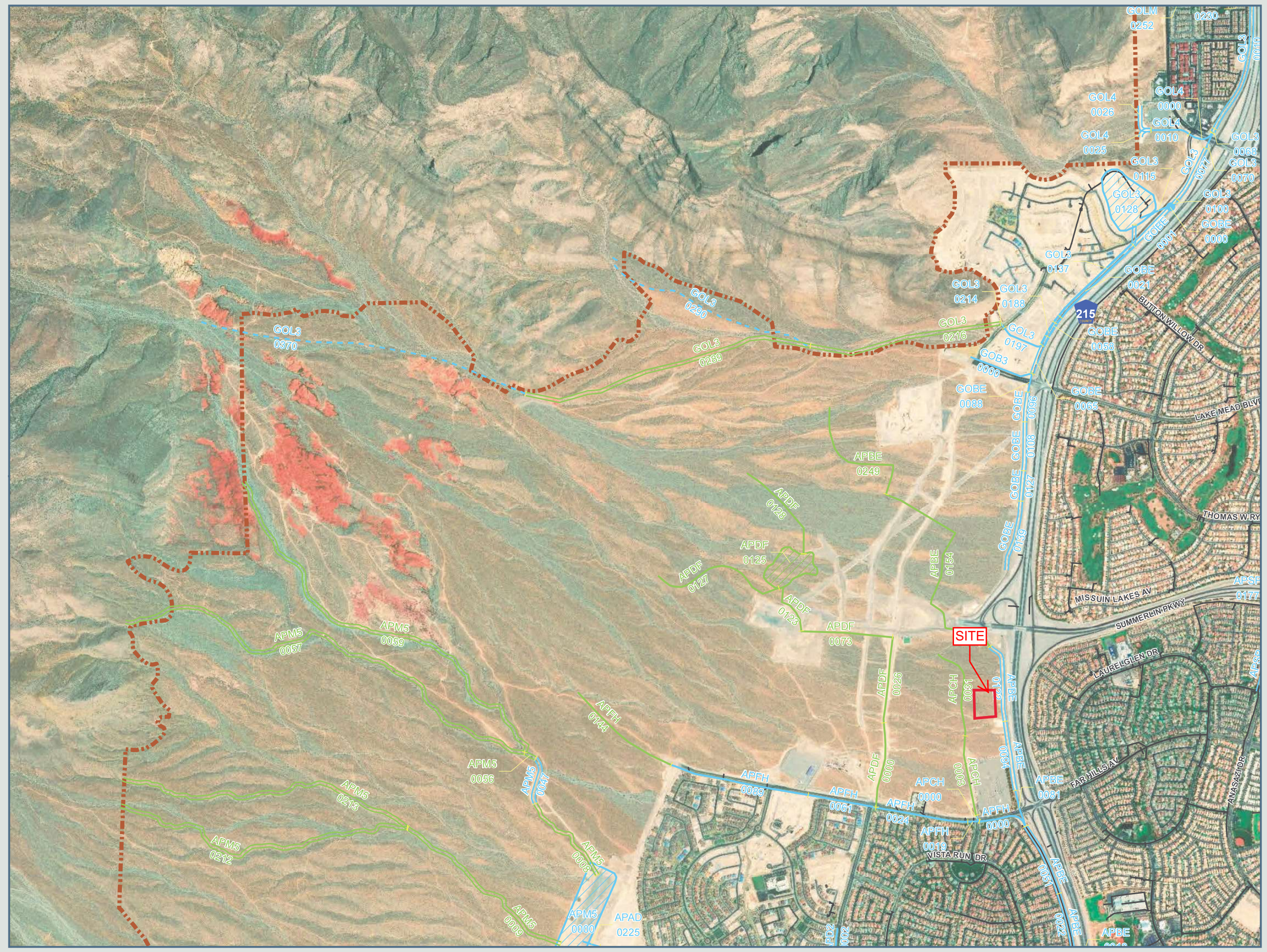
- LEGEND**
- Ultimate Development Boundary
 - Existing Facilities
 - Category A Proposed Facilities
 - Category B Proposed Facilities
 - Local Existing Facilities
 - Detention Basin
 - Culvert or Bridge Crossing
 - Stormdrain
 - Lined Channel
 - Unlined Channel
 - Levee/Dike
 - Natural Wash/Floodway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

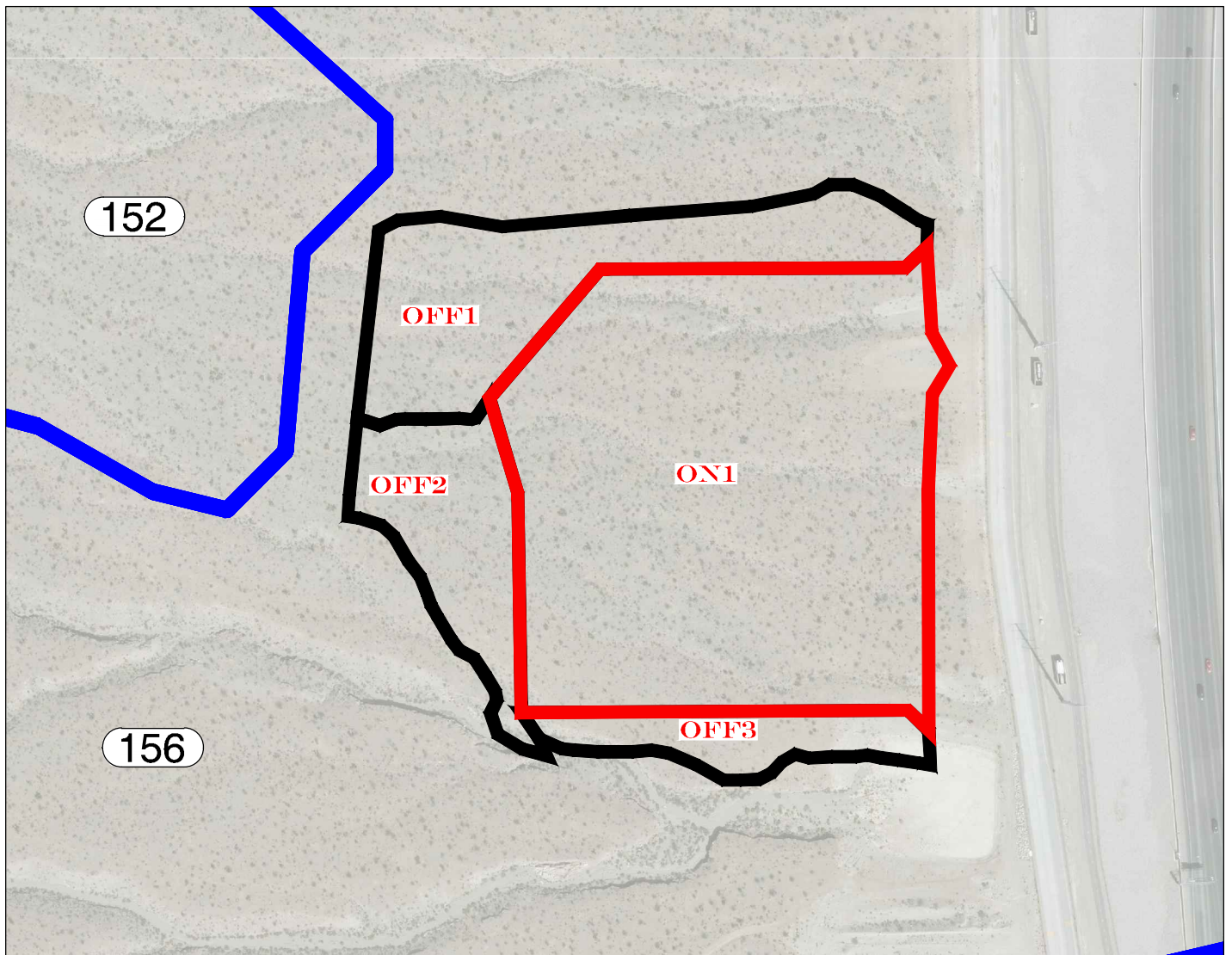


Scale: 1 inch = 2,000 feet
AerialSource: Esri World Imagery 2017



ATKINS
Member of the SNC-Lavalin Group





LEGEND

— SITE BOUNDARY

300 SOIL NUMBER

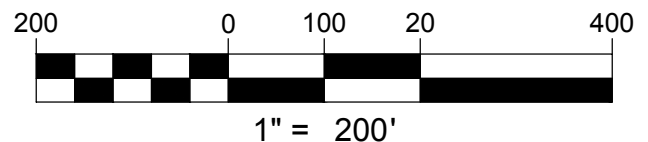
— SOIL BOUNDARY

NOTE:

1. This data was taken from the following website:
<http://soildatamart.nrcs.usda.gov>
2. This data is in state plane coordinates



GRAPHIC SCALE



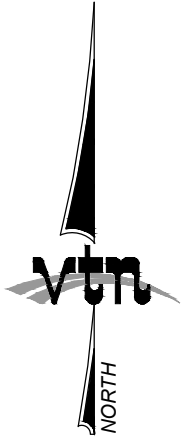
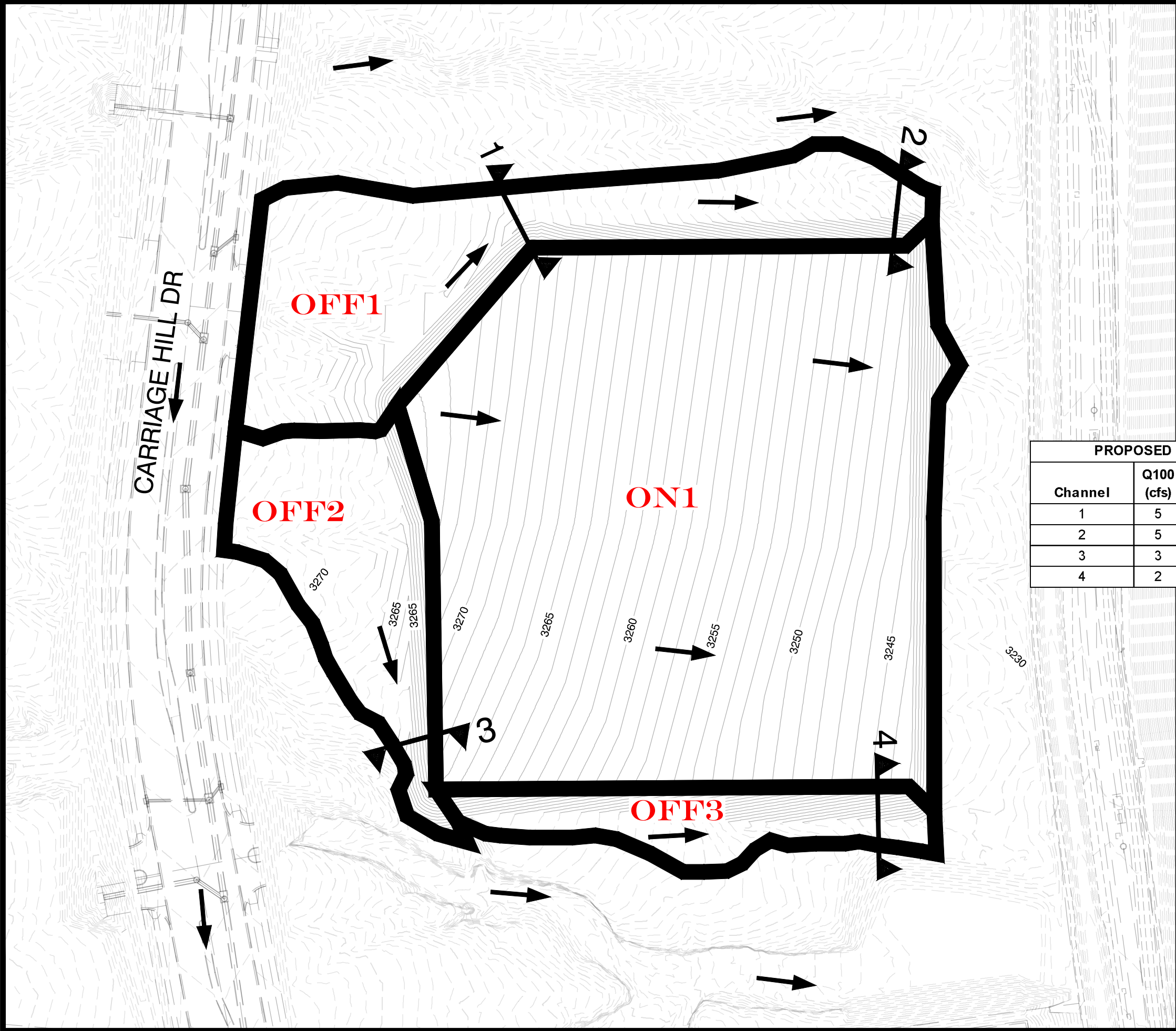
H:\7851\Parcel I Stock Pile\Drainage\A Figures\Figure 5 - Soil Map.dwg

vtm
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

FIGURE 5: PROPOSED CONDITION SOILS MAP

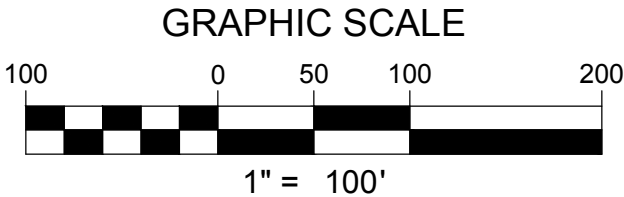
**SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE**

SCALE	HORZ.	1"=200'
	VERT.	n/a
W.O. NO.		7809
DRAWN BY:		ACY
DATE:		MAY 2019
SHEET		1 OF 1



PROPOSED CONDITION HEC-1 SUMMARY TABLE		
BASIN ID	AREA (ac)	Q100 (CFS)
OFF1	1.91	5
OFF2	1.09	3
OFF3	0.63	2
ON1	6.08	26

PROPOSED CONDITION CHANNEL SUMMARY TABLE					
Channel	Q100 (cfs)	Slope	Normal Depth (ft)	Velocity (ft/s)	Description
1	5	1.60%	0.51	2.99	OFF1
2	5	6.71%	0.37	4.98	OFF1
3	3	2.22%	0.38	2.91	OFF2
4	2	6.24%	0.24	3.37	OFF3



LEGEND

- CONCENTRATION POINT
- BASIN BOUNDARY
- BASIN DESIGNATION
- FLOW ARROW
- CROSS SECTION

W.O.#:	7809
DATE:	05/2019
BY:	ACY
SCALE:	1"=100'
SHEET	1 OF 1

FIGURE 6 - PROPOSED CONDITION BASIN MAP
SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE

APPENDIX B

HYDROLOGIC

CALCULATIONS

Las Vegas Valley Area, Nevada, Part of Clark County

156—Vace-Wechech association

Map Unit Setting

National map unit symbol: 1tf5w

Elevation: 2,720 to 4,030 feet

Mean annual precipitation: 5 to 7 inches

Mean annual air temperature: 57 to 69 degrees F

Frost-free period: 180 to 300 days

Farmland classification: Not prime farmland

Map Unit Composition

Vace and similar soils: 45 percent

Wechech and similar soils: 25 percent

Wechech, steep, and similar soils: 15 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vace

Setting

Landform: Fan remnants

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Calcareous loess and mixed alluvium

Typical profile

H1 - 0 to 2 inches: gravelly fine sandy loam

H2 - 2 to 8 inches: loam

H3 - 8 to 60 inches: cemented material

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: 4 to 14 inches to petrocalcic

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 30 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Ecological site: Desert Fans 4-6 P.Z. (R030XB005NV)
Other vegetative classification: Limy 5-7 p.z. (030XB005NV_3)
Hydric soil rating: No

Description of Wechech

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Desert Fans 4-6 P.Z. (R030XB005NV)
Hydric soil rating: No

Description of Wechech, Steep

Setting

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

Typical profile

H1 - 0 to 2 inches: very gravelly sandy loam

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

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: 8 to 14 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: LIMY HILL 5-7 P.Z. (R030XB001NV)
Hydric soil rating: No

Minor Components

Weiser

Percent of map unit: 8 percent
Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: GRAVELLY FAN 5-7 P.Z. (R030XB075NV)
Other vegetative classification: Gravelly Fan 5-7 p.z.
(030XB075NV_1)
Hydric soil rating: No

Irongold

Percent of map unit: 4 percent
Landform: Fan remnants
Landform position (two-dimensional): Shoulder
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: SHALLOW GRAVELLY LOAM 5-7 P.Z. cool thermic fan portions corr cool hills to R030XB029NV (R030XB029NV)
Other vegetative classification: Shallow Gravelly Loam 5-7 p.z.
(030XB029NV_2)
Hydric soil rating: No

Commski

Percent of map unit: 2 percent

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: CALCAREOUS LOAM 5-7 P.Z. (R030XA066NV)
Other vegetative classification: Calcareous Loam 5-7 p.z.
(030XA066NV_1)
Hydric soil rating: No

Threelakes

Percent of map unit: 1 percent
Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: VALLEY WASH (R030XB028NV)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 12, Sep 15, 2017

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (SEMIARID RANGELANDS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition ²	A ³	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

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

²Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: >70% ground cover.

³Curve numbers for group A have been developed only for desert shrub.

Revision	Date

CURVE NUMBERS FOR SOILS

Soil # 156 Vace - Wechech association						
Soil	Percent	Group	Existing ₁	Open Space ₂ (Poor Condition)	Newly Graded Areas ₃	Impervious ₄
Vace and Similar	45%	D	88	89	95	98
Wechech and Similar	25%	D	88	89	95	98
Wechech, steep, and similar	15%	D	88	89	95	98
Weiser	8%	B	77	79	92	98
Irongold	4%	D	88	89	95	98
Commski	2%	B	77	79	92	98
Threelakes	1%	A	63	68	89	98
Total	100%		86.7	87.8	94.6	98.0

Notes:

- 1- Referenced from Table 602 (4 of 4), Desert Shrub, Poor Condition
- 2- Referenced from Table 602 (1 of 4), Open space (Poor Condition)
- 4- Referenced from Table 602 (1 of 4) Newly Graded Areas
- 5- Referenced from Table 602 (1 of 4), Impervious Paved Streets and Roads

Curve Number Calculations for Basins

Basin	Type	Soil	Existing ₁	Open Space ₂ (Poor Condition)	Newly Graded Areas ₃	Impervious ₄	CN Value
PROPOSED CONDITION							
ON1	156	100%			100%		94.6
OFF1	156	100%	100%				86.7
OFF2	156	100%	100%				86.7
OFF3	156	100%	100%				86.7

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Street I Stockpile

W.O. # 7809

CALCULATED BY: ACY

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

C1 applies to the first 500 feet of travel distance

C2 applies to the remaining travel distance

Non-urban		Urbanized	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

[illegible]


```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 03MAY19 TIME 09:53:43
*
*****

I-PRO.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
XXXXXX XXXX X XXXX 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 PROPOSED CONDITION HYDROLOGIC MODEL
2 ID INPUT FILE DATE = MAY 3, 2019
3 ID DESIGN STORM = 100-YEAR 6-HR STORM
4 ID STORM DISTRIBUTION = SDN #3
5 ID MODELED BY VTN (ACY)
6 ID
7 ID
8 ID * SUMMERLIN WEST VILLAGE 21 *
9 ID * PARCEL I STOCKPILE *
10 ID *****
11 ID
12 ID 100-YEAR, 6-HOUR STORM, SDN3
13 ID
14 IT 5 0 0 300
15 IO 5 0 0
16 IN 5 0 0
17 JR PREC 1.00
*

18 KK OFF1
19 BA 0.0030
20 PC 0 0.02 0.057 0.07 0.087 0.108 0.124 0.13 0.13 0.130
21 PC 0.13 0.13 0.13 0.133 0.14 0.142 0.148 0.158 0.172 0.181
22 PC 0.19 0.197 0.199 0.2 0.201 0.204 0.214 0.229 0.241 0.249
23 PC 0.251 0.256 0.27 0.278 0.281 0.283 0.295 0.322 0.352 0.409
24 PC 0.499 0.59 0.71 0.744 0.781 0.812 0.819 0.835 0.851 0.856
25 PC 0.86 0.868 0.876 0.888 0.91 0.926 0.937 0.95 0.97 0.976
26 PC 0.982 0.985 0.987 0.989 0.99 0.993 0.993 0.994 0.995 0.998
27 PC 0.998 0.999 1
28 PB 3.35
29 LS 0 86.7
30 UD 0.100
*

31 KK OFF2
32 BA 0.0017
33 LS 0 86.7
34 UD 0.100
*

35 KK OFF3
36 BA 0.0010
37 LS 0 86.7
38 UD 0.100
*

39 KK ON1
40 BA 0.0095
41 LS 0 94.6

```

```

      42      UD  0.050
      43      ZZ
1
      SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
LINE  (V) ROUTING      (--->) DIVERSION OR PUMP FLOW
NO.    (.) CONNECTOR    (<---) RETURN OF DIVERTED OR PUMPED FLOW
18      OFF1
      .
      .
31      .      OFF2
      .      .
      .      .
35      .      .      OFF3
      .      .      .
      .      .      .
39      .      .      .      ON1

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 03MAY19 TIME 09:53:43
*
*****

```

```

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

```

PROPOSED CONDITION HYDROLOGIC MODEL
 INPUT FILE DATE = MAY 3, 2019
 DESIGN STORM = 100-YEAR 6-HR STORM
 STORM DISTRIBUTION = SDN #3
 MODELED BY VTN (ACY)

```

*****
* SUMMERLIN WEST VILLAGE 21
* PARCEL I STOCKPILE
*****

```

100-YEAR, 6-HOUR STORM, SDN3

```

15 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
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

I-PRO.OUT					
RATIOS APPLIED TO PRECIPITATION					
OPERATION	STATION	AREA	PLAN	RATIO 1	
				1.00	
HYDROGRAPH AT +	OFF1	.00	1 FLOW TIME	5. 3.50	
HYDROGRAPH AT +	OFF2	.00	1 FLOW TIME	3. 3.50	
HYDROGRAPH AT +	OFF3	.00	1 FLOW TIME	2. 3.50	
HYDROGRAPH AT +	ON1	.01	1 FLOW TIME	26. 3.50	

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

APPENDIX C

HYDRAULIC CALCULATIONS

Worksheet for Section 1

Project Description

Manning Formula

Normal Depth

Input Data

0.01600 ft/ft

5.00 ft³/s

Section Definitions

Station (ft)	Elevation (ft)
10+00	3264.23
10+05	3264.16
10+12	3264.07
10+31	3263.65
10+45	3263.36
10+47	3263.13
10+53	3262.53
10+55	3262.33
10+55	3262.32
10+59	3261.88
10+81	3269.17
10+83	3269.66
10+83	3269.92
10+84	3269.92
10+84	3269.92
10+84	3269.92
10+84	3269.92
10+85	3269.92
10+86	3269.92
10+87	3269.92
10+88	3269.91
10+89	3269.91

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
---------------	----------------	-----------------------

Worksheet for Section 1

Input Data

Start Station	Ending Station	Roughness Coefficient
(10+00, 3264.23)	(10+89, 3269.91)	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	0.51	ft
Elevation Range	3261.88 to 3269.92 ft	
Flow Area	1.67	ft²
Wetted Perimeter	6.67	ft
Hydraulic Radius	0.25	ft
Top Width	6.56	ft
Normal Depth	0.51	ft
Critical Depth	0.52	ft
Critical Slope	0.01460	ft/ft
Velocity	2.99	ft/s
Velocity Head	0.14	ft
Specific Energy	0.65	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.51	ft

Worksheet for Section 1

GVF Output Data

Critical Depth	0.52	ft
Channel Slope	0.01600	ft/ft
Critical Slope	0.01460	ft/ft

Cross Section for Section 1

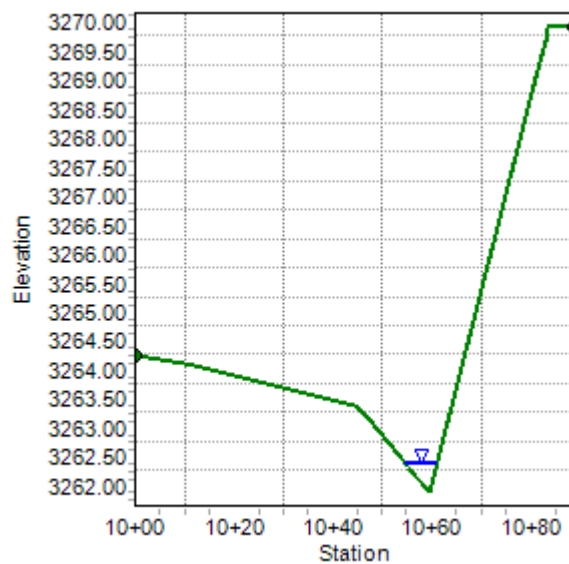
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01600	ft/ft
Normal Depth	0.51	ft
Discharge	5.00	ft ³ /s

Cross Section Image



Worksheet for Section 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06710	ft/ft
Discharge	5.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
10+00	3238.61
10+10	3238.66
10+19	3237.41
10+21	3237.15
10+22	3237.02
10+29	3236.10
10+33	3236.56
10+34	3236.75
10+36	3237.00
10+42	3237.65
10+44	3237.74
10+50	3238.46
10+50	3238.53
10+52	3238.64
10+56	3240.26
10+63	3242.48
10+73	3245.87
10+80	3248.27
10+82	3248.25
10+83	3248.25
10+87	3248.22
10+88	3248.22
10+89	3248.21

Roughness Segment Definitions

Worksheet for Section 2

Input Data

Start Station	Ending Station	Roughness Coefficient
(10+00, 3238.61)	(10+89, 3248.21)	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	0.37	ft
Elevation Range	3236.10 to 3248.27 ft	
Flow Area	1.00	ft ²
Wetted Perimeter	5.46	ft
Hydraulic Radius	0.18	ft
Top Width	5.41	ft
Normal Depth	0.37	ft
Critical Depth	0.49	ft
Critical Slope	0.01470	ft/ft
Velocity	4.98	ft/s
Velocity Head	0.39	ft
Specific Energy	0.76	ft
Froude Number	2.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft

Worksheet for Section 2

GVF Output Data

Critical Depth	0.49	ft
Channel Slope	0.06710	ft/ft
Critical Slope	0.01470	ft/ft

Cross Section for Section 2

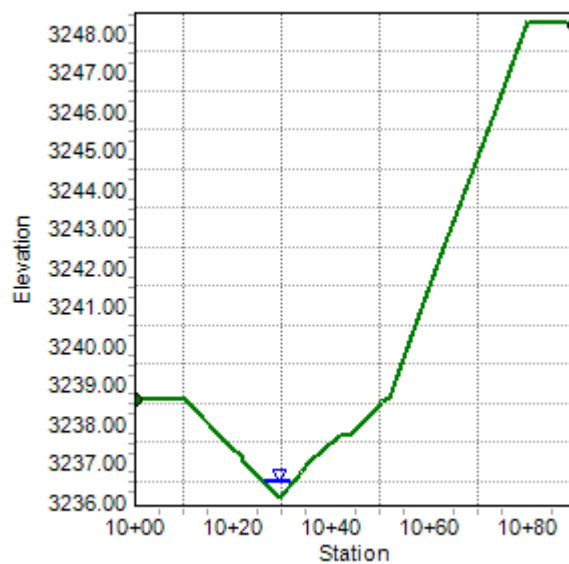
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06710	ft/ft
Normal Depth	0.37	ft
Discharge	5.00	ft ³ /s

Cross Section Image



Worksheet for Section 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02200	ft/ft
Discharge	3.00	ft³/s
Section Definitions		

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

10+00	3268.06
10+00	3268.07
10+01	3268.11
10+04	3268.29
10+05	3268.31
10+09	3268.51
10+09	3268.53
10+13	3268.74
10+13	3268.75
10+16	3268.93
10+20	3267.62
10+30	3264.59
10+40	3261.14
10+41	3260.79
10+42	3260.89
10+52	3261.75
10+52	3261.76
10+62	3261.92
10+63	3261.86
10+65	3261.79

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(10+00, 3268.06)	(10+65, 3261.79)	0.025

Worksheet for Section 3

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		0.38	ft
Elevation Range	3260.79 to 3268.93 ft		
Flow Area		1.03	ft ²
Wetted Perimeter		5.46	ft
Hydraulic Radius		0.19	ft
Top Width		5.38	ft
Normal Depth		0.38	ft
Critical Depth		0.41	ft
Critical Slope		0.01577	ft/ft
Velocity		2.91	ft/s
Velocity Head		0.13	ft
Specific Energy		0.52	ft
Froude Number		1.17	
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	0.38	ft
Critical Depth	0.41	ft
Channel Slope	0.02200	ft/ft
Critical Slope	0.01577	ft/ft

Cross Section for Section 3

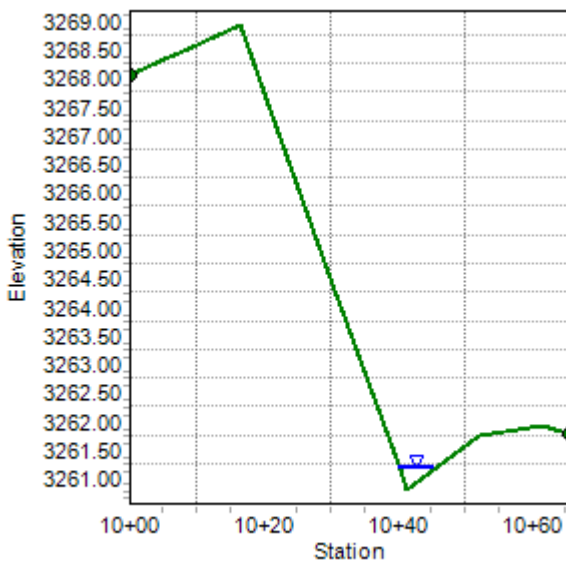
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02200	ft/ft
Normal Depth	0.38	ft
Discharge	3.00	ft ³ /s

Cross Section Image



Worksheet for Section 4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06240	ft/ft
Discharge	2.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
10+00	3244.74
10+01	3244.73
10+03	3244.72
10+07	3244.70
10+07	3244.69
10+12	3244.68
10+12	3244.67
10+13	3244.67
10+37	3236.60
10+46	3233.70
10+47	3233.78
10+47	3233.78
10+52	3233.99
10+54	3234.13
10+60	3234.55
10+70	3234.81
10+70	3234.82
10+71	3234.70
10+71	3234.66

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(10+00, 3244.74)	(10+71, 3234.66)	0.025

Worksheet for Section 4

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		0.24	ft
Elevation Range	3233.70 to 3244.74 ft		
Flow Area		0.59	ft ²
Wetted Perimeter		5.51	ft
Hydraulic Radius		0.11	ft
Top Width		5.46	ft
Normal Depth		0.24	ft
Critical Depth		0.29	ft
Critical Slope		0.01782	ft/ft
Velocity		3.37	ft/s
Velocity Head		0.18	ft
Specific Energy		0.41	ft
Froude Number		1.80	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.24	ft
Critical Depth	0.29	ft
Channel Slope	0.06240	ft/ft
Critical Slope	0.01782	ft/ft

Cross Section for Section 4

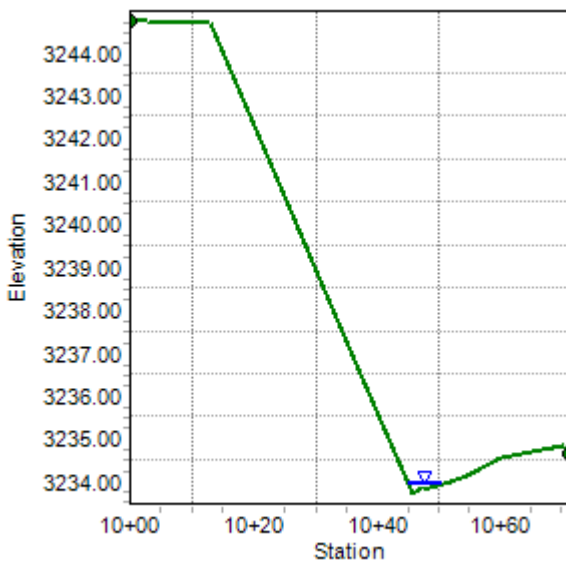
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06240	ft/ft
Normal Depth	0.24	ft
Discharge	2.00	ft ³ /s

Cross Section Image



APPENDIX D

REFERENCE MATERIAL

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		April 17, 2019
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: Summerlin West Planning Area Master Plan Update		COPIES TO: VTN Nevada
Cross Streets:	West of I-215 between Lake Mead Boulevard and Charleston Boulevard	The Howard Hughes Corporation
File Number:	F:\Depot\DSMemos\DS4926H.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-22-000-017	CCRFC
Zoning Action:		CCPW
FEMA Flood Zone	YES ☒ NO	
Proposed Storm Drain	YES ☒ NO	

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

REMARKS:

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

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

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

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

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

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

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

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

END OF REMARKS
WSP/AYS

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

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: April 4, 2019
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
Summerlin West Village 21 - Carriage Hill Drive – Update #1 (Redpoint Drive to Summerlin Parkway)		COPIES TO: VTN Nevada
Cross Streets:	Carriage Hill Drive and Summerlin Parkway	The Howard Hughes Company LLC
File Number:	F:\Depot\DSMemos\DS5064C.doc	Bart Anderson, P.E., DevCo
Parcel Number:	137-26-101-001	CCRFC
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	11/13/2018 & 11/28/2018	12/6/2018	Not Approved	\$400.00	500783: \$400
2 nd Submittal	1/31/2019	2/14/2019	Conditional Approval	\$400.00	502868: \$400
3 rd Submittal & CCRFC	3/14/2019 & 3/21/2019	4/4/2019	Concurrence Recv'd	\$100.00	503994: \$100
TOTAL FEES (LDDRS):				\$900.00	----

REMARKS:

3rd Submittal: Update #1 to upsize a 24"-lateral at Station 28+49.39 to a 30"-RCP

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 *Carriage Hill 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* (702-229-6371) to begin the agreement process.

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

1. Since the street and the associated storm drain facilities will eventually be accepted by the **City of Las Vegas**, the engineer/developer must coordinate with *City of Las Vegas Streets & Sanitation Department* for their review and approval prior to the final acceptance of the subject improvement plans.
2. All offsite interim flood control facilities such as but not limited to berms/ditches and temporary sump are privately owned and to be privately maintained by the *Howard Hughes Company*.
3. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

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

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

END OF REMARKS
WSP/AYS

T/R/S: T20S/R59E/S26
AREA K-26

SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE

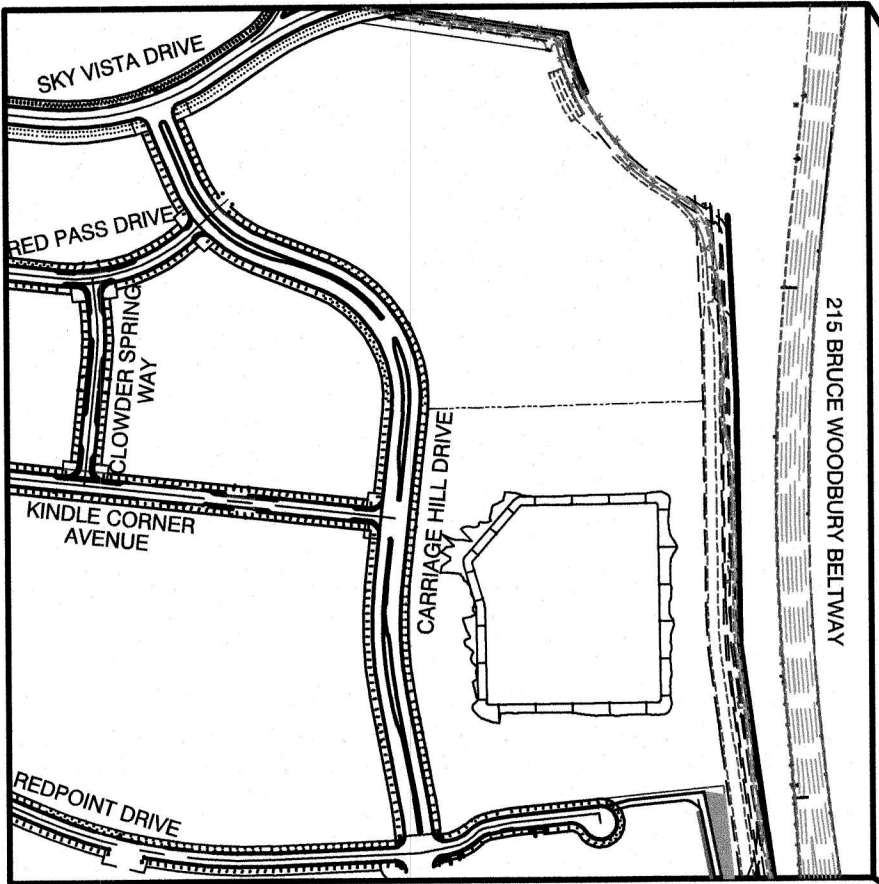
APN: 137-26-101-001
CITY OF LAS VEGAS
STATE OF NEVADA
DEVELOPED BY:
HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY

10801 W CHARLESTON BLVD SUITE 300
LAS VEGAS, NEVADA 89135
702-791-4000

SHEET #	SHEET	DESCRIPTION
CV	1	COVER SHEET
NT	2	NOTE SHEET
GR1	3	GRADING PLAN 1
DT1	4	DETAIL SHEET 1

BASIS OF BEARING
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 M (984,250.0000 FTUS) 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
PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008) NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USGCS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN. T21S, R59E, S03



LOCATION MAP
N.T.S.

OWNER
HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY
10801 W CHARLESTON BLVD SUITE 300
LAS VEGAS, NEVADA 89135
702-791-4000

DEVELOPER
HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY
10801 W CHARLESTON BLVD SUITE 300
LAS VEGAS, NEVADA 89135
702-791-4000

ENGINEERING FIRM
VTN
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7550
FAX (702) 362-2597

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.

CALL BEFORE YOU DIG

1-702-227-2929

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

Call before you Dig

1-800-227-2600
OR
1-702-455-6000
AND
1-702-455-6000
CLARK COUNTY TRAFFIC OPERATIONS

AVOID OTHER UNDERGROUND UTILITY LINES (ELECTRIC, GAS, WATER, SEWER, ETC.).

Call before you Dig

1-702-455-6000
CLARK COUNTY TRAFFIC OPERATIONS

THESE PLANS AND THE DESIGN CRITERIA CONTAINED WITHIN THESE PLANS ARE BASED UPON THE INFORMATION PRESENTLY KNOWN BY THE ENGINEER. ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL STATUTES, LAWS, CODES, REGULATIONS AND ORDINANCES, INCLUDING BUT NOT LIMITED TO THE FEDERAL FAIR HOUSING AMENDMENTS ACT, AMERICANS WITH DISABILITIES ACT, THE ARCHITECTURAL BARRIERS ACT AND ANY APPLICABLE UNIFORM STANDARDS, SPECIFICATIONS OR DRAWINGS. THE PERSON OR ENTITY PERFORMING THE CONSTRUCTION SHALL BE SOLELY RESPONSIBLE TO MAKE SURE CONSTRUCTION IS IN CONFORMANCE WITH ALL LOCAL, STATE AND FEDERAL STATUTES, LAWS, CODES, REGULATIONS, STANDARDS, GUIDELINES AND ORDINANCES AND FURTHER, IS IN CONFORMANCE WITH ANY APPLICABLE DESIGN CRITERIA, INCLUDING BUT NOT LIMITED TO SOILS REPORTS, TRAFFIC STUDIES, GEOTECHNICAL REPORTS, ARCHITECTURAL PLANS AND SPECIFICATIONS, DRAINAGE PLANS OR STUDIES AND ANY OTHER CRITERIA, STANDARDS OR REQUIREMENTS LISTED IN THE PLANS OR THE GENERAL NOTES RELATED TO THESE PLANS OR PROVIDED BY ANYONE IN REFERENCE TO THIS PROJECT.

APPROVALS

CITY ENGINEER ALLEN PAVELKA, P.E. # 9029

APPROVAL OF THESE PLANS BY THE CITY ENGINEER IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHT-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS EXCEPT THOSE SPECIFICALLY LISTED UNDER DEVIATIONS FROM STANDARD. THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN DEVIATIONS FROM STANDARDS IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA.

PLANNING DEPARTMENT, CITY OF LAS VEGAS DATE

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT

KEVIN T. ORROCK, VICE PRESIDENT DATE

HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY

FIRE DEPARTMENT APPROVAL
APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM THE LVWVD.

HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY
10801 W CHARLESTON BLVD SUITE 300
LAS VEGAS, NEVADA 89135
702-791-4000

COVER SHEET

SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE

DRAWN BY: DEH	04/02/2019
DESIGNED BY: DEH	04/02/2019
CHECKED BY: NMM	04/02/2019
PROJECT NO: 7851	SCALE: NA
	HORIZ. NA
	VERT. NA

PROFESSIONAL ENGINEER STATE OF NEVADA
WILLIAM J. MEYER
EXP: 12/31/19
CIVIL
5/2/19

1 OF 4 SHEETS
DRAWING NO.

H:\7851\Parcel I Stock Pile\Sheet Set\7851-CV.dwg, May 08, 2019

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

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 VALEY WATER DISTRICTS' - APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC § 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. [IFC § 3310, § 3312]
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTERLINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [IFC § 507.5.7.3]
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC § 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC § 507.2.1, NFPA 24]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC § 507]
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. [IFC § 507.5.7.1]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC § 507]
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [IFC § C102]
- RESIDENTIAL - 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. [IFC § C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC § C102.10]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC § C102.7]
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC § C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. [IFC § C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC § 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC § 503.2.7, § 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [IFC § 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [IFC § 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [IFC § 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS SPRINKLERED. [IFC § 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-ENDS, COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC § 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC § 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC § 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. IFC § 503.6

EFFECTIVE DATE: FEBRUARY 4th, 2019

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLICWORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE "UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THERE WITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE. FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY: NOVA GEOTECHNICAL, PROJECT NO. G-18-003, DATED MARCH 5, 2018. APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLAN.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625-380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
- WALL NOTES:
16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC. THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS.
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

REVISED 06/04/2018

CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:
- | | HORIZONTAL | VERTICAL |
|---------------------------|------------|------------------------------|
| A. PAVEMENT AREA SUBGRADE | 0.1" + | +0.070-0.1" SEE SOILS REPORT |
| B. ENGINEERED FILL | 0.5" + | +0.110-0.1" 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 CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC, SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 04/15/10

BENCHMARK

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

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)

FND USGAS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R99E,S03

GENERAL CONSTRUCTION NOTE:

THE FOLLOWING SEPARATE VILLAGE 21 ROADWAY INFRASTRUCTURE PLANS ARE TO BE CONSTRUCTED GENERALLY ALL TOGETHER.
1. DESERT FOOTHILLS (REDPOINT DRIVE TO SUMMERLIN PARKWAY)
2. CARRIAGE HILL (REDPOINT DRIVE TO SUMMERLIN PARKWAY)
3. KINDLE CORNER AVENUE (CARRIAGE HILL TO DESERT FOOTHILLS)
4. RED PASS DRIVE (CARRIAGE HILL TO DESERT FOOTHILLS)
5. CLOWDER SPRING WAY (KINDLE CORNER AVENUE TO RED PASS DRIVE)

BASIS OF BEARING

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 M (984,250.0000 FTUS)
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.

LEGEND

DESCRIPTION	PROPOSED	EXISTING	FUTURE
CONTOUR (5' INTERVAL)	—2450—	---(2450)---	---[2450]---
CONTOUR (1' INTERVAL)			
EDGE OF PAVEMENT			
SAW CUT			
RETAINING WALL			
SCREEN WALL			
RIGHT OF WAY			
CENTER LINE			
BACK OF CURB			
LIP OF GUTTER			
FACE OF CURB			
SIDEWALK			
UNIT BOUNDARY LINE			
UNIT BOUNDARY / ROW			
PROPERTY LINE			
SLOPE AND FLOW DIRECTION			
SCARP AREA			
MATCHLINE			
SIDEWALK RAMP			
SIGHT VISIBILITY ZONES			
PAVED ROAD			
PAVEMENT REMOVAL			
STREET LIGHT			
WATER UNDER 18"			
WATER 18" & OVER			
SANITARY SEWER UNDER 18"			
SANITARY SEWER 18" & OVER			
STORM SEWER			
FIRE HYDRANT			
SANITARY SEWER MAN HOLE			
CLEAN OUT			
STORM DRAIN MAN HOLE			

ABBREVIATIONS

FF FINISH FLOOR	PT POINT OF TANGENCY	O/C OFFSET CROWN
FG FINISH GRADE	PRC POINT OF REVERSE CURVATURE	BC BACK OF CURB
FL FLOW LINE	PCC POINT OF COMPOUND CURVATURE	BCR BEGIN CURB RETURN
TC TOP OF CURB	BVC BEGIN VERTICAL CURVE	BCL BACK OF CURB LENGTH
TRC TOP OF ROLL CURB	MVC MID-POINT OF VERTICAL CURVE	TF TOP OF FOOTING
EOP EDGE OF ASPHALT PAVEMENT	EVC END VERTICAL CURVE	GB GRADE BREAK
FUT FUTURE	PRVC POINT OF REVERSE VERTICAL CURVE	PC POINT OF CURVATURE
EX EXISTING	R/W RIGHT-OF-WAY	TPW TOP OF PLANTER WALL
VG VALLEY GUTTER	DI DROP INLET	TRW TOP OF RETAINMENT WALL
NG NATURAL GROUND	BFE BASE FLOOD ELEVATION	TOP TOP OF CHANNEL/SCARP
H.P. HIGH POINT	CCUSD CLARK COUNTY UNIFORM STANDARD DRAWINGS	TOE TOE OF CHANNEL/SCARP
L.P. LOW POINT	SW SIDEWALK	TOB TOP OF BOX
SMH SEWER MANHOLE	TSW TOP OF SIDEWALK	PP POWER POLE
WTR WATER LINE	INT INTERSECTION	PP TRANS.
SD STORM DRAIN	D.G. DESIGN GRADE	RET. RETAINMENT
RCP REINFORCED CONCRETE PIPE	C/L CENTER LINE	

DEVIATION FROM CITY OF LAS VEGAS STANDARDS

- NONE

EARTHWORK QUANTITIES

CUT	FILL	NET
368 CUBIC YARDS	92,328 CUBIC YARDS	91,960 CUBIC YARDS (FILL)

LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES NOTES:

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF THE CITY OF LAS VEGAS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPs WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPs SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH: (702) 875-7550 FAX: (702) 362-2597 WEB: WWW.VTNV.COM
CONSULTING ENGINEERS & PLANNERS & LAND SURVEYORS

NOTE SHEET

SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE

DRAWN BY: DEH 04/30/2019

DESIGNED BY: DEH 04/30/2019

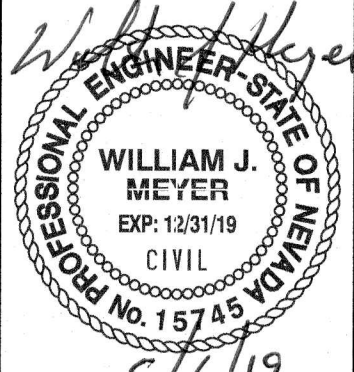
CHECKED BY: WJM 04/30/2019

PROJECT NO: 2021

SCALE: N/A

HORIZ. N/A

VERT. N/A

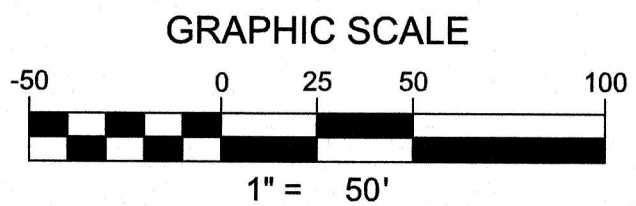
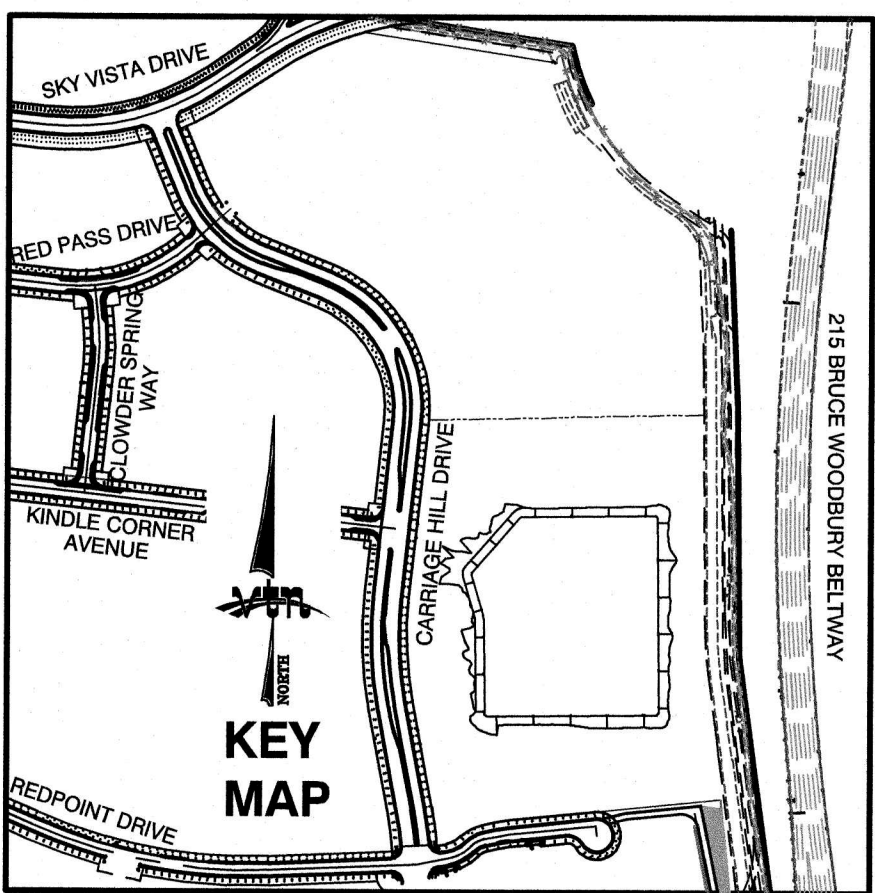
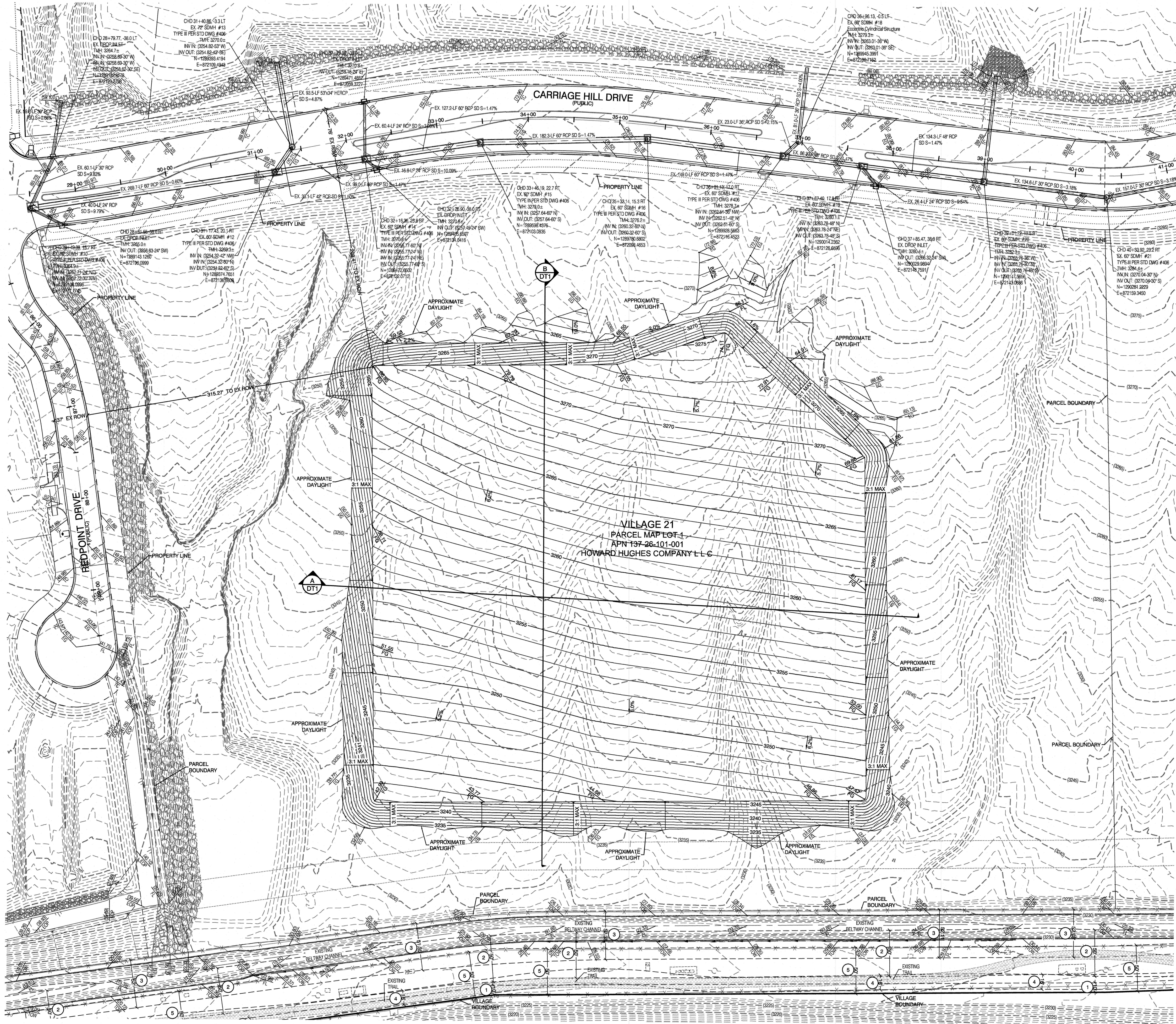


SHEET

NT

2 OF 4 SHEETS

DRAWING NO.



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

811
OR
1-800-227-2600
AND
1-702-455-8000
CLARK COUNTY TRAFFIC
OPERATIONS

Call before you Dig
Avoid hitting overhead
power lines, it's costly.

Call before you Dig
Underground
1-702-455-7511
CLARK COUNTY TRAFFIC
OPERATIONS

1-702-227-2929

EARTHWORK QUANTITIES		
CUT	FILL	NET
368	92.328	91.960
CUBIC YARDS	CUBIC YARDS	CUBIC YARDS (FILL)

- EASEMENT REFERENCE LEGEND**
- 50' WIDE NEVADA POWER COMPANY EASEMENT
GRANTED PER OR: 19980510:0001072. SUPERCEDES 50'
WIDE NEVADA POWER COMPANY EASEMENT GRANTED
PER OR: 19961001:0000671.
 - 50' WIDE NEVADA POWER COMPANY EASEMENT
GRANTED PER OR: 20071119:0002005.
 - DRAINAGE EASEMENT GRANTED TO CLARK COUNTY PER
OR: 20000816:0000525.
 - PEDESTRIAN TRAIL EASEMENT GRANTED TO CLARK
COUNTY PER OR: 20080527:0000541.
 - 10' GAS EASEMENT GRANTED TO SOUTHWEST GAS
COMPANY PER OR: 19991103:0000824.

GRADING PERMIT NOTE
THIS GRADING PERMIT DOES NOT INCLUDE THE
CONSTRUCTION OF RETAINING WALLS AND OTHERS
STRUCTURES. SEPARATE PERMITS AND APPLICATIONS ARE
REQUIRED FOR THESE.

STOCKPILE NOTE:
STOCKPILES WITH HEIGHT OVER 4 FT MUST BE PROVIDED
WITH A TEMPORARY FENCING.
STOCK PILE MATERIALS SHALL CONSIST OF CLEAN EARTH FILL
UNLESS OTHERWISE APPROVED BY THE CITY OF LAS VEGAS.

FLOOD ZONE NOTE
SITE IS LOCATED IN A SHADED ZONE X AS SHOWN IN FIRM MAP
32003C22150E, DATED SEPTEMBER 27, 2002. A SHADED ZONE X
IS DETERMINED TO BE OUTSIDE THE 2.0% ANNUAL CHANCE
FLOODPLAIN, ENTIRE SITE BOUNDARY IS WITHIN ZONE X.

GRADING PERMIT NOTE
THIS GRADING PERMIT DOES NOT INCLUDE THE
CONSTRUCTION OF RETAINING WALLS AND OTHERS
STRUCTURES. SEPARATE PERMITS AND APPLICATIONS ARE
REQUIRED FOR THESE.

GEOTECHNICAL NOTE:
REFER TO SOILS REPORT: NOVA GEOTECHNICAL
PROJECT #G-18-003, DATED MARCH 5, 2018

GRADING NOTE:
ALL OFFSITE INTERIM FLOOD CONTROL FACILITIES SUCH AS
BUT NOT LIMITED TO BERMS / DITCHES AND A TEMPORARY
LOCAL MINOR SEDIMENT BASIN ARE PRIVATELY OWNED AND
TO BE PRIVATELY MAINTAINED BY HOWARD HUGHES
COMPANY.

ENGINEER DISCLAIMER NOTE:
UTILITY LOCATIONS SHOWN HERE ON ARE APPROXIMATE
ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO
DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION
OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES
AND NOTIFY THE DESIGN ENGINEER IMMEDIATELY OF ANY
DISCREPANCIES PRIOR TO COMMENCING CONSTRUCTION. NO
REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE
SHOWN HERE ON. THE ENGINEER ASSUMES NO
RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT
SHOWN IN THEIR PROPER LOCATION.

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE
APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE WITH
CITY OF LAS VEGAS, #.....

With J. Meyer 5/6/19
WILLIAM J. MEYER, P.E. NO. 15745 DATE

HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY
1000 W. CHARLESTON BLVD. SUITE 300
LAS VEGAS, NEVADA 89105
702.791.4000

GRADING PLAN 1
SUMMERLIN WEST VILLAGE 21
PARCEL 1 STOCKPILE

DRAWN BY: DEH
DESIGNED BY: DEH
CHECKED BY: WJM
PROJECT NO: 7851

DATE: 04/30/2019
SCALE: N/A
HORIZ. VERT. N/A

PROFESSIONAL ENGINEER'S SEAL OF WILLIAM J. MEYER, P.E. NO. 15745, CIVIL, EXPIRATION DATE 12/31/19

SHEET
GR1
3 OF 4 SHEETS
DRAWING NO.

CITY OF LAS VEGAS

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH: (702) 873-7550 FAX: (702) 382-2887 WEB: WWW.VTNV.COM

CONSULTING ENGINEERS & LAND SURVEYORS

REVISION

BY

DATE

REV

DATE

REV

DATE

REV

DATE

REV

DATE

REV

DATE

REV

DATE

REV

DATE

REV

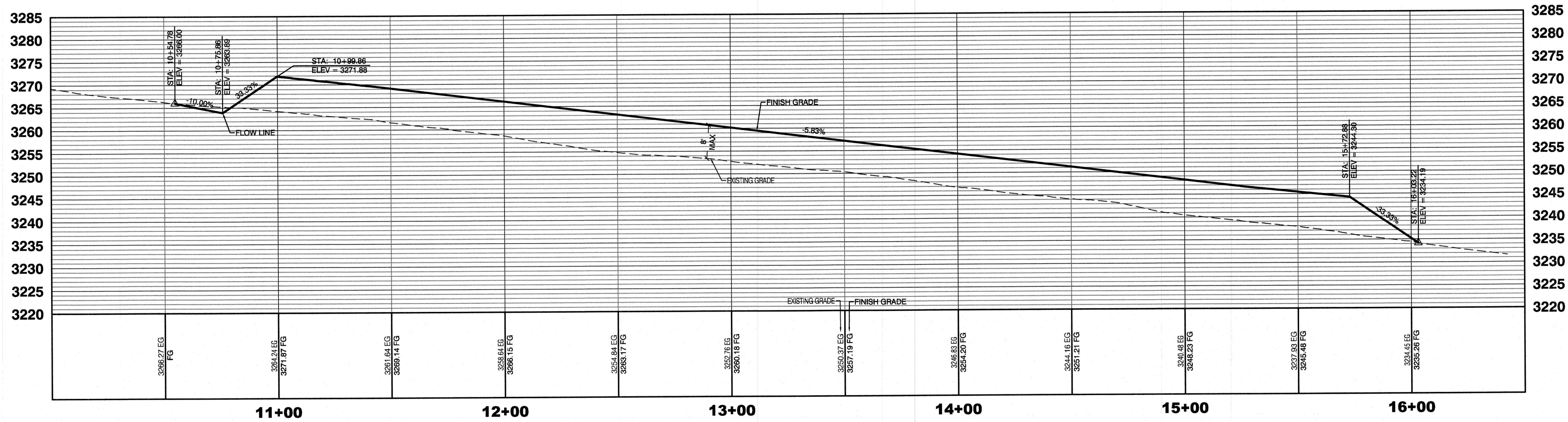
DATE

REV

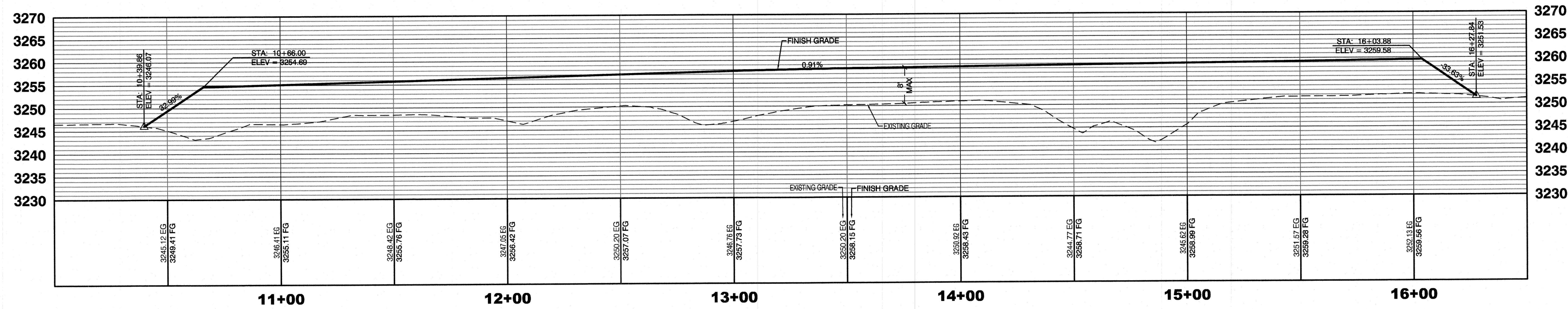
DATE

REV

DATE



EAST WEST TYPICAL SECTION
NTS



NORTH SOUTH TYPICAL SECTION
NTS

	DRAWN BY: DEH	04/30/2019
	DESIGNED BY: DEH	04/30/2019
	CHECKED BY: NMM	04/30/2019
	PROJECT NO: 7851	SCALE: N/A
SHEET DT1		4 OF 4 SHEETS
DRAWING NO. ---		REVISION

HOWARD HUGHES COMPANY, LLC
A DELAWARE LIMITED LIABILITY COMPANY
10801 W. CHARLESTON BLVD SUITE 300
LAS VEGAS, NEVADA 89135
702-791-4000

CITY OF LAS VEGAS

SUMMERLIN WEST VILLAGE 21
PARCEL I STOCKPILE

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5146
PH: (702) 873-7550 FAX: (702) 382-2887 WEB: WWW.TTNY.COM
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS